


<div></div>			PIPING MATERIAL SPECIFICATION				JOB 032243										
							Piping Class:			01CA1S01							
							Sh. 2 of 4			Rev. <table><tr><td>A</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					A	0	1
A	0	1	2	3													
opt.	Size from to		Item Description			Ends	Rating/Facing	Material									
FITTINGS																	
	2	8	WELDOLET - MSS-SP97			BW		ASTM A350 LF2 - CL.1									
	2	2	LATROLET - BW END - MSS-SP97			BW	3000	ASTM A350 LF2 - CL.1									
	3	8	SPECIAL LATROLET - <MFR Std>			BW		ASTM A350 LF2 - CL.1									
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97			SW\BW	3000	ASTM A350 LF2 - CL.1									
	1/2	1 1/2	LATROLET - SW END - MSS-SP97			SW\BW	3000	ASTM A350 LF2 - CL.1									
GASKETS																	
	26	60	FLAT GASKET - GROOVED - <MFR Std>					AISI 316L+GRAPHITE									
	64	64	FLAT GASKET - GROOVED - <MFR Std> GA-E-060013					AISI 316L+GRAPHITE									
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20					304 SS+GRAPH 98% - C.S. OUT.RING									
BOLTS																	
	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)									
VALVES																	
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material										
1	1/2	1 1/2	GA-E-60100	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF										
1	2	24	GA-E-60101	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF										
1	26	36	GA-E-67006	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF										
2	26	48	GA-E-60501	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc										
4	1/2	1 1/2	GA-E-60200	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF										
4	2	12	GA-E-60201	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF										
6	1/2	1 1/2	GA-E-60300	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF										
6	2	10	GA-E-60301	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF										
6	12	24	GA-E-60302	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF										
7	6	6	GA-E-60401	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats										
7	8	24	GA-E-60402	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats										
8	1/2	1 1/2	GA-E-60400	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats										
8	6	24	GA-E-60767	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats										
10	1/2	1 1/2	GA-E-60173	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF										
13	2	2	GA-E-60104	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF										
14	1/2	1 1/2	GA-E-60174	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF										
14	2	24	GA-E-60175	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF										
19	1/2	1 1/2	GA-E-60176	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF										
69	36	36	GA-E-67500	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF										
80	1/2	1 1/2	GA-E-60479	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats										
80	6	24	GA-E-67153	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats										
82	6	24	GA-E-60775	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.										
89	1/2	1 1/2	GA-E-60496	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.										
101	1/2	1 1/2	GA-E-60147	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF										
101	2	24	GA-E-60589	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF										
101	26	36	GA-E-60575	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF										
103	2	2	GA-E-60592	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF										
103	3	3	GA-E-60592	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF										
105	2	2	GA-E-60598	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF										
113	1/2	1 1/2	GA-E-67345	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF										
130	1/2	1 1/2	GA-E-67074	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF										
140	3	4	GA-E-67353	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF										
141	4	4	GA-E-67354	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF										
143	2	24	GA-E-60574	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF										



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **01CA1S01**

Rev.				
A	0	1	2	3

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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
201	26	48	GA-E-60526	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
401	2	12	GA-E-60279	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF
701	4	6	GA-E-67160	Ball-Stem Extension-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
701	8	24	GA-E-60778	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67124	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
801	3	3	GA-E-67263	Ball-Stem Extension-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
801	6	24	GA-E-60777	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
824	8	8	GA-E-67600	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
840	6	6	GA-E-67602	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
841	6	10	GA-E-67601	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
902	26	48	GA-E-69001	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
902	50	60	GA-E-69043	Special Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
902	62	64	GA-E-69002	Special Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
907	2	6	GA-E-69000	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
907	12	12	GA-E-69095	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
936	6	6	GA-E-69097	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
976	12	12	GA-E-69096	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
4	36	36	GA-E-60600	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3
5	36	36	GA-E-60651	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3
10	42	48	GA-E-60626	Angle T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3
12	42	48	GA-E-60650	Angle T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

<div> MOZAMBIQUE LNG</div>		PIPING MATERIAL SPECIFICATION														JOB 032243																			
																Piping Class:										01CA1S60									
																Sh. 1 of 4										Rev. A 0 1									
Base Material : LOW TEMP. CARBON STEEL														Design code : ASME B 31.3 2016																					
Nom. Rating : CL150														PWHT : AS PER CODE (NOTE 1)																					
Facing/Finishing : RF														Valve Trim : 12 - SS316/HF																					
Corrosion Allow. : 1.5 mm														Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																					
Temp. Limit : -45 °C to 230 °C																																			
Service: [AIV] CF - Dry (Cold) Flare PR - Propane Refrigerant																																			
Pipe Thickness																																			
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30	36	38	40	42	48	52									
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	12.7	9.53	12.7	12.7	14.27	14.27									
SCH.	XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	XS	STD	XS	XS											
	54	56	60	64																															
	14.27	15.88	15.88	17.48																															
Nipple Thickness																																			
NPS	1/2	3/4	1	1 1/2	2																														
Thk.mm	4.78	5.56	6.35	7.14	8.74																														
SCH.	160	160	160	160	160																														
PRESSURE - TEMPERATURE Ratings																																			
NPS	Press. bar	19.65	19.65	17.93	15.86	13.79	11.72	9.65	8.62	ASME B16.5/ASME B16.47																									
1/2 - 56	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	315.6	343.3	Material Group 1.1																									
NPS	Press. bar	14																																	
60 - 64	Temp. °C	180																																	
opt.	Size from to		Item Description										Ends	Rating/Facing	Material																				
PIPE																																			
	1/2	24	PIPE										BW		ASTM A333 GR.6 - SMLS																				
	26	64	PIPE										BW		ASTM A671 GR.CC65 CL.12 - EFW + S2 (-46°C)																				
FLANGES																																			
	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL150 RF	ASTM A350 LF2 - CL.1																				
	2	24	WN FLANGE - ASME-B16.5										BW	CL150 RF	ASTM A350 LF2 - CL.1																				
	26	60	WN FLANGE - ASME-B16.47 series.A										BW	CL150 RF	ASTM A350 LF2 - CL.1																				
	64	64	SPECIAL WN FLANGE - <MFR Std> GA-E-060013										BW	CL150 RF	ASTM A350 LF2 - CL.1																				
3	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL300 RF	ASTM A350 LF2 - CL.1																				
3	2	24	WN FLANGE - ASME-B16.5										BW	CL300 RF	ASTM A350 LF2 - CL.1																				
3	26	60	WN FLANGE - ASME-B16.47 series.A										BW	CL300 RF	ASTM A350 LF2 - CL.1																				
5	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL600 RF	ASTM A350 LF2 - CL.1																				
5	2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A350 LF2 - CL.1																				
	1/2	24	BLIND FLANGE - ASME-B16.5											CL150 RF	ASTM A350 LF2 - CL.1																				
	26	60	BLIND FLANGE - ASME-B16.47 series.A											CL150 RF	ASTM A350 LF2 - CL.1																				
3	1/2	24	BLIND FLANGE - ASME-B16.5											CL300 RF	ASTM A350 LF2 - CL.1																				
3	26	60	BLIND FLANGE - ASME-B16.47 series.A											CL300 RF	ASTM A350 LF2 - CL.1																				
3	2	2	SW REDUCING FLANGE - ASME-B16.5										SW	CL300 RF	ASTM A350 LF2 - CL.1																				
14	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL150 RF	ASTM A350 LF2 - CL.1																				
SPECTACLE BLIND																																			
	1/2	14	SPECTACLE BLIND - ASME-B16.48											CL150 RF	ASTM A516 GR.70 + S5 (-46°C)																				
	16	20	BLIND & SPACER - ASME-B16.48											CL150 RF	ASTM A516 GR.70 + S5 (-46°C)																				
	24	24	BLIND & SPACER - ASME-B16.48											CL150 RF	ASTM A516 GR.70 + S5 (-46°C)																				
	54	60	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060013											CL150 RF	ASTM A516 GR.70 + S5 (-46°C)																				
2	1/2	14	BLIND & SPACER - ASME-B16.48											CL150 RF	ASTM A516 GR.70 + S5 (-46°C)																				
23	3	3	BLIND & SPACER - ASME-B16.48											CL300 RF	ASTM A516 GR.70 + S5 (-46°C)																				
FITTINGS																																			
3	1/2	3	DRIP-RING - TB DRI 5011											CL150 RF	ASTM A350 LF2 - CL.1																				
	1/2	3	DRIP-RING - TB DRI 5011											CL300 RF	ASTM A350 LF2 - CL.1																				
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11										SW	6000	ASTM A350 LF2 - CL.1																				
	2	24	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																				
	26	48	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A420 WPL6W - WLDD																				
	52	64	LONG RADIUS ELBOW - TB RAC 5060										BW		ASTM A420 WPL6W - WLDD																				
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11										SW	6000	ASTM A350 LF2 - CL.1																				
	2	24	REDUCER - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																				
	26	48	REDUCER - ASME-B16.9										BW		ASTM A420 WPL6W - WLDD																				
	52	64	REDUCER, LARGE BORE - TB RAC 5062										BW		ASTM A420 WPL6W - WLDD																				
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11										THDF	3000	ASTM A350 LF2 - CL.1																				
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11										SW	6000	ASTM A350 LF2 - CL.1																				
	2	48	CAP - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																				
	52	64	CAP - TB RAC 5064										BW		ASTM A420 WPL6W - WLDD																				
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11										SW	6000	ASTM A350 LF2 - CL.1																				
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11										SW/THDF	3000	ASTM A350 LF2 - CL.1																				
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A350 LF2 - CL.1																				
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDM/PE		ASTM A333 GR.6 - SMLS																				
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE/THDM		ASTM A420 WPL6 - SMLS																				
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A420 WPL6 - SMLS																				
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11										SW	6000	ASTM A350 LF2 - CL.1																				
	2	24	TEE - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																				
	26	48	TEE - ASME-B16.9										BW		ASTM A420 WPL6W - WLDD																				
	52	64	TEE - TB RAC 5061										BW		ASTM A420 WPL6W - WLDD																				
	2	36	SPECIAL SWEEPOLET - <MFR Std>										BW	6000	ASTM A350 LF2 - CL.1																				
GASKETS																																			
	26	60	FLAT GASKET - GROOVED - <MFR Std>												AISI 316L+GRAPHITE																				
	62	64	FLAT GASKET - GROOVED - <MFR Std> GA-E-060013												AISI 316L+GRAPHITE																				



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 01CA1S60

Rev.				
Sh.	2	of	4	
A	0	1		

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
GASKETS						
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
BOLTS						
	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES								
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material	
1	1/2	1 1/2	GA-E-60100	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF	
1	2	24	GA-E-60101	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF	
1	26	36	GA-E-67006	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF	
2	26	48	GA-E-60501	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc	
4	1/2	1 1/2	GA-E-60200	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF	
4	2	12	GA-E-60201	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF	
6	1/2	1 1/2	GA-E-60300	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF	
6	2	10	GA-E-60301	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF	
6	12	24	GA-E-60302	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF	
7	6	6	GA-E-60401	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats	
7	8	24	GA-E-60402	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats	
8	1/2	1 1/2	GA-E-60400	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats	
8	6	24	GA-E-60767	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats	
10	1/2	1 1/2	GA-E-60173	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF	
13	2	2	GA-E-60104	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF	
14	1/2	1 1/2	GA-E-60174	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF	
14	2	24	GA-E-60175	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF	
19	1/2	1 1/2	GA-E-60176	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF	
80	1/2	1 1/2	GA-E-60479	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats	
80	6	24	GA-E-67153	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats	
82	6	24	GA-E-60775	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
89	1/2	1 1/2	GA-E-60496	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
101	1/2	1 1/2	GA-E-60147	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF	
101	2	24	GA-E-60589	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF	
101	26	36	GA-E-60575	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF	
103	2	2	GA-E-60592	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF	
103	3	3	GA-E-60592	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF	
140	6	6	GA-E-67353	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF	
143	2	24	GA-E-60574	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF	
201	26	48	GA-E-60526	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc	
401	2	12	GA-E-60279	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF	
701	6	6	GA-E-67160	Ball-Stem Extension-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats	
701	8	24	GA-E-60778	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats	
801	1/2	1 1/2	GA-E-67124	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats	
801	6	24	GA-E-60777	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats	
824	8	18	GA-E-67600	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 01CA1S60

Sh. 3 of 4

Rev.

A	0	1		

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	3	GA-E-60630	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3
1	42	42	GA-E-60600	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3
2	36	48	GA-E-60626	Angle T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees	
1/2	A		
3/4	A	A	
1	A	A	A
1 1/2	A	A	A
2			T
3			T T
4			T T T
6			SW T T T
8			SW SW T T T
10			SW SW T T T T
12			SW SW SW T T T T
14			SW SW SW T T T T T
16			SW SW SW T T T T T T
18			SW SW SW SW T T T T T T
20			SW SW SW SW T T T T T T
22			SW SW SW SW T T T T T T
24			SW SW SW SW T T T T T T
26			SW SW SW SW SW SW T T T T T T
28			SW SW SW SW SW SW T T T T T T
30			SW SW SW SW SW SW T T T T T T
36			SW SW SW SW SW SW SW SW T T T T T T
38			SW SW SW SW SW SW SW SW T T T T T T
40			SW SW SW SW SW SW SW SW T T T T T T
42			SW SW SW SW SW SW SW SW T T T T T T
48			SW SW SW SW SW SW SW SW T T T T T T
52			SW SW SW SW SW SW SW SW SW SW T1 T1 T1 T1 T1 T1 T1 T1
54			SW SW SW SW SW SW SW SW SW SW T1 T1 T1 T1 T1 T1 T1 T1
56			SW SW SW SW SW SW SW SW SW SW T1 T1 T1 T1 T1 T1 T1 T1
60			SW SW SW SW SW SW SW SW SW SW SW SW T1 T1 T1 T1 T1 T1 T1 T1
64			SW SW SW SW SW SW SW SW SW SW SW SW SW SW T1 T1 T1 T1 T1 T1 T1 T1
BranchSize		1/2 3/4 1 1 1/2 2 3 4 6 8 10 12 14 16 18 20 22 24 26 28 30 36 38 40 42 48 52 54 56 60 64	
Legenda			
A	TEE - SW ENDS - ASME-B16.11		
SW	SPECIAL SWEEPOLET - <MFR Std>		
T	TEE - ASME-B16.9		
T1	TEE - TB RAC 5061		

RunSize		45 degrees	
2			
3	PP		
4		PP	
6			PP
8			PP
10			PP
12			PP PP
14			PP PP PP
16			PP PP PP PP
18			PP PP PP PP PP
20			PP PP PP PP PP PP
22			PP PP PP PP PP PP PP
24			PP PP PP PP PP PP PP PP
28			PP PP PP PP PP PP PP PP
30			PP PP PP PP PP PP PP PP
36			PP PP PP PP PP PP PP PP
38			PP PP PP PP PP PP PP PP
40			PP PP PP PP PP PP PP PP
42			PP PP PP PP PP PP PP PP
48			PP PP PP PP PP PP PP PP
52			PP PP PP PP PP PP PP PP
54			PP PP PP PP PP PP PP PP
56			PP PP PP PP PP PP PP PP
60			PP PP PP PP PP PP PP PP
64			PP PP PP PP PP PP PP PP
BranchSize		2 3 4 6 8 10 12 14 16 18 20 22 24 28 30 36 38 40 42 48 52 54 56 60 64	
Legenda			
PP	PIPE TO PIPE WITH FULL ENCIRCLEMENT SLEEVE:TS-COR-ENG-PIPMT-012-E		



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **01CA1S60**


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Rev.

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GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are not permitted.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.
- 6) This piping class is created for lines subjected to Acoustic Induced Vibration.

		PIPING MATERIAL SPECIFICATION																JOB 032243														
																		Piping Class:										01CA2S01				
																		Sh. 1 of 3		Rev.												
A	0	1	2	3																												

Base Material : LOW TEMP. CARBON STEEL										Design code : ASME B 31.3 2016											
Nom. Rating : CL150										PWHT : AS PER CODE (NOTE 1)											
Facing/Finishing : RF										Valve Trim : 12 - SS316/HF											
Corrosion Allow. : 3 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -45 °C to 230 °C																					
Service: CF - Dry (Cold) Flare WEG - Water/Ethylene Glycol WF - Wet (Warm) Flare																					

Pipe Thickness																					
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	52
Thk.mm	4.78	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	9.53	9.53	12.7	12.7	12.7	12.7
SCH.	160	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	XS	XS	XS	XS

Nipple Thickness									
NPS	1/2	3/4	1	1 1/2	2				
Thk.mm	4.78	5.56	6.35	7.14	8.74				
SCH.	160	160	160	160	160				

PRESSURE - TEMPERATURE Ratings										
NPS	Press. bar	19.65	19.65	17.93	15.86	13.79	11.72	9.65	8.62	ASME B16.5/ASME B16.47
1/2 - 52	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	315.6	343.3	Material Group 1.1

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	24	PIPE	BW		ASTM A333 GR.6 - SMLS
	26	52	PIPE	BW		ASTM A671 GR.CC65 CL.12 - EFW + S2 (-46°C)

FLANGES						
3	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL150 RF	ASTM A350 LF2 - CL.1
	2	24	WN FLANGE - ASME-B16.5	BW	CL150 RF	ASTM A350 LF2 - CL.1
	26	52	WN FLANGE - ASME-B16.47 series.A	BW	CL150 RF	ASTM A350 LF2 - CL.1
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A350 LF2 - CL.1
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A350 LF2 - CL.1
	1/2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A350 LF2 - CL.1
	4	4	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A350 LF2 - CL.1
	1/2	24	BLIND FLANGE - ASME-B16.5		CL150 RF	ASTM A350 LF2 - CL.1
	26	52	BLIND FLANGE - ASME-B16.47 series.A		CL150 RF	ASTM A350 LF2 - CL.1
	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A350 LF2 - CL.1
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL150 RF	ASTM A350 LF2 - CL.1

SPECTACLE BLIND						
	1/2	14	SPECTACLE BLIND - ASME-B16.48		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
	16	24	BLIND & SPACER - ASME-B16.48		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
3	1/2	3	DRIP-RING - TB DRI 5011		CL150 RF	ASTM A350 LF2 - CL.1
	1/2	3	DRIP-RING - TB DRI 5011		CL300 RF	ASTM A350 LF2 - CL.1
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	6000	ASTM A350 LF2 - CL.1
	2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	48	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	52	52	LONG RADIUS ELBOW - TB RAC 5060	BW		ASTM A420 WPL6W - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A350 LF2 - CL.1
	2	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	48	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	52	52	REDUCER, LARGE BORE - TB RAC 5062	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	6000	ASTM A350 LF2 - CL.1
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A350 LF2 - CL.1
	2	48	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	52	52	CAP - TB RAC 5064	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A350 LF2 - CL.1
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A350 LF2 - CL.1
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A350 LF2 - CL.1
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM\PE		ASTM A333 GR.6 - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A420 WPL6 - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A420 WPL6 - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	6000	ASTM A350 LF2 - CL.1
	2	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	48	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	52	52	TEE - TB RAC 5061	BW		ASTM A420 WPL6W - WLDD
	2	8	WELDOLET - MSS-SP97	BW		ASTM A350 LF2 - CL.1
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	6000	ASTM A350 LF2 - CL.1

GASKETS						
	26	52	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
5	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
63	4	4	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS						
	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60100	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
1	2	24	GA-E-60101	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **01CA2S01**

Sh. 2 of 3

Rev.

A	0	1	2	3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
4	1/2	1 1/2	GA-E-60200	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
4	2	12	GA-E-60201	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	1/2	1 1/2	GA-E-60300	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
6	2	10	GA-E-60301	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	12	24	GA-E-60302	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF
7	6	6	GA-E-60401	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60402	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60400	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60767	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60173	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
13	2	2	GA-E-60104	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
14	2	24	GA-E-60175	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF
19	1/2	1 1/2	GA-E-60176	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
80	1/2	1 1/2	GA-E-60479	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
82	16	24	GA-E-60775	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60496	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60147	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
101	2	2	GA-E-60589	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF
103	2	2	GA-E-60592	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
130	1/2	1 1/2	GA-E-67074	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
140	8	8	GA-E-67353	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF
143	3	3	GA-E-60574	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF

BRANCH TABLES

RunSize		90 Degrees																								
1/2	A																									
3/4	A	A																								
1	A	A	A																							
1 1/2	A	A	A	A																						
2	S	S	T	T																						
3	S	S	S	S																						
4	S	S	S	S	S																					
6	S	S	S	S	S	W																				
8	S	S	S	S	S	W	W																			
10	S	S	S	S	S	W	W	W																		
12	S	S	S	S	S	W	W	W	W																	
14	S	S	S	S	S	W	W	W	W	W																
16	S	S	S	S	S	W	W	W	W	W	P															
18	S	S	S	S	S	W	W	W	W	W	P	P														
20	S	S	S	S	S	W	W	W	W	W	P	P	P													
24	S	S	S	S	S	W	W	W	W	W	P	P	P	P												
30	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P											
36	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P										
42	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P									
48	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P								
52	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	T1	T1	T1	T1	T1	T1	T1	T1
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	52					
Legenda																										
A	TEE - SW ENDS - ASME-B16.11																									
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																									
S	SOCKOLET - SW END - MSS-SP97																									
T	TEE - ASME-B16.9																									
T1	TEE - TB RAC 5061																									
W	WELDOLET - MSS-SP97																									

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

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PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 01CA2S60

Sh. 2 of 3

Rev.

A 0


VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	2	10	GA-E-60301	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	12	24	GA-E-60302	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF
7	6	6	GA-E-60401	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60402	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60400	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60173	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
13	2	2	GA-E-60104	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
14	2	24	GA-E-60175	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF
19	1/2	1 1/2	GA-E-60176	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
80	1/2	1 1/2	GA-E-60479	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
82	6	24	GA-E-60775	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60496	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60147	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
101	2	2	GA-E-60589	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : 316 / HF
103	2	2	GA-E-60592	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
130	1/2	1 1/2	GA-E-67074	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
143	3	3	GA-E-60574	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
824	18	20	GA-E-67600	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

BRANCH TABLES

90 Degrees																					
RunSize																					
1/2	A																				
3/4	A	A																			
1	A	A	A																		
1 1/2	A	A	A	A																	
2					T																
3					T	T															
4					T	T	T														
6					SW	T	T	T													
8					SW	SW	T	T	T												
10					SW	SW	T	T	T	T											
12					SW	SW	SW	T	T	T	T										
14					SW	SW	SW	T	T	T	T	T									
16					SW	SW	SW	T	T	T	T	T	T								
18					SW	SW	SW	SW	T	T	T	T	T	T							
20					SW	SW	SW	SW	T	T	T	T	T	T	T						
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T					
30					SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T				
36					SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T			
42					SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T		
48					SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	
52					SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	T1	T1	T1	T1	T1
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	52
Legenda																					
A	TEE - SW ENDS - ASME-B16.11																				
SW	SPECIAL SWEEPOLET - <MFR Std>																				
T	TEE - ASME-B16.9																				
T1	TEE - TR RAC 5061																				

GENERAL NOTES

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:		01CA2S60			
		Sh. 3 of 3		Rev.			
				A	0		

1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
5) This piping class is created for lines subjected to Acoustic Induced Vibration.

PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **01CB1S01**

Sh. 1 of 4	Rev.				
	A	0	1	2	3

Base Material	: CARBON STEEL	Design code	: ASME B 31.3 2016
Nom. Rating	: CL150	PWHT	: AS PER CODE (NOTE 1)
Facing/Finishing	: RF	Valve Trim	: 8 - 13Cr/ HF
Corrosion Allow.	: 1.5 mm	Welding Spec	: MZ-000-CCX-MC-SPC-00009/00013
Temp. Limit	: -29 °C to 250 °C		

Service: A - Air BWF - Liquid Blowdown Warm Flare CF - Dry (Cold) Flare CH - Chemical (Vent line from chemical injection unit to safe location) DP - Drain - Process DR - Potentially Contaminated Open Drain FO - Fuel Oil HL - Hydrocarbon Liquid HO - Hot Oil HOD - Hot Oil Drain HV - Hydrocarbon Vapour ME - Methanol MEG - Monoethylene Glycol N - Nitrogen NG - Natural Gas O - Oil PC - Process Condensate PG - Process Gas / Purge Gas V - Vent WF - Wet (Warm) Flare

Pipe Thickness

[illegible]

Nipple Thickness

NPS	1/2	3/4	1	1 1/2	2
Thk.mm	4.78	5.56	6.35	7.14	8.74
SCH.	160	160	160	160	160

PRESSURE - TEMPERATURE Ratings

NPS 1/2 · 52	Press. bar Temp. °C	19.65 37.78	17.93 93.33	15.86 148.9	13.79 204.4	11.72 260	9.65 315.6	8.62 343.3	7.58 371.1	6.55 398.9	ASME B16.5/ASME B16.47 Material Group 1.1
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opt.	Size from to	Item Description	Ends	Rating/Facing	Material
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PIPE

1/2	24	PIPE	BW	ASTM A106 GR.B - SMLS
26	52	PIPE	BW	ASTM A671 GR.CC65 CL.12 - EFW + S2 (-46°C)

FLANGES


3	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL150 RF	ASTM A105 Normalized	
	2	24	WN FLANGE - ASME-B16.5	BW	CL150 RF	ASTM A105 Normalized	
	30	52	WN FLANGE - ASME-B16.47 series.A	BW	CL150 RF	ASTM A105 Normalized	
3	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized	
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized	
	30	52	WN FLANGE - ASME-B16.47 series.A	BW	CL300 RF	ASTM A105 Normalized	
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized	
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized	
	24	52	WN FLANGE - ASME-B16.5	BW	CL1500 RF	ASTM A105 Normalized	
7	2	24	WN FLANGE - ASME-B16.5	BW	CL1500 RF	ASTM A105 Normalized	
	2	24	WN FLANGE - ASME-B16.5	BW	CL150 FF	ASTM A105 Normalized	
	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized	
73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized	
	2	24	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized	
	2	12	WN FLANGE - ASME-B16.5	BW	CL2500 RJ (F)	ASTM A105 Normalized	
993	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized	
995	1/2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized	
	1/2	24	BLIND FLANGE - ASME-B16.5		CL150 RF	ASTM A105 Normalized	
	30	52	BLIND FLANGE - ASME-B16.47 series.A		CL150 RF	ASTM A105 Normalized	
3	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized	
	5	2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A105 Normalized
	3	2	2	SW REDUCING FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL150 RF	ASTM A105 Normalized	

SPECTACLE BLIND

3	1/2	14	SPECTACLE BLIND - ASME-B16.48	CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
	16	24	BLIND & SPACER - ASME-B16.48	CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
	42	42	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060013	CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
	1/2	12	SPECTACLE BLIND - ASME-B16.48	CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	5	1/2	8	SPECTACLE BLIND - ASME-B16.48	CL600 RF

FITTINGS

1/2	3	DRIP-RING - TB DRI 5011		CL150 RF	ASTM A105 Normalized
1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
30	48	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
50	52	LONG RADIUS ELBOW - TB RAC 5060	BW		ASTM A420 WPL6W - WLDD
3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
2	24	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
30	48	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
50	52	REDUCER, LARGE BORE - TB RAC 5062	BW		ASTM A420 WPL6W - WLDD
1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A105 Normalized
1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A105 Normalized
2	24	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
30	48	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
50	52	CAP - TB RAC 5064	BW		ASTM A420 WPL6W - WLDD
1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A105 Normalized
1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM\PE		ASTM A106 GR.B - SMLS
1/2	2	NIPPLE - PE/PE - ASME-B36.10	PE		ASTM A106 GR.B - SMLS
3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A234 WPB - SMLS
3/4	2	SWAGE NIPPLE - THDD/THDD - MSS-SP95	THDM		ASTM A234 WPB - SMLS
3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
2	24	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
30	48	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD

	PIPING MATERIAL SPECIFICATION		JOB 032243				
			Piping Class: 01CB1S01				
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			A	0	1	2	3

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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FITTINGS

	52	52	TEE - TB RAC 5061	BW		ASTM A420 WPL6W - WLDD
	2	8	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A105 Normalized

MISCELLANEOUS

	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5		CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)
	14	14	SPECIAL TEMPORARY STRAINER - <MFR Std - Metallic>		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)

GASKETS

	26	52	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
73	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
83	2	12	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS

	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)
993	1/2	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A453 GR. 660 - PTFE COATED
995	1/2	1 7/8	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A453 GR. 660 - PTFE COATED

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
1	2	24	GA-E-60113	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
2	26	48	GA-E-60503	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
4	2	12	GA-E-60210	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
5	1/2	1 1/2	GA-E-67200	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	2	10	GA-E-60313	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	12	24	GA-E-60314	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	2	6	GA-E-60411	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60412	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
8	1/2	1 1/2	GA-E-60410	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
8	2	2	GA-E-60779	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60780	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
11	1/2	1 1/2	GA-E-60585	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
11	2	2	GA-E-60102	Gate-BB-FB-Flex wdg-Thdd seat - API600	BW	CL150	Body: ASTM A216 WCB Trim : 13CR / HF
13	2	2	GA-E-60117	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
14	1/2	1 1/2	GA-E-60148	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
14	2	24	GA-E-67000	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
15	2	2	GA-E-60126	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
19	1/2	1 1/2	GA-E-67001	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
62	2	10	GA-E-60305	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
62	12	12	GA-E-60747	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
63	2	2	GA-E-60322	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
80	1/2	1 1/2	GA-E-60794	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
82	6	24	GA-E-60782	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
101	2	2	GA-E-67035	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
103	2	2	GA-E-60591	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **01CB1S01**

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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
110	2	2	GA-E-67343	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
113	1/2	1 1/2	GA-E-60583	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67075	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
140	2	8	GA-E-67355	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
143	2	2	GA-E-67061	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
150	14	16	GA-E-67304	Gate-Ext. Stem (2000mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
161	6	6	GA-E-67305	Gate-Ext. Stem (1600mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
801	1/2	1 1/2	GA-E-67125	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
824	3	3	GA-E-67696	Ball-Split body-FB-Floating ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
824	6	24	GA-E-67293	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
840	6	10	GA-E-67603	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
890	1/2	1 1/2	GA-E-67653	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+ Nipple - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
907	2	6	GA-E-69003	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
907	12	12	GA-E-69075	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
908	2	6	GA-E-69004	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
908	10	10	GA-E-69076	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
972	8	24	GA-E-69046	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+CR CARB.trim-(XM19 stem)-GRAPH
973	2	6	GA-E-69045	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	2	2	GA-E-60631	Y Strainer-Bolted cover - ASME-B16.34	BW	CL150 RF	Body : ASTM A216 WCB Screen: 316 - PERF.PLATE - 18 Holes/Cm2
1	3	14	GA-E-60601	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3
9	2	14	GA-E-60637	Special Strainer, Basket Type-Bolted Cover - <MFR Std>	FLGD	CL150 RF	Body : ASTM A216 WCB Screen: 316 - PERF.PLATE - 18 Holes/Cm2

BRANCH TABLES

<div><div></div></div>		PIPING MATERIAL SPECIFICATION														JOB 032243																			
																Piping Class: 01CB1S02																			
																Sh. 1 of 3		Rev.																	
A	0	1																																	
Base Material : CARBON STEEL																		Design code : ASME B 31.3 2016																	
Nom. Rating : CL150																		PWHT : AS PER CODE (NOTE 1)																	
Facing/Finishing : RF																		Valve Trim : 12 - SS316/HF																	
Corrosion Allow. : 1.5 mm																		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																	
Temp. Limit : -29 °C to 180 °C																																			
Service: DR - Potentially Contaminated Open Drain MEG - Monoethylene Glycol																																			
Pipe Thickness																																			
NPS		1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24																		
Thk.mm		3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	12.7																		
SCH.		XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	XS																		
Nipple Thickness																																			
NPS		1/2	3/4	1	1 1/2	2																													
Thk.mm		4.78	5.56	6.35	7.14	8.74																													
SCH.		160	160	160	160	160																													
PRESSURE - TEMPERATURE Ratings																																			
NPS		Press. bar		19.65	19.65	17.93	15.86	ASME B16.5																											
1/2 - 24		Temp. °C		-28.9	37.78	93.33	148.9	Material Group 1.1																											
opt.		Size from to		Item Description										Ends		Rating/Facing		Material																	
PIPE																																			
		1/2	24	PIPE										BW				ASTM A106 GR.B - SMLS																	
FLANGES																																			
		1/2	1 1/2	SW FLANGE - ASME-B16.5										SW		CL150 RF		ASTM A105 Normalized																	
		2	24	WN FLANGE - ASME-B16.5										BW		CL150 RF		ASTM A105 Normalized																	
3		1/2	1 1/2	SW FLANGE - ASME-B16.5										SW		CL300 RF		ASTM A105 Normalized																	
		2	24	WN FLANGE - ASME-B16.5										BW		CL300 RF		ASTM A105 Normalized																	
5		1/2	1 1/2	SW FLANGE - ASME-B16.5										SW		CL600 RF		ASTM A105 Normalized																	
		2	24	WN FLANGE - ASME-B16.5										BW		CL600 RF		ASTM A105 Normalized																	
7		2	24	WN FLANGE - ASME-B16.5										BW		CL1500 RF		ASTM A105 Normalized																	
		1/2	1 1/2	SW FLANGE - ASME-B16.5										SW		CL1500 RJ (F)		ASTM A105 Normalized																	
73		2	2	WN FLANGE - ASME-B16.5										BW		CL1500 RJ (F)		ASTM A105 Normalized																	
		1/2	24	WN FLANGE - ASME-B16.5										BW		CL600 RF		ASTM A105 Normalized																	
995		1/2	24	BLIND FLANGE - ASME-B16.5												CL150 RF		ASTM A105 Normalized																	
		3	1/2	24	BLIND FLANGE - ASME-B16.5												CL300 RF		ASTM A105 Normalized																
3		2	2	SW REDUCING FLANGE - ASME-B16.5										SW		CL300 RF		ASTM A105 Normalized																	
		14	2	2	THDD RED. FLANGE - ASME-B16.5										THDF		CL150 RF		ASTM A105 Normalized																
SPECTACLE BLIND																																			
3		1/2	14	SPECTACLE BLIND - ASME-B16.48												CL150 RF		ASTM A516 GR.70 + S5 (-46°C)																	
		16	24	BLIND & SPACER - ASME-B16.48												CL150 RF		ASTM A516 GR.70 + S5 (-46°C)																	
		1/2	12	SPECTACLE BLIND - ASME-B16.48												CL300 RF		ASTM A516 GR.70 + S5 (-46°C)																	
FITTINGS																																			
		1/2	3	DRIP-RING - TB DRI 5011												CL150 RF		ASTM A105 Normalized																	
		1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11										SW		3000		ASTM A105 Normalized																	
2		24		LONG RADIUS ELBOW - ASME-B16.9										BW				ASTM A234 WPB - SMLS																	
		3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11										SW		3000		ASTM A105 Normalized																	
2		24		REDUCER - ASME-B16.9										BW				ASTM A234 WPB - SMLS																	
		1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11										THDF		3000		ASTM A105 Normalized																	
1/2		1 1/2		FEMALE CAP - SW END - ASME-B16.11										SW		3000		ASTM A105 Normalized																	
		2	24	CAP - ASME-B16.9										BW				ASTM A234 WPB - SMLS																	
1/2		1 1/2		COUPLING - SW/THDD ENDS - ASME-B16.11										SW\THDF		3000		ASTM A105 Normalized																	
		1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11										SW		3000		ASTM A105 Normalized																	
1/2		1 1/2		THD MALE PLUG - RND HEAD - ASME-B16.11										THDM				ASTM A105 Normalized																	
		1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDM\PE				ASTM A106 GR.B - SMLS																	
1/2		2		NIPPLE - THDD/THDD - ASME-B36.10										THDM				ASTM A106 GR.B - SMLS																	
		3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE\THDM				ASTM A234 WPB - SMLS																	
3/4		2		SWAGE NIPPLE - PE/PE - MSS-SP95										PE				ASTM A234 WPB - SMLS																	
		1/2	1 1/2	TEE - SW ENDS - ASME-B16.11										SW		3000		ASTM A105 Normalized																	
2		24		TEE - ASME-B16.9										BW				ASTM A234 WPB - SMLS																	
		2	8	WELDOLET - MSS-SP97										BW				ASTM A105 Normalized																	
1/2		1 1/2		SOCKOLET - SW END - MSS-SP97										SW\BW		3000		ASTM A105 Normalized																	
MISCELLANEOUS																																			
		1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5												CL150 RF		GRE LAMINATED + TFE (MAX T 180 C)																	
		3	4	SPECIAL TEMPORARY STRAINER - <MFR Std - Metallic>												CL150 RF		ASTM A516 GR.70 + S5 (-46°C)																	
GASKETS																																			
73		1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20														304 SS+GRAPH 98% - C.S. OUT.RING																	
		1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20														SOFT IRON																	
BOLTS																																			
995		1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368														ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)																	
		1/2	1 7/8	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368														ASTM A453 GR. 660 - PTFE COATED																	
VALVES																																			
pos.		Size from to		Data Sheet		Item Description						Ends		Rating/Facing		Material																			
1		1/2	1 1/2	GA-E-60167		Gate-BB-Red.B-Solid wdg-Exp.seat - API602						SW		CL800		Body: ASTM A105 Normalized Trim : 316 / HF																			
1		2	24	GA-E-60116		Gate-BB-FB-Flex wdg-Thdd seat - API600						FLGD		CL150 RF		Body: ASTM A216 WCB Trim : 316 / HF																			
4		1/2	1 1/2	GA-E-60259		Globe-BB-Red B.-Thdd seat - API602						SW		CL800		Body: ASTM A105 Normalized Trim : 316 / HF																			



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 01CB1S02

Rev.				
A	0	1		

Sh. 2 of 3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
4	2	12	GA-E-60212	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
5	1/2	1 1/2	GA-E-67205	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
6	1/2	1 1/2	GA-E-60375	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
6	2	10	GA-E-60316	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
6	12	24	GA-E-60317	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
7	2	6	GA-E-60411	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60471	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60410	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
8	2	3	GA-E-60779	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60197	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67012	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
110	1/2	1 1/2	GA-E-67324	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
140	4	4	GA-E-67356	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
610	2	2	GA-E-60742	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
710	2	2	GA-E-67266	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67125	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
810	2	4	GA-E-67267	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	4	6	GA-E-60601	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3


BRANCH TABLES

RunSize		90 Degrees																	
1/2	A																		
3/4	A	A																	
1	A	A	A																
1 1/2	A	A	A	A															
2	S	S	T	T	T														
3	S	S	S	S	W	T													
4	S	S	S	S	W	T	T												
6	S	S	S	S	W	W	T	T											
8	S	S	S	S	W	W	W	T	T										
10	S	S	S	S	W	W	W	W	T	T									
12	S	S	S	S	W	W	W	W	W	T	T								
14	S	S	S	S	W	W	W	W	W	P	T	T							
16	S	S	S	S	W	W	W	W	W	P	P	T	T						
18	S	S	S	S	W	W	W	W	W	P	P	P	T	T					
20	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T				
24	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T			
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24			
Legend																			
A	TEE - SW ENDS - ASME-B16.11																		
P	PIPE TO PIPE WITH REINFORCING PAD																		
S	SOCKOLET - SW END - MSS-SP97																		
T	TEE - ASME-B16.9																		
W	WELDOLET - MSS-SP97																		

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:	01CB1S02				
		Sh. 3 of 3	Rev.				
			A	0	1		
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010. 5) Specified Thickness are suitable to withstand Full Vacuum condition.							

<div> MOZAMBIQUE LNG</div>		PIPING MATERIAL SPECIFICATION										JOB 032243									
												Piping Class:						01CB1S60			
												Sh. 1 of 3						Rev.			
						A		0		1											

Base Material : CARBON STEEL										Design code : ASME B 31.3 2016									
Nom. Rating : CL150										PWHT : AS PER CODE (NOTE 1)									
Facing/Finishing : RF										Valve Trim : 8 - 13Cr/ HF									
Corrosion Allow. : 1.5 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013									
Temp. Limit : -29 °C to 250 °C																			
Service: [AIV] A - Air BWF - Liquid Blowdown Warm Flare CF - Dry (Cold) Flare CH - Chemical DP - Drain - Process FG - Fuel Gas FO - Fuel Oil HL - Hydrocarbon Liquid HO - Hot Oil HOD - Hot Oil Drain HV - Hydrocarbon Vapour ME - Methanol MEG - Monoethylene Glycol N - Nitrogen NG - Natural Gas O - Oil PC - Process Condensate PG - Process Gas / Purge Gas V - Vent WF - Wet (Warm) Flare																			

Pipe Thickness																					
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	52
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	9.53	9.53	12.7	12.7	12.7	
SCH.	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	XS	XS	XS

Nipple Thickness																				
NPS	1/2	3/4	1	1 1/2	2															
Thk.mm	4.78	5.56	6.35	7.14	8.74															
SCH.	160	160	160	160	160															

PRESSURE - TEMPERATURE Ratings																			
NPS	Press. bar	19.65	17.93	15.86	13.79	11.72	9.65	8.62	7.58	6.55	ASME B16.5/ASME B16.47								
1/2 - 52	Temp. °C	37.78	93.33	148.9	204.4	260	315.6	343.3	371.1	398.9	Material Group 1.1								

opt.	Size from to		Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	24	PIPE	BW		ASTM A106 GR.B - SMLS
	26	52	PIPE	BW		ASTM A671 GR.CC65 CL.12 - EFW + S2 (-46°C)

FLANGES						
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL150 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL150 RF	ASTM A105 Normalized
	30	52	WN FLANGE - ASME-B16.47 series.A	BW	CL150 RF	ASTM A105 Normalized
3	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
3	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
3	30	52	WN FLANGE - ASME-B16.47 series.A	BW	CL300 RF	ASTM A105 Normalized
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized
5	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
5	30	30	WN FLANGE - ASME-B16.47 series.A	BW	CL600 RF	ASTM A105 Normalized
7	2	24	WN FLANGE - ASME-B16.5	BW	CL1500 RF	ASTM A105 Normalized
12	2	24	WN FLANGE - ASME-B16.5	BW	CL150 FF	ASTM A105 Normalized
63	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
73	2	24	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized
993	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
995	1/2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL150 RF	ASTM A105 Normalized
	30	52	BLIND FLANGE - ASME-B16.47 series.A		CL150 RF	ASTM A105 Normalized
3	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
3	2	2	SW REDUCING FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL150 RF	ASTM A105 Normalized

SPECTACLE BLIND						
	1/2	14	SPECTACLE BLIND - ASME-B16.48		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
	16	24	BLIND & SPACER - ASME-B16.48		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
3	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		CL150 RF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	30	48	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	50	52	LONG RADIUS ELBOW - TB RAC 5060	BW		ASTM A420 WPL6W - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	24	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	30	48	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	50	52	REDUCER, LARGE BORE - TB RAC 5062	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	6000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A105 Normalized
	2	24	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	30	48	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	50	52	CAP - TB RAC 5064	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDMPE		ASTM A106 GR.B - SMLS
	1/2	2	NIPPLE - THDD/THDD - ASME-B36.10	THDM		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - THDD/THDD - MSS-SP95	THDM		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	24	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	30	48	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	52	52	TEE - TB RAC 5061	BW		ASTM A420 WPL6W - WLDD
	2	20	SPECIAL SWEEPOLET - <MFR Std>	BW	6000	ASTM A105 Normalized

MISCELLANEOUS					
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<div> </div>			PIPING MATERIAL SPECIFICATION			JOB 032243				
						Piping Class:		01CB1S60		
						Sh. 2 of 3		Rev. A 0 1		
opt.	Size from to		Item Description			Ends	Rating/Facing	Material		
MISCELLANEOUS										
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5				CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)		
GASKETS										
12	2	24	FLAT NON MET. GASKET - ASME-B16.21					ARAMIDIC FIBER (13%)		
	26	52	FLAT GASKET - GROOVED - <MFR Std>					AISI 316L+GRAPHITE		
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20					304 SS+GRAPH 98% - C.S. OUT.RING		
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20					SOFT IRON		
73	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20					SOFT IRON		
BOLTS										
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)		
993	1/2	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A453 GR. 660 - PTFE COATED		
995	1/2	1 7/8	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A453 GR. 660 - PTFE COATED		
VALVES										
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material			
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body:ASTM A105 Normalized Trim : 13CR / HF			
1	2	24	GA-E-60113	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : 13CR / HF			
2	26	48	GA-E-60503	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc			
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body:ASTM A105 Normalized Trim : 13CR / HF			
4	2	12	GA-E-60210	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : 13CR / HF			
5	1/2	1 1/2	GA-E-67200	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body:ASTM A105 Normalized Trim : 13CR / HF			
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body:ASTM A105 Normalized Trim : 13CR / HF			
6	2	10	GA-E-60313	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : 13CR / HF			
6	12	24	GA-E-60314	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : 13CR / HF			
7	6	6	GA-E-60411	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats			
7	8	24	GA-E-60412	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats			
8	1/2	1 1/2	GA-E-60410	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body:ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats			
8	6	24	GA-E-60780	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats			
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body:ASTM A105 Normalized Trim : 13CR / HF			
11	1/2	1 1/2	GA-E-60585	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL150 RF	Body:ASTM A105 Normalized Trim : 13CR / HF			
11	2	2	GA-E-60102	Gate-BB-FB-Flex wdg-Thdd seat - API600	BW	CL150	Body:ASTM A216 WCB Trim : 13CR / HF			
13	2	2	GA-E-60117	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body:ASTM A216 WCB Trim : 13CR / HF			
14	1/2	1 1/2	GA-E-60148	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body:ASTM A105 Normalized Trim : 13CR / HF			
14	2	24	GA-E-67000	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : 13CR / HF			
19	1/2	1 1/2	GA-E-67001	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body:ASTM A105 Normalized Trim : 13CR / HF			
62	2	10	GA-E-60305	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : 13CR / HF			
80	1/2	1 1/2	GA-E-60794	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body:ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats			
82	6	24	GA-E-60782	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.			
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body:ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.			
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body:ASTM A105 Normalized Trim : 13CR / HF			
101	2	2	GA-E-67035	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : 13CR / HF			
103	2	2	GA-E-60591	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body:ASTM A216 WCB Trim : 13CR / HF			
140	3	3	GA-E-67355	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body:ASTM A216 WCB Trim : 13CR / HF			
801	1/2	1 1/2	GA-E-67125	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body:ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats			
824	8	20	GA-E-67293	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body:ASTM A216 WCB Trim :Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.			
STRAINERS										
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material			
1	2	2	GA-E-60631	Y Strainer-Bolted cover - ASME-B16.34	BW	CL150 RF	Body :ASTM A216 WCB Screen: 316 - PERF.PLATE - 18 Holes/Cm2			

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	12	GA-E-60601	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																				
1/2	A																					
3/4	A	A																				
1	A	A	A																			
1 1/2	A	A	A	A																		
2					T																	
3					T	T																
4					T	T	T															
6					SW	T	T	T														
8					SW	SW	T	T	T													
10					SW	SW	T	T	T	T												
12					SW	SW	SW	T	T	T	T											
14					SW	SW	SW	T	T	T	T	T										
16					SW	SW	SW	T	T	T	T	T	T									
18					SW	SW	SW	SW	T	T	T	T	T	T								
20					SW	SW	SW	SW	T	T	T	T	T	T	T							
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T						
30					SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T					
36					SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T				
42					SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T			
48					SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T		
52					SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	T1	T1	T1	T1
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	52	
Legenda																						
A	TEE - SW ENDS - ASME-B16.11																					
SW	SPECIAL SWEEPOLET - <MFR Std>																					
T	TEE - ASME-B16.9																					
T1	TEE - TB RAC 5061																					

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are not permitted.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.
- 6) This piping class is created for lines subjected to Acoustic Induced Vibration.

<div></div>		PIPING MATERIAL SPECIFICATION												JOB 032243									
														Piping Class:						01CB2B03			
														Sh. 1 of 2						Rev.			
												A		0		1		2		3			

Base Material : CARBON STEEL												Design code : ASME B 31.3 2016											
Nom. Rating : CL150												PWHT : YES (NOTE 1)											
Facing/Finishing : RF												Valve Trim : 12 - SS316/HF											
Corrosion Allow. : 3 mm												Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -29 °C to 180 °C																							
Service: [Amine Service] AD - Amine Drain (AG) AL - Amine Lean (AG) DMW - Demineralized Water (AG) PRW - Process Water SV - Solvent (AG)																							

Pipe Thickness																							
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24							
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	12.7							
SCH.	XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	XS							

Nipple Thickness																							
NPS	1/2	3/4	1	1 1/2	2																		
Thk.mm	4.78	5.56	6.35	7.14	8.74																		
SCH.	160	160	160	160	160																		

PRESSURE - TEMPERATURE Ratings																							
NPS	Press. bar	19.65	17.93	15.86	ASME B16.5																		
1/2 - 24	Temp. °C	37.78	93.33	148.9	Material Group 1.1																		

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	24	PIPE	BW		ASTM A106 GR.B - SMLS

FLANGES						
	1/2	24	WN FLANGE - ASME-B16.5	BW	CL150 RF	ASTM A105 Normalized
3	1/2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
5	1/2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
63	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
73	1/2	24	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL150 RF	ASTM A105 Normalized
3	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
5	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A105 Normalized
3	2	2	WN REDUCING FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
14	3/4	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL150 RF	ASTM A105 Normalized

SPECTACLE BLIND						
	1/2	14	SPECTACLE BLIND - ASME-B16.48		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
	16	24	BLIND & SPACER - ASME-B16.48		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
3	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
5	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		CL150 RF	ASTM A105 Normalized
	1/2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	3/4	24	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	1/2	24	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDMPE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1/2	24	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	1/2	8	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized

MISCELLANEOUS						
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5		CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)

GASKETS						
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
73	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60124	Gate-BB-Red.B-Solid wdg-Exp.seat + Nipples - API602	BW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
1	2	24	GA-E-60116	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
4	1/2	1 1/2	GA-E-60211	Globe-BB-Red B.-Thdd seat + Nipples - API602	BW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
4	2	12	GA-E-60212	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
5	1/2	1 1/2	GA-E-67203	Globe-BB-Red.B-Needle-Thdd seat + Nipples - ASME-B16.34	BW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
6	1/2	1 1/2	GA-E-60315	Check-BB-Red.B-Piston-Thdd seat + Nipples - API602	BW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
6	2	10	GA-E-60316	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
6	12	24	GA-E-60317	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
7	6	6	GA-E-60414	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60415	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60413	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
8	6	24	GA-E-60795	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-67023	Gate-BB-Red.B-Solid wdg-Exp.seat + Nipples - API602	BW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
11	1/2	1 1/2	GA-E-67046	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : 316 / HF
13	2	2	GA-E-60119	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
15	2	2	GA-E-60128	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 316 / HF
82	1/2	1 1/2	GA-E-67126	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	6	24	GA-E-60782	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60796	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - API608	BW/TH DF	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	2	2	GA-E-67036	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
103	2	2	GA-E-67027	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
113	3/4	3/4	GA-E-67386	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : 316 / HF
160	3	4	GA-E-67306	Gate-Ext. Stem (1400mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	3	GA-E-60601	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3


BRANCH TABLES

RunSize		90 Degrees															
1/2	T																
3/4	T	T															
1	T	T	T														
1 1/2	T	T	T	T													
2	W	W	T	T	T												
3	W	W	W	W	W	T											
4	W	W	W	W	W	T	T										
6	W	W	W	W	W	W	T	T									
8	W	W	W	W	W	W	W	T	T								
10	W	W	W	W	W	W	W	W	T	T							
12	W	W	W	W	W	W	W	W	W	T	T	T					
14	W	W	W	W	W	W	W	W	W	P	T	T					
16	W	W	W	W	W	W	W	W	W	P	P	T	T				
18	W	W	W	W	W	W	W	W	W	P	P	P	T	T			
20	W	W	W	W	W	W	W	W	W	P	P	P	P	T	T		
24	W	W	W	W	W	W	W	W	W	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Legenda																	
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) PWHT is mandatory for all thickness.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.

		PIPING MATERIAL SPECIFICATION										JOB 032243										
												Piping Class:					01CB2B09					
												Sh. 1 of 2					Rev. A 0 1 2 3					
Base Material : CARBON STEEL										Design code : ASME B 31.3 2016												
Nom. Rating : CL150										PWHT : YES (NOTE 1)												
Facing/Finishing : RF										Valve Trim : 12 - SS316/HF												
Corrosion Allow. : 3 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013												
Temp. Limit : -29 °C to 130 °C																						
Service: [Amine Service] AD - Amine Drain (UG) AL - Amine Lean (UG) SV - Solvent (UG)																						
Pipe Thickness																						
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24						
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	12.7						
SCH.	XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	XS						
Nipple Thickness																						
NPS	1/2	3/4	1	1 1/2	2																	
Thk.mm	4.78	5.56	6.35	7.14	8.74																	
SCH.	160	160	160	160	160																	
PRESSURE - TEMPERATURE Ratings																						
NPS	Press. bar	19.65	17.93	15.86	ASME B16.5																	
1/2 - 24	Temp. °C	37.78	93.33	148.9	Material Group 1.1																	
opt.	from	Size to	Item Description								Ends	Rating/Facing	Material									
PIPE																						
	1/2	24	PIPE								BW		ASTM A106 GR.B - SMLS									
FLANGES																						
	1/2	24	WN FLANGE - ASME-B16.5								BW	CL150 RF	ASTM A105 Normalized									
3	1/2	24	WN FLANGE - ASME-B16.5								BW	CL300 RF	ASTM A105 Normalized									
5	1/2	24	WN FLANGE - ASME-B16.5								BW	CL600 RF	ASTM A105 Normalized									
6	3	24	WN FLANGE - ASME-B16.5								BW	CL900 RF	ASTM A105 Normalized									
	1/2	24	BLIND FLANGE - ASME-B16.5									CL150 RF	ASTM A105 Normalized									
3	1/2	24	BLIND FLANGE - ASME-B16.5									CL300 RF	ASTM A105 Normalized									
SPECTACLE BLIND																						
	1/2	14	SPECTACLE BLIND - ASME-B16.48									CL150 RF	ASTM A516 GR.70 + S5 (-46°C)									
	16	24	BLIND & SPACER - ASME-B16.48									CL150 RF	ASTM A516 GR.70 + S5 (-46°C)									
FITTINGS																						
	1/2	24	LONG RADIUS ELBOW - ASME-B16.9								BW		ASTM A234 WPB - SMLS									
	3/4	24	REDUCER - ASME-B16.9								BW		ASTM A234 WPB - SMLS									
	1/2	24	CAP - ASME-B16.9								BW		ASTM A234 WPB - SMLS									
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11								THDM		ASTM A105 Normalized									
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10								THDM/PE		ASTM A106 GR.B - SMLS									
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95								PE\THDM		ASTM A234 WPB - SMLS									
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95								PE		ASTM A234 WPB - SMLS									
	1/2	24	TEE - ASME-B16.9								BW		ASTM A234 WPB - SMLS									
	1/2	8	WELDOLET - MSS-SP97								BW		ASTM A105 Normalized									
	1/2	2	LATROLET - BW END - MSS-SP97								BW		ASTM A105 Normalized									
	3	8	SPECIAL LATROLET - <MFR Std>								BW		ASTM A105 Normalized									
MISCELLANEOUS																						
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5									CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)									
GASKETS																						
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20										304 SS+GRAPH 98% - C.S. OUT.RING									
BOLTS																						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368								ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED											
VALVES																						
pos.	from	Size to	Data Sheet	Item Description						Ends	Rating/Facing	Material										
1	3/4	3/4	GA-E-60124	Gate-BB-Red.B-Solid wdg-Exp.seat + Nipples - API602						BW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF										
1	2	8	GA-E-60116	Gate-BB-FB-Flex wdg-Thdd seat - API600						FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF										
7	2	4	GA-E-60414	Ball-Split body-Red.B-Floating ball - API6D						FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats										
8	3/4	1 1/2	GA-E-60413	Ball-End entry -FB-Float.ball -Frgd body - API608						FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats										

<div></div>		PIPING MATERIAL SPECIFICATION												JOB 032243							
														Piping Class:				01CB2B10			
														Sh. 1 of 2				Rev.			
				A				0				1									

Base Material : CARBON STEEL												Design code : ASME B 31.3 2016											
Nom. Rating : CL150												PWHT : YES (NOTE 1)											
Facing/Finishing : RF												Valve Trim : 9 - Monel											
Corrosion Allow. : 3 mm												Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -29 °C to 70 °C																							
Service: [Caustic Service] CI - Chemical Injection CH - Chemical NA - Caustic																							

Pipe Thickness																							
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24							
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	12.7							
SCH.	XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	XS							

Nipple Thickness																							
NPS	1/2	3/4	1	1 1/2	2																		
Thk.mm	4.78	5.56	6.35	7.14	8.74																		
SCH.	160	160	160	160	160																		

PRESSURE - TEMPERATURE Ratings																							
NPS	Press. bar	19.65	19.65	ASME B16.5																			
1/2 - 24	Temp. °C	-28.9	37.78	Material Group 1.1																			

opt.	Size		Item Description											Ends	Rating/Facing	Material
	from	to														

PIPE																
	1/2	24	PIPE											BW		ASTM A106 GR.B - SMLS

FLANGES																
	1/2	24	WN FLANGE - ASME-B16.5											BW	CL150 RF	ASTM A105 Normalized
3	1/2	24	WN FLANGE - ASME-B16.5											BW	CL300 RF	ASTM A105 Normalized
5	1/2	24	WN FLANGE - ASME-B16.5											BW	CL600 RF	ASTM A105 Normalized
63	3	24	WN FLANGE - ASME-B16.5											BW	CL900 RJ (F)	ASTM A105 Normalized
73	1/2	2	WN FLANGE - ASME-B16.5											BW	CL1500 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5												CL150 RF	ASTM A105 Normalized
3	1/2	24	BLIND FLANGE - ASME-B16.5												CL300 RF	ASTM A105 Normalized
3	2	2	WN REDUCING FLANGE - ASME-B16.5											BW	CL300 RF	ASTM A105 Normalized
14	3/4	2	THDD RED. FLANGE - ASME-B16.5											THDF	CL150 RF	ASTM A105 Normalized

SPECTACLE BLIND																
	1/2	14	SPECTACLE BLIND - ASME-B16.48												CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
	16	24	BLIND & SPACER - ASME-B16.48												CL150 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS																
	1/2	3	DRIP-RING - TB DRI 5011												CL150 RF	ASTM A105 Normalized
	1/2	24	LONG RADIUS ELBOW - ASME-B16.9											BW		ASTM A234 WPB - SMLS
	3/4	24	REDUCER - ASME-B16.9											BW		ASTM A234 WPB - SMLS
	1/2	24	CAP - ASME-B16.9											BW		ASTM A234 WPB - SMLS
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11											THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10											THDM/PE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95											PE		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95											PE\THDM		ASTM A234 WPB - SMLS
	1/2	24	TEE - ASME-B16.9											BW		ASTM A234 WPB - SMLS
	1/2	8	WELDOLET - MSS-SP97											BW		ASTM A105 Normalized

GASKETS																
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20													304 SS+GRAPH 98% - C.S. OUT.RING
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20													SOFT IRON
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20													SOFT IRON

BOLTS																
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368													ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES																
pos.	Size		Data Sheet	Item Description	Ends	Rating/Facing	Material									
	from	to														

1	1/2	1 1/2	GA-E-60169	Gate-BB-Red.B-Solid wdg-Integral seat + Nipples - API602	BW	CL800	Body: ASTM A105 Normalized Trim : Monel
1	2	24	GA-E-60170	Gate-BB-FB-Flex wdg-Wlidd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Monel
4	1/2	1 1/2	GA-E-60261	Globe-BB-Red B.-Integral seat + Nipples - API602	BW	CL800	Body: ASTM A105 Normalized Trim : Monel
4	2	12	GA-E-60262	Globe-BB-Disk-Wlidd seat - API 623	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Monel
6	1/2	1 1/2	GA-E-60377	Check-BB-Red.B-Piston-Integral seat + Nipples - API602	BW	CL800	Body: ASTM A105 Normalized Trim : Monel
6	2	10	GA-E-60378	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Monel
6	12	24	GA-E-60379	Check-Flanged -Dual plate-Wlidd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Monel
7	2	6	GA-E-60491	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-MONEL trim - RPTFE seats
7	8	24	GA-E-60492	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-MONEL trim - RPTFE seats
8	1/2	1 1/2	GA-E-60490	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-MONEL trim - RPTFE seats
8	6	24	GA-E-67251	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-MONEL trim - RPTFE seats
10	1/2	1 1/2	GA-E-67395	Gate-BB-Red.B-Solid wdg-Integral seat + Nipples - API602	BW/THDM	CL800	Body: ASTM A105 Normalized Trim : Monel
13	2	2	GA-E-60191	Gate-BB-FB-Flex wdg-Wlidd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Monel
120	1/2	1 1/2	GA-E-67076	Gate-BB-Red.B-Solid wdg-Integral seat + Nipples - API602	THDM	CL800	Body: ASTM A105 Normalized Trim : Monel

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	3	GA-E-60601	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees															
1/2	T																
3/4	T	T															
1	T	T	T														
1 1/2	T	T	T	T													
2	W	W	T	T	T												
3	W	W	W	W	W	T											
4	W	W	W	W	W	T	T										
6	W	W	W	W	W	W	T	T									
8	W	W	W	W	W	W	W	T	T								
10	W	W	W	W	W	W	W	W	T	T							
12	W	W	W	W	W	W	W	W	W	T	T						
14	W	W	W	W	W	W	W	W	W	P	T	T					
16	W	W	W	W	W	W	W	W	W	P	P	T	T				
18	W	W	W	W	W	W	W	W	W	P	P	P	T	T			
20	W	W	W	W	W	W	W	W	W	P	P	P	P	T	T		
24	W	W	W	W	W	W	W	W	W	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Legenda																	
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPM-T-012-E																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) PWHT is mandatory for all tiickness.
- 2) This piping Class is for CAUSTIC SERVICE
- 3) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.

<div></div>		PIPING MATERIAL SPECIFICATION														JOB 032243							
																Piping Class:				01CB2S01			
																Sh. 1 of 3				Rev.			
				A				0				1				2				3			

Base Material : CARBON STEEL														Design code : ASME B 31.3 2016													
Nom. Rating : CL150														PWHT : AS PER CODE (NOTE 1)													
Facing/Finishing : RF														Valve Trim : 8 - 13Cr/ HF													
Corrosion Allow. : 3 mm														Welding Spec : MZ-000-CCX-MC-SPC-00009/00013													
Temp. Limit : -29 °C to 230 °C																											

Service: AG - Acid Gas (AG) BWF - Liquid Blowdown Warm Flare CD - Closed Drain CWR - Cooung Water Return CWS - Cooling Water Supply DR - Potentially Contaminated Open Drain FG - Fuel Gas HL - Hydrocarbon Liquid HO - Hot Oil HV - Hydrocarbon Vapour IA - Instrument Air N - Nitrogen O - Oil OW - Oily Water (AG) OWS - Oily Water Sewer PRW - Process Water SS - Sanitary Sewer (AG) STS - Storm Sewer (AG) V - Vent WEG - Water/Ethylene Glycol WF - Wet (Warm) Flare WW - Waste Water

Pipe Thickness																					
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	52
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	12.7	9.53	12.7	12.7	12.7	12.7
SCH.	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	XS	STD	XS	XS	XS	

Nipple Thickness										
NPS	1/2	3/4	1	1 1/2	2					
Thk.mm	4.78	5.56	6.35	7.14	8.74					
SCH.	160	160	160	160	160					

PRESSURE - TEMPERATURE Ratings											
NPS	Press. bar	19.65	17.93	15.86	13.79	11.72	9.65	8.62	7.58	6.55	ASME B16.5/ASME B16.47
1/2 - 52	Temp. °C	37.78	93.33	148.9	204.4	260	315.6	343.3	371.1	398.9	Material Group 1.1

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	24	PIPE	BW		ASTM A106 GR.B - SMLS
	26	52	PIPE	BW		ASTM A671 GR.CC65 CL.12 - EFW + S2 (-46°C)

FLANGES							
3	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL150 RF	ASTM A105 Normalized	
	2	24	WN FLANGE - ASME-B16.5	BW	CL150 RF	ASTM A105 Normalized	
	30	52	WN FLANGE - ASME-B16.47 series.A	BW	CL150 RF	ASTM A105 Normalized	
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized	
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized	
	30	52	WN FLANGE - ASME-B16.47 series.A	BW	CL300 RF	ASTM A105 Normalized	
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized	
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized	
	30	30	WN FLANGE - ASME-B16.47 series.A	BW	CL600 RF	ASTM A105 Normalized	
	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RF	ASTM A105 Normalized	
	12	2	WN FLANGE - ASME-B16.5	BW	CL150 FF	ASTM A105 Normalized	
	63	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
	73	2	2	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL150 RF	ASTM A105 Normalized	
	30	52	BLIND FLANGE - ASME-B16.47 series.A		CL150 RF	ASTM A105 Normalized	
	3	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
3	2	2	SW REDUCING FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized	
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL150 RF	ASTM A105 Normalized	

SPECTACLE BLIND						
	1/2	14	SPECTACLE BLIND - ASME-B16.48		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
	16	24	BLIND & SPACER - ASME-B16.48		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
2	1/2	14	BLIND & SPACER - ASME-B16.48		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
3	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
5	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		CL150 RF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	30	48	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	52	52	LONG RADIUS ELBOW - TB RAC 5060	BW		ASTM A420 WPL6W - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	24	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	30	48	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	52	52	REDUCER, LARGE BORE - TB RAC 5062	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A105 Normalized
	2	24	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	30	48	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	52	52	CAP - TB RAC 5064	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW/THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - THDD/THDD - MSS-SP95	THDM		ASTM A234 WPB - SMLS
	3/4	3	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	24	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	30	48	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	52	52	TEE - TB RAC 5061	BW		ASTM A420 WPL6W - WLDD
	2	8	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW/BW	3000	ASTM A105 Normalized

MISCELLANEOUS						
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5		CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 01CB2S01

Sh. 2 of 3			Rev.				
			A	0	1	2	3

opt.	Size		Item Description	Ends	Rating/Facing	Material	
from	to						
GASKETS							
12	1/2	24	FLAT NON MET. GASKET - ASME-B16.21			ARAMIDIC FIBER (13%) AISI 316L+GRAPHITE 304 SS+GRAPH 98% - C.S. OUT.RING SOFT IRON SOFT IRON	
	30	52	FLAT GASKET - GROOVED - <MFR Std>				
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20				
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20				
73	2	2	OCTAGONAL RJ GASKET - ASME-B16.20				
BOLTS							
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)	
VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
1	2	24	GA-E-60113	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
4	2	12	GA-E-60210	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
5	1/2	1 1/2	GA-E-67200	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	2	10	GA-E-60313	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	12	24	GA-E-60314	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	2	6	GA-E-60411	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60412	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
8	1/2	1 1/2	GA-E-60410	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
8	2	4	GA-E-60779	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60780	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
11	1/2	1 1/2	GA-E-60585	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
13	2	24	GA-E-60117	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
14	3	3	GA-E-67000	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
41	1/2	1 1/2	GA-E-60297	Globe-BB-Red B.-Thdd seat - API602	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
62	2	10	GA-E-60305	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
82	2	3	GA-E-60781	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	6	24	GA-E-60782	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
101	2	4	GA-E-67035	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
103	2	2	GA-E-60591	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
113	3/4	3/4	GA-E-60583	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67075	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
140	2	8	GA-E-67355	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
144	3	3	GA-E-67357	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
159	4	4	GA-E-67307	Gate-Ext. Stem (1200mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
161	3	3	GA-E-67305	Gate-Ext. Stem (1600mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
740	12	12	GA-E-67604	Ball-Split body-Red.B-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
801	1/2	1 1/2	GA-E-67125	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
824	3	3	GA-E-67696	Ball-Split body-FB-Floating ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
824	6	16	GA-E-67293	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
840	3	3	GA-E-67607	Ball-Split body-FB-Floating ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

	PIPING MATERIAL SPECIFICATION	JOB 032243						
		Piping Class:		01CB2S01				
		Sh. 3 of 3		Rev.				
		A	0	1	2	3		

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
840	6	12	GA-E-67603	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
937	2	6	GA-E-69010	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
938	2	2	GA-E-69077	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	2	2	GA-E-60631	Y Strainer-Bolted cover - ASME-B16.34	BW	CL150 RF	Body : ASTM A216 WCB Screen: 316 - PERF.PLATE - 18 Holes/Cm2
1	4	8	GA-E-60601	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3
9	8	8	GA-E-60637	Special Strainer, Basket Type-Bolted Cover - <MFR Std>	FLGD	CL150 RF	Body : ASTM A216 WCB Screen: 316 - PERF.PLATE - 18 Holes/Cm2

BRANCH TABLES

RunSize		90 Degrees															
1/2	A																
3/4	A	A															
1	A	A	A														
1 1/2	A	A	A	A													
2	S	S	T	T	T												
3	S	S	S	S	W	T											
4	S	S	S	S	W	T	T										
6	S	S	S	S	W	W	T	T									
8	S	S	S	S	W	W	W	T	T								
10	S	S	S	S	W	W	W	W	T	T							
12	S	S	S	S	W	W	W	W	T	T	T						
14	S	S	S	S	W	W	W	W	W	P	T	T					
16	S	S	S	S	W	W	W	W	W	P	P	T	T				
18	S	S	S	S	W	W	W	W	W	P	P	P	T	T			
20	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T		
24	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T	T	
30	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T	
36	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T	
42	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T
48	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T
52	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	T1	T1
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30
Legend																	
A	TEE - SW ENDS - ASME-B16.11																
P	PIPE TO PIPE WITH REINFORCING PAD																
S	SOCKOLET - SW END - MSS-SP97																
T	TEE - ASME-B16.9																
T1	TEE - TB RAC 5061																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243									
												Piping Class:					01CB2S02				
												Sh. 1 of 3		Rev.							
A	0	1	2	3																	
Base Material : CARBON STEEL										Design code : ASME B 31.3 2016											
Nom. Rating : CL150										PWHT : AS PER CODE (NOTE 1)											
Facing/Finishing : RF										Valve Trim : 12 - SS316/HF											
Corrosion Allow. : 3 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -29 °C to 230 °C																					
Service: CD - Closed Drain DR - Potentially Contaminated Open Drain GD - Glycol Drain HL - Hydrocarbon Liquid HV - Hydrocarbon Vapour MEG - Monoethylene Glycol PRW - Process Water WEG - Water / Ethylene Glycol WF - Wet (Warm) Flare																					
Pipe Thickness																					
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	52				
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	12.7	12.7				
SCH.	XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	XS					
Nipple Thickness																					
NPS	1/2	3/4	1	1 1/2	2																
Thk.mm	4.78	5.56	6.35	7.14	8.74																
SCH.	160	160	160	160	160																
PRESSURE - TEMPERATURE Ratings																					
NPS	Press. bar	19.65	17.93	15.86	ASME B16.5/ASME B16.47																
1/2 - 52	Temp. °C	37.78	93.33	148.9	Material Group 1.1																
opt.	Size from to		Item Description										Ends	Rating/Facing	Material						
PIPE																					
	1/2	24	PIPE										BW		ASTM A106 GR.B - SMLS						
	26	52	PIPE										BW		ASTM A671 GR.CC65 CL.12 - EFW + S2 (-46°C)						
FLANGES																					
3	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL150 RF	ASTM A105 Normalized						
	2	24	WN FLANGE - ASME-B16.5										BW	CL150 RF	ASTM A105 Normalized						
	52	52	WN FLANGE - ASME-B16.47 series.A										BW	CL150 RF	ASTM A105 Normalized						
3	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL300 RF	ASTM A105 Normalized						
	2	24	WN FLANGE - ASME-B16.5										BW	CL300 RF	ASTM A105 Normalized						
	5	1/2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A105 Normalized					
6	3	24	WN FLANGE - ASME-B16.5										BW	CL900 RF	ASTM A105 Normalized						
63	3	24	WN FLANGE - ASME-B16.5										BW	CL900 RJ (F)	ASTM A105 Normalized						
73	1/2	2	WN FLANGE - ASME-B16.5										BW	CL1500 RJ (F)	ASTM A105 Normalized						
	1/2	24	BLIND FLANGE - ASME-B16.5											CL150 RF	ASTM A105 Normalized						
	52	52	BLIND FLANGE - ASME-B16.47 series.A											CL150 RF	ASTM A105 Normalized						
3	1/2	24	BLIND FLANGE - ASME-B16.5											CL300 RF	ASTM A105 Normalized						
3	2	2	SW REDUCING FLANGE - ASME-B16.5										SW	CL300 RF	ASTM A105 Normalized						
14	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL150 RF	ASTM A105 Normalized						
34	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL300 RF	ASTM A105 Normalized						
SPECTACLE BLIND																					
	1/2	14	SPECTACLE BLIND - ASME-B16.48											CL150 RF	ASTM A516 GR.70 + S5 (-46°C)						
	16	24	BLIND & SPACER - ASME-B16.48											CL150 RF	ASTM A516 GR.70 + S5 (-46°C)						
3	1/2	12	SPECTACLE BLIND - ASME-B16.48											CL300 RF	ASTM A516 GR.70 + S5 (-46°C)						
FITTINGS																					
1/2	1/2	3	DRIP-RING - TB DRI 5011											CL150 RF	ASTM A105 Normalized						
	1 1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11										SW	3000	ASTM A105 Normalized						
	2	24	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A234 WPB - SMLS						
52	52	52	LONG RADIUS ELBOW - TB RAC 5060										BW		ASTM A420 WPL6W - WLDD						
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11										SW	3000	ASTM A105 Normalized						
	2	24	REDUCER - ASME-B16.9										BW		ASTM A234 WPB - SMLS						
1/2	52	52	REDUCER, LARGE BORE - TB RAC 5062										BW		ASTM A420 WPL6W - WLDD						
	1 1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11										THDF	3000	ASTM A105 Normalized						
	1 1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11										SW	3000	ASTM A105 Normalized						
1/2	2	24	CAP - ASME-B16.9										BW		ASTM A234 WPB - SMLS						
	52	52	CAP - TB RAC 5064										BW		ASTM A420 WPL6 - SMLS						
	1 1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11										SW\THDF	3000	ASTM A105 Normalized						
1/2	1 1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11										SW	3000	ASTM A105 Normalized						
	1 1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A105 Normalized						
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDM\PE		ASTM A106 GR.B - SMLS						
3/4	2	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE\THDM		ASTM A234 WPB - SMLS						
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A234 WPB - SMLS						
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11										SW	3000	ASTM A105 Normalized						
2	24	24	TEE - ASME-B16.9										BW		ASTM A234 WPB - SMLS						
	52	52	TEE - TB RAC 5061										BW		ASTM A420 WPL6W - WLDD						
	2	8	WELDOLET - MSS-SP97										BW		ASTM A105 Normalized						
1/2	1 1/2	1 1/2	SOCKOLET - SW END - MSS-SP97										SW\BW	3000	ASTM A105 Normalized						
MISCELLANEOUS																					
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5											CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)						
GASKETS																					
63	52	52	FLAT GASKET - GROOVED - <MFR Std>												AISI 316L+GRAPHITE						
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												304 SS+GRAPH 98% - C.S. OUT.RING						
	3	24	OCTAGONAL RJ GASKET - ASME-B16.20												SOFT IRON						
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20												SOFT IRON						
BOLTS																					
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368												ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)						



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 01CB2S02

Rev.					
A	0	1	2	3	

Sh. 2 of 3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60167	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
1	2	24	GA-E-60116	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
2	52	52	GA-E-60530	Special Butterfly-Flanged-Triple Off Set-Int.seat- Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
4	1/2	1 1/2	GA-E-60259	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
4	2	12	GA-E-60212	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
5	1/2	1 1/2	GA-E-67205	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
6	1/2	1 1/2	GA-E-60375	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
6	2	10	GA-E-60316	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
6	12	24	GA-E-60317	Check-Flanged -Dual plate-Wlidd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
7	2	6	GA-E-60411	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60471	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60410	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
8	2	3	GA-E-60779	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-67161	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60197	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
11	1/2	1 1/2	GA-E-67046	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : 316 / HF
13	2	24	GA-E-60119	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
82	6	24	GA-E-60782	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67012	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
101	2	2	GA-E-67036	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
103	2	2	GA-E-67027	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
110	1/2	1 1/2	GA-E-67324	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
110	2	2	GA-E-67346	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
130	1/2	1 1/2	GA-E-67077	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
140	2	10	GA-E-67356	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
410	2	2	GA-E-60299	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
710	2	3	GA-E-67266	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67125	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
810	6	6	GA-E-67268	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
814	6	6	GA-E-67605	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
824	8	8	GA-E-67293	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
840	8	8	GA-E-67606	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
937	6	6	GA-E-69010	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	6	GA-E-60601	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																	
1/2	A																		
3/4	A	A																	
1	A	A	A																
1 1/2	A	A	A	A	A														
2	S	S	T	T		T													
3	S	S	S	S	S	W	T												
4	S	S	S	S	S	W	T	T											
6	S	S	S	S	S	W	W	T	T										
8	S	S	S	S	S	W	W	W	T	T									
10	S	S	S	S	S	W	W	W	W	T	T		T						
12	S	S	S	S	S	W	W	W	W	W	W	P	T	T					
14	S	S	S	S	S	W	W	W	W	W	W	P	T	T	T				
16	S	S	S	S	S	W	W	W	W	W	W	P	P	T	T				
18	S	S	S	S	S	W	W	W	W	W	W	P	P	P	T	T			
20	S	S	S	S	S	W	W	W	W	W	W	P	P	P	P	T	T		
24	S	S	S	S	S	W	W	W	W	W	W	P	P	P	P	T	T		
52	S	S	S	S	S	W	W	W	W	W	W	P	P	P	P	P	P	T1	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	52		
Legenda																			
A	TEE - SW ENDS - ASME-B16.11																		
P	PIPE TO PIPE WITH REINFORCING PAD																		
S	SOCKOLET - SW END - MSS-SP97																		
T	TEE - ASME-B16.9																		
T1	TEE - TB RAC 5061																		
W	WELDOLET - MSS-SP97																		

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 01CB2S05

Sh. 2 of 3

Rev.

A	0	1		

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
4	1/2	1 1/2	GA-E-60259	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
4	2	12	GA-E-60212	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
6	1/2	1 1/2	GA-E-60375	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
6	2	10	GA-E-60316	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
6	12	24	GA-E-60317	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
7	6	6	GA-E-60411	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60471	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60410	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats

BRANCH TABLES

90 Degrees

RunSize

1/2	A																		
3/4	A	A																	
1	A	A	A																
1 1/2	A	A	A	A															
2	S	S	T	T	T														
3	S	S	S	S	W	T													
4	S	S	S	S	W	T	T												
6	S	S	S	S	W	W	T	T											
8	S	S	S	S	W	W	W	T	T										
10	S	S	S	S	W	W	W	W	T	T									
12	S	S	S	S	W	W	W	W	W	T	T								
14	S	S	S	S	W	W	W	W	W	P	T	T							
16	S	S	S	S	W	W	W	W	W	P	P	T	T						
18	S	S	S	S	W	W	W	W	W	P	P	P	T	T					
20	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T				
24	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T			
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24			

Legenda

A	TEE - SW ENDS - ASME-B16.11
P	PIPE TO PIPE WITH REINFORCING PAD
S	SOCKOLET - SW END - MSS-SP97
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

45 degrees

RunSize


2	L	L	L	L	PP														
3	L	L	L	L	LB	PP													
4	L	L	L	L	LB	LS	PP												
6	L	L	L	L	LB	LS	LS	PP											
8	L	L	L	L	LB	LS	LS	LS	PP										
10	L	L	L	L	LB	LS	LS	LS	LS	PP									
12	L	L	L	L	LB	LS	LS	LS	LS	PP	PP								
14	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP							
16	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP						
18	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP					
20	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP				
24	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP			
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24			


Legenda


L	LATROLET - SW END - MSS-SP97
LB	LATROLET - BW END - MSS-SP97
LS	SPECIAL LATROLET - <MFR Std>
PP	PIPE TO PIPE WITH FULL ENCIRCLEMENT SLEEVE:TS-COR-ENG-PIPM-012-E

GENERAL NOTES

1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:	01CB2S05				
		Sh. 3 of 3	Rev.				
			A	0	1		
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.							
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).							
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.							
5) Specified Thickness are suitable to withstand Full Vacuum condition.							

		PIPING MATERIAL SPECIFICATION										JOB 032243									
												Piping Class: 01CB2S06									
												Sh. 1 of 2		Rev. A 0 1							
Base Material : CARBON STEEL										Design code : ASME B 31.3 2016											
Nom. Rating : CL150										PWHT : AS PER CODE (NOTE 1)											
Facing/Finishing : RF										Valve Trim : 12 - SS316/HF											
Corrosion Allow. : 3 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -29 °C to 70 °C																					
Service: [Possible presence of sands and small stones] STS - Storm Sewer																					
Pipe Thickness																					
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24					
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	12.7					
SCH.	XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	XS					
Nipple Thickness																					
NPS	1/2	3/4	1	1 1/2	2																
Thk.mm	4.78	5.56	6.35	7.14	8.74																
SCH.	160	160	160	160	160																
PRESSURE - TEMPERATURE Ratings																					
NPS	Press. bar	19.65	19.65	ASME B16.5																	
1/2 - 24	Temp. °C	-28.9	37.78	Material Group 1.1																	
opt.	Size from to		Item Description								Ends	Rating/Facing	Material								
PIPE																					
	1/2	24	PIPE								BW		ASTM A106 GR.B - SMLS								
FLANGES																					
3	1/2	1 1/2	SW FLANGE - ASME-B16.5								SW	CL150 RF	ASTM A105 Normalized								
	2	24	WN FLANGE - ASME-B16.5								BW	CL150 RF	ASTM A105 Normalized								
3	1/2	1 1/2	SW FLANGE - ASME-B16.5								SW	CL300 RF	ASTM A105 Normalized								
	2	24	WN FLANGE - ASME-B16.5								BW	CL300 RF	ASTM A105 Normalized								
5	1/2	1 1/2	SW FLANGE - ASME-B16.5								SW	CL600 RF	ASTM A105 Normalized								
	2	24	WN FLANGE - ASME-B16.5								BW	CL600 RF	ASTM A105 Normalized								
6	3	24	WN FLANGE - ASME-B16.5								BW	CL900 RF	ASTM A105 Normalized								
	2	24	WN FLANGE - ASME-B16.5								BW	CL150 FF	ASTM A105 Normalized								
63	3	24	WN FLANGE - ASME-B16.5								BW	CL900 RJ (F)	ASTM A105 Normalized								
	2	2	WN FLANGE - ASME-B16.5								BW	CL1500 RJ (F)	ASTM A105 Normalized								
73	1/2	24	BLIND FLANGE - ASME-B16.5									CL150 RF	ASTM A105 Normalized								
	3	1/2	BLIND FLANGE - ASME-B16.5									CL300 RF	ASTM A105 Normalized								
3	2	2	SW REDUCING FLANGE - ASME-B16.5								SW	CL300 RF	ASTM A105 Normalized								
	2	2	THDD RED. FLANGE - ASME-B16.5								THDF	CL150 RF	ASTM A105 Normalized								
SPECTACLE BLIND																					
3	1/2	14	SPECTACLE BLIND - ASME-B16.48									CL150 RF	ASTM A516 GR.70 + S5 (-46°C)								
	16	24	BLIND & SPACER - ASME-B16.48									CL150 RF	ASTM A516 GR.70 + S5 (-46°C)								
	1/2	12	SPECTACLE BLIND - ASME-B16.48									CL300 RF	ASTM A516 GR.70 + S5 (-46°C)								
FITTINGS																					
1/2	3		DRIP-RING - TB DRI 5011									CL150 RF	ASTM A105 Normalized								
	1 1/2		ELBOW - SW ENDS - ASME-B16.11								SW	3000	ASTM A105 Normalized								
2	24		LONG RADIUS ELBOW - ASME-B16.9								BW		ASTM A234 WPB - SMLS								
	1 1/2		RED. COUPLING - SW ENDS - ASME-B16.11								SW	3000	ASTM A105 Normalized								
2	24		REDUCER - ASME-B16.9								BW		ASTM A234 WPB - SMLS								
	1 1/2		FEMALE CAP - SW END - ASME-B16.11								SW	3000	ASTM A105 Normalized								
1/2	1 1/2		FEMALE CAP - THD END - ASME-B16.11								THDF	3000	ASTM A105 Normalized								
	2		CAP - ASME-B16.9								BW		ASTM A234 WPB - SMLS								
1/2	1 1/2		COUPLING - SW ENDS - ASME-B16.11								SW	3000	ASTM A105 Normalized								
	1 1/2		COUPLING - SW/THDD ENDS - ASME-B16.11								SW/THDF	3000	ASTM A105 Normalized								
1/2	1 1/2		THD MALE PLUG - RND HEAD - ASME-B16.11								THDM		ASTM A105 Normalized								
	2		NIPPLE - THDD/PE - ASME-B36.10								THDM/PE		ASTM A106 GR.B - SMLS								
3/4	2		SWAGE NIPPLE - PE/THDD - MSS-SP95								PE/THDM		ASTM A234 WPB - SMLS								
	2		SWAGE NIPPLE - PE/PE - MSS-SP95								PE		ASTM A234 WPB - SMLS								
1/2	1 1/2		TEE - SW ENDS - ASME-B16.11								SW	3000	ASTM A105 Normalized								
	2		TEE - ASME-B16.9								BW		ASTM A234 WPB - SMLS								
2	8		WELDOLET - MSS-SP97								BW		ASTM A105 Normalized								
	1 1/2		SOCKOLET - SW END - MSS-SP97								SW/BW	3000	ASTM A105 Normalized								
MISCELLANEOUS																					
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5									CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)								
GASKETS																					
12	1/2	24	FLAT NON MET. GASKET - ASME-B16.21										ARAMIDIC FIBER (13%)								
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20										304 SS+GRAPH 98% - C.S. OUT.RING								
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20										SOFT IRON								
73	2	2	OCTAGONAL RJ GASKET - ASME-B16.20										SOFT IRON								
BOLTS																					
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368										ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)								
VALVES																					
pos.	Size from to		Data Sheet	Item Description						Ends	Rating/Facing	Material									

	PIPING MATERIAL SPECIFICATION	JOB 032243						
		Piping Class:		01CB2S06				
		Sh. 2 of 2		Rev.				
				A	0	1		

BRANCH TABLES

RunSize		90 Degrees															
1/2	A																
3/4	A	A															
1	A	A	A														
1 1/2	A	A	A	A													
2	S	S	T	T	T												
3	S	S	S	S	W	T											
4	S	S	S	S	W	T	T										
6	S	S	S	S	W	W	T	T									
8	S	S	S	S	W	W	W	T	T								
10	S	S	S	S	W	W	W	W	T	T							
12	S	S	S	S	W	W	W	W	W	T	T						
14	S	S	S	S	W	W	W	W	W	P	T	T					
16	S	S	S	S	W	W	W	W	W	P	P	T	T				
18	S	S	S	S	W	W	W	W	W	P	P	P	T	T			
20	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T		
24	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Legenda																	
A	TEE - SW ENDS - ASME-B16.11																
P	PIPE TO PIPE WITH REINFORCING PAD																
S	SOCKOLET - SW END - MSS-SP97																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.


<div><div><div>CCS JV</div><div>MOZAMBIQUE LNG</div></div></div>	PIPING MATERIAL SPECIFICATION										JOB 032243														
											Piping Class:										01CB2S08				
											Sh. 2 of 2										Rev.				
										A					0	1	2	3							


90 Degrees																
RunSize	A															
1/2	A															
3/4	A	A														
1	A	A	A													
1 1/2	A	A	A	A												
2	S	S	T	T	T											
3	S	S	S	S	S	W	T									
4	S	S	S	S	S	W	T	T								
6	S	S	S	S	S	W	W	T	T							
8	S	S	S	S	S	W	W	W	T	T						
10	S	S	S	S	S	W	W	W	W	T	T					
12	S	S	S	S	S	W	W	W	W	W	T	T				
14	S	S	S	S	S	W	W	W	W	W	P	T	T			
16	S	S	S	S	S	W	W	W	W	W	P	P	T	T		
18	S	S	S	S	S	W	W	W	W	W	P	P	P	T	T	
20	S	S	S	S	S	W	W	W	W	W	P	P	P	T	T	
24	S	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24

Legenda	
A	TEE - SW ENDS - ASME-B16.11
P	PIPE TO PIPE WITH REINFORCING PAD
S	SOCKOLET - SW END - MSS-SP97
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 4) Buried Carbon Steel piping shall be FBE external coated in accordance with Specification MZ-000-CCX-MC-SPC-00004 External Coating for Buried Pipeline and Piping Components-FBE and FJC

<div> MOZAMBIQUE LNG</div>		PIPING MATERIAL SPECIFICATION														JOB 032243																					
																Piping Class:										01CB2S60											
																Sh. 1 of 3		Rev.																			
A	0	1																																			
Base Material : CARBON STEEL																		Design code : ASME B 31.3 2016																			
Nom. Rating : CL150																		PWHT : AS PER CODE (NOTE 1)																			
Facing/Finishing : RF																		Valve Trim : 8 - 13Cr/ HF																			
Corrosion Allow. : 3 mm																		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																			
Temp. Limit : -29 °C to 250 °C																																					
Service: [AIV] AG - Acid Gas (AG) BWF - Liquid Blowdown Warm Flare CD - Closed Drain DR - Potentially Contaminated Open Drain FG - Fuel Gas HL - Hydrocarbon Liquid HV - Hydrocarbon Vapour IA - Instrument Air N - Nitrogen O - Oil OW - Oily Water (AG) OWS - Oily Water Sewer PRW - Process Water SS - Sanitary Sewer (AG) STS - Storm Sewer (AG) V - Vent WF - Wet (Warm) Flare WW - Waste Water																																					
Pipe Thickness																																					
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	52	60															
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	9.53	9.53	12.7	12.7	12.7	12.7	14.27															
SCH.	XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	XS	XS	XS																	
Nipple Thickness																																					
NPS	1/2	3/4	1	1 1/2	2																																
Thk.mm	4.78	5.56	6.35	7.14	8.74																																
SCH.	160	160	160	160	160																																
PRESSURE - TEMPERATURE Ratings																																					
NPS	Press. bar	19.65	17.93	15.86	13.79	11.72	9.65	8.62	7.58	6.55	ASME B16.5/ASME B16.47																										
1/2 - 60	Temp. °C	37.78	93.33	148.9	204.4	260	315.6	343.3	371.1	398.9	Material Group 1.1																										
opt.	Size from to		Item Description										Ends	Rating/Facing	Material																						
PIPE																																					
	1/2	24	PIPE										BW		ASTM A106 GR.B - SMLS																						
	26	52	PIPE										BW		ASTM A671 GR.CC65 CL.12 - EFW + S2 (-46°C)																						
	54	60	PIPE										BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)																						
FLANGES																																					
	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL150 RF	ASTM A105 Normalized																						
	2	24	WN FLANGE - ASME-B16.5										BW	CL150 RF	ASTM A105 Normalized																						
	30	60	WN FLANGE - ASME-B16.47 series.A										BW	CL150 RF	ASTM A105 Normalized																						
3	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL300 RF	ASTM A105 Normalized																						
3	2	24	WN FLANGE - ASME-B16.5										BW	CL300 RF	ASTM A105 Normalized																						
3	30	60	WN FLANGE - ASME-B16.47 series.A										BW	CL300 RF	ASTM A105 Normalized																						
5	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL600 RF	ASTM A105 Normalized																						
5	2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A105 Normalized																						
7	2	24	WN FLANGE - ASME-B16.5										BW	CL1500 RF	ASTM A105 Normalized																						
12	2	24	WN FLANGE - ASME-B16.5										BW	CL150 FF	ASTM A105 Normalized																						
63	3	24	WN FLANGE - ASME-B16.5										BW	CL900 RJ (F)	ASTM A105 Normalized																						
73	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL1500 RJ (F)	ASTM A105 Normalized																						
73	2	24	WN FLANGE - ASME-B16.5										BW	CL1500 RJ (F)	ASTM A105 Normalized																						
993	2	24	WN FLANGE - ASME-B16.5										BW	CL300 RF	ASTM A105 Normalized																						
995	1/2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A105 Normalized																						
	1/2	24	BLIND FLANGE - ASME-B16.5											CL150 RF	ASTM A105 Normalized																						
	30	60	BLIND FLANGE - ASME-B16.47 series.A											CL150 RF	ASTM A105 Normalized																						
3	1/2	24	BLIND FLANGE - ASME-B16.5											CL300 RF	ASTM A105 Normalized																						
3	2	2	SW REDUCING FLANGE - ASME-B16.5										SW	CL300 RF	ASTM A105 Normalized																						
14	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL150 RF	ASTM A105 Normalized																						
SPECTACLE BLIND																																					
	1/2	14	SPECTACLE BLIND - ASME-B16.48											CL150 RF	ASTM A516 GR.70 + S5 (-46°C)																						
	16	24	BLIND & SPACER - ASME-B16.48											CL150 RF	ASTM A516 GR.70 + S5 (-46°C)																						
3	1/2	12	SPECTACLE BLIND - ASME-B16.48											CL300 RF	ASTM A516 GR.70 + S5 (-46°C)																						
FITTINGS																																					
	1/2	3	DRIP-RING - TB DRI 5011											CL150 RF	ASTM A105 Normalized																						
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11										SW	6000	ASTM A105 Normalized																						
	2	24	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A234 WPB - SMLS																						
	30	48	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A420 WPL6W - WLDD																						
	50	52	LONG RADIUS ELBOW - TB RAC 5060										BW		ASTM A420 WPL6W - WLDD																						
	60	60	LONG RADIUS ELBOW - TB RAC 5060										BW		ASTM A420 WPL6W - WLDD																						
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11										SW	6000	ASTM A105 Normalized																						
	2	24	REDUCER - ASME-B16.9										BW		ASTM A234 WPB - SMLS																						
	30	48	REDUCER - ASME-B16.9										BW		ASTM A420 WPL6W - WLDD																						
	50	52	REDUCER, LARGE BORE - TB RAC 5062										BW		ASTM A420 WPL6W - WLDD																						
	60	60	REDUCER, LARGE BORE - TB RAC 5062										BW		ASTM A420 WPL6W - WLDD																						
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11										THDF	3000	ASTM A105 Normalized																						
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11										SW	6000	ASTM A105 Normalized																						
	2	24	CAP - ASME-B16.9										BW		ASTM A234 WPB - SMLS																						
	30	48	CAP - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																						
	50	60	CAP - TB RAC 5064										BW		ASTM A420 WPL6W - WLDD																						
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11										SW/THDF	3000	ASTM A105 Normalized																						
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11										SW	6000	ASTM A105 Normalized																						
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A105 Normalized																						
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDM/PE		ASTM A106 GR.B - SMLS																						
	1/2	2	NIPPLE - THDD/THDD - ASME-B36.10										THDM		ASTM A106 GR.B - SMLS																						
	3/4	2	SWAGE NIPPLE - THDD/THDD - MSS-SP95										THDM		ASTM A234 WPB - SMLS																						
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A234 WPB - SMLS																						
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE/THDM		ASTM A234 WPB - SMLS																						
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11										SW	6000	ASTM A105 Normalized																						
	2	24	TEE - ASME-B16.9										BW		ASTM A234 WPB - SMLS																						
	30	48	TEE - ASME-B16.9										BW		ASTM A420 WPL6W - WLDD																						
	52	52	TEE - TB RAC 5061										BW		ASTM A420 WPL6W - WLDD																						

<div></div>			PIPING MATERIAL SPECIFICATION				JOB 032243						
							Piping Class:			01CB2S60			
							Sh. 2 of 3			Rev. A 0 1			
opt.	Size from to		Item Description			Ends	Rating/Facing	Material					
FITTINGS													
	60	60	TEE - TB RAC 5061			BW		ASTM A420 WPL6W - WLDD					
	2	24	SPECIAL SWEEPOLET - <MFR Std>			BW	6000	ASTM A105 Normalized					
	30	30	SPECIAL SWEEPOLET - <MFR Std>			BW		ASTM A350 LF2 - CL.1					
MISCELLANEOUS													
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5				CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)					
GASKETS													
12	1/2	24	FLAT NON MET. GASKET - ASME-B16.21					ARAMIDIC FIBER (13%)					
	26	60	FLAT GASKET - GROOVED - <MFR Std>					AISI 316L+GRAPHITE					
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20					304 SS+GRAPH 98% - C.S. OUT.RING					
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20					SOFT IRON					
73	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20					SOFT IRON					
BOLTS													
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)					
993	1/2	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A453 GR. 660 - PTFE COATED					
995	1/2	1 7/8	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A453 GR. 660 - PTFE COATED					
VALVES													
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material						
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF						
1	2	24	GA-E-60113	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF						
2	26	48	GA-E-60503	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc						
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF						
4	2	12	GA-E-60210	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF						
5	1/2	1 1/2	GA-E-67200	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF						
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF						
6	2	10	GA-E-60313	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF						
6	12	24	GA-E-60314	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF						
7	6	6	GA-E-60411	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats						
7	8	24	GA-E-60412	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats						
8	1/2	1 1/2	GA-E-60410	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats						
8	6	24	GA-E-60780	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats						
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF						
11	1/2	1 1/2	GA-E-60585	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : 13CR / HF						
11	2	2	GA-E-60102	Gate-BB-FB-Flex wdg-Thdd seat - API600	BW	CL150	Body: ASTM A216 WCB Trim : 13CR / HF						
13	2	2	GA-E-60117	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF						
14	1/2	1 1/2	GA-E-60148	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF						
14	2	24	GA-E-67000	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF						
19	1/2	1 1/2	GA-E-67001	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF						
62	2	10	GA-E-60305	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF						
80	1/2	1 1/2	GA-E-60794	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats						
82	6	24	GA-E-60782	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.						
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.						
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF						
101	2	2	GA-E-67035	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF						
103	2	2	GA-E-60591	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF						
140	4	4	GA-E-67355	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF						
801	1/2	1 1/2	GA-E-67125	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats						
824	10	20	GA-E-67293	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.						

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:		01CB2S60			
		Sh. 3 of 3		Rev.			
A				0	1		

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	2	2	GA-E-60631	Y Strainer-Bolted cover - ASME-B16.34	BW	CL150 RF	Body : ASTM A216 WCB Screen: 316 - PERF.PLATE - 18 Holes/Cm2
1	3	12	GA-E-60601	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																						
1/2	A																							
3/4	A	A																						
1	A	A	A																					
1 1/2	A	A	A	A																				
2					T																			
3					T	T																		
4					T	T	T																	
6					SW	T	T	T																
8					SW	SW	T	T	T															
10					SW	SW	T	T	T	T														
12					SW	SW	SW	T	T	T	T													
14					SW	SW	SW	T	T	T	T	T												
16					SW	SW	SW	T	T	T	T	T	T											
18					SW	SW	SW	SW	T	T	T	T	T	T										
20					SW	SW	SW	SW	T	T	T	T	T	T	T									
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T								
30					SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T							
36					SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T						
42					SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T					
48					SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	T	T	T				
52					SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	T1	T1	T1	T1	T1	T1	
60					SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	T1	T1	T1	T1	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	52	60		
Legenda																								
A	TEE - SW ENDS - ASME-B16.11																							
SW	SPECIAL SWEEPOLET - <MFR Std>																							
T	TEE - ASME-B16.9																							
T1	TEE - TB RAC 5061																							

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are not permitted.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.
- 6) This piping class is created for lines subjected to Acoustic Induced Vibration.

<div></div>		PIPING MATERIAL SPECIFICATION														JOB 032243													
																Piping Class:										01CB2S70			
																Sh. 1 of 2		Rev.											
A	0	1	2	3																									

Base Material : CARBON STEEL																		Design code : ASME B 31.3 2016																	
Nom. Rating : CL150																		PWHT : AS PER CODE (NOTE 1)																	
Facing/Finishing : FF																		Valve Trim : Bronze																	
Corrosion Allow. : 3 mm																		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																	
Temp. Limit : -29 °C to 70 °C																																			
Service: FW - Fire Water (AG)																																			
Pipe Thickness																																			
NPS	1/2	3/4	1	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24																		
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.16	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	9.53																		
SCH.	XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD																		
Nipple Thickness																																			
NPS	1/2	3/4	1	1 1/2	2																														
Thk.mm	4.78	5.56	6.35	7.14	8.74																														
SCH.	160	160	160	160	160																														
PRESSURE - TEMPERATURE Ratings																																			
NPS	Press. bar	19.65	ASME B16.5																																
1/2 - 24	Temp. °C	37.78	Material Group 1.1																																

opt.	Size		Item Description										Ends	Rating/Facing	Material
	from	to													

PIPE

	1/2	24	PIPE										BW		ASTM A106 GR.B - SMLS
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FLANGES

	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL150 FF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5										BW	CL150 FF	ASTM A105 Normalized
3	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL300 FF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5										BW	CL300 FF	ASTM A105 Normalized
5	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL600 FF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5										BW	CL600 FF	ASTM A105 Normalized
6	3	24	WN FLANGE - ASME-B16.5										BW	CL900 FF	ASTM A105 Normalized
	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL150 RF	ASTM A105 Normalized
12	2	24	WN FLANGE - ASME-B16.5										BW	CL150 RF	ASTM A105 Normalized
	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL600 RF	ASTM A105 Normalized
52	2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A105 Normalized
	3	24	WN FLANGE - ASME-B16.5										BW	CL900 RJ (F)	ASTM A105 Normalized
63	1/2	24	BLIND FLANGE - ASME-B16.5											CL150 FF	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5											CL300 FF	ASTM A105 Normalized
3	2	2	SW REDUCING FLANGE - ASME-B16.5										SW	CL300 FF	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL150 FF	ASTM A105 Normalized
34	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL300 FF	ASTM A105 Normalized

SPECTACLE BLIND

	1/2	14	SPECTACLE BLIND - ASME-B16.48											CL150 FF	ASTM A516 GR.70 + S5 (-46°C)
	16	24	BLIND & SPACER - ASME-B16.48											CL150 FF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS

	1/2	3	DRIP-RING - TB DRI 5011											CL150 FF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11										SW	3000	ASTM A105 Normalized
2	24		LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A234 WPB - SMLS
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11										SW	3000	ASTM A105 Normalized
2	24		REDUCER - ASME-B16.9										BW		ASTM A234 WPB - SMLS
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11										SW	3000	ASTM A105 Normalized
1/2	1 1/2		FEMALE CAP - THD END - ASME-B16.11										THDF	3000	ASTM A105 Normalized
	2	24	CAP - ASME-B16.9										BW		ASTM A234 WPB - SMLS
1/2	1 1/2		COUPLING - THD ENDS - ASME-B16.11										THDF	3000	ASTM A105 Normalized
1/2	1 1/2		COUPLING - SW ENDS - ASME-B16.11										SW	3000	ASTM A105 Normalized
	1 1/2		COUPLING - SW/THDD ENDS - ASME-B16.11										SW\THDF	3000	ASTM A105 Normalized
1/2	1 1/2		THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A105 Normalized
	2		NIPPLE - THDD/PE - ASME-B36.10										THDMPE		ASTM A106 GR.B - SMLS
3/4	2		SWAGE NIPPLE - THDD/THDD - MSS-SP95										THDM		ASTM A234 WPB - SMLS
3/4	2		SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE\THDM		ASTM A234 WPB - SMLS
1/2	1 1/2		TEE - SW ENDS - ASME-B16.11										SW	3000	ASTM A105 Normalized
	2	24	TEE - ASME-B16.9										BW		ASTM A234 WPB - SMLS
2	8		WELDOLET - MSS-SP97										BW		ASTM A105 Normalized
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97										SW\BW	3000	ASTM A105 Normalized

MISCELLANEOUS

	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5											CL150 FF	GRE LAMINATED + TFE (MAX T 180 C)
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GASKETS

	1/2	24	FLAT NON MET. GASKET - ASME-B16.21												ARAMIDIC FIBER (13%)
12	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												304 SS+GRAPH 98% - C.S. OUT.RING
52	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												304 SS+GRAPH 98% - C.S. OUT.RING
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20												SOFT IRON

BOLTS

	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368										ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)			
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VALVES

pos.	Size		Data Sheet	Item Description	Ends	Rating/Facing	Material
	from	to					
1	1/2	2	GA-E-67062	Bronze Gate-UB-Red.B-Solid wdg- Rising stem-Int.seat - MSS-SP80	THDF	CL200	Body: ASTM B61 UNS C92200 Trim : Bronze
1	3	24	GA-E-67050	Gate-BB-FB-Solid wdg-Integral seat - MSS SP 128 - UL/FM Certified	FLGD	CL150 FF	Body: ASTM A395 Trim : Bronze - Rubber coated



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 01CB2S70

Sh. 2 of 2

Rev.

A	0	1	2	3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	3	16	GA-E-60707	Check-Wafer-Dual plate-Wlidd seat - API594 - BUNA-N Lined - UL/FM Certified	WAFER	CL150 FF	Body: ASTM A395 Trim : Bronze
8	1/2	1 1/2	GA-E-67197	Bronze Ball-End entry-FB-Floating ball - <MFR Std - Metallic>	THDF	PN25	Body: ASTM B61 UNS C92200 Trim : Soft seat-BRONZE trim - PTFE seats
12	3	24	GA-E-67051	Gate-BB-FB-Solid wdg-Integral seat - MSS SP 128 - UL/FM Certified	FLGD	CL150 RF	Body: ASTM A395 Trim : Bronze - Rubber coated
13	2	2	GA-E-67398	Bronze Gate-UB-Red.B-Solid wdg- Rising stem- Int.seat - MSS-SP80	THDF	CL300	Body: ASTM B61 UNS C92200 Trim : Bronze


BRANCH TABLES

90 Degrees

90 Degrees																	
RunSize																	
1/2	A																
3/4	A	A															
1	A	A	A														
1 1/2	A	A	A	A													
2	S	S	T	T	T												
2 1/2	S	S	S	S	T	T											
3	S	S	S	S	S	W	T	T									
4	S	S	S	S	S	W	W	T	T								
6	S	S	S	S	S	W	W	W	T	T							
8	S	S	S	S	S	W	W	W	W	T	T						
10	S	S	S	S	S	W	W	W	W	W	T	T					
12	S	S	S	S	S	W	W	W	W	W	W	T	T				
14	S	S	S	S	S	W	W	W	W	W	W	P	T	T			
16	S	S	S	S	S	W	W	W	W	W	W	P	P	T	T		
18	S	S	S	S	S	W	W	W	W	W	W	P	P	P	T	T	
20	S	S	S	S	S	W	W	W	W	W	W	P	P	P	P	T	T
24	S	S	S	S	S	W	W	W	W	W	W	P	P	P	P	P	T
BranchSize	1/2	3/4	1	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24
Legenda																	
A	TEE - SW ENDS - ASME-B16.11																
P	PIPE TO PIPE WITH REINFORCING PAD																
S	SOCKOLET - SW END - MSS-SP97																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 4) This Piping Class is also used for Underground Fire Water Riser

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243														
												Piping Class:										01CB4S01				
												Sh.		1		of		2		Rev.						
												A		0		1		2		3						

Base Material : CARBON STEEL										Design code : ASME B 31.3 2016									
Nom. Rating : CL150										PWHT : AS PER CODE (NOTE 1)									
Facing/Finishing : RF										Valve Trim : 8 - 13Cr/ HF									
Corrosion Allow. : 6 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013									
Temp. Limit : -29 °C to 70 °C																			
Service: WW - Waste Water																			

Pipe Thickness																
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
Thk.mm	7.47	7.82	9.09	10.15	8.74	11.13	8.56	10.97	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
SCH.	XXS	XXS	XXS	XXS	160	160	XS	XS	XS	XS	XS	XS	XS	XS	XS	XS

Nipple Thickness																				
NPS	1/2	3/4	1	1 1/2	2															
Thk.mm	7.47	7.82	9.09	10.15	8.74															
SCH.	XXS	XXS	XXS	XXS	160															

PRESSURE - TEMPERATURE Ratings																
NPS	Press. bar	19.65	17.93	15.86	13.79	11.72	9.65	8.62	7.58	6.55	ASME B16.5					
1/2 - 24	Temp. °C	37.78	93.33	148.9	204.4	260	315.6	343.3	371.1	398.9	Material Group 1.1					

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	24	PIPE	BW		ASTM A106 GR.B - SMLS

FLANGES						
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL150 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL150 RF	ASTM A105 Normalized
3	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
12	2	10	WN FLANGE - ASME-B16.5	BW	CL150 FF	ASTM A105 Normalized
	4	4	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
63	1/2	24	BLIND FLANGE - ASME-B16.5		CL150 RF	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL150 RF	ASTM A105 Normalized

SPECTACLE BLIND						
	1/2	14	SPECTACLE BLIND - ASME-B16.48 GA-E-060011		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
	16	24	BLIND & SPACER - ASME-B16.48 GA-E-060011		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		CL150 RF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
2	24	LONG RADIUS ELBOW - ASME-B16.9	BW			ASTM A234 WPB - SMLS
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
2	24	REDUCER - ASME-B16.9	BW			ASTM A234 WPB - SMLS
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	6000	ASTM A105 Normalized
1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	9000		ASTM A105 Normalized
	2	24	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	9000		ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	6000	ASTM A105 Normalized
1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM			ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM\PE		ASTM A106 GR.B - SMLS
3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM			ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	9000		ASTM A105 Normalized
	2	24	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
2	8	WELDOLET - MSS-SP97	BW			ASTM A105 Normalized
	1/2	1 1/2	SOCKOLET - SW END - TB RAC 5380	SW\BW	9000	ASTM A105 Normalized

MISCELLANEOUS						
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5		CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)
	3	3	SPECIAL TEMPORARY STRAINER - <MFR Std - Metallic>		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)

GASKETS						
12	2	10	FLAT NON MET. GASKET - ASME-B16.21			ARAMIDIC FIBER (13%)
63	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
	4	4	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368	ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)		

VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60164	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized
							Trim : 13CR stellited
1	2	24	GA-E-60121	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB
							Trim : 13CR / HF
4	1/2	1 1/2	GA-E-60220	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A105 Normalized
							Trim : 13CR stellited
4	2	12	GA-E-60214	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A216 WCB
							Trim : 13CR / HF
5	1/2	1 1/2	GA-E-67201	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL1500	Body: ASTM A105 Normalized
							Trim : 13CR stellited
6	1/2	1 1/2	GA-E-60348	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A105 Normalized
							Trim : 13CR stellited



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 01CB4S01

Rev.					
Sh.	2	of	2	A	0
				1	2
				3	

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	2	24	GA-E-60319	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	6	6	GA-E-60417	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60418	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
8	1/2	1 1/2	GA-E-60416	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60182	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
11	1/2	1 1/2	GA-E-67021	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
13	2	24	GA-E-60125	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
89	1/2	1 1/2	GA-E-67120	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67013	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
101	2	2	GA-E-67039	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
103	2	2	GA-E-67028	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67079	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
140	2	8	GA-E-67355	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 13CR / HF
801	1/2	1 1/2	GA-E-67127	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
824	2	6	GA-E-67607	Ball-Split body-FB-Floating ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	4	GA-E-60601	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

90 Degrees																
RunSize																
1/2	A															
3/4	A	A														
1	A	A	A													
1 1/2	A	A	A	A												
2	S	S	T	T	T											
3	S	S	S	S	W	T	T									
4	S	S	S	S	W	W	T	T								
6	S	S	S	S	W	W	T	T								
8	S	S	S	S	W	W	W	T	T							
10	S	S	S	S	W	W	W	W	T	T						
12	S	S	S	S	W	W	W	W	W	T	T					
14	S	S	S	S	W	W	W	W	W	P	T	T				
16	S	S	S	S	W	W	W	W	W	P	P	T	T			
18	S	S	S	S	W	W	W	W	W	P	P	P	T	T		
20	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T	
24	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
Legenda																
A	TEE - SW ENDS - ASME-B16.11															
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E															
S	SOCKOLET - SW END - TB RAC 5380															
T	TEE - ASME-B16.9															
W	WELDOLET - MSS-SP97															

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 01CB4S02

Rev.					
Sh.	2	of	3	A	0
				1	2
				3	

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
7	8	24	GA-E-67164	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-S.31803 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60499	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-S.31803 trim - RPTFE seats
8	2	4	GA-E-67162	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-S.31803 trim - RPTFE seats
8	6	24	GA-E-67156	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-S.31803 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60199	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : Duplex S.31803
13	2	24	GA-E-60168	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Duplex S.31803
62	2	2	GA-E-60303	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Duplex S.31803
72	2	2	GA-E-67252	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-S.31803 trim-GRAPH.
82	1/2	1 1/2	GA-E-67265	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Metal seat-S.31803 trim-GRAPH.
82	2	4	GA-E-67253	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-S.31803 trim-GRAPH.
82	6	24	GA-E-67189	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-S.31803 trim-GRAPH.
89	1/2	1 1/2	GA-E-60498	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-S.31803 trim-GRAPH.
101	1/2	1 1/2	GA-E-67014	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : Duplex S.31803
101	2	2	GA-E-67040	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Duplex S.31803
103	2	2	GA-E-67029	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Duplex S.31803
130	1/2	1 1/2	GA-E-67080	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : Duplex S.31803
140	2	8	GA-E-67366	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Duplex S.31803
801	1/2	1 1/2	GA-E-67128	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-S.31803 trim - RPTFE seats
810	12	12	GA-E-67269	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-S.31803 trim - RPTFE seats
820	12	12	GA-E-67286	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-S.31803 trim-GRAPH.
824	2	3	GA-E-67620	Ball-Split body-FB-Floating ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Metal seat-S.31803 trim-GRAPH.
824	6	6	GA-E-67697	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-S.31803 trim - RPTFE seats
907	8	12	GA-E-69075	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats

BRANCH TABLES

<div><div><div>CCS TV</div><div>MOZAMBIQUE LNG</div></div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243					
												Piping Class:		01CB4S05			
Sh. 1 of 2		Rev.				A		0		1							

Base Material : CARBON STEEL										Design code : ASME B 31.3 2016									
Nom. Rating : CL150										PWHT : AS PER CODE (NOTE 1)									
Facing/Finishing : RF										Valve Trim : 12 - SS316/HF									
Corrosion Allow. : 6 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013									
Temp. Limit : -29 °C to 150 °C																			
Service: CD - Closed Drain HL - Hydrocarbon Liquid WEG - Water / Ethylene Glycol																			

Pipe Thickness																
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
Thk.mm	7.47	7.82	9.09	10.15	8.74	11.13	8.56	10.97	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
SCH.	XXS	XXS	XXS	XXS	160	160	XS	XS	XS	XS	XS	XS	XS	XS	XS	XS

Nipple Thickness																	
NPS	1/2	3/4	1	1 1/2	2												
Thk.mm	7.47	7.82	9.09	10.15	8.74												
SCH.	XXS	XXS	XXS	XXS	160												

PRESSURE - TEMPERATURE Ratings																	
NPS	Press. bar	19.65	19.65	17.93	15.86	ASME B16.5											
1/2 - 24	Temp. °C	-28.9	37.78	93.33	148.9	Material Group 1.1											

opt.	Size from to		Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	24	PIPE	BW		ASTM A106 GR.B - SMLS

FLANGES						
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL150 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL150 RF	ASTM A105 Normalized
3	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
63	3	12	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
	1/2	2	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized
73	1/2	24	BLIND FLANGE - ASME-B16.5		CL150 RF	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL150 RF	ASTM A105 Normalized

SPECTACLE BLIND						
3	1/2	14	SPECTACLE BLIND - ASME-B16.48 GA-E-060011		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
	16	24	BLIND & SPACER - ASME-B16.48 GA-E-060011		CL150 RF	ASTM A516 GR.70 + S5 (-46°C)
	1/2	12	SPECTACLE BLIND - ASME-B16.48 GA-E-060011		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		CL150 RF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
	2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
	2	24	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	9000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	6000	ASTM A105 Normalized
	2	24	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	6000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
	2	24	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	2	8	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized
	1/2	1 1/2	SOCKOLET - SW END - TB RAC 5380	SW\BW	9000	ASTM A105 Normalized

MISCELLANEOUS						
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5		CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)

GASKETS						
63 73	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			316 SS+GRAPH 98% - C.S. OUT.RING
	3	12	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 316
	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 316

BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368	ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)		

VALVES							
pos.	Size from to		Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60186	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF
1	2	24	GA-E-60187	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
4	1/2	1 1/2	GA-E-60267	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF
4	2	12	GA-E-60268	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
6	1/2	1 1/2	GA-E-60390	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF
6	2	24	GA-E-60391	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
7	6	6	GA-E-60417	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-67116	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60416	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-67059	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF
13	2	2	GA-E-60192	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
62	4	4	GA-E-60740	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : 316 / HF
89	1/2	1 1/2	GA-E-67120	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67082	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF
907	2	6	GA-E-69005	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats

STRAINERS



pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	6	GA-E-60632	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3


BRANCH TABLES

RunSize		90 Degrees																	
1/2	A																		
3/4	A	A																	
1	A	A	A																
1 1/2	A	A	A	A															
2	S	S	S	T	T	T													
3	S	S	S	S	S	W	T												
4	S	S	S	S	S	W	T	T											
6	S	S	S	S	S	W	W	T	T										
8	S	S	S	S	S	W	W	W	T	T									
10	S	S	S	S	S	W	W	W	W	T	T								
12	S	S	S	S	S	W	W	W	W	T	T	T							
14	S	S	S	S	S	W	W	W	W	P	T	T							
16	S	S	S	S	S	W	W	W	W	P	P	T	T						
18	S	S	S	S	S	W	W	W	W	P	P	P	T	T					
20	S	S	S	S	S	W	W	W	W	P	P	P	P	T	T				
24	S	S	S	S	S	W	W	W	W	P	P	P	P	P	T	T			
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24			
Legenda																			
A	TEE - SW ENDS - ASME-B16.11																		
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPM-T-012-E																		
S	SOCKOLET - SW END - TB RAC 5380																		
T	TEE - ASME-B16.9																		
W	WELDOLET - MSS-SP97																		

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div> </div>		PIPING MATERIAL SPECIFICATION														JOB 032243																			
																Piping Class: 01CG1T01																			
																Sh. 1 of 2		Rev.																	
		A 0 1 2 3																																	
Base Material : GALVANIZED CARBON STEEL																		Design code : ASME B 31.3 2016																	
Nom. Rating : CL150																		PWHT : AS PER CODE (NOTE 1)																	
Facing/Finishing : RF																		Valve Trim : 8 - 13Cr/ HF																	
Corrosion Allow. : 1.5 mm																		Welding Spec : (1/2->2) ---																	
Temp. Limit : 0 °C to 70 °C																		(2 1/2->24) MZ-000-CCX-MC-SPC-00009/00013																	
Service:																																			
PA - Plant Air RV - Relief Vent																																			
Pipe Thickness																																			
NPS 1/2 3/4 1 1 1/2 2 3 4 6 8 10 12 14 16 18 20 24																		Thk.mm 3.73 3.91 4.55 5.08 5.54 5.49 6.02 7.11 8.18 9.27 9.53 9.53 9.53 9.53 9.53 9.53																	
SCH. XS XS XS XS STD STD STD STD STD STD STD STD STD STD STD STD STD STD																																			
Nipple Thickness																																			
NPS 1/2 3/4 1 1 1/2 2																		Thk.mm 4.78 5.56 6.35 7.14 8.74																	
SCH. 160 160 160 160 160																																			
PRESSURE - TEMPERATURE Ratings																																			
NPS Press. bar 19.65 19.65 17.93 15.86 ASME B16.5																		1/2 - 24 Temp. °C -28.9 37.78 93.33 148.9 Material Group 1.1																	
opt. from Size to Item Description																		Ends		Rating/Facing		Material													
PIPE																																			
1/2 2 PIPE - NPT ENDS																		THDM				ASTM A53 GR.B Hot Dip GALV. - SMLS													
2 1/2 24 PIPE																		BW				ASTM A106 GR.B - SMLS													
FLANGES																																			
1/2 2 THD FLANGE - ASME-B16.5																		THDF		CL150 RF		ASTM A105 Hot Dip GALVANIZED													
3 24 WN FLANGE - ASME-B16.5																		BW		CL150 RF		ASTM A105 Normalized													
1/2 2 THD FLANGE - ASME-B16.5																		THDF		CL300 RF		ASTM A105 Hot Dip GALVANIZED													
3 24 WN FLANGE - ASME-B16.5																		BW		CL300 RF		ASTM A105 Normalized													
5 1/2 2 THD FLANGE - ASME-B16.5																		THDF		CL600 RF		ASTM A105 Hot Dip GALVANIZED													
5 3 24 WN FLANGE - ASME-B16.5																		BW		CL600 RF		ASTM A105 Normalized													
12 2 2 THD FLANGE - ASME-B16.5																		THDF		CL150 FF		ASTM A105 Hot Dip GALVANIZED													
14 3/4 4 THD FLANGE - ASME-B16.5																		THDF		CL150 RF		ASTM A105 Normalized													
1/2 24 BLIND FLANGE - ASME-B16.5																				CL150 RF		ASTM A105 Hot Dip GALVANIZED													
1/2 24 BLIND FLANGE - ASME-B16.5																				CL300 RF		ASTM A105 Hot Dip GALVANIZED													
2 3 THDD RED. FLANGE - ASME-B16.5																		THDF		CL150 RF		ASTM A105 Hot Dip GALVANIZED													
3 2 3 THDD RED. FLANGE - ASME-B16.5																		THDF		CL300 RF		ASTM A105 Hot Dip GALVANIZED													
SPECTACLE BLIND																																			
1/2 14 SPECTACLE BLIND - ASME-B16.48																				CL150 RF		ASTM A516 GR.70+S5 Hot Dip GALV.													
16 24 BLIND & SPACER - ASME-B16.48																				CL150 RF		ASTM A516 GR.70+S5 Hot Dip GALV.													
FITTINGS																																			
1/2 2 ELBOW - THD ENDS - ASME-B16.11																		THDF		3000		ASTM A105 Hot Dip GALVANIZED													
3 24 LONG RADIUS ELBOW - ASME-B16.9																		BW				ASTM A234 WPB - SMLS													
3/4 2 RED. COUPLING - THD ENDS - ASME-B16.11																		THDF		3000		ASTM A105 Hot Dip GALVANIZED													
3 24 REDUCER - ASME-B16.9																		BW				ASTM A234 WPB - SMLS													
1/2 2 FEMALE CAP - THD END - ASME-B16.11																		THDF		3000		ASTM A105 Hot Dip GALVANIZED													
3 24 CAP - ASME-B16.9																		BW				ASTM A234 WPB - SMLS													
1/2 2 COUPLING - THD ENDS - ASME-B16.11																		THDF		3000		ASTM A105 Hot Dip GALVANIZED													
1/2 1 1/2 THD MALE PLUG - RND HEAD - ASME-B16.11																		THDM				ASTM A105 Hot Dip GALVANIZED													
1/2 2 NIPPLE - THDD/PE - ASME-B36.10																		THDMPE				ASTM A53 GR.B Hot Dip GALV. - SMLS													
1/2 2 NIPPLE - THDD/THDD - ASME-B36.10																		THDM				ASTM A53 GR.B Hot Dip GALV. - SMLS													
3/4 2 SWAGE NIPPLE - PE/THDD - MSS-SP95																		PE/THDM				ASTM A234 WPB HotDipGalv. A123 - SMLS													
3/4 2 SWAGE NIPPLE - THDD/THDD - MSS-SP95																		THDM				ASTM A234 WPB HotDipGalv. A123 - SMLS													
3/4 2 SWAGE NIPPLE - PE/PE - MSS-SP95																		PE				ASTM A234 WPB HotDipGalv. A123 - SMLS													
1/2 2 TEE - THD ENDS - ASME-B16.11																		THDF		3000		ASTM A105 Hot Dip GALVANIZED													
3 24 TEE - ASME-B16.9																		BW				ASTM A234 WPB - SMLS													
3 8 WELDOLET - MSS-SP97																		BW				ASTM A105 Normalized													
1/2 2 THREDOLET - THD END - MSS-SP97																		THDF\BW		3000		ASTM A105 Normalized													
MISCELLANEOUS																																			
1/2 24 KIT FOR INSULATING FLANGE - ASME-B16.5																				CL150 RF		GRE LAMINATED + TFE (MAX T 180 C)													
GASKETS																																			
12 2 3 FLAT NON MET. GASKET - ASME-B16.21																						ARAMIDIC FIBER (13%)													
1/2 24 SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20																						304 SS+GRAPH 98% - C.S. OUT.RING													
BOLTS																																			
1/2 4 ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368																						ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED													
VALVES																																			
pos. from Size to Data Sheet Item Description																		Ends		Rating/Facing		Material													
1 1/2 2 GA-E-60165 Bronze Gate-UB-Red.B-Solid wdg- Rising stem-Int.seat - MSS-SP80																		THDF		CL200		Body: ASTM B61 UNS C92200 Trim : Bronze													
1 3 4 GA-E-60113 Gate-BB-FB-Flex wdg-Thdd seat - API600																		FLGD		CL150 RF		Body: ASTM A216 WCB Trim : 13CR / HF													
4 1/2 2 GA-E-60257 Bronze Globe-UB-Red.B -Int.seat - MSS-SP80																		THDF		CL200		Body: ASTM B61 UNS C92200 Trim : Bronze													
6 2 2 GA-E-60372 Bronze Check-UB-Red.B-Swing-Int.seat - MSS-SP80																		THDF		CL200		Body: ASTM B61 UNS C92200 Trim : Bronze													
8 1/2 1 1/2 GA-E-60750 Bronze Ball-End entry-FB-Floating ball - <MFR Std - Metallic>																		THDF		PN25		Body: ASTM B61 UNS C92200 Trim : Soft seat-BRONZE trim - PTFE seats													
160 4 4 GA-E-67308 Gate-Ext. Stem (1400mm)-BB-FB-Flex wdg-Thdd seat - API600																		FLGD		CL150 RF		Body: ASTM A216 WCB Trim : 13CR / HF													


	PIPING MATERIAL SPECIFICATION	JOB 032243						
		Piping Class:		01CG1T01				
		Sh. 2 of 2		Rev.				
				A	0	1	2	3

BRANCH TABLES

90 Degrees																
RunSize																
1/2	A															
3/4	A	A														
1	A	A	A													
1 1/2	A	A	A	A												
2	A	A	A	A	A	A										
3	B	B	B	B	B	B	T									
4	B	B	B	B	B	B	T	T								
6	B	B	B	B	B	B	W	T	T							
8	B	B	B	B	B	B	W	W	T	T						
10	B	B	B	B	B	B	W	W	W	T	T					
12	B	B	B	B	B	B	W	W	W	W	T	T				
14	B	B	B	B	B	B	W	W	W	W	P	T	T			
16	B	B	B	B	B	B	W	W	W	W	P	P	T	T		
18	B	B	B	B	B	B	W	W	W	W	P	P	P	T	T	
20	B	B	B	B	B	B	W	W	W	W	P	P	P	P	T	T
24	B	B	B	B	B	B	W	W	W	W	P	P	P	P	P	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
Legenda																
A	TEE - THD ENDS - ASME-B16.11															
B	THREDOLET - THD END - MSS-SP97															
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E															
T	TEE - ASME-B16.9															
W	WELDOLET - MSS-SP97															

GENERAL NOTES

1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
2) Pipes NPS 3" and above shall be Hot Dip Galvanized at site after spool fabrication in accordance with Specification MZ-000-CCX-MC-SPC-00017
3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div> MOZAMBIQUE LNG</div>		PIPING MATERIAL SPECIFICATION														JOB 032243																			
																Piping Class:					01CG1T02														
																Sh. 1 of 2		Rev.																	
A	0	1	2	3																															
Base Material : GALVANIZED CARBON STEEL																		Design code : ASME B 31.3 2016																	
Nom. Rating : CL150																		PWHT : AS PER CODE (NOTE 1)																	
Facing/Finishing : RF																		Valve Trim : Bronze																	
Corrosion Allow. : 1.5 mm																		Welding Spec : (1/2->2) ---																	
Temp. Limit : 0 °C to 70 °C																		(2 1/2->24) MZ-000-CCX-MC-SPC-00009/00013																	
Service: DR - Potentially Contaminated Open Drain SW - Service Water (AG)																																			
Pipe Thickness																																			
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24																			
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	9.53																			
SCH.	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD																			
Nipple Thickness																																			
NPS	1/2	3/4	1	1 1/2	2																														
Thk.mm	4.78	5.56	6.35	7.14	8.74																														
SCH.	160	160	160	160	160																														
PRESSURE - TEMPERATURE Ratings																																			
NPS	Press. bar	19.65	19.65	17.93	15.86	ASME B16.5																													
1/2 - 24	Temp. °C	-28.9	37.78	93.33	148.9	Material Group 1.1																													
opt.		Size from to		Item Description												Ends		Rating/Facing		Material															
PIPE																																			
		1/2		2		PIPE - NPT ENDS												THDM				ASTM A53 GR.B Hot Dip GALV. - SMLS													
		2 1/2		24		PIPE												BW				ASTM A106 GR.B - SMLS													
FLANGES																																			
		1/2		2		THD FLANGE - ASME-B16.5												THDF		CL150 RF		ASTM A105 Hot Dip GALVANIZED													
		3		24		WN FLANGE - ASME-B16.5												BW		CL150 RF		ASTM A105 Normalized													
3	1/2		2		THD FLANGE - ASME-B16.5												THDF		CL300 RF		ASTM A105 Hot Dip GALVANIZED														
3	3		24		WN FLANGE - ASME-B16.5												BW		CL300 RF		ASTM A105 Normalized														
5	1/2		2		THD FLANGE - ASME-B16.5												THDF		CL600 RF		ASTM A105 Hot Dip GALVANIZED														
5	3		24		WN FLANGE - ASME-B16.5												BW		CL600 RF		ASTM A105 Normalized														
12	1/2		2		THD FLANGE - ASME-B16.5												THDF		CL150 FF		ASTM A105 Hot Dip GALVANIZED														
12	3		6		WN FLANGE - ASME-B16.5												BW		CL150 FF		ASTM A105 Normalized														
15	1/2		2		WN FLANGE - ASME-B16.5												BW		CL150 FF		ASTM A105 Normalized														
		1/2		24		BLIND FLANGE - ASME-B16.5														CL150 RF		ASTM A105 Hot Dip GALVANIZED													
3	1/2		24		BLIND FLANGE - ASME-B16.5														CL300 RF		ASTM A105 Hot Dip GALVANIZED														
		2		3		THDD RED. FLANGE - ASME-B16.5												THDF		CL150 RF		ASTM A105 Hot Dip GALVANIZED													
3	2		3		THDD RED. FLANGE - ASME-B16.5												THDF		CL300 RF		ASTM A105 Hot Dip GALVANIZED														
SPECTACLE BLIND																																			
		1/2		14		SPECTACLE BLIND - ASME-B16.48														CL150 RF		ASTM A516 GR.70+S5 Hot Dip GALV.													
		16		24		BLIND & SPACER - ASME-B16.48														CL150 RF		ASTM A516 GR.70+S5 Hot Dip GALV.													
FITTINGS																																			
		1/2		2		ELBOW - THD ENDS - ASME-B16.11												THDF		3000		ASTM A105 Hot Dip GALVANIZED													
		3		24		LONG RADIUS ELBOW - ASME-B16.9												BW				ASTM A234 WPB - SMLS													
		3/4		2		RED. COUPLING - THD ENDS - ASME-B16.11												THDF		3000		ASTM A105 Hot Dip GALVANIZED													
		3		24		REDUCER - ASME-B16.9												BW				ASTM A234 WPB - SMLS													
		1/2		2		FEMALE CAP - THD END - ASME-B16.11												THDF		3000		ASTM A105 Hot Dip GALVANIZED													
		3		24		CAP - ASME-B16.9												BW				ASTM A234 WPB - SMLS													
		1/2		2		COUPLING - THD ENDS - ASME-B16.11												THDF		3000		ASTM A105 Hot Dip GALVANIZED													
		1/2		1 1/2		THD MALE PLUG - RND HEAD - ASME-B16.11												THDM				ASTM A105 Hot Dip GALVANIZED													
		1/2		2		NIPPLE - THDD/PE - ASME-B36.10												THDM/PE				ASTM A53 GR.B Hot Dip GALV. - SMLS													
		1/2		2		NIPPLE - THDD/THDD - ASME-B36.10												THDM				ASTM A53 GR.B Hot Dip GALV. - SMLS													
		3/4		2		SWAGE NIPPLE - PE/THDD - MSS-SP95												PE/THDM				ASTM A234 WPB HotDipGalv. A123 - SMLS													
		3/4		2		SWAGE NIPPLE - THDD/THDD - MSS-SP95												THDM				ASTM A234 WPB HotDipGalv. A123 - SMLS													
		3/4		2		SWAGE NIPPLE - PE/PE - MSS-SP95												PE				ASTM A234 WPB HotDipGalv. A123 - SMLS													
		1/2		2		TEE - THD ENDS - ASME-B16.11												THDF		3000		ASTM A105 Hot Dip GALVANIZED													
		3		24		TEE - ASME-B16.9												BW				ASTM A234 WPB - SMLS													
		3		8		WELDOLET - MSS-SP97												BW				ASTM A105 Normalized													
		1/2		2		THREDOLET - THD END - MSS-SP97												THDF/BW		3000		ASTM A105 Normalized													
MISCELLANEOUS																																			
		1/2		24		KIT FOR INSULATING FLANGE - ASME-B16.5														CL150 RF		GRE LAMINATED + TFE (MAX T 180 C)													
GASKETS																																			
12	1/2		6		FLAT NON MET. GASKET - ASME-B16.21																ARAMIDIC FIBER (13%)														
15	1/2		2		FLAT NON MET. GASKET - ASME-B16.21																ARAMIDIC FIBER (13%)														
		1/2		24		SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20																304 SS+GRAPH 98% - C.S. OUT.RING													
BOLTS																																			
		1/2		4		ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368																ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED													
VALVES																																			
pos.		Size from to		Data Sheet		Item Description												Ends		Rating/Facing		Material													
1	1/2		2		GA-E-60165		Bronze Gate-UB-Red.B-Solid wdg- Rising stem-Int.seat - MSS-SP80												THDF		CL200		Body: ASTM B61 UNS C92200 Trim : Bronze												
1	3		10		GA-E-67053		Gate-BB-FB-Flex wdg-Thdd seat - API600												FLGD		CL150 RF		Body: ASTM A216 WCB Trim : Duplex S.31803												
5	1/2		1/2		GA-E-67206		Globe-UB-Red.B-Needle-Int seat - <MFR Std - Metallic>												THDF		PN25		Body: ASTM B61 UNS C92200 Trim : Bronze												
6	1/2		2		GA-E-60372		Bronze Check-UB-Red.B-Swing-Int.seat - MSS-SP80												THDF		CL200		Body: ASTM B61 UNS C92200 Trim : Bronze												
6	3		6		GA-E-60713		Check-BB- FB- Swing - API594												FLGD		CL150 RF		Body: ASTM A216 WCB Trim : Inconel 625												

	PIPING MATERIAL SPECIFICATION		JOB 032243					
			Piping Class:	01CG1T02				
			Sh. 2 of 2	Rev.				
				A	0	1	2	3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
8	1/2	1 1/2	GA-E-60750	Bronze Ball-End entry-FB-Floating ball - <MFR Std - Metallic>	THDF	PN25	Body: ASTM B61 UNS C92200 Trim : Soft seat-BRONZE trim - PTFE seats
160	4	4	GA-E-67309	Gate-Ext. Stem (1400mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A216 WCB Trim : Inconel 625

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	6	GA-E-60601	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3


BRANCH TABLES

RunSize		90 Degrees															
1/2	A																
3/4	A	A															
1	A	A	A														
1 1/2	A	A	A	A													
2	A	A	A	A	A												
3	B	B	B	B	B	T											
4	B	B	B	B	B	T	T										
6	B	B	B	B	B	W	T	T									
8	B	B	B	B	B	W	W	T	T								
10	B	B	B	B	B	W	W	W	T	T							
12	B	B	B	B	B	W	W	W	W	T	T						
14	B	B	B	B	B	W	W	W	W	P	T	T					
16	B	B	B	B	B	W	W	W	W	P	P	T	T				
18	B	B	B	B	B	W	W	W	W	P	P	P	T	T			
20	B	B	B	B	B	W	W	W	W	P	P	P	P	T	T		
24	B	B	B	B	B	W	W	W	W	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Legenda																	
A	TEE - THD ENDS - ASME-B16.11																
B	THREDOLET - THD END - MSS-SP97																
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Pipes NPS 3" and above shall be Hot Dip Galvanized at site after spool fabrication in accordance with Specification MZ-000-CCX-MC-SPC-00017
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION																JOB 032243														
																		Piping Class:										01CG1T70				
																		Sh. 1 of 2		Rev.												
A	0	1	2	3																												
Base Material : GALVANIZED CARBON STEEL																		Design code : ASME B 31.3 2016														
Nom. Rating : CL150																		PWHT : AS PER CODE (NOTE 1)														
Facing/Finishing : FF																		Valve Trim : Bronze														
Corrosion Allow. : 1.5 mm																		Welding Spec : (1/2->2) ---														
Temp. Limit : 0 °C to 70 °C																		(2 1/2->24) MZ-000-CCX-MC-SPC-00009/00013														
Service:																																
FW - Fire Water (AG)																																
Pipe Thickness																																
NPS	1/2	3/4	1	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24															
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.16	5.49	6.02	7.11	8.18	9.27	9.53	9.53	9.53	9.53	9.53	9.53															
SCH.	XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD															
Nipple Thickness																																
NPS	1/2	3/4	1	1 1/2	2																											
Thk.mm	4.78	5.56	6.35	7.14	8.74																											
SCH.	160	160	160	160	160																											
PRESSURE - TEMPERATURE Ratings																																
NPS	Press. bar	19.65	19.65	17.93	15.86	ASME B16.5																										
1/2 - 24	Temp. °C	-28.9	37.78	93.33	148.9	Material Group 1.1																										
opt.	Size from to		Item Description										Ends	Rating/Facing	Material																	
PIPE																																
	1/2	2	PIPE - NPT ENDS										THDM		ASTM A53 GR.B Hot Dip GALV. - SMLS																	
	2 1/2	24	PIPE										BW		ASTM A106 GR.B - SMLS																	
FLANGES																																
	1/2	2	THD FLANGE - ASME-B16.5										THDF	CL150 FF	ASTM A105 Hot Dip GALVANIZED																	
	2 1/2	24	WN FLANGE - ASME-B16.5										BW	CL150 FF	ASTM A105 Normalized																	
3	1/2	2	THD FLANGE - ASME-B16.5										THDF	CL300 FF	ASTM A105 Hot Dip GALVANIZED																	
3	3	24	WN FLANGE - ASME-B16.5										BW	CL300 FF	ASTM A105 Normalized																	
5	1/2	2	THD FLANGE - ASME-B16.5										THDF	CL600 FF	ASTM A105 Hot Dip GALVANIZED																	
5	2 1/2	24	WN FLANGE - ASME-B16.5										BW	CL600 FF	ASTM A105 Normalized																	
12	3	8	WN FLANGE - ASME-B16.5										BW	CL150 RF	ASTM A105 Normalized																	
14	2	2	WN FLANGE - ASME-B16.5										BW	CL150 FF	ASTM A105 Normalized																	
	1/2	24	BLIND FLANGE - ASME-B16.5											CL150 FF	ASTM A105 Hot Dip GALVANIZED																	
3	1/2	24	BLIND FLANGE - ASME-B16.5											CL300 FF	ASTM A105 Hot Dip GALVANIZED																	
	2	4	THDD RED. FLANGE - ASME-B16.5										THDF	CL150 FF	ASTM A105 Hot Dip GALVANIZED																	
3	2	4	THDD RED. FLANGE - ASME-B16.5										THDF	CL300 FF	ASTM A105 Hot Dip GALVANIZED																	
SPECTACLE BLIND																																
	1/2	14	SPECTACLE BLIND - ASME-B16.48											CL150 FF	ASTM A516 GR.70+S5 Hot Dip GALV.																	
	16	24	BLIND & SPACER - ASME-B16.48											CL150 FF	ASTM A516 GR.70+S5 Hot Dip GALV.																	
FITTINGS																																
	1/2	2	ELBOW - THD ENDS - ASME-B16.11										THDF	3000	ASTM A105 Hot Dip GALVANIZED																	
	3	24	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A234 WPB - SMLS																	
	3/4	2	RED. COUPLING - THD ENDS - ASME-B16.11										THDF	3000	ASTM A105 Hot Dip GALVANIZED																	
	2 1/2	24	REDUCER - ASME-B16.9										BW		ASTM A234 WPB - SMLS																	
	1/2	2	FEMALE CAP - THD END - ASME-B16.11										THDF	3000	ASTM A105 Hot Dip GALVANIZED																	
	3	24	CAP - ASME-B16.9										BW		ASTM A234 WPB - SMLS																	
	1/2	2	COUPLING - THD ENDS - ASME-B16.11										THDF	3000	ASTM A105 Hot Dip GALVANIZED																	
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A105 Hot Dip GALVANIZED																	
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDM/PE		ASTM A53 GR.B Hot Dip GALV. - SMLS																	
	1/2	2	NIPPLE - THDD/THDD - ASME-B36.10										THDM		ASTM A53 GR.B Hot Dip GALV. - SMLS																	
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE\THDM		ASTM A234 WPB HotDipGalv. A123 - SMLS																	
	3/4	2	SWAGE NIPPLE - THDD/THDD - MSS-SP95										THDM		ASTM A234 WPB HotDipGalv. A123 - SMLS																	
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A234 WPB HotDipGalv. A123 - SMLS																	
	1/2	2	TEE - THD ENDS - ASME-B16.11										THDF	3000	ASTM A105 Hot Dip GALVANIZED																	
	2 1/2	24	TEE - ASME-B16.9										BW		ASTM A234 WPB - SMLS																	
	2 1/2	8	WELDOLET - MSS-SP97										BW		ASTM A105 Normalized																	
	1/2	2	THREDOLET - THD END - MSS-SP97										THDF\BW	3000	ASTM A105 Normalized																	
GASKETS																																
	1/2	24	FLAT NON MET. GASKET - ASME-B16.21												ARAMIDIC FIBER (13%)																	
12	3	4	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												304 SS+GRAPH 98% - C.S. OUT.RING																	
BOLTS																																
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368										ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED																			
VALVES																																
pos.	Size from to		Data Sheet	Item Description							Ends	Rating/Facing	Material																			
1	1/2	2	GA-E-67062	Bronze Gate-UB-Red.B-Solid wdg- Rising stem-Int.seat - MSS-SP80							THDF	CL200	Body: ASTM B61 UNS C92200 Trim : Bronze																			
1	3	10	GA-E-67050	Gate-BB-FB-Solid wdg-Integral seat - MSS SP 128 - UL/FM Certified							FLGD	CL150 FF	Body: ASTM A395 Trim : Bronze - Rubber coated																			
6	3	6	GA-E-60707	Check-Wafer-Dual plate-Wldd seat - API594 - BUNA-N Lined - UL/FM Certified							WAFER	CL150 FF	Body: ASTM A395 Trim : Bronze																			
8	1/2	1 1/2	GA-E-67197	Bronze Ball-End entry-FB-Floating ball - <MFR Std - Metallic>							THDF	PN25	Body: ASTM B61 UNS C92200 Trim : Soft seat-BRONZE trim - PTFE seats																			
12	3	6	GA-E-67051	Gate-BB-FB-Solid wdg-Integral seat - MSS SP 128 - UL/FM Certified							FLGD	CL150 RF	Body: ASTM A395 Trim : Bronze - Rubber coated																			

<div></div>		PIPING MATERIAL SPECIFICATION																JOB 032243														
																		Piping Class:										01FE0A02				
																		Sh. 1 of 3					Rev.					A 0 1 2 3				
Base Material : RTR-EPOXY										Design code : ASME B 31.3 2016																						
Nom. Rating : CL150										PWHT : NO																						
Facing/Finishing : FF										Valve Trim : Aluminum Bronze																						
Corrosion Allow. : 0 mm										Welding Spec : ---																						
Temp. Limit : 0 °C to 70 °C																																
Service: BR - Brine (UG) DR - Potentially Contaminated Open Drain (UG) IA - Instrument Air (UG) PA - Plant Air (UG) OW - Oily Water (UG) OWS - Oily Water Sewer (UG) STS - Storm Sewer SW - Service Water SWS - Sea Water Supply (UG) WW - Waste Water																																
Pipe Thickness																																
NPS	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	28	30	32	40	44	48	52	56	60									
Thk.mm																																
SCH.																																
Nipple Thickness																																
NPS																																
Thk.mm																																
SCH.																																
PRESSURE - TEMPERATURE Ratings																																
NPS		Press. bar		16																												
1 - 24		Temp. °C		70																												
NPS		Press. bar		3.5																												
28 - 60		Temp. °C		65																												
opt.		Size from to		Item Description										Ends		Rating/Facing		Material														
PIPE																																
		1 36		PIPE - BELL & SPIGOT ENDS - <MFR Std - Plastic>										BELL\SPIGOT		PN16		RTR-EPOXY														
		38 60		PIPE - PE ENDS - <MFR Std - Plastic>										PE		PN6		RTR-EPOXY														
FLANGES																																
		1 24		BELL FLANGE - <MFR Std - Plastic> RTR-PN16										BELL		CL150 FF		RTR-EPOXY														
		26 32		BELL FLANGE - <MFR Std - Plastic> RTR-PN6										BELL		CL150 FF		RTR-EPOXY														
		40 60		WN FLANGE - <MFR Std - Plastic> RTR-PN6										BW		CL150 FF		RTR-EPOXY														
3		2 2		BELL FLANGE - <MFR Std - Plastic> RTR-PN16										BELL		CL300 FF		RTR-EPOXY														
		1 24		BLIND FLANGE - <MFR Std - Plastic> RTR-PN16												CL150 FF		RTR-EPOXY														
		26 60		BLIND FLANGE - <MFR Std - Plastic> RTR-PN6												CL150 FF		RTR-EPOXY														
SPECTACLE BLIND																																
		1 14		SPECTACLE BLIND - ASME-B16.48												CL150 FF		ASTM B171 UNS C70600 (Ann.)														
FITTINGS																																
		1 32		ELBOW - BELL ENDS - <MFR Std - Plastic>										BELL		PN16		RTR-EPOXY														
		40 60		ELBOW - PE ENDS - <MFR Std - Plastic>										PE		PN6		RTR-EPOXY														
		1 32		REDUCER - BELL ENDS - <MFR Std - Plastic>										BELL		PN16		RTR-EPOXY														
		40 60		REDUCER - PE ENDS - <MFR Std - Plastic>										PE		PN6		RTR-EPOXY														
		1 60		CAP - PE END - <MFR Std - Plastic>										PE		PN16		RTR-EPOXY														
		1 24		COUPLING - BELL ENDS - <MFR Std - Plastic>										BELL		PN16		RTR-EPOXY														
		1 32		Y.TEE - BELL ENDS - <MFR Std - Plastic>										BELL		PN16		RTR-EPOXY														
		1 32		TEE - BELL ENDS - <MFR Std - Plastic>										BELL		PN16		RTR-EPOXY														
		40 60		Y.TEE - PE ENDS - <MFR Std - Plastic>										PE		PN6		RTR-EPOXY														
		40 60		TEE - PE ENDS - <MFR Std - Plastic>										PE		PN6		RTR-EPOXY														
MISCELLANEOUS																																
		1 2		SADDLE WITH NIPPLE PE - <MFR Std - Plastic>										PE\BW				RTR-EPOXY														
GASKETS																																
		1 60		FLAT NON MET. GASKET - ASME-B16.21														ARAMIDIC FIBER (13%)														
BOLTS																																
		1/4 4		ST.BOLT+2 NUTS+2 WASH. - ANSI Thdd - TB BUL 5368														ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED														
VALVES																																
pos.		Size from to		Data Sheet		Item Description								Ends		Rating/Facing		Material														
1		1 2		GA-E-67058		Bronze Gate-BB-Solid wdg-Thdd seat - MSS-SP80								FLGD		CL150 FF		Body: ASTM B148 UNS C95800 Trim : Ni-Aluminum Bronze - PTFE														
1		3 16		GA-E-67055		Gate-BB-FB-Flex wdg-Thdd seat - API600								FLGD		CL150 FF		Body: ASTM A216 WCB Trim : Inconel 625														
5		1 1		GA-E-67208		Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34								FLGD		CL150 FF		Body: ASTM B148 UNS C95800 Trim : Ni-Aluminum Bronze - PTFE														
6		2 2		GA-E-60719		Bronze Check-BB-FB-Swing-Integral seat - BS5154								FLGD		CL150 FF		Body: ASTM B148 UNS C95800 Trim : NI-Aluminum Bronze														
6		3 10		GA-E-60714		Check-BB- FB- Swing - API594								FLGD		CL150 FF		Body: ASTM A216 WCB Trim : Inconel 625														
8		1 2		GA-E-67192		Bronze Ball-End entry-FB-Floating ball - <MFR Std - Metallic>								FLGD		CL150 FF		Body: ASTM B148 UNS C95800 Trim : Soft seat-NI-AL.BRONZE trim - PTFE seats														
112		8 10		GA-E-67054		Gate-BB-FB-Solid wdg-Integral seat - MSS-SP-128								FLGD		CL150 FF		Body: ASTM A395 - FBE Lined Trim : Ni-Aluminum Bronze														
150		4 4		GA-E-67094		Gate-Ext. Stem (2000mm)-BB-FB-Flex wdg-Thdd seat - API600								FLGD		CL150 FF		Body: ASTM A216 WCB Trim : Inconel 625														
150		10 10		GA-E-67094		Gate-Ext. Stem (2000mm)-BB-FB-Flex wdg-Thdd seat - API600								FLGD		CL150 FF		Body: ASTM A216 WCB Trim : Inconel 625														
151		4 4		GA-E-67095		Gate-Ext. Stem (2400mm)-BB-FB-Flex wdg-Thdd seat - API600								FLGD		CL150 FF		Body: ASTM A216 WCB Trim : Inconel 625														
151		6 10		GA-E-67095		Gate-Ext. Stem (2400mm)-BB-FB-Flex wdg-Thdd seat - API600								FLGD		CL150 FF		Body: ASTM A216 WCB Trim : Inconel 625														



PIPING MATERIAL
SPECIFICATION

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032243

Piping Class:

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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
153	8	10	GA-E-67097	Gate-Ext. Stem (3000mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Inconel 625
154	6	6	GA-E-67098	Gate-Ext. Stem (3200mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Inconel 625
154	10	10	GA-E-67098	Gate-Ext. Stem (3200mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Inconel 625
154	12	12	GA-E-67098	Gate-Ext. Stem (3200mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Inconel 625
155	10	10	GA-E-67099	Gate-Ext. Stem (4100mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Inconel 625
156	10	12	GA-E-67300	Gate-Ext. Stem (4500mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Inconel 625
158	10	10	GA-E-60584	Gate-Ext. Stem (3600mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Inconel 625
162	4	10	GA-E-67390	Gate-Ext. Stem (1800mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Inconel 625
164	12	12	GA-E-67700	Gate-Ext. Stem (3200mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Inconel 625
690	8	10	GA-E-60708	Check-Flanged -Dual plate-Wldd seat - API594 - Buna-N lined	FLGD	CL150 FF	Body: ASTM A395 Trim : Ni-Al- Bronze - BUNA-N Lined
862	10	10	GA-E-67679	Ball- 3way -Split body -FB-Floating ball - ASME-B16.34	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Soft seat-AL.BRONZE trim - PTFE seats
902	2	8	GA-E-69073	Butterfly-Flanged-Double Off Set-Plastic seat - API609	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Sleeve/lined BUNA-N - PN 16 - C.S. disc
907	6	6	GA-E-69093	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 FF	Body: ASTM B148 UNS C95800 Trim : Soft seat-NI-AL.BRONZE trim - PTFE seats
908	2	6	GA-E-69006	Bronze Ball-End entry-FB-Floating ball - <MFR Std - Metallic>	FLGD	CL150 FF	Body: ASTM B148 UNS C95800 Trim : Soft seat-NI-AL.BRONZE trim - PTFE seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
9	10	10	GA-E-60647	Special Strainer, Basket Type-Bolted Cover - <MFR Std>	FLGD	CL150 FF	Body : ASTM A395 - FBE Lined Screen: 316 - PERF.PLATE - 18 Holes/Cm2

BRANCH TABLES

RunSize		90 Degrees																											
1	A																												
1 1/2	A	A																											
2	A	A	A																										
3	A	A	A	A																									
4	A	A	A	A	A																								
6	A	A	A	A	A	A																							
8	S	S	S	S	A	A	A																						
10	S	S	S	S	A	A	A	A																					
12	S	S	S	S	A	A	A	A	A																				
14	S	S	S	S	A	A	A	A	A	A																			
16	S	S	S	S	A	A	A	A	A	A	A																		
18	S	S	S	S	A	A	A	A	A	A	A	A																	
20	S	S	S	S	A	A	A	A	A	A	A	A	A																
24	S	S	S	S	A	A	A	A	A	A	A	A	A	A															
28	S	S	S	S	A	A	A	A	A	A	A	A	A	A	A														
30	S	S	S	S	A	A	A	A	A	A	A	A	A	A	A	A													
32	S	S	S	S	A	A	A	A	A	A	A	A	A	A	A	A	A												
40	S	S	S	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T											
44	S	S	S	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T										
48	S	S	S	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T									
52	S	S	S	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T								
56	S	S	S	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T							
60	S	S	S	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T						
BranchSize	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	28	30	32	40	44	48	52	56	60						
Legenda																													
A	TEE - BELL ENDS - <MFR Std - Plastic>																												
S	SADDLE WITH NIPPLE PE - <MFR Std - Plastic>																												
T	TEE - PE ENDS - <MFR Std - Plastic>																												



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 01FE0A02

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A	0	1	2	3

45 degrees


RunSize	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	28	30	32	40	44	48	52	56	60
1	Y																						
1 1/2	Y	Y																					
2	Y	Y	Y																				
3	Y	Y	Y	Y																			
4	Y	Y	Y	Y	Y																		
6	Y	Y	Y	Y	Y	Y																	
8	Y	Y	Y	Y	Y	Y	Y																
10	Y	Y	Y	Y	Y	Y	Y	Y															
12	Y	Y	Y	Y	Y	Y	Y	Y	Y														
14	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y													
16	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y												
18	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y											
20	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y										
24	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y									
28	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y								
30	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y							
32	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y						
40	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P					
44	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
48	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P			
52	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P		
56	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
60	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
BranchSize	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	28	30	32	40	44	48	52	56	60

Legenda

P	Y.TEE - PE ENDS - <MFR Std - Plastic>
Y	Y.TEE - BELL ENDS - <MFR Std - Plastic>

GENERAL NOTES

-GRP piping is designe din accordance with ISO 14692
-Wall thicknesses shall be calculated by the SUPPLIER, based on the design pressure, and ensuring that the wall thickness shall withstand the installation at completely buried condition. The burial depth will be provided by Purchaser. Be based on withstanding simultaneous hydraulic and external loads as well as a full vacuum. Purchaser responsible for stress calcs.

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243									
												Piping Class:						01FE0A03			
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						A		0													

Base Material : RTR-EPOXY										Design code : ASME B 31.3 2016											
Nom. Rating : CL150										PWHT : NO											
Facing/Finishing : FF										Valve Trim : Aluminum Bronze											
Corrosion Allow. : 0 mm										Welding Spec : ---											
Temp. Limit : 0 °C to 70 °C																					
Service: BR - Brine (AG) DR - Potentially Contaminated Open Drain (AG) OW - Oily Water (AG) OWS - Oily Water Sewer (AG) SWS - Sea Water Supply (AG) WW - Waste Water (AG)																					

Pipe Thickness											
NPS	1	1 1/2	2	3	4	6	8	10	12	14	
Thk.mm											
SCH.											

Nipple Thickness											
NPS											
Thk.mm											
SCH.											

PRESSURE - TEMPERATURE Ratings											
NPS	Press. bar	16									
1 - 4	Temp. °C	70									
NPS	Press. bar	3.5									
14 - 14	Temp. °C	65									

opt.	Size		Item Description	Ends	Rating/Facing	Material
from	to					

PIPE						
	1	14	PIPE - BELL & SPIGOT ENDS - <MFR Std - Plastic>	BELL\SPIGOT	PN16 PN20 PN16	RTR-EPOXY

FLANGES						
	1	4	BELL FLANGE - <MFR Std - Plastic> RTR-PN16	BELL	CL150 FF	RTR-EPOXY
	6	12	BELL FLANGE - <MFR Std - Plastic> RTR-PN20	BELL	CL150 FF	RTR-EPOXY
	14	14	BELL FLANGE - <MFR Std - Plastic> RTR-PN16	BELL	CL150 FF	RTR-EPOXY
3	3	3	BELL FLANGE - <MFR Std - Plastic> RTR-PN16	BELL	CL300 FF	RTR-EPOXY
	1	4	BLIND FLANGE - <MFR Std - Plastic> RTR-PN16		CL150 FF	RTR-EPOXY
	6	12	BLIND FLANGE - <MFR Std - Plastic> RTR-PN20		CL150 FF	RTR-EPOXY
	14	14	BLIND FLANGE - <MFR Std - Plastic> RTR-PN16		CL150 FF	RTR-EPOXY

SPECTACLE BLIND						
	1	14	SPECTACLE BLIND - ASME-B16.48		CL150 FF	ASTM B171 UNS C70600 (Ann.)

FITTINGS						
	1	14	ELBOW - BELL ENDS - <MFR Std - Plastic>	BELL	PN16 PN20 PN16	RTR-EPOXY
	1	14	REDUCER - BELL ENDS - <MFR Std - Plastic>	BELL	PN16 PN20 PN16	RTR-EPOXY
	1	14	CAP - PE END - <MFR Std - Plastic>	PE	PN16 PN20 PN16	RTR-EPOXY
	1	14	COUPLING - BELL ENDS - <MFR Std - Plastic>	BELL	PN16 PN20 PN16	RTR-EPOXY
	1	14	TEE - BELL ENDS - <MFR Std - Plastic>	BELL	PN16 PN20 PN16	RTR-EPOXY
	1	14	Y.TEE - BELL ENDS - <MFR Std - Plastic>	BELL	PN16 PN20 PN16	RTR-EPOXY

MISCELLANEOUS						
	1	2	SADDLE WITH NIPPLE PE - <MFR Std - Plastic>	PE\BW		RTR-EPOXY

GASKETS						
	1	14	FLAT NON MET. GASKET - ASME-B16.21			ARAMIDIC FIBER (13%)

BOLTS						
	1/4	4	ST.BOLT+2 NUTS+2 WASH. - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED

VALVES							
pos.	from	Size	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1	2	GA-E-67058	Bronze Gate-BB-Solid wdg-Thdd seat - MSS-SP80	FLGD	CL150 FF	Body: ASTM B148 UNS C95800 Trim : Ni-Aluminum Bronze - PTFE
1	3	14	GA-E-67055	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Inconel 625
2	8	8	GA-E-60543	Butterfly-Flanged-Double Off Set-Plastic seat - API609	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Sleeve/lined BUNA-N - PN 16 - C.S. disc
5	1	1	GA-E-67208	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	FLGD	CL150 FF	Body: ASTM B148 UNS C95800 Trim : Ni-Aluminum Bronze - PTFE
6	2	2	GA-E-60719	Bronze Check-BB-FB-Swing-Integral seat - BS5154	FLGD	CL150 FF	Body: ASTM B148 UNS C95800 Trim : Ni-Aluminum Bronze
6	3	10	GA-E-60714	Check-BB- FB- Swing - API594	FLGD	CL150 FF	Body: ASTM A216 WCB Trim : Inconel 625
8	2	2	GA-E-67192	Bronze Ball-End entry-FB-Floating ball - <MFR Std - Metallic>	FLGD	CL150 FF	Body: ASTM B148 UNS C95800 Trim : Soft seat-NI-AL.BRONZE trim - PTFE seats
112	8	10	GA-E-67054	Gate-BB-FB-Solid wdg-Integral seat - MSS-SP-128	FLGD	CL150 FF	Body: ASTM A395 - FBE Lined Trim : Ni-Aluminum Bronze
690	8	10	GA-E-60708	Check-Flanged -Dual plate-Wlidd seat - API594 - Buna-N lined	FLGD	CL150 FF	Body: ASTM A395 Trim : Ni-Al- Bronze - BUNA-N Lined



PIPING MATERIAL SPECIFICATION

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BRANCH TABLES

90 Degrees

RunSize

1	A												
1 1/2	A	A											
2	A	A	A										
3	A	A	A	A									
4	A	A	A	A	A								
6	A	A	A	A	A	A							
8	S	S	S	A	A	A	A						
10	S	S	S	A	A	A	A	A					
12	S	S	S	A	A	A	A	A	A				
14	S	S	S	A	A	A	A	A	A	A			
BranchSize	1	1 1/2	2	3	4	6	8	10	12	14			

Legenda

A	TEE - BELL ENDS - <MFR Std - Plastic>
S	SADDLE WITH NIPPLE PE - <MFR Std - Plastic>
T	TEE - PE ENDS - <MFR Std - Plastic>

45 degrees

RunSize

1	Y												
1 1/2	Y	Y											
2	Y	Y	Y										
3	Y	Y	Y	Y									
4	Y	Y	Y	Y	Y								
6	Y	Y	Y	Y	Y	Y							
8	Y	Y	Y	Y	Y	Y	Y						
10	Y	Y	Y	Y	Y	Y	Y	Y					
12	Y	Y	Y	Y	Y	Y	Y	Y	Y				
14	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
BranchSize	1	1 1/2	2	3	4	6	8	10	12	14			

Legenda

P	Y.TEE - PE ENDS - <MFR Std - Plastic>
Y	Y.TEE - BELL ENDS - <MFR Std - Plastic>

GENERAL NOTES

-GRP piping is designe din accordance with ISO 14692
 -Wall thicknesses shall be calculated by the SUPPLIER, based on the design pressure.Be based on withstanding simultaneous hydraulic and external loads as well as a full vacuum. Purchaser responsible for stress calcs.

<div><div><div>CCS</div><div>JV</div></div><div><div>MOZAMBIQUE</div><div>LNG</div></div></div>	PIPING MATERIAL SPECIFICATION										JOB 032243														
											Piping Class:										01FV0A01				
											Sh.		1		of		2		Rev.						
										A		0		1											

Base Material : RTR-VINYLESTER										Design code : ASME B 31.3 2016									
Nom. Rating : CL150										PWHT : NO									
Facing/Finishing : FF										Valve Trim : Soft seat-NI-AL.BRONZE trim - PTFE seats									
Corrosion Allow. : 0 mm										Welding Spec : ---									
Temp. Limit : 0 °C to 70 °C																			
Service: CH - Chemical																			
Pipe Thickness																			
NPS	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24					
Thk.mm																			
SCH.																			
Nipple Thickness																			
NPS																			
Thk.mm																			
SCH.																			
PRESSURE - TEMPERATURE Ratings																			
NPS	Press. bar	16																	
1 - 24	Temp. °C	70																	

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE

	1	24	PIPE - BELL & SPIGOT ENDS - <MFR Std - Plastic>	BELL\SPIGOT T	PN16	RTR-VINYLESTER
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FLANGES

	1	24	BELL FLANGE - <MFR Std - Plastic> RTR-PN16	BELL	CL150 FF	RTR-VINYLESTER
	1	24	BLIND FLANGE - <MFR Std - Plastic> RTR-PN16		CL150 FF	RTR-VINYLESTER

SPECTACLE BLIND

	1	14	SPECTACLE BLIND - ASME-B16.48		CL150 FF	ASTM B171 UNS C70600 (Ann.)
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FITTINGS

	1	24	ELBOW - BELL ENDS - <MFR Std - Plastic>	BELL	PN16	RTR-VINYLESTER
	1	24	REDUCER - BELL ENDS - <MFR Std - Plastic>	BELL	PN16	RTR-VINYLESTER
	1	24	CAP - PE END - <MFR Std - Plastic>	PE	PN16	RTR-VINYLESTER
	1	24	COUPLING - BELL ENDS - <MFR Std - Plastic>	BELL	PN16	RTR-VINYLESTER
	1	24	Y.TEE - BELL ENDS - <MFR Std - Plastic>	BELL	PN16	RTR-VINYLESTER
	1	24	TEE - BELL ENDS - <MFR Std - Plastic>	BELL	PN16	RTR-VINYLESTER

MISCELLANEOUS

	1	2	SADDLE WITH NIPPLE PE - <MFR Std - Plastic>	PE\BW		RTR-VINYLESTER
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GASKETS

	1	24	FLAT NON MET. GASKET - ASME-B16.21			ARAMIDIC FIBER (13%)
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BOLTS

	1/4	4	ST.BOLT+2 NUTS+2 WASH. - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED
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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
8	2	2	GA-E-67192	Bronze Ball-End entry-FB-Floating ball - <MFR Std - Metallic>	FLGD	CL150 FF	Body: ASTM B148 UNS C95800 Trim : Soft seat-NI-AL.BRONZE trim - PTFE seats

BRANCH TABLES											
90 Degrees											
RunSize											
1	A										
1 1/2	A	A	A								
2	A	A	A	A							
3	A	A	A	A	A						
4	A	A	A	A	A	A					
6	A	A	A	A	A	A	A				
8	S	S	S	A	A	A	A	A			
10	S	S	S	A	A	A	A	A	A		
12	S	S	S	A	A	A	A	A	A	A	
14	S	S	S	A	A	A	A	A	A	A	A
16	S	S	S	A	A	A	A	A	A	A	A
18	S	S	S	A	A	A	A	A	A	A	A
20	S	S	S	A	A	A	A	A	A	A	A
24	S	S	S	A	A	A	A	A	A	A	A
BranchSize											
1	1 1/2	2	3	4	6	8	10	12	14	16	18
2											
3											
4											
6											
8											
10											
12											
14											
16											
18											
20											
24											
Legenda											
A	TEE - BELL ENDS - <MFR Std - Plastic>										
S	SADDLE WITH NIPPLE PE - <MFR Std - Plastic>										
T	TEE - PE ENDS - <MFR Std - Plastic>										


<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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<table><tr><td>NPS</td><td>Press. bar</td><td>19.65</td><td colspan="31">ASME B16.5</td></tr><tr><td>1/2 - 12</td><td>Temp. °C</td><td>37.78</td><td colspan="31">Material Group 1.1</td></tr></table>																																		NPS	Press. bar	19.65	ASME B16.5																															1/2 - 12	Temp. °C	37.78	Material Group 1.1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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BRANCH TABLES

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:	01PD0H01				
		Sh. 2 of 2	Rev.				
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GENERAL NOTES

- 1) If not already epoxy coated, buried metallic Flanges and Blind Flanges shall be FBE external coated in accordance with Specification MZ-000-CCX-MC-SPC-00004 External Coating for Buried Pipeline and Piping Components-FBE and FJC
- 2) Gaskets are not required at joints between HDPE flange adaptors. Gasket are required when transitioning HDPE flange adaptors to non-lined metallic flanges
- 3) Bolts shall be torqued in accordance to HDPE manufacturer recommended torque values.
- 4) HDPE Pipe and Fittings materials shall be in accordance with ASTM D3350 CL.345464C- PE 3608. CL. 445574C - PE 4710 is considered an acceptable alternative.
- 5) Wall thickness shall be determined by Supplier in accordance with IPS Sizing System (ASTM F714/D3261) and Dimension Ratio DR9.
- 6) The Supplier shall be responsible for the design and the pressure rating of pipes and fittings. The components shall be resistant to full vacuum condition.
- 7) The supplier shall have responsibility for performing pipe stress analysis of the HDPE piping system.


	PIPING MATERIAL SPECIFICATION										JOB 032243									
											Piping Class: 01PD0H70									
Base Material : HDPE					Design code : ASME B 31.3 2016															
Nom. Rating : CL150					PWHT : NO															
Facing/Finishing : FF					Valve Trim : Bronze															
Corrosion Allow. : 0 mm					Welding Spec : ---															
Temp. Limit : 0 °C to 35 °C																				
Service: FW - Fire Water (UG)																				
Pipe Thickness																				
NPS	3	4	6	8	10	12	14	16	18	20	24									
Thk.mm																				
SCH.																				
Nipple Thickness																				
NPS																				
Thk.mm																				
SCH.																				
PRESSURE - TEMPERATURE Ratings																				
NPS	Press. bar	16																		
3 - 24	Temp. °C	35																		
opt.	from	Size to	Item Description						Ends	Rating/Facing	Material									
PIPE																				
	3	24	PIPE - PE ENDS - <MFR Std - Plastic>						PE	PN16	ASTM D3350 PE 3608 - Fire Water - FM Certified									
FLANGES																				
	3	24	LJ FLANGE - ASME-B16.5 HDPE-PN16								ASTM A536 GR.65-45-12									
	3	24	BLIND FLANGE - ASME-B16.5 HDPE-PN16							CL150 FF	ASTM A536 GR.65-45-12									
FITTINGS																				
	3	24	FLANGE ADAPTER - PE END - ASTM F2880						PE/FLGD	CL150 FF	ASTM D3350 PE 3608 - Fire Water - FM Certified									
	3	24	ELBOW - PE ENDS - <MFR Std - Plastic>						PE	PN16	ASTM D3350 PE 3608 - Fire Water - FM Certified									
	3	24	REDUCER - PE ENDS - <MFR Std - Plastic>						PE	PN16	ASTM D3350 PE 3608 - Fire Water - FM Certified									
	3	24	CAP - PE END - <MFR Std - Plastic>						PE	PN16	ASTM D3350 PE 3608 - Fire Water - FM Certified									
	3	24	TEE - PE ENDS - <MFR Std - Plastic>						PE	PN16	ASTM D3350 PE 3608 - Fire Water - FM Certified									
GASKETS																				
	3	24	FLAT NON MET. GASKET - ASME-B16.21								NEOPRENE									
BOLTS																				
	1/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368								ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED									
VALVES																				
pos.	from	Size to	Data Sheet	Item Description					Ends	Rating/Facing	Material									
1	4	24	GA-E-67052	Gate-BB-FB-Solid wdg-Integral seat - MSS SP 128 - UL/FM Certified - Extended stem					FLGD	CL150 FF	Body: ASTM A395 Trim : Bronze - Rubber coated									

BRANCH TABLES

RunSize		90 Degrees											
3	A												
4	A	A											
6	A	A	A										
8	A	A	A	A									
10	A	A	A	A	A								
12	A	A	A	A	A	A							
14	A	A	A	A	A	A	A						
16	A	A	A	A	A	A	A	A					
18	A	A	A	A	A	A	A	A	A				
20	A	A	A	A	A	A	A	A	A	A			
24	A	A	A	A	A	A	A	A	A	A	A		
BranchSize	3	4	6	8	10	12	14	16	18	20	24		
Legenda													
A	TEE - PE ENDS - <MFR Std - Plastic>												

GENERAL NOTES

- 1) If not already Epoxy coated, buried metallic Flanges and Blind Flanges shall be FBE external coated in accordance with Specification MZ-000-CCX-MC-SPC-00004 External Coating for Buried Pipeline and Piping Components-FBE and FJC
- 2) Gaskets are not required at joints between HDPE flange adaptors. Gasket are required when transitioning HDPE flange adapters to non-lined metallic flanges
- 3) Bolts shall be torqued in accordance to HDPE manufacturer recommended torque values.
- 4) HDPE Pipe and Fittings materials shall be in accordance with ASTM D3350 CL.345464C PE 3608. CL. 445574C PE 4710 is considered an acceptable alternative.
- 5) Wall thickness shall be determined by Supplier in accordance with IPS Sizing System (ASTM F714/D3261) and Dimension Ratio DR7.
- 6) The Supplier shall be responsible for the design and the pressure rating of pipes and fittings. The components shall be resistant to full vacuum condition.
- 7) The supplier shall have responsibility for performing pipe stress analysis of the HDPE piping system.

<div></div>			PIPING MATERIAL SPECIFICATION			JOB 032243				
						Piping Class: 01SA0B01				
						Sh. 2 of 4				
						Rev.				
						A	0	1	2	3

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material	
FITTINGS							
	8	48	TEE - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD	
	52	72	TEE - TB RAC 5061	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD	
	1/2	8	WELDOLET - MSS-SP97	BW		ASTM A182 F304/304L DUAL GRADE	
GASKETS							
	28	60	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE	
	72	72	FLAT GASKET - GROOVED - <MFR Std> GA-E-060013			AISI 316L+GRAPHITE	
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING	
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304	
73	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304	
73	30	36	OCTAGONAL RJ GASKET - <MFR Std> GA-E-060018			AISI 304	
73	52	52	OCTAGONAL RJ GASKET - <MFR Std> GA-E-060018			AISI 304	
BOLTS							
	1/2	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A320 B8 CL.2 + ASTM A194 GR.8	
	1 5/8	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A453 GR. 660	
995	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A453 GR. 660 - PTFE COATED	
VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60142	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
1	2	24	GA-E-60143	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
2	26	48	GA-E-60505	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
2	50	56	GA-E-60522	Special Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
4	1/2	1 1/2	GA-E-60234	Globe-BB-Red B.-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	12	GA-E-60235	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
5	1/2	1 1/2	GA-E-67204	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	1/2	1 1/2	GA-E-60341	Check-BB-Red.B-Piston-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60342	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60343	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	2	3	GA-E-60438	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
7	6	6	GA-E-60438	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60439	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60437	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60784	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-67026	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
13	2	24	GA-E-60150	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
14	1/2	1 1/2	GA-E-60140	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
14	2	24	GA-E-67002	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
62	2	10	GA-E-60700	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
62	12	24	GA-E-60741	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
63	2	2	GA-E-60355	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
80	1/2	1 1/2	GA-E-67129	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
82	1/2	1 1/2	GA-E-67130	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	6	24	GA-E-60785	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60476	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60593	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	24	GA-E-60590	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
103	2	2	GA-E-60594	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
140	3	4	GA-E-67358	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
141	3/4	3/4	GA-E-67702	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602-Interlock System	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF

	PIPING MATERIAL SPECIFICATION	JOB 032243																
		Piping Class:		01SA0B01														
		Sh.	3	of	4	Rev. <table><tr><td>A</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					A	0	1	2	3			
A	0	1	2	3														

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
201	56	56	GA-E-60532	Special Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
241	56	56	GA-E-60544	Special Butterfly-Limit Switch-Interlock System-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
401	2	12	GA-E-60280	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
701	3	6	GA-E-67166	Ball-Stem Extension-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
701	8	24	GA-E-67254	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67131	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
801	2	2	GA-E-67255	Ball-Stem Extension-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
801	6	24	GA-E-67110	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
824	4	4	GA-E-67612	Ball-Split body-FB-Floating ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
824	6	12	GA-E-67608	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
840	8	14	GA-E-67609	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
841	16	16	GA-E-67610	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
907	2	6	GA-E-69007	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
936	6	6	GA-E-69099	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
972	8	24	GA-E-69048	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
973	2	6	GA-E-69047	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PTFE seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	6	GA-E-60629	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A403 WP304S/304LS DUAL GRADE - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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GENERAL NOTES

1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.

2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).

3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

4) Specified Thickness are suitable to withstand Full Vacuum condition.

<div> MOZAMBIQUE LNG</div>		PIPING MATERIAL SPECIFICATION														JOB 032243													
																Piping Class: 01SA0B30													
																Sh. 1 of 3		Rev.											
A	0	1	2	3																									
Base Material : STAINLESS STEEL 304/304L DUAL GRADE														Design code : ASME B 31.3 2016															
Nom. Rating : CL150														PWHT : NO															
Facing/Finishing : RF														Valve Trim : 12 - SS316/HF															
Corrosion Allow. : 0 mm														Welding Spec : MZ-000-CCX-MC-SPC-00009/00013															
Temp. Limit : -196 °C to 175 °C																													
Service: [Cryogenic Service] BOG - Boil Off Gas LIN - Liquid Nitrogen LNG - Liquefied Natural Gas MR - Mixed Refrigerant																													
Pipe Thickness																													
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	26	28	30	32	36	40	42	48	52	54			
Thk.mm	2.77	2.87	3.38	3.68	3.91	3.05	3.05	3.4	3.76	4.19	4.57	4.78	4.78	4.78	5.54	6.35	6.35	7.92	7.92	9.53	9.53	11.13	11.13	12.7	12.7	14.27			
SCH.	40S	40S	40S	40S	40S	10S	10S	10S	10S	10S	10S	10S	10S	10S	10S	10S			10S										
	56	60																											
	14.27	15.88																											
Nipple Thickness																													
NPS	1/2	3/4	1	1 1/2	2																								
Thk.mm	3.73	3.91	4.55	5.08	5.54																								
SCH.	80S	80S	80S	80S	80S																								
PRESSURE - TEMPERATURE Ratings																													
NPS	Press. bar	18.96	15.86	14.13	ASME B16.5/ASME B16.47																								
1/2 - 48	Temp. °C	37.78	93.33	148.9	Material Group 2.1																								
NPS	Press. bar	3.5																											
52 - 60	Temp. °C	175																											
opt.	from	Size to	Item Description											Ends	Rating/Facing	Material													
PIPE																													
	1/2	6	PIPE											BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS													
	8	60	PIPE											BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW													
FLANGES																													
	1/2	24	WN FLANGE - ASME-B16.5											BW	CL150 RF	ASTM A182 F304/304L DUAL GRADE													
	26	60	WN FLANGE - ASME-B16.47 series.A											BW	CL150 RF	ASTM A182 F304/304L DUAL GRADE													
3	1/2	24	WN FLANGE - ASME-B16.5											BW	CL300 RF	ASTM A182 F304/304L DUAL GRADE													
3	26	60	WN FLANGE - ASME-B16.47 series.A											BW	CL300 RF	ASTM A182 F304/304L DUAL GRADE													
5	1/2	24	WN FLANGE - ASME-B16.5											BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE													
5	26	60	WN FLANGE - ASME-B16.47 series.A											BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE													
14	1/2	1/2	THD FLANGE - ASME-B16.5											THDF	CL150 RF	ASTM A182 F304/304L DUAL GRADE													
73	1/2	2	WN FLANGE - ASME-B16.5											BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE													
	1/2	24	BLIND FLANGE - ASME-B16.5												CL150 RF	ASTM A182 F304/304L DUAL GRADE													
	26	60	BLIND FLANGE - ASME-B16.47 series.A												CL150 RF	ASTM A182 F304/304L DUAL GRADE													
3	1/2	24	BLIND FLANGE - ASME-B16.5												CL300 RF	ASTM A182 F304/304L DUAL GRADE													
5	1/2	24	BLIND FLANGE - ASME-B16.5												CL600 RF	ASTM A182 F304/304L DUAL GRADE													
3	2	2	WN REDUCING FLANGE - ASME-B16.5											BW	CL300 RF	ASTM A182 F304/304L DUAL GRADE													
14	3/4	2	THDD RED. FLANGE - ASME-B16.5											THDF	CL150 RF	ASTM A182 F304/304L DUAL GRADE													
34	2	2	THDD RED. FLANGE - ASME-B16.5											THDF	CL300 RF	ASTM A182 F304/304L DUAL GRADE													
SPECTACLE BLIND																													
	1/2	24	BLIND & SPACER - ASME-B16.48												CL150 RF	ASTM A240 TP304													
	28	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060013												CL150 RF	ASTM A240 TP304													
	36	36	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060013												CL150 RF	ASTM A240 TP304													
	40	40	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060013												CL150 RF	ASTM A240 TP304													
	52	52	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060013												CL150 RF	ASTM A240 TP304													
	60	60	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060013												CL150 RF	ASTM A240 TP304													
3	1/2	24	BLIND & SPACER - ASME-B16.48												CL300 RF	ASTM A240 TP304													
5	1/2	24	BLIND & SPACER - ASME-B16.48												CL600 RF	ASTM A240 TP304													
FITTINGS																													
	1/2	3	DRIP-RING - TB DRI 5011												CL150 RF	ASTM A182 F304/304L DUAL GRADE													
	1/2	6	LONG RADIUS ELBOW - ASME-B16.9											BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS													
	8	48	LONG RADIUS ELBOW - ASME-B16.9											BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD													
	50	60	LONG RADIUS ELBOW - TB RAC 5060											BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD													
	3/4	6	REDUCER - ASME-B16.9											BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS													
	8	48	REDUCER - ASME-B16.9											BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD													
	50	60	REDUCER, LARGE BORE - TB RAC 5062											BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD													
	1/2	48	CAP - ASME-B16.9											BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS													
	50	60	CAP - TB RAC 5064											BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD													
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11											THDM		ASTM A182 F304/304L DUAL GRADE													
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10											THDMPE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS													
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95											PE\THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS													
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95											PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS													
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95											THDMPE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS													
	1/2	6	TEE - ASME-B16.9											BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS													
	8	48	TEE - ASME-B16.9											BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD													
	52	60	TEE - TB RAC 5061											BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD													
	1/2	8	WELDOLET - MSS-SP97											BW		ASTM A182 F304/304L DUAL GRADE													
GASKETS																													
	26	60	FLAT GASKET - GROOVED - <MFR Std>													AISI 316L+GRAPHITE													
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20													304 SS+GRAPH 98% - 304 OUT.RING													
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20													AISI 304													
BOLTS																													
	1/2	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368											ASTM A320 B8 CL.2 + ASTM A194 GR.8															
	1 5/8	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368											ASTM A453 GR. 660															



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 01SA0B30

Rev.				
A	0	1	2	3

Sh. 2 of 3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60144	Cryo.Gate-Extend.BB-Red.B-Solid wdg-Wldd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
1	2	24	GA-E-60145	Cryo.Gate-Extend.BB-FB-Flex wdg-Thd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
1	26	30	GA-E-67008	Cryo.Gate-Extend.BB-FB-Flex wdg-Thd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
2	26	48	GA-E-60507	Cryog.Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
2	50	60	GA-E-60528	Cryog.Butterfly-Flanged-Triple Offset-Int.seat-Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
4	1/2	1 1/2	GA-E-60236	Cryo.Globe-Extend.BB-Red.B-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	12	GA-E-60238	Cryo.Globe-Extend.BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	1/2	1 1/2	GA-E-60344	Cryo.Check-BB-Red.B-Piston-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60345	Cryo.Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60346	Cryo.Check-Flanged-Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	2	4	GA-E-60441	Cryo.Ball-Ext.bnt-Split body-Red.B-Float.ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
7	6	6	GA-E-60441	Cryo.Ball-Ext.bnt-Split body-Red.B-Float.ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
7	8	24	GA-E-60442	Cryo.Ball-Ext.bnt-Split body-Red.B-Trun.ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
8	1/2	1 1/2	GA-E-60440	Cryo.Ball-Ext.bnt-Split body-FB-Floating ball - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Crio Soft seal-316 trim - KEL.F seats
8	2	3	GA-E-67147	Cryo.Ball-Ext.bnt-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
8	6	24	GA-E-67148	Cryo.Ball-Ext.bnt-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
11	1	1	GA-E-67349	Cryo.Gate-Extend.BB-Red.B-Solid wdg-Wldd seat - API602	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
19	1/2	1 1/2	GA-E-67041	Cryo.Gate-Extend.BB-Red.B-Solid wdg-Wldd seat - API602	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
62	2	10	GA-E-60701	Cryo.Check-Flanged-Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
73	2	2	GA-E-60450	Cryo.Ball-Ext.bnt-Split body-Red.B-Float.ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
73	3	3	GA-E-60450	Cryo.Ball-Ext.bnt-Split body-Red.B-Float.ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
83	1/2	1 1/2	GA-E-60449	Cryo.Ball-Ext.bnt-Split body-FB-Floating ball - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Crio Soft seal-316 trim - KEL.F seats
140	4	4	GA-E-67359	Cryo.Gate-Extend.BB-FB-Flex wdg-Thd seat - API600- Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
240	36	36	GA-E-60542	Cryog.Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609 - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
241	60	60	GA-E-60545	Cryog.Butterfly-Interlock System-Limit Switch-Flanged-Triple Offset-Int.seat-Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
840	8	12	GA-E-67611	Cryo.Ball-Ext.bnt-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
920	24	24	GA-E-69084	Cryog.Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
920	30	30	GA-E-69083	Cryog.Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	36	36	GA-E-60633	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES



PIPING MATERIAL SPECIFICATION


JOB
032243

Piping Class: **01SA0B60**

Sh. 2 of 3				Rev.			
A	0	1					

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
BOLTS						
	1/2	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A320 B8 CL.2 + ASTM A194 GR.8
	1 5/8	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A453 GR. 660
995	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A453 GR. 660 - PTFE COATED

VALVES								
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material	
1	1/2	1 1/2	GA-E-60142	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF	
1	2	24	GA-E-60143	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :316 / HF	
2	26	48	GA-E-60505	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :Metal seat - 316 - 316 disc	
2	50	56	GA-E-60522	Special Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :Metal seat - 316 - 316 disc	
4	1/2	1 1/2	GA-E-60234	Globe-BB-Red B.-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF	
4	2	12	GA-E-60235	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :316 / HF	
5	1/2	1 1/2	GA-E-67204	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF	
6	1/2	1 1/2	GA-E-60341	Check-BB-Red.B-Piston-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF	
6	2	10	GA-E-60342	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :316 / HF	
6	12	24	GA-E-60343	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :316 / HF	
7	2	6	GA-E-60438	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :Soft seat-316 trim - RPTFE seats	
7	8	24	GA-E-60439	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :Soft seat-316 trim - RPTFE seats	
8	1/2	1 1/2	GA-E-60437	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim :Soft seat-316 trim - RPTFE seats	
8	6	24	GA-E-60784	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :Soft seat-316 trim - RPTFE seats	
10	1/2	1 1/2	GA-E-67026	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF	
13	2	24	GA-E-60150	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim :316 / HF	
14	1/2	1 1/2	GA-E-60140	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF	
14	2	24	GA-E-67002	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :316 / HF	
62	2	10	GA-E-60700	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :316 / HF	
80	1/2	1 1/2	GA-E-67129	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim :Soft seat-316 trim - RPTFE seats	
82	1/2	1 1/2	GA-E-67130	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim :Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
82	6	24	GA-E-60785	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
89	1/2	1 1/2	GA-E-60476	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
101	1/2	1 1/2	GA-E-60593	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF	
101	2	24	GA-E-60590	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :316 / HF	
103	2	2	GA-E-60594	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim :316 / HF	
140	8	8	GA-E-67358	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :316 / HF	
250	56	56	GA-E-60534	Special Butterfly-Ext. Stem (2100mm)-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :Metal seat - 316 - 316 disc	
401	2	12	GA-E-60280	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :316 / HF	
701	6	6	GA-E-67166	Ball-Stem Extension-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :Soft seat-316 trim - RPTFE seats	
701	24	24	GA-E-67254	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :Soft seat-316 trim - RPTFE seats	
801	1/2	1 1/2	GA-E-67131	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim :Soft seat-316 trim - RPTFE seats	
801	6	24	GA-E-67110	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :Soft seat-316 trim - RPTFE seats	
824	6	20	GA-E-67608	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
850	12	12	GA-E-67264	Ball-Ext. Stem (1300mm)-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim :Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
853	12	12	GA-E-67644	Ball-Ext. Stem (1300mm)-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim :Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243					
												Piping Class:		01SA0B61			
												Sh. 1 of 2		Rev. A 0			
Base Material : STAINLESS STEEL 304/304L DUAL GRADE										Design code : ASME B 31.3 2016							
Nom. Rating : CL150										PWHT : NO							
Facing/Finishing : RF										Valve Trim : 12 - SS316/HF							
Corrosion Allow. : 0 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013							
Temp. Limit : -196 °C to 175 °C																	
Service: [AIV] [Cryogenic Service] BOG - Boil Off Gas LIN - Liquid Nitrogen LNG - Liquefied Natural Gas MR - Mixed Refrigerant																	
Pipe Thickness																	
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Thk.mm	2.77	2.87	3.38	3.68	3.91	3.05	3.05	3.4	3.76	4.19	4.57	4.78	4.78	4.78	5.54	6.35	
SCH.	40S	40S	40S	40S	40S	10S	10S	10S	10S	10S	10S	10S	10S	10S	10S	10S	
Nipple Thickness																	
NPS	1/2	3/4	1	1 1/2	2												
Thk.mm	3.73	3.91	4.55	5.08	5.54												
SCH.	80S	80S	80S	80S	80S												
PRESSURE - TEMPERATURE Ratings																	
NPS	Press. bar	18.96	15.86	14.13	ASME B16.5												
1/2 - 24	Temp. °C	37.78	93.33	148.9	Material Group 2.1												
opt.	Size from to		Item Description							Ends	Rating/Facing	Material					
PIPE																	
	1/2	6	PIPE							BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS					
	8	60	PIPE							BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW					
FLANGES																	
3	1/2	24	WN FLANGE - ASME-B16.5							BW	CL150 RF	ASTM A182 F304/304L DUAL GRADE					
	1/2	24	WN FLANGE - ASME-B16.5							BW	CL300 RF	ASTM A182 F304/304L DUAL GRADE					
5	1/2	24	WN FLANGE - ASME-B16.5							BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE					
14	1/2	1/2	THD FLANGE - ASME-B16.5							THDF	CL150 RF	ASTM A182 F304/304L DUAL GRADE					
73	1/2	2	WN FLANGE - ASME-B16.5							BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE					
	1/2	24	BLIND FLANGE - ASME-B16.5								CL150 RF	ASTM A182 F304/304L DUAL GRADE					
3	1/2	24	BLIND FLANGE - ASME-B16.5								CL300 RF	ASTM A182 F304/304L DUAL GRADE					
5	1/2	24	BLIND FLANGE - ASME-B16.5								CL600 RF	ASTM A182 F304/304L DUAL GRADE					
3	2	2	WN REDUCING FLANGE - ASME-B16.5							BW	CL300 RF	ASTM A182 F304/304L DUAL GRADE					
14	3/4	2	THDD RED. FLANGE - ASME-B16.5							THDF	CL150 RF	ASTM A182 F304/304L DUAL GRADE					
34	2	2	THDD RED. FLANGE - ASME-B16.5							THDF	CL300 RF	ASTM A182 F304/304L DUAL GRADE					
SPECTACLE BLIND																	
	1/2	24	BLIND & SPACER - ASME-B16.48								CL150 RF	ASTM A240 TP304					
3	1/2	24	BLIND & SPACER - ASME-B16.48								CL300 RF	ASTM A240 TP304					
5	1/2	24	BLIND & SPACER - ASME-B16.48								CL600 RF	ASTM A240 TP304					
FITTINGS																	
	1/2	3	DRIP-RING - TB DRI 5011								CL150 RF	ASTM A182 F304/304L DUAL GRADE					
	1/2	6	LONG RADIUS ELBOW - ASME-B16.9							BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	8	24	LONG RADIUS ELBOW - ASME-B16.9							BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD					
	3/4	6	REDUCER - ASME-B16.9							BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	8	24	REDUCER - ASME-B16.9							BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD					
	1/2	24	CAP - ASME-B16.9							BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11							THDM		ASTM A182 F304/304L DUAL GRADE					
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10							THDMPE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS					
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95							PE/THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95							THDMPE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95							PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	1/2	6	TEE - ASME-B16.9							BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	8	24	TEE - ASME-B16.9							BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD					
	2	8	SPECIAL SWEEPOLET - <MFR Std>							BW		ASTM A182 F304/304L DUAL GRADE					
GASKETS																	
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20									304 SS+GRAPH 98% - 304 OUT.RING					
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20									AISI 304					
BOLTS																	
	1/2	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368									ASTM A320 B8 CL.2 + ASTM A194 GR.8					
	1 5/8	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368									ASTM A453 GR. 660					
VALVES																	
pos.	Size from to		Data Sheet	Item Description						Ends	Rating/Facing	Material					
1	1/2	1 1/2	GA-E-60144	Cryo.Gate-Extend.BB-Red.B-Solid wdg-Wldd seat - API602						BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF					
1	2	24	GA-E-60145	Cryo.Gate-Extend.BB-FB-Flex wdg-Thd seat - API600						FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF					
4	1/2	1 1/2	GA-E-60236	Cryo.Globe-Extend.BB-Red.B-Thdd seat - API602						BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF					
4	2	12	GA-E-60238	Cryo.Globe-Extend.BB-Disk-Thdd seat - API 623						FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF					
6	1/2	1 1/2	GA-E-60344	Cryo.Check-BB-Red.B-Piston-Thdd seat - API602						BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF					
6	2	10	GA-E-60345	Cryo.Check-BB- FB- Swing - API594						FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF					
6	12	24	GA-E-60346	Cryo.Check-Flanged-Dual plate-Wldd seat - API594						FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF					
7	2	4	GA-E-60441	Cryo.Ball-Ext.bnt-Split body-Red.B-Float.ball - API6D						FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats					
7	6	6	GA-E-60441	Cryo.Ball-Ext.bnt-Split body-Red.B-Float.ball - API6D						FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats					



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 01SA0B61

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A 0

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
7	8	24	GA-E-60442	Cryo.Ball-Ext.bnt-Split body-Red.B-Trun.ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
8	1/2	1 1/2	GA-E-60440	Cryo.Ball-Ext.bnt-Split body-FB-Floating ball - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Crio Soft seal-316 trim - KEL.F seats
8	2	3	GA-E-67147	Cryo.Ball-Ext.bnt-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
8	6	24	GA-E-67148	Cryo.Ball-Ext.bnt-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats



BRANCH TABLES

90 Degrees

RunSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
1/2	T															
3/4	T	T														
1	T	T	T													
1 1/2	T	T	T	T												
2					T											
3					T	T										
4					T	T	T									
6					SW	T	T	T								
8					SW	SW	T	T	T							
10					SW	SW	T	T	T	T						
12					SW	SW	SW	T	T	T	T					
14					SW	SW	SW	T	T	T	T	T				
16					SW	SW	SW	T	T	T	T	T	T			
18					SW	SW	SW	SW	T	T	T	T	T	T		
20					SW	SW	SW	SW	T	T	T	T	T	T	T	
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
Legenda																
SW	SPECIAL SWEEPOLET - <MFR Std>															
T	TEE - ASME-B16.9															

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 3) Specified Thickness are suitable to withstand Full Vacuum condition.

<div> </div>			PIPING MATERIAL SPECIFICATION				JOB 032243						
							Piping Class:		01SA0S01				
							Sh. 2 of 3		Rev. A 0 1 2 3				
opt.	Size from to		Item Description	Ends	Rating/Facing	Material							
FITTINGS													
	52	56	TEE - TB RAC 5061	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD							
	2	8	WELDOLET - MSS-SP97	BW		ASTM A182 F304/304L DUAL GRADE							
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A182 F304/304L DUAL GRADE							
MISCELLANEOUS													
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5		CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)							
GASKETS													
12	1/2	24	FLAT NON MET. GASKET - ASME-B16.21			ARAMIDIC FIBER (13%)							
	26	56	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE							
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING							
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304							
73	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304							
73	36	36	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304							
BOLTS													
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED							
VALVES													
pos.	Size from to		Data Sheet	Item Description	Ends	Rating/Facing	Material						
1	1/2	1 1/2	GA-E-60146	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF						
1	2	24	GA-E-60143	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF						
1	30	30	GA-E-67348	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF						
2	36	36	GA-E-60505	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc						
2	52	52	GA-E-60522	Special Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc						
4	1/2	1 1/2	GA-E-60239	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF						
4	2	12	GA-E-60235	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF						
5	1/2	1 1/2	GA-E-67202	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF						
6	1/2	1 1/2	GA-E-60347	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF						
6	2	10	GA-E-60342	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF						
6	12	24	GA-E-60343	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF						
7	2	6	GA-E-60438	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats						
7	8	24	GA-E-60439	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats						
8	1/2	1 1/2	GA-E-60437	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats						
8	2	4	GA-E-60783	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats						
8	6	24	GA-E-60784	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats						
10	1/2	1 1/2	GA-E-60178	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF						
11	1/2	1 1/2	GA-E-67022	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF						
11	2	10	GA-E-60195	Gate-BB-FB-Flex wdg-Thdd seat - API600	BW	CL150	Body: ASTM A351 CF8M Trim : 316 / HF						
13	2	24	GA-E-60150	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF						
14	2	24	GA-E-67002	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF						
43	2	2	GA-E-60243	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF						
62	1	1	GA-E-60723	Check-BB-Red.B-Swing-Thdd seat - API602	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF						
62	2	3	GA-E-60700	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF						
62	20	20	GA-E-60741	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF						
82	6	24	GA-E-60785	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.						
89	1/2	1 1/2	GA-E-60475	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.						
101	1/2	1 1/2	GA-E-67016	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF						
101	2	3	GA-E-60590	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF						
103	2	2	GA-E-60594	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF						
110	1/2	1 1/2	GA-E-67325	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF						
130	1/2	1 1/2	GA-E-67083	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF						



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 01SA0S01

Rev.					
A	0	1	2	3	

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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
140	2	12	GA-E-67358	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
144	3	3	GA-E-67360	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
160	3	8	GA-E-67310	Gate-Ext. Stem (1400mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
241	52	52	GA-E-60546	Special Butterfly-Interlock System-Limit Switch-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
801	1/2	1 1/2	GA-E-67131	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
810	4	4	GA-E-67270	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
824	4	4	GA-E-67612	Ball-Split body-FB-Floating ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
824	8	16	GA-E-67608	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
840	2	2	GA-E-67613	Ball-Split body-FB-Floating ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
840	6	6	GA-E-67609	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
840	14	14	GA-E-67609	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
907	2	6	GA-E-69007	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
973	2	6	GA-E-69047	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PTFE seats

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	6	GA-E-60629	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A403 WP304S/304LS DUAL GRADE - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																						
1/2	A																							
3/4	A	A																						
1	A	A	A																					
1 1/2	A	A	A	A																				
2	S	S	T	T	T																			
3	S	S	S	S	S	W	T																	
4	S	S	S	S	S	W	T	T																
6	S	S	S	S	S	W	W	T	T															
8	S	S	S	S	S	W	W	W	T	T														
10	S	S	S	S	S	W	W	W	W	T	T													
12	S	S	S	S	S	W	W	W	W	W	T	T												
14	S	S	S	S	S	W	W	W	W	W	P	T	T											
16	S	S	S	S	S	W	W	W	W	W	P	P	T	T										
18	S	S	S	S	S	W	W	W	W	W	T	T	T	T	T									
20	S	S	S	S	S	W	W	W	W	W	T	T	T	T	T	T								
24	S	S	S	S	S	W	W	W	W	W	P	T	T	T	T	T	T							
30	S	S	S	S	S	W	W	W	W	W	P	P	P	T	T	T	T	T						
36	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	T	T					
42	S	S	S	S	S	W	W	W	W	W	P	P	P	T	T	T	T	T	T					
48	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	T	T	T				
52	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	T1	T1	T1	T1			
56	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	T1	T1	T1	T1	T1		
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	52	56		
Legenda																								
A	TEE - SW ENDS - ASME-B16.11																							
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																							
S	SOCKOLET - SW END - MSS-SP97																							
T	TEE - ASME-B16.9																							
T1	TEE - TB RAC 5061																							
W	WELDOLET - MSS-SP97																							

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 4) Specified Thickness are suitable to withstand Full Vacuum condition.

		PIPING MATERIAL SPECIFICATION														JOB 032243																			
																Piping Class:					01SA0S02														
																Sh.		1 of 3		Rev.															
		A		0		1		2		3																									
Base Material : STAINLESS STEEL 304/304L DUAL GRADE																		Design code : ASME B 31.3 2016																	
Nom. Rating : CL150																		PWHT : NO																	
Facing/Finishing : RF																		Valve Trim : 12 - SS316/HF																	
Corrosion Allow. : 0 mm																		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																	
Temp. Limit : -5 °C to 180 °C																																			
Service: [Amine Service] AD - Amine Drain AG - Acid Gas AL - Amine Lean AR - Amine Rich DMW - Demineralized Water PRW - Process Water																																			
Pipe Thickness																																			
NPS 1/2 3/4 1 1 1/2 2 3 4 6 8 10 12 14 16 18 20 24 Thk.mm 2.77 2.87 3.38 3.68 3.91 3.05 3.05 3.4 3.76 4.19 4.57 4.78 4.78 4.78 5.54 6.35 SCH. 40S 40S 40S 40S 40S 10S 10S 10S 10S 10S 10S 10S 10S 10S 10S 10S 10S																																			
Nipple Thickness																																			
NPS 1/2 3/4 1 1 1/2 2 Thk.mm 3.73 3.91 4.55 5.08 5.54 SCH. 80S 80S 80S 80S 80S																																			
PRESSURE - TEMPERATURE Ratings																																			
NPS Press. bar 18.96 15.86 14.13 ASME B16.5 1/2 - 24 Temp. °C 37.78 93.33 148.9 Material Group 2.1																																			
opt. from Size to Item Description Ends Rating/Facing Material																																			
PIPE																																			
1/2 6 PIPE BW ASTM A312 TP304/TP304L DUAL GRADE - SMLS 8 24 PIPE BW ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW																																			
FLANGES																																			
1/2 1 1/2 SW FLANGE - ASME-B16.5 SW CL150 RF ASTM A182 F304/304L DUAL GRADE 2 24 WN FLANGE - ASME-B16.5 BW CL150 RF ASTM A182 F304/304L DUAL GRADE 3 1/2 1 1/2 SW FLANGE - ASME-B16.5 SW CL300 RF ASTM A182 F304/304L DUAL GRADE 3 2 24 WN FLANGE - ASME-B16.5 BW CL300 RF ASTM A182 F304/304L DUAL GRADE 5 1/2 1 1/2 SW FLANGE - ASME-B16.5 SW CL600 RF ASTM A182 F304/304L DUAL GRADE 5 2 24 WN FLANGE - ASME-B16.5 BW CL600 RF ASTM A182 F304/304L DUAL GRADE 63 3 24 WN FLANGE - ASME-B16.5 BW CL900 RJ (F) ASTM A182 F304/304L DUAL GRADE 1/2 24 BLIND FLANGE - ASME-B16.5 CL150 RF ASTM A182 F304/304L DUAL GRADE 3 1/2 24 BLIND FLANGE - ASME-B16.5 CL300 RF ASTM A182 F304/304L DUAL GRADE 5 1/2 24 BLIND FLANGE - ASME-B16.5 CL600 RF ASTM A182 F304/304L DUAL GRADE 3 2 2 SW REDUCING FLANGE - ASME-B16.5 SW CL300 RF ASTM A182 F304/304L DUAL GRADE 14 2 2 THDD RED. FLANGE - ASME-B16.5 THDF CL150 RF ASTM A182 F304/304L DUAL GRADE 34 2 2 THDD RED. FLANGE - ASME-B16.5 THDF CL300 RF ASTM A182 F304/304L DUAL GRADE																																			
SPECTACLE BLIND																																			
1/2 14 SPECTACLE BLIND - ASME-B16.48 CL150 RF ASTM A240 TP304 16 24 BLIND & SPACER - ASME-B16.48 CL150 RF ASTM A240 TP304 3 1/2 12 SPECTACLE BLIND - ASME-B16.48 CL300 RF ASTM A240 TP304 5 1/2 8 SPECTACLE BLIND - ASME-B16.48 CL600 RF ASTM A240 TP304																																			
FITTINGS																																			
1/2 3 DRIP-RING - TB DRI 5011 CL150 RF ASTM A182 F304/304L DUAL GRADE 1/2 1 1/2 ELBOW - SW ENDS - ASME-B16.11 SW 3000 ASTM A182 F304/304L DUAL GRADE 2 6 LONG RADIUS ELBOW - ASME-B16.9 BW ASTM A403 WP304S/304LS DUAL GRADE - SMLS 8 24 LONG RADIUS ELBOW - ASME-B16.9 BW ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD 3/4 1 1/2 RED. COUPLING - SW ENDS - ASME-B16.11 SW 3000 ASTM A182 F304/304L DUAL GRADE 2 6 REDUCER - ASME-B16.9 BW ASTM A403 WP304S/304LS DUAL GRADE - SMLS 8 24 REDUCER - ASME-B16.9 BW ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD 1/2 1 1/2 FEMALE CAP - THD END - ASME-B16.11 THDF 3000 ASTM A182 F304/304L DUAL GRADE 1/2 1 1/2 FEMALE CAP - SW END - ASME-B16.11 SW 3000 ASTM A182 F304/304L DUAL GRADE 2 24 CAP - ASME-B16.9 BW ASTM A403 WP304S/304LS DUAL GRADE - SMLS 1/2 1 1/2 COUPLING - SW ENDS - ASME-B16.11 SW 3000 ASTM A182 F304/304L DUAL GRADE 1/2 1 1/2 COUPLING - SW/THDD ENDS - ASME-B16.11 SW/THDF 3000 ASTM A182 F304/304L DUAL GRADE 1/2 1 1/2 THD MALE PLUG - RND HEAD - ASME-B16.11 THDM ASTM A182 F304/304L DUAL GRADE 1/2 2 NIPPLE - THDD/PE - ASME-B36.10 THDMPE ASTM A312 TP304/TP304L DUAL GRADE - SMLS 1/2 2 NIPPLE - THDD/THDD - ASME-B36.10 THDM ASTM A312 TP304/TP304L DUAL GRADE - SMLS 3/4 2 SWAGE NIPPLE - PE/THDD - MSS-SP95 PE/THDM ASTM A403 WP304S/304LS DUAL GRADE - SMLS 3/4 2 SWAGE NIPPLE - THDD/PE - MSS-SP95 THDMPE ASTM A403 WP304S/304LS DUAL GRADE - SMLS 3/4 2 SWAGE NIPPLE - PE/PE - MSS-SP95 PE ASTM A403 WP304S/304LS DUAL GRADE - SMLS 1/2 1 1/2 TEE - SW ENDS - ASME-B16.11 SW 3000 ASTM A182 F304/304L DUAL GRADE 2 6 TEE - ASME-B16.9 BW ASTM A403 WP304S/304LS DUAL GRADE - SMLS 8 24 TEE - ASME-B16.9 BW ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD 2 8 WELDOLET - MSS-SP97 BW ASTM A182 F304/304L DUAL GRADE 3 8 SPECIAL LATROLET - <MFR Std> BW ASTM A182 F304/304L DUAL GRADE 1/2 1 1/2 SOCKOLET - SW END - MSS-SP97 SW/BW 3000 ASTM A182 F304/304L DUAL GRADE 1/2 2 LATROLET - SW END - MSS-SP97 SW/BW 3000 ASTM A182 F304/304L DUAL GRADE																																			
MISCELLANEOUS																																			
1/2 24 KIT FOR INSULATING FLANGE - ASME-B16.5 CL150 RF GRE LAMINATED + TFE (MAX T 180 C)																																			
GASKETS																																			
1/2 24 SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20 304 SS+GRAPH 98% - C.S. OUT.RING 63 3 24 OCTAGONAL RJ GASKET - ASME-B16.20 AISI 304																																			
BOLTS																																			
1/2 4 ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368 ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED																																			



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 01SA0S02

Rev.				
A	0	1	2	3

Sh. 2 of 3


VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60146	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
1	2	24	GA-E-60143	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
4	1/2	1 1/2	GA-E-60239	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	12	GA-E-60235	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
5	1/2	1 1/2	GA-E-67202	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	1/2	1 1/2	GA-E-60347	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60342	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60343	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	6	6	GA-E-60444	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60445	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60443	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-67276	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60178	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
13	2	24	GA-E-60150	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
14	2	24	GA-E-67002	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
15	2	2	GA-E-60154	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
44	2	2	GA-E-60294	Globe-Dead Man Quick Opening Valve-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
82	6	24	GA-E-60785	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60475	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67016	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	2	GA-E-60590	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
103	2	2	GA-E-60594	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
113	1/2	1 1/2	GA-E-60597	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
130	1/2	1 1/2	GA-E-67083	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
744	2	2	GA-E-67237	Ball-Dead Man Quick Opening Valve-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67132	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
840	6	8	GA-E-67609	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	10	12	GA-E-60604	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A403 WP316WX/WP316LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES


<div> MOZAMBIQUE LNG</div>			PIPING MATERIAL SPECIFICATION			JOB 032243				
						Piping Class:		01SA0S60		
						Sh. 2 of 3		Rev. <table><tr><td>A</td><td>0</td><td></td><td></td><td></td></tr></table>		
A	0									

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material	
GASKETS							
63	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING	
	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304	
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304	
BOLTS							
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED	
VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60146	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
1	2	24	GA-E-60143	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
2	52	52	GA-E-60522	Special Butterfly-Flanged-Triple Off Set-Int.seat- Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
4	1/2	1 1/2	GA-E-60239	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	12	GA-E-60235	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
5	1/2	1 1/2	GA-E-67202	Globe-BB-Red.B-Needle-Thdd seat - ASME- B16.34	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	1/2	1 1/2	GA-E-60347	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60342	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60343	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	2	6	GA-E-60438	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60439	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60437	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
8	2	4	GA-E-60783	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60784	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60178	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	1/2	1 1/2	GA-E-67022	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	2	10	GA-E-60195	Gate-BB-FB-Flex wdg-Thdd seat - API600	BW	CL150	Body: ASTM A351 CF8M Trim : 316 / HF
13	2	24	GA-E-60150	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
43	2	2	GA-E-60243	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
62	1	1	GA-E-60723	Check-BB-Red.B-Swing-Thdd seat - API602	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
62	2	3	GA-E-60700	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
82	6	24	GA-E-60785	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60475	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67016	Gate-Stem Extension-BB-Red.B-Solid wdg- Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	3	GA-E-60590	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
103	2	2	GA-E-60594	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
130	1/2	1 1/2	GA-E-67083	Gate-Stem Extension-BB-Red.B-Solid wdg- Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
250	50	52	GA-E-60534	Special Butterfly-Ext. Stem (2100mm)-Flanged- Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
801	1/2	1 1/2	GA-E-67131	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
824	8	20	GA-E-67608	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	6	GA-E-60629	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A403 WP304S/304LS DUAL GRADE - SMLS Screen: 316 - CLOTH - MESH 3

<div></div>				PIPING MATERIAL SPECIFICATION								JOB 032243									
												Piping Class:						01SD0B02			
												Sh. 1 of 2		Rev.				A 0			
Base Material : STAINLESS STEEL 316/316L DUAL GRADE				Design code : ASME B 31.3 2016																	
Nom. Rating : CL150				PWHT : NO																	
Facing/Finishing : RF				Valve Trim : 12 - SS316/HF																	
Corrosion Allow. : 0 mm				Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																	
Temp. Limit : -29 °C to 125 °C																					
Service: LO - Lube Oil																					
Pipe Thickness																					
NPS	1/2	3/4	1	1 1/2	2	3	4	5	6	8	10	12	14								
Thk.mm	3.73	3.91	4.55	3.68	3.91	3.05	3.05	3.4	3.4	3.76	4.19	4.57	4.78								
SCH.	80S	80S	80S	40S	40S	10S	10S	10S	10S	10S	10S	10S	10S								
Nipple Thickness																					
NPS	1/2	3/4	1	1 1/2	2																
Thk.mm	3.73	3.91	4.55	3.68	3.91																
SCH.	80S	80S	80S	40S	40S																
PRESSURE - TEMPERATURE Ratings																					
NPS	Press. bar	18.96 ASME B16.5																			
1/2 - 14	Temp. °C	37.78 Material Group 2.2																			
opt.	from	Size to	Item Description								Ends	Rating/Facing	Material								
PIPE																					
	1/2	6	PIPE								BW		ASTM A312 TP316/TP316L DUAL GRADE - SMLS								
	8	14	PIPE								BW		ASTM A358 TP316/TP316L CL.1 DUAL GRADE - EFW								
FLANGES																					
3	1/2	14	WN FLANGE - ASME-B16.5								BW	CL150 RF	ASTM A182 F316/F316L DUAL GRADE								
	1/2	14	WN FLANGE - ASME-B16.5								BW	CL300 RF	ASTM A182 F316/F316L DUAL GRADE								
	1/2	14	BLIND FLANGE - ASME-B16.5									CL150 RF	ASTM A182 F316/F316L DUAL GRADE								
14	2	2	THDD RED. FLANGE - ASME-B16.5								THDF	CL150 RF	ASTM A182 F316/F316L DUAL GRADE								
SPECTACLE BLIND																					
	1/2	14	SPECTACLE BLIND - ASME-B16.48									CL150 RF	ASTM A240 TP316								
FITTINGS																					
	1/2	3	DRIP-RING - TB DRI 5011									CL150 RF	ASTM A182 F316/F316L DUAL GRADE								
	1/2	6	LONG RADIUS ELBOW - ASME-B16.9								BW		ASTM A403 WP316S/TP316LS DUAL GRADE - SMLS								
	8	14	LONG RADIUS ELBOW - ASME-B16.9								BW		ASTM A403 WP316WX/TP316LWX DUAL GRADE - WLDD								
	3/4	6	REDUCER - ASME-B16.9								BW		ASTM A403 WP316S/TP316LS DUAL GRADE - SMLS								
	8	14	REDUCER - ASME-B16.9								BW		ASTM A403 WP316WX/TP316LWX DUAL GRADE - WLDD								
	1/2	14	CAP - ASME-B16.9								BW		ASTM A403 WP316S/TP316LS DUAL GRADE - SMLS								
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11								THDM		ASTM A182 F316/F316L DUAL GRADE								
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10								THDM/PE		ASTM A312 TP316/TP316L DUAL GRADE - SMLS								
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95								PE/THDM		ASTM A403 WP316S/TP316LS DUAL GRADE - SMLS								
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95								PE		ASTM A403 WP316S/TP316LS DUAL GRADE - SMLS								
	1/2	6	TEE - ASME-B16.9								BW		ASTM A403 WP316S/TP316LS DUAL GRADE - SMLS								
	8	14	TEE - ASME-B16.9								BW		ASTM A403 WP316WX/TP316LWX DUAL GRADE - WLDD								
	1/2	8	WELDOLET - MSS-SP97								BW		ASTM A182 F316/F316L DUAL GRADE								
MISCELLANEOUS																					
	1/2	14	KIT FOR INSULATING FLANGE - ASME-B16.5									CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)								
GASKETS																					
	1/2	14	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20										316 SS+GRAPH 98% - C.S. OUT.RING								
BOLTS																					
	1/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368										ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED								
VALVES																					
pos.	from	Size to	Data Sheet	Item Description						Ends	Rating/Facing	Material									
1	1/2	1 1/2	GA-E-60142	Gate-BB-Red.B-Solid wdg-Exp.seat - API602						BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE									
												Trim : 316 / HF									
1	2	14	GA-E-60143	Gate-BB-FB-Flex wdg-Thdd seat - API600						FLGD	CL150 RF	Body: ASTM A351 CF8M									
												Trim : 316 / HF									
6	2	2	GA-E-60342	Check-BB- FB- Swing - API594						FLGD	CL150 RF	Body: ASTM A351 CF8M									
												Trim : 316 / HF									

BRANCH TABLES

<div></div>	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:	01SD0B02				
		Sh. 2 of 2	Rev.				
		A	0				

RunSize	90 Degrees													
1/2	T													
3/4	T	T												
1	T	T	T											
1 1/2	T	T	T	T										
2	W	W	T	T	T									
3	W	W	W	W	W	T								
4	W	W	W	W	W	T	T							
5	W	W	W	W	W	W	T	T						
6	W	W	W	W	W	W	W	T	T					
8	W	W	W	W	W	W	W	W	T	T				
10	W	W	W	W	W	W	W	W	W	T	T			
12	W	W	W	W	W	W	W	W	W	W	T	T		
14	W	W	W	W	W	W	W	W	W	W	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	5	6	8	10	12	14	

Legenda	
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

Legenda

P

PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E

T

TEE - ASME-B16.9

W

WELDOLET - MSS-SP97

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
4) Specified Thickness are suitable to withstand Full Vacuum condition.



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 01SD0S02

Rev.				
A	0	1	2	3

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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60146	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
1	2	24	GA-E-60143	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
4	1/2	1 1/2	GA-E-60239	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	12	GA-E-60235	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
5	1/2	1 1/2	GA-E-67202	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	1/2	1 1/2	GA-E-60347	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60342	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60343	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	2	6	GA-E-60438	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
7	8	24	GA-E-60439	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60437	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
8	2	4	GA-E-60783	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60784	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60178	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	1/2	1 1/2	GA-E-67022	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
13	2	24	GA-E-60150	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
44	2	2	GA-E-60294	Globe-Dead Man Quick Opening Valve-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
62	2	2	GA-E-60700	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
89	1/2	1 1/2	GA-E-60475	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67016	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	4	GA-E-60590	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
103	2	2	GA-E-60594	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
110	2	2	GA-E-67344	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
130	1/2	1 1/2	GA-E-67083	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
140	6	6	GA-E-67358	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
740	2	2	GA-E-67614	Ball-Split body-Red.B-Floating ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67131	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
840	3	3	GA-E-67613	Ball-Split body-FB-Floating ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
840	16	16	GA-E-67609	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
907	2	6	GA-E-69091	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PTFE seats
908	2	6	GA-E-69008	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	2	2	GA-E-60639	Y Strainer - Bolted cover - ASME-B16.34	FLGD	CL150 RF	Body : ASTM A182 F316/F316L DUAL GRADE Screen: 316 - CLOTH - MESH 3
1	4	8	GA-E-60604	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A403 WP316LWX/WP316LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3
9	2	2	GA-E-60649	Special Strainer, Basket Type-Bolted Cover - <MFR Std>	FLGD	CL150 RF	Body : ASTM A351 CF8M Screen: 316 - PERF.PLATE - 18 Holes/Cm2

BRANCH TABLES

RunSize		90 Degrees																										
1/2	A																											
3/4	A	A																										
1	A	A	A																									
1 1/2	A	A	A	A	A																							
2	S	S	T	T		T																						
3	S	S	S	S	S	W	T																					
4	S	S	S	S	S	W	T	T																				
5	S	S	S	S	S	W	W	T	T																			
6	S	S	S	S	S	W	W	T	T	T																		
8	S	S	S	S	S	W	W	W	W	T	T																	
10	S	S	S	S	S	W	W	W	W	W	T	T																
12	S	S	S	S	S	W	W	W	W	W	W	T	T															
14	S	S	S	S	S	W	W	W	W	W	W	P	T	T														
16	S	S	S	S	S	W	W	W	W	W	W	P	P	T	T													
18	S	S	S	S	S	W	W	W	W	W	W	T	T	T	T													
20	S	S	S	S	S	W	W	W	W	W	W	T	T	T	T	T												
24	S	S	S	S	S	W	W	W	W	W	W	P	T	T	T	T	T											
34	S	S	S	S	S	W	W	W	W	W	W	P	P	P	T	T	T	T										
BranchSize	1/2	3/4	1	1 1/2	2	3	4	5	6	8	10	12	14	16	18	20	24	34										
Legenda																												
A	TEE - SW ENDS - ASME-B16.11																											
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																											
S	SOCKOLET - SW END - MSS-SP97																											
T	TEE - ASME-B16.9																											
W	WELDOLET - MSS-SP97																											

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 4) Specified Thickness are suitable to withstand Full Vacuum condition.

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:	01SD0S05				
		Sh. 2 of 2	Rev.				
		A	0	1			

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
5	1/2	1 1/2	GA-E-67207	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	1/2	1 1/2	GA-E-60715	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	24	GA-E-60716	Check-BB- FB- Swing - API594	FLGD	CL150 FF	Body: ASTM A351 CF8M Trim : 316 / HF
10	1/2	1 1/2	GA-E-67047	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	1/2	1 1/2	GA-E-67301	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL150 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
12	2	2	GA-E-67385	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A351 CF8M Trim : 316 / HF
101	1/2	1 1/2	GA-E-67084	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	24	GA-E-67056	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 FF	Body: ASTM A351 CF8M Trim : 316 / HF
160	4	4	GA-E-67311	Gate-Ext. Stem (1400mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 FF	Body: ASTM A351 CF8M Trim : 316 / HF
401	2	12	GA-E-60244	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL150 FF	Body: ASTM A351 CF8M Trim : 316 / HF

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	10	10	GA-E-60604	T Strainer-BW - <MFR Std - Metallic>	BW	CL150 RF	Body : ASTM A403 WP316WX/WP316LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees															
1/2	A																
3/4	A	A															
1	A	A	A														
1 1/2	A	A	A	A													
2	S	S	T	T													
3	S	S	S	S	W	T											
4	S	S	S	S	W	T	T										
6	S	S	S	S	W	W	T	T									
8	S	S	S	S	W	W	W	T	T								
10	S	S	S	S	W	W	W	W	T	T							
12	S	S	S	S	W	W	W	W	W	T	T						
14	S	S	S	S	W	W	W	W	W	P	T	T					
16	S	S	S	S	W	W	W	W	W	P	P	T	T				
18	S	S	S	S	W	W	W	W	W	T	T	T	T	T			
20	S	S	S	S	W	W	W	W	W	T	T	T	T	T	T		
24	S	S	S	S	W	W	W	W	W	P	T	T	T	T	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Legenda																	
A	TEE - SW ENDS - ASME-B16.11																
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																
S	SOCKOLET - SW END - MSS-SP97																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 4) Specified Thickness are suitable to withstand Full Vacuum condition.

		PIPING MATERIAL SPECIFICATION										JOB 032243										
												Piping Class:					01SP0S01					
												Sh. 1 of 3					Rev. A 0 1 2 3					
Base Material : DUPLEX STAINLESS STEEL UNS S31803										Design code : ASME B 31.3 2016												
Nom. Rating : CL150										PWHT : NO												
Facing/Finishing : RF										Valve Trim : UNS S31803 (duplex)												
Corrosion Allow. : 0 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00011/00013												
Temp. Limit : 0 °C to 180 °C																						
Service: CD - Closed Drain V - Vent WEG - Water / Ethylene Glycol																						
Pipe Thickness																						
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24						
Thk.mm	2.77	2.87	3.38	3.68	3.91	3.05	3.05	3.4	3.76	4.19	4.57	4.78	4.78	4.78	5.54	6.35						
SCH.	40S	40S	40S	40S	40S	10S	10S	10S	10S	10S	10S	10S	10S	10S	10S	10S						
Nipple Thickness																						
NPS	1/2	3/4	1	1 1/2	2																	
Thk.mm	3.73	3.91	4.55	5.08	5.54																	
SCH.	80S	80S	80S	80S	80S																	
PRESSURE - TEMPERATURE Ratings																						
NPS	Press. bar	19.99	17.93	15.86	ASME B16.5																	
1/2 - 24	Temp. °C	37.78	93.33	148.9	Material Group 2.8																	
opt.	Size from to		Item Description								Ends	Rating/Facing	Material									
PIPE																						
	1/2	6	PIPE								BW		ASTM A790 UNS S31803 - SMLS									
	8	24	PIPE								BW		ASTM A928 UNS S31803 CL.1 - EFW									
FLANGES																						
3	1/2	1 1/2	SW FLANGE - ASME-B16.5								SW	CL150 RF	ASTM A182 GR.F51 (UNS S31803)									
	2	24	WN FLANGE - ASME-B16.5								BW	CL150 RF	ASTM A182 GR.F51 (UNS S31803)									
	1/2	1 1/2	SW FLANGE - ASME-B16.5								SW	CL300 RF	ASTM A182 GR.F51 (UNS S31803)									
	2	24	WN FLANGE - ASME-B16.5								BW	CL300 RF	ASTM A182 GR.F51 (UNS S31803)									
5	1/2	1 1/2	SW FLANGE - ASME-B16.5								SW	CL600 RF	ASTM A182 GR.F51 (UNS S31803)									
5	2	24	WN FLANGE - ASME-B16.5								BW	CL600 RF	ASTM A182 GR.F51 (UNS S31803)									
14	1/2	24	BLIND FLANGE - ASME-B16.5									CL150 RF	ASTM A182 GR.F51 (UNS S31803)									
	2	2	THDD RED. FLANGE - ASME-B16.5								THDF	CL150 RF	ASTM A182 GR.F51 (UNS S31803)									
SPECTACLE BLIND																						
3	1/2	14	SPECTACLE BLIND - ASME-B16.48									CL150 RF	ASTM A240 UNS S31803									
	16	24	BLIND & SPACER - ASME-B16.48									CL150 RF	ASTM A240 UNS S31803									
	1/2	12	SPECTACLE BLIND - ASME-B16.48									CL300 RF	ASTM A240 UNS S31803									
	1/2	8	SPECTACLE BLIND - ASME-B16.48									CL600 RF	ASTM A240 UNS S31803									
FITTINGS																						
3	1/2	3	DRIP-RING - TB DRI 5011									CL150 RF	ASTM A182 GR.F51 (UNS S31803)									
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11								SW	3000	ASTM A182 GR.F51 (UNS S31803)									
	2	6	LONG RADIUS ELBOW - ASME-B16.9								BW		ASTM A815 UNS S31803 - SMLS									
	8	24	LONG RADIUS ELBOW - ASME-B16.9								BW		ASTM A815 UNS S31803 WP-WX									
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11								SW	3000	ASTM A182 GR.F51 (UNS S31803)									
	2	6	REDUCER - ASME-B16.9								BW		ASTM A815 UNS S31803 - SMLS									
	8	24	REDUCER - ASME-B16.9								BW		ASTM A815 UNS S31803 WP-WX									
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11								SW	3000	ASTM A182 GR.F51 (UNS S31803)									
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11								THDF	3000	ASTM A182 GR.F51 (UNS S31803)									
	2	24	CAP - ASME-B16.9								BW		ASTM A815 UNS S31803 - SMLS									
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11								SW	3000	ASTM A182 GR.F51 (UNS S31803)									
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11								SW\THDF	3000	ASTM A182 GR.F51 (UNS S31803)									
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11								THDM		ASTM A182 GR.F51 (UNS S31803)									
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10								THDM\PE		ASTM A790 UNS S31803 - SMLS									
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95								PE\THDM		ASTM A815 UNS S31803 - SMLS									
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95								THDM\PE		ASTM A815 UNS S31803 - SMLS									
3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95								PE		ASTM A815 UNS S31803 - SMLS										
1/2	1 1/2	TEE - SW ENDS - ASME-B16.11								SW	3000	ASTM A182 GR.F51 (UNS S31803)										
2	6	TEE - ASME-B16.9								BW		ASTM A815 UNS S31803 - SMLS										
8	24	TEE - ASME-B16.9								BW		ASTM A815 UNS S31803 WP-WX										
2	8	WELDOLET - MSS-SP97								BW		ASTM A182 GR.F51 (UNS S31803)										
1/2	1 1/2	SOCKOLET - SW END - MSS-SP97								SW\BW	3000	ASTM A182 GR.F51 (UNS S31803)										
MISCELLANEOUS																						
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5									CL150 RF	GRE LAMINATED + TFE (MAX T 180 C)									
	12	12	SPECIAL TEMPORARY STRAINER - <MFR Std - Metallic>									CL150 RF	ASTM A240 UNS S31803									
GASKETS																						
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20										S31803+GRAPH 99,8% - C.S. OUT. RING									
BOLTS																						
	1/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368										ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED									
VALVES																						
pos.	from	Size to	Data Sheet	Item Description						Ends	Rating/Facing	Material										
1	1/2	1 1/2	GA-E-60160	Gate-BB-Red.B-Solid wdg-Exp.seat - API602						SW	CL800	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Duplex S.31803										
1	2	24	GA-E-60161	Gate-BB-FB-Flex wdg-Thdd seat - API600						FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803										
4	1/2	1 1/2	GA-E-60253	Globe-BB-Red B.-Thdd seat - API602						SW	CL800	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Duplex S.31803										
4	2	12	GA-E-60254	Globe-BB-Disk-Thdd seat - API 623						FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803										
6	1/2	1 1/2	GA-E-60366	Check-BB-Red.B-Piston-Thdd seat - API602						SW	CL800	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Duplex S.31803										



PIPING MATERIAL
SPECIFICATION

JOB
032243


Piping Class: 01SP0S01

Sh. 2 of 3			Rev.				
			A	0	1	2	3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	2	10	GA-E-60367	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803
6	12	24	GA-E-60368	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803
7	2	6	GA-E-67113	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats
7	8	24	GA-E-67114	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats
8	1/2	1 1/2	GA-E-67112	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Soft seat-S.31803 trim - PEEK seats
8	2	3	GA-E-67158	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats
8	6	24	GA-E-67157	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats
10	1/2	1 1/2	GA-E-60571	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Duplex S.31803
13	2	24	GA-E-60570	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803
44	2	2	GA-E-60296	Globe-Dead Man Quick Opening Valve-BB-Disk- Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803
62	2	2	GA-E-60702	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803
73	2	4	GA-E-67249	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats
82	2	3	GA-E-67256	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Metal seat-S.31803 trim-GRAPH.
83	2	2	GA-E-67261	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats
89	1/2	1 1/2	GA-E-60477	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Metal seat-S.31803 trim-GRAPH.
101	1/2	1 1/2	GA-E-67015	Gate-Stem Extension-BB-Red.B-Solid wdg- Exp.seat - API602	SW	CL800	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Duplex S.31803
101	2	2	GA-E-67043	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803
103	2	2	GA-E-67042	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803
110	1/2	1 1/2	GA-E-67326	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Duplex S.31803
140	6	6	GA-E-67361	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803
810	2	4	GA-E-67271	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats
813	4	4	GA-E-67272	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats
820	2	4	GA-E-67287	Ball-Split body-FB-Floating ball - API6D	FLGD	CL150 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Metal seat-S.31803 trim-GRAPH.
907	2	6	GA-E-69092	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats

BRANCH TABLES


<div></div>	PIPING MATERIAL SPECIFICATION										JOB 032243														
											Piping Class:										01SP0S01				
																					Sh. 3 of 3		Rev.		
		A	0	1	2	3																			

90 Degrees																
RunSize																
1/2	A															
3/4	A	A														
1	A	A	A													
1 1/2	A	A	A	A												
2	S	S	T	T	T											
3	S	S	S	S	W	T										
4	S	S	S	S	W	T	T									
6	S	S	S	S	W	W	T	T								
8	S	S	S	S	W	W	W	T	T							
10	S	S	S	S	W	W	W	W	T	T						
12	S	S	S	S	W	W	W	W	W	T	T					
14	S	S	S	S	W	W	W	W	W	P	T	T				
16	S	S	S	S	W	W	W	W	W	P	P	T	T			
18	S	S	S	S	W	W	W	W	W	T	T	T	T	T		
20	S	S	S	S	W	W	W	W	W	T	T	T	T	T	T	
24	S	S	S	S	W	W	W	W	W	P	T	T	T	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24

Legenda	
A	TEE - SW ENDS - ASME-B16.11
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E
S	SOCKOLET - SW END - MSS-SP97
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 3) Specified Thickness are suitable to withstand Full Vacuum condition.

<div></div>		PIPING MATERIAL SPECIFICATION												JOB 032243									
														Piping Class:						01SW0B10			
														Sh. 1 of 2		Rev.							
A	0	1																					

Base Material : SUPER DUPLEX STAINLESS STEEL UNS S32750																		Design code : ASME B 31.3 2016																	
Nom. Rating : CL150																		PWHT : NO																	
Facing/Finishing : RF																		Valve Trim : UNS S32750 (superduplex)																	
Corrosion Allow. : 0 mm																		Welding Spec : MZ-000-CCX-MC-SPC-00009/00011/00013																	
Temp. Limit : 0 °C to 70 °C																																			
Service: [Caustic Service] CI - Chemical Injection																																			
Pipe Thickness																																			
NPS		1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24																		
Thk.mm		2.77	2.87	3.38	3.68	3.91	3.05	3.05	3.4	3.76	4.19	4.57	4.78	4.78	4.78	5.54	6.35																		
SCH.		40S	40S	40S	40S	40S	10S	10S	10S	10S	10S	10S	10S	10S	10S	10S	10S																		
Nipple Thickness																																			
NPS		1/2	3/4	1	1 1/2	2																													
Thk.mm		3.73	3.91	4.55	5.08	5.54																													
SCH.		80S	80S	80S	80S	80S																													

PRESSURE - TEMPERATURE Ratings							
NPS		Press. bar		19.99		ASME B16.5	
1/2 - 24		Temp. °C		37.78		Material Group 2.8	

opt.	Size from to		Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	6	PIPE	BW		ASTM A790 UNS S32750 - SMLS
	8	24	PIPE	BW		ASTM A928 UNS S32750 CL.1 - EFW

FLANGES						
3	1/2	24	WN FLANGE - ASME-B16.5	BW	CL150 RF	ASTM A182 GR.F53 (UNS S32750)
	1/2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A182 GR.F53 (UNS S32750)
5	1/2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A182 GR.F53 (UNS S32750)
	1/2	24	BLIND FLANGE - ASME-B16.5		CL150 RF	ASTM A182 GR.F53 (UNS S32750)
3	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A182 GR.F53 (UNS S32750)
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL150 RF	ASTM A182 GR.F53 (UNS S32750)


SPECTACLE BLIND						
	1/2	14	SPECTACLE BLIND - ASME-B16.48		CL150 RF	ASTM A240 UNS S32750
	16	24	BLIND & SPACER - ASME-B16.48		CL150 RF	ASTM A240 UNS S32750

FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		CL150 RF	ASTM A182 GR.F53 (UNS S32750)
	1/2	6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A815 UNS S32750 - SMLS
	8	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A815 UNS S32750 WP-WX
	3/4	6	REDUCER - ASME-B16.9	BW		ASTM A815 UNS S32750 - SMLS
	8	24	REDUCER - ASME-B16.9	BW		ASTM A815 UNS S32750 WP-WX
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A182 GR.F53 (UNS S32750)
	1/2	24	CAP - ASME-B16.9	BW		ASTM A815 UNS S32750 - SMLS
	1/2	1 1/2	COUPLING - THD ENDS - ASME-B16.11	THDF	3000	ASTM A182 GR.F53 (UNS S32750)
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A182 GR.F53 (UNS S32750)
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDMPE		ASTM A790 UNS S32750 - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A815 UNS S32750 - SMLS
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95	THDMPE		ASTM A815 UNS S32750 - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A815 UNS S32750 - SMLS
	1/2	6	TEE - ASME-B16.9	BW		ASTM A815 UNS S32750 - SMLS
	8	24	TEE - ASME-B16.9	BW		ASTM A815 UNS S32750 WP-WX
	1/2	8	WELDOLET - MSS-SP97	BW		ASTM A182 GR.F53 (UNS S32750)

GASKETS						
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			S32750+GRAPH 98%-S32750 OUT.RING

BOLTS						
	1/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED

VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-67064	Gate-BB-Red.B-Solid wdg-Exp.seat + Nipples - API602	BW	CL800	Body: ASTM A182 GR.F53 (UNS S32750) Trim : Duplex S.32750
1	2	24	GA-E-67065	Gate-BB-FB-Flex wdg-Wlidd seat - API600	FLGD	CL150 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Duplex S.32750
4	1/2	1 1/2	GA-E-60248	Globe-BB-Red B.-Integral seat + Nipples - API602	BW	CL800	Body: ASTM A182 GR.F53 (UNS S32750) Trim : Duplex S.32750
4	2	12	GA-E-60269	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Duplex S.32750
6	1/2	1 1/2	GA-E-60727	Check-BB-Red.B-Piston-Integral seat + Nipples - API602	BW	CL800	Body: ASTM A182 GR.F53 (UNS S32750) Trim : Duplex S.32750
6	2	10	GA-E-60728	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Duplex S.32750
6	12	24	GA-E-60729	Check-Flanged -Dual plate-Wlidd seat - API594	FLGD	CL150 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Duplex S.32750
7	6	6	GA-E-67692	Ball-Split body-Red.B-Floating ball - API608	FLGD	CL150 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Soft seat-S.32750 trim - RPTFE seats
7	8	24	GA-E-67231	Ball-Split body-Red.B-Trunnion ball - API608	FLGD	CL150 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Soft seat-S.32750 trim - RPTFE seats
8	1/2	1 1/2	GA-E-67232	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 GR.F53 (UNS S32750) Trim : Soft seat-S.32750 trim - PTFE seats


	PIPING MATERIAL SPECIFICATION	JOB 032243													
		Piping Class:	01SW0B10												
		Sh. 2 of 2	Rev. <table><tr><td>A</td><td>0</td><td>1</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					A	0	1					
A	0	1													

BRANCH TABLES

90 Degrees																
RunSize																
1/2	T															
3/4	T	T														
1	T	T	T													
1 1/2	T	T	T	T												
2	W	W	T	T	T											
3	W	W	W	W	W	T										
4	W	W	W	W	W	T	T									
6	W	W	W	W	W	W	T	T								
8	W	W	W	W	W	W	W	T	T							
10	W	W	W	W	W	W	W	W	T	T						
12	W	W	W	W	W	W	W	W	W	T	T					
14	W	W	W	W	W	W	W	W	W	P	T	T				
16	W	W	W	W	W	W	W	W	W	P	P	T	T			
18	W	W	W	W	W	W	W	W	W	T	T	T	T	T		
20	W	W	W	W	W	W	W	W	W	T	T	T	T	T	T	
24	W	W	W	W	W	W	W	W	W	P	T	T	T	T	T	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
Legenda																
P	PIPE TO PIPE WITH FULL ENCIRCLEMENT - TB PIP 5012															
T	TEE - ASME-B16.9															
W	WELDOLET - MSS-SP97															

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 3) Specified Thickness are suitable to withstand Full Vacuum condition.

	PIPING MATERIAL SPECIFICATION				JOB 032243								
					Piping Class:				01SW0S01				
					Sh. 2 of 2				Rev. A 0 1 2 3				

VALVES								
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material	
4	1/2	1 1/2	GA-E-60255	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A182 GR.F53 (UNS S32750) Trim : Duplex S.32750	
4	2	12	GA-E-60256	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL150 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Duplex S.32750	
6	1/2	1 1/2	GA-E-60369	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A182 GR.F53 (UNS S32750) Trim : Duplex S.32750	
6	2	10	GA-E-60370	Check-BB- FB- Swing - API594	FLGD	CL150 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Duplex S.32750	
6	12	24	GA-E-60371	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL150 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Duplex S.32750	
7	6	6	GA-E-67122	Ball-Split body-Red.B-Floating ball - API608	FLGD	CL150 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Soft seat-S.32750 trim - RPTFE seats	
7	8	24	GA-E-67123	Ball-Split body-Red.B-Trunnion ball - API608	FLGD	CL150 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Soft seat-S.32750 trim - RPTFE seats	
8	1/2	1 1/2	GA-E-60752	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 GR.F53 (UNS S32750) Trim : Soft seat-S.32750 trim - PTFE seats	
10	1/2	1 1/2	GA-E-60573	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 GR.F53 (UNS S32750) Trim : Duplex S.32750	
13	2	24	GA-E-60572	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Duplex S.32750	
89	1/2	1 1/2	GA-E-60753	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 GR.F53 (UNS S32750) Trim : Metal seat-S.32750 trim-GRAPH.	
101	1/2	1 1/2	GA-E-67017	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 GR.F53 (UNS S32750) Trim : Duplex S.32750	
101	2	2	GA-E-67045	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL150 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Duplex S.32750	
103	2	2	GA-E-67044	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A995 GR.5A (UNS J93404, CE3MN) Trim : Duplex S.32750	
130	1/2	1 1/2	GA-E-67085	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 GR.F53 (UNS S32750) Trim : Duplex S.32750	
801	1/2	1 1/2	GA-E-67133	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL150 RF	Body: ASTM A182 GR.F53 (UNS S32750) Trim : Soft seat-S.32750 trim - PTFE seats	

BRANCH TABLES

90 Degrees														
RunSize														
3/8														
1/2	A													
3/4	A	A												
1	A	A	A											
1 1/2	A	A	A	A										
2	S	S	T	T	T									
3	S	S	S	S	W	T								
4	S	S	S	S	W	T	T							
6	S	S	S	S	W	W	T	T						
8	S	S	S	S	W	W	W	T	T					
10	S	S	S	S	W	W	W	W	T	T				
12	S	S	S	S	W	W	W	W	W	P	T			
14	S	S	S	S	W	W	W	W	W	P	T	T		
16	S	S	S	S	W	W	W	W	W	P	P	T	T	
18	S	S	S	S	W	W	W	W	W	T	T	T	T	
20	S	S	S	S	W	W	W	W	W	T	T	T	T	T
24	S	S	S	S	W	W	W	W	W	P	T	T	T	T
30	S	S	S	S	W	W	W	W	W	P	P	P	T	T
BranchSize 3/8 1/2 3/4 1 1 1/2 2 3 4 6 8 10 12 14 16 18 20 24 30														
Legenda														
A	TEE - SW ENDS - ASME-B16.11													
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E													
S	SOCKOLET - SW END - MSS-SP97													
T	TEE - ASME-B16.9													
W	WELDOLET - MSS-SP97													

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 3) Specified Thickness are suitable to withstand Full Vacuum condition.

PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **03CA1S01**

Sh. 1 of 4	Rev.				
	A	0	1	2	3

Base Material : LOW TEMP. CARBON STEEL

Design code : ASME B 31.3 2016

Nom. Rating : CL300

PWHT : AS PER CODE (NOTE 1)

Facing/Finishing : RF

Valve Trim : 12 - SS316/HF

Corrosion Allow. : 1.5 mm

Welding Spec : MZ-000-CCX-MC-SPC-00009/00013

Temp. Limit : -45 °C to 220 °C

Service: HL - Hydrocarbon Liquid MEG - Monoethylene Glycol O - Oil PC - Process Condensate PG - Process Gas / Purge Gas PR - Propane Refrigerant

Pipe Thickness

[illegible]

Nipple Thickness

NPS	1/2	3/4	1	1 1/2	2
Thk.mm	4.78	5.56	6.35	7.14	8.74
SCH.	160	160	160	160	160

PRESSURE - TEMPERATURE Ratings

NPS 1/2 - 24	Press. bar Temp. °C	51.02 -28.9	51.02 37.78	46.88 93.33	45.16 148.9	43.78 204.4	ASME B16.5 Material Group 1.1
NPS 26 - 72	Press. bar Temp. °C	25 180					

opt.	Size from to	Item Description	Ends	Rating/Facing	Material
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PIPE

1/2	24	PIPE	BW	ASTM A333 GR.6 - SMLS
26	72	PIPE	BW	ASTM A671 GR.CC65 CL.12 - EFW + S2 (-46°C)

FLANGES

5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A350 LF2 - CL.1
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A350 LF2 - CL.1
	26	60	WN FLANGE - ASME-B16.47 series.A	BW	CL300 RF	ASTM A350 LF2 - CL.1
	68	68	SPECIAL WN FLANGE - <MFR Std> GA-E-060015	BW	CL300 RF	ASTM A350 LF2 - CL.1
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A350 LF2 - CL.1
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A350 LF2 - CL.1
	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A350 LF2 - CL.1
	26	60	BLIND FLANGE - ASME-B16.47 series.A		CL300 RF	ASTM A350 LF2 - CL.1
	3	3/4	3/4 BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A350 LF2 - CL.1
	5	1/2	24 BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A350 LF2 - CL.1
14	2	2	SW REDUCING FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A350 LF2 - CL.1
	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A350 LF2 - CL.1

11	2	2
SPECTACLE BLIND		

	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	14	24	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	30	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060015		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	36	36	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060015		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	48	48	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060015		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	52	52	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060015		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	68	68	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060015		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
2	1/2	12	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
5	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)
25	2	2	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS

1/2	3	DRIP-RING - TB DRI 5011		CL300 RF	ASTM A350 LF2 - CL.1
1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
26	48	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
50	72	LONG RADIUS ELBOW - TB RAC 5060	BW		ASTM A420 WPL6W - WLDD
3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
2	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
26	48	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
50	72	REDUCER, LARGE BORE - TB RAC 5062	BW		ASTM A420 WPL6W - WLDD
1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A350 LF2 - CL.1
2	48	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
50	72	CAP - TB RAC 5064	BW		ASTM A420 WPL6W - WLDD
1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A350 LF2 - CL.1
1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A350 LF2 - CL.1
1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A333 GR.6 - SMLS
3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A420 WPL6 - SMLS
3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A420 WPL6 - SMLS
1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
2	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
28	48	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
52	72	TEE - TB RAC 5061	BW		ASTM A420 WPL6W - WLDD
2	8	WELDOLET - MSS-SP97	BW		ASTM A350 LF2 - CL.1
2	2	LATROLET - BW END - MSS-SP97	BW	3000	ASTM A350 LF2 - CL.1
3	8	SPECIAL LATROLET - <MFR Std>	BW		ASTM A350 LF2 - CL.1
1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A350 LF2 - CL.1



PIPING MATERIAL SPECIFICATION

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opt.	Size from to		Item Description	Ends	Rating/Facing	Material	
FITTINGS							
	1/2	1 1/2	LATROLET - SW END - MSS-SP97	SW\BW	3000	ASTM A350 LF2 - CL.1	
MISCELLANEOUS							
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5		CL300 RF	GRE LAMINATED + TFE (MAX T 180 C)	
GASKETS							
	26	60	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE	
	68	68	FLAT GASKET - GROOVED - <MFR Std> GA-E-060015			AISI 316L+GRAPHITE	
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING	
BOLTS							
	1/2	2 1/8	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)	
VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60100	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
1	2	24	GA-E-60104	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
2	26	48	GA-E-60509	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
2	52	52	GA-E-60538	Special Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
2	68	68	GA-E-60527	Special Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
4	1/2	1 1/2	GA-E-60200	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
4	2	12	GA-E-60204	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	1/2	1 1/2	GA-E-60300	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
6	2	10	GA-E-60306	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	12	24	GA-E-60307	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	26	36	GA-E-60384	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	52	52	GA-E-60720	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
7	2	4	GA-E-60404	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
7	6	24	GA-E-60405	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60403	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
8	2	4	GA-E-67257	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60787	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60173	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
11	1/2	1 1/2	GA-E-67345	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	1/2	1 1/2	GA-E-60174	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	2	24	GA-E-60574	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
15	2	2	GA-E-60105	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
19	1/2	1 1/2	GA-E-60176	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
62	10	10	GA-E-60712	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
64	52	52	GA-E-60725	Nozzle Check-Long-Axial non slam-Thdd seat - <MFR Std - Metallic>	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
69	52	52	GA-E-60717	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
80	1/2	1 1/2	GA-E-60480	Ball-Stem Extension-End entry-FB-Float.ball-Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
82	1/2	1 1/2	GA-E-60754	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
84	1/2	1 1/2	GA-E-67680	Ball-Stem Extension-End entry-FB-Float.ball-Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60496	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60147	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
101	2	24	GA-E-60592	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
102	2	24	GA-E-60118	Gate-BB-FB-Flex wdg-Thdd seat - API600	BW	CL300	Body: ASTM A352 LCC Trim : 316 / HF
111	1/2	1 1/2	GA-E-67391	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
114	1/2	1 1/2	GA-E-67389	Gate-Stem Extension-BB-Red.B-Solid wdg-Exo.seat - API602	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF



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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
130	1/2	1 1/2	GA-E-67074	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
140	3	3	GA-E-67362	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
142	3	4	GA-E-60118	Gate-BB-FB-Flex wdg-Thdd seat - API600	BW	CL300	Body: ASTM A352 LCC Trim : 316 / HF
144	3	12	GA-E-67363	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
145	2	2	GA-E-60577	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
162	6	6	GA-E-67312	Gate-Ext. Stem (1800mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
162	12	12	GA-E-67312	Gate-Ext. Stem (1800mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
201	30	30	GA-E-60533	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
201	42	42	GA-E-60533	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
401	1/2	1 1/2	GA-E-67409	Globe-Stem Extension-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
401	2	12	GA-E-60282	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
701	10	12	GA-E-67258	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
780	2	3	GA-E-67655	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
781	2	2	GA-E-67658	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
782	2	2	GA-E-67688	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
783	2	3	GA-E-67654	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
784	2	2	GA-E-67657	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
785	2	3	GA-E-67656	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
801	1/2	1 1/2	GA-E-67134	Ball-Stem Extension-End entry-FB-Float.ball-Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
801	8	8	GA-E-67259	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
840	4	4	GA-E-67616	Ball-Split body-FB-Floating ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
840	6	10	GA-E-67615	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
841	8	8	GA-E-67617	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
890	1/2	1 1/2	GA-E-67681	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+ Nipple - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
907	2	6	GA-E-69009	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
907	10	10	GA-E-69078	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
917	8	24	GA-E-69049	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL300	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
972	6	8	GA-E-69100	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
976	6	8	GA-E-69097	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
991	1	1	GA-E-69101	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	12	GA-E-60605	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3
1	36	48	GA-E-60610	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3
2	30	36	GA-E-60611	Angle T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243							
												Piping Class:				03CA1S02			
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		A		0															

Base Material : LOW TEMP. CARBON STEEL												Design code : ASME B 31.3 2016											
Nom. Rating : CL300												PWHT : AS PER CODE (NOTE 1)											
Facing/Finishing : RF												Valve Trim : 12 - SS316/HF											
Corrosion Allow. : 1.5 mm												Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -45 °C to 70 °C																							
Service: PR - Propane Refrigerant																							
Pipe Thickness																							
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12												
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	10.97	12.7	15.09	17.48												
SCH.	XS	XS	XS	XS	XS	STD	STD	80	80	80	80												
Nipple Thickness																							
NPS	1/2	3/4	1	1 1/2	2																		
Thk.mm	4.78	5.56	6.35	7.14	8.74																		
SCH.	160	160	160	160	160																		
PRESSURE - TEMPERATURE Ratings																							
NPS	Press. bar		51.02	51.02	ASME B16.5																		
1/2 - 12	Temp. °C		-28.9	37.78	Material Group 1.1																		

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material	
PIPE							
	1/2	12	PIPE	BW		ASTM A333 GR.6 - SMLS	
FLANGES							
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A350 LF2 - CL.1	
	2	12	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A350 LF2 - CL.1	
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A350 LF2 - CL.1	
	2	12	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A350 LF2 - CL.1	
3	1/2	12	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A350 LF2 - CL.1	
	3/4	3/4	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A350 LF2 - CL.1	
5	1/2	12	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A350 LF2 - CL.1	
	2	2	SW REDUCING FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A350 LF2 - CL.1	
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A350 LF2 - CL.1	
SPECTACLE BLIND							
	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)	
2	1/2	12	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)	
5	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)	
FITTINGS							
	1/2	3	DRIP-RING - TB DRI 5011		CL300 RF	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1	
	2	12	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1	
	2	12	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A350 LF2 - CL.1	
	2	12	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A350 LF2 - CL.1	
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A350 LF2 - CL.1	
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDMPE		ASTM A333 GR.6 - SMLS	
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A420 WPL6 - SMLS	
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A420 WPL6 - SMLS	
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1	
	2	12	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	2	8	WELDOLET - MSS-SP97	BW		ASTM A350 LF2 - CL.1	
	2	2	LATROLET - BW END - MSS-SP97	BW	3000	ASTM A350 LF2 - CL.1	
	3	8	SPECIAL LATROLET - <MFR Std>	BW		ASTM A350 LF2 - CL.1	
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	LATROLET - SW END - MSS-SP97	SW\BW	3000	ASTM A350 LF2 - CL.1	
	GASKETS						
		1/2	12	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
	BOLTS						
	1/2	2 1/8	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)	
VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60100	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
1	2	12	GA-E-60104	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
4	1/2	1 1/2	GA-E-60200	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
4	2	12	GA-E-60204	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	1/2	1 1/2	GA-E-60300	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
6	2	10	GA-E-60306	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	12	12	GA-E-60307	Check-Flanged -Dual plate-Widd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
7	2	2	GA-E-60404	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **03CA1S02**

Sh. 2 of 3				Rev.			
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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
7	6	12	GA-E-60405	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60403	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
8	2	4	GA-E-67257	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
8	6	12	GA-E-60787	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60173	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
11	1/2	1 1/2	GA-E-67345	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	1/2	1 1/2	GA-E-60174	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	2	12	GA-E-60574	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
15	2	2	GA-E-60105	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
19	1/2	1 1/2	GA-E-60176	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
62	10	10	GA-E-60712	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
80	1/2	1 1/2	GA-E-60480	Ball-Stem Extension-End entry-FB-Float.ball-Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
82	1/2	1 1/2	GA-E-60754	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60496	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60147	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
101	2	12	GA-E-60592	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
102	2	12	GA-E-60118	Gate-BB-FB-Flex wdg-Thdd seat - API600	BW	CL300	Body: ASTM A352 LCC Trim : 316 / HF
130	1/2	1 1/2	GA-E-67074	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
140	3	3	GA-E-67362	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
142	3	4	GA-E-60118	Gate-BB-FB-Flex wdg-Thdd seat - API600	BW	CL300	Body: ASTM A352 LCC Trim : 316 / HF
144	3	12	GA-E-67363	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
145	2	2	GA-E-60577	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
162	6	6	GA-E-67312	Gate-Ext. Stem (1800mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
162	12	12	GA-E-67312	Gate-Ext. Stem (1800mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
401	2	12	GA-E-60282	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
701	10	12	GA-E-67258	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67134	Ball-Stem Extension-End entry-FB-Float.ball-Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
801	8	8	GA-E-67259	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats

BRANCH TABLES



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 03CA1S60

Rev.				
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Sh. 2 of 3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
2	68	68	GA-E-60527	Special Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
4	1/2	1 1/2	GA-E-60200	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
4	2	12	GA-E-60204	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	1/2	1 1/2	GA-E-60300	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
6	2	10	GA-E-60306	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	12	24	GA-E-60307	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	26	36	GA-E-60384	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	52	52	GA-E-60720	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
7	6	24	GA-E-60405	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60403	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60787	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60173	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	1/2	1 1/2	GA-E-60174	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	2	24	GA-E-60574	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
19	1/2	1 1/2	GA-E-60176	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
62	10	10	GA-E-60712	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
64	68	68	GA-E-60725	Nozzle Check-Long-Axial non slam-Thdd seat - <MFR Std - Metallic>	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
69	52	52	GA-E-60717	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
80	1/2	1 1/2	GA-E-60480	Ball-Stem Extension-End entry-FB-Float.ball-Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats
82	1/2	1 1/2	GA-E-60754	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60496	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60147	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
101	2	24	GA-E-60592	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
102	2	24	GA-E-60118	Gate-BB-FB-Flex wdg-Thdd seat - API600	BW	CL300	Body: ASTM A352 LCC Trim : 316 / HF
130	1/2	1 1/2	GA-E-67074	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
201	30	30	GA-E-60533	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
401	2	12	GA-E-60282	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
701	12	24	GA-E-67258	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67134	Ball-Stem Extension-End entry-FB-Float.ball-Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	12	GA-E-60605	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3
1	36	48	GA-E-60610	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **03CA2S01**

Sh. 1 of 3	Rev.				
	A	0	1		

Base Material	: LOW TEMP. CARBON STEEL	Design code	: ASME B 31.3 2016
Nom. Rating	: CL300	PWHT	: AS PER CODE (NOTE 1)
Facing/Finishing	: RF	Valve Trim	: 12 - SS316/HF
Corrosion Allow.	: 3 mm	Welding Spec	: MZ-000-CCX-MC-SPC-00009/00013
Temp. Limit	: -45 °C to 230 °C		

Service: WF - Wet (Warm) Flare

Pipe Thickness

NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
Thk.mm	4.78	5.56	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	10.31	11.13	12.7	14.27	15.09	17.48
SCH.	160	160	XS	XS	XS	STD	STD	STD	STD	STD	40	40	XS	40	40	40

[illegible]

NPS	1/2	3/4	1	1 1/2	2
Thk.mm	7.47	7.82	6.35	7.14	8.74
SCH.	XXS	XXS	160	160	160

PRESSURE - TEMPERATURE Ratings

NPS	Press. bar	51.02	51.02	46.88	45.16	43.78	ASME B16.5
1/2 · 24	Temp. °C	-28.9	37.78	93.33	148.9	204.4	Material Group 1.1

opt.	Size		Item Description	Ends	Rating/Facing	Material
	from	to				

PIPE

1/2	24	PIPE	BW	ASTM A333 GR.6 - SMLS
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FLANGES

5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A350 LF2 - CL.1
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A350 LF2 - CL.1
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A350 LF2 - CL.1
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A350 LF2 - CL.1
	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A350 LF2 - CL.1
14	2	2	SW REDUCING FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A350 LF2 - CL.1
	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A350 LF2 - CL.1

14	2	2
SPECTACLE BLIND		

2	1/2	12	SPECTACLE BLIND - ASME-B16.48	CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	14	24	BLIND & SPACER - ASME-B16.48	CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	1/2	12	BLIND & SPACER - ASME-B16.48	CL300 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS

1/2	3	DRIP-RING - TB DRI 5011		CL300 RF	ASTM A350 LF2 - CL.1
1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
2	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A350 LF2 - CL.1
2	24	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A350 LF2 - CL.1
1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A350 LF2 - CL.1
1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM\PE		ASTM A333 GR.6 - SMLS
3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A420 WPL6 - SMLS
3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A420 WPL6 - SMLS
1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
2	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
2	8	Weldolet - MSS-SP97	BW		ASTM A350 LF2 - CL.1
2	2	Latrolet - BW END - MSS-SP97	BW	3000	ASTM A350 LF2 - CL.1
3	8	SPECIAL LATROLET - <MFR Std>	BW		ASTM A350 LF2 - CL.1
1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A350 LF2 - CL.1
1/2	1 1/2	LATROLET - SW END - MSS-SP97	SW\BW	3000	ASTM A350 LF2 - CL.1

GASKETS

1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20		304 SS+GRAPH 98% - C.S. OUT.RING
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BOLTS

1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368	ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)
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VALVES


pos.	Size from	to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60100	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
1	2	24	GA-E-60104	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
4	1/2	1 1/2	GA-E-60200	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
4	2	12	GA-E-60204	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	1/2	1 1/2	GA-E-60300	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
6	2	10	GA-E-60306	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	12	24	GA-E-60307	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF
7	6	24	GA-E-60405	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60403	Ball-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats


PIPING MATERIAL SPECIFICATION

VALVES

BRANCH TABLES

Legenda	
A	TEE - SW ENDS - ASME-B16.11
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E
S	SOCKOLET - SW END - MSS-SP97
T	TEE - ASME-B16.9
T1	TEE - TB RAC 5061
W	WELDOLET - MSS-SP97

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243									
												Piping Class:						03CA4S01			
												Sh. 1 of 2		Rev.				A		0	
Base Material : LOW TEMP. CARBON STEEL										Design code : ASME B 31.3 2016											
Nom. Rating : CL300										PWHT : AS PER CODE (NOTE 1)											
Facing/Finishing : RF										Valve Trim : 12 - SS316/HF											
Corrosion Allow. : 6 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -45 °C to 90 °C																					
Service: HL - Hydrocarbon Liquid																					
Pipe Thickness																					
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24					
Thk.mm	7.47	7.82	9.09	10.15	8.74	11.13	11.13	10.97	12.7	12.7	14.27	15.09	15.88	17.48	17.48	20.62					
SCH.	XXS	XXS	XXS	XXS	160	160	120	XS	XS	XS	60	60									
Nipple Thickness																					
NPS	1/2	3/4	1	1 1/2	2																
Thk.mm	7.47	7.82	9.09	10.15	8.74																
SCH.	XXS	XXS	XXS	XXS	160																
PRESSURE - TEMPERATURE Ratings																					
NPS	Press. bar	51.02	51.02	ASME B16.5																	
1/2 - 24	Temp. °C	-28.9	37.78	Material Group 1.1																	
opt.	Size from to		Item Description								Ends	Rating/Facing	Material								
PIPE																					
	1/2	24	PIPE								BW		ASTM A333 GR.6 - SMLS								
FLANGES																					
5	1/2	1 1/2	SW FLANGE - ASME-B16.5								SW	CL300 RF	ASTM A350 LF2 - CL.1								
	2	24	WN FLANGE - ASME-B16.5								BW	CL300 RF	ASTM A350 LF2 - CL.1								
	1/2	1 1/2	SW FLANGE - ASME-B16.5								SW	CL600 RF	ASTM A350 LF2 - CL.1								
	2	24	WN FLANGE - ASME-B16.5								BW	CL600 RF	ASTM A350 LF2 - CL.1								
5	1/2	24	BLIND FLANGE - ASME-B16.5									CL300 RF	ASTM A350 LF2 - CL.1								
	2	2	SW REDUCING FLANGE - ASME-B16.5								SW	CL300 RF	ASTM A350 LF2 - CL.1								
	2	2	THDD RED. FLANGE - ASME-B16.5								THDF	CL300 RF	ASTM A350 LF2 - CL.1								
	14	2																			
SPECTACLE BLIND																					
2	1/2	12	SPECTACLE BLIND - ASME-B16.48 GA-E-060011									CL300 RF	ASTM A516 GR.70 + S5 (-46°C)								
	14	24	BLIND & SPACER - ASME-B16.48 GA-E-060011									CL300 RF	ASTM A516 GR.70 + S5 (-46°C)								
	1/2	12	BLIND & SPACER - ASME-B16.48 GA-E-060011									CL300 RF	ASTM A516 GR.70 + S5 (-46°C)								
FITTINGS																					
	1/2	3	DRIP-RING - TB DRI 5011									CL300 RF	ASTM A350 LF2 - CL.1								
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11								SW	9000	ASTM A350 LF2 - CL.1								
	2	24	LONG RADIUS ELBOW - ASME-B16.9								BW		ASTM A420 WPL6 - SMLS								
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11								SW	9000	ASTM A350 LF2 - CL.1								
	2	24	REDUCER - ASME-B16.9								BW		ASTM A420 WPL6 - SMLS								
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11								THDF	6000	ASTM A350 LF2 - CL.1								
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11								SW	9000	ASTM A350 LF2 - CL.1								
	2	24	CAP - ASME-B16.9								BW		ASTM A420 WPL6 - SMLS								
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11								SW	9000	ASTM A350 LF2 - CL.1								
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11								SW\THDF	6000	ASTM A350 LF2 - CL.1								
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11								THDM		ASTM A350 LF2 - CL.1								
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10								THDM/PE		ASTM A333 GR.6 - SMLS								
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95								PE\THDM		ASTM A420 WPL6 - SMLS								
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95								PE		ASTM A420 WPL6 - SMLS								
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11								SW	9000	ASTM A350 LF2 - CL.1								
	2	24	TEE - ASME-B16.9								BW		ASTM A420 WPL6 - SMLS								
	2	8	WELDOLET - MSS-SP97								BW		ASTM A350 LF2 - CL.1								
	1/2	1 1/2	SOCKOLET - SW END - TB RAC 5380								SW\BW	9000	ASTM A350 LF2 - CL.1								
GASKETS																					
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20										304 SS+GRAPH 98% - C.S. OUT.RING								
BOLTS																					
	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368										ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)								
VALVES																					
pos.	from	Size to	Data Sheet	Item Description						Ends	Rating/Facing	Material									
1	1/2	1 1/2	GA-E-60109	Gate-WB-Red.B-Solid wdg-Exp.seat - API602						SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF									
1	2	24	GA-E-67387	Gate-BB-FB-Flex wdg-Thdd seat - API600						FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF									
4	1/2	1 1/2	GA-E-60206	Globe-WB-Red.B-Thdd seat - API602						SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF									
4	2	12	GA-E-67406	Globe-BB-Disk-Thdd seat - API 623						FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF									
6	1/2	1 1/2	GA-E-67506	Check-WB-Red.B-Piston-Int seat - API602						SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF									
6	2	10	GA-E-67507	Check-BB- FB- Swing - API594						FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF									
6	12	24	GA-E-67508	Check-Flanged -Dual plate-Wldd seat - API594						FLGD	CL300 RF	Body: ASTM A352 LCC Trim : 316 / HF									
7	6	24	GA-E-67647	Ball-Split body-Red.B-Trunnion ball - API6D						FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats									
8	1/2	1 1/2	GA-E-67648	Ball-End entry -FB-Float.ball -Frgd body - API608						FLGD	CL300 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - RPTFE seats									
8	6	24	GA-E-67649	Ball-Split body-FB-Trunnion ball - API6D						FLGD	CL300 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - RPTFE seats									
10	1/2	1 1/2	GA-E-60183	Gate-WB-Red.B-Solid wdg-Exp.seat - API602						SW/THDF	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF									



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class:03CA4S01

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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
14	1/2	1 1/2	GA-E-60578	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
19	1/2	1 1/2	GA-E-60579	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
101	1/2	1 1/2	GA-E-67031	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF

BRANCH TABLES

90 Degrees

RunSize																
1/2	A															
3/4	A	A														
1	A	A	A													
1 1/2	A	A	A	A												
2	S	S	T	T	T											
3	S	S	S	S	W	T										
4	S	S	S	S	W	T	T									
6	S	S	S	S	W	W	T	T								
8	S	S	S	S	W	W	W	T	T							
10	S	S	S	S	W	W	W	W	T	T						
12	S	S	S	S	W	W	W	W	W	T	T					
14	S	S	S	S	W	W	W	W	W	P	T	T				
16	S	S	S	S	W	W	W	W	W	P	P	T	T			
18	S	S	S	S	W	W	W	W	W	P	P	P	T	T		
20	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T	
24	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24

Legenda

A	TEE - SW ENDS - ASME-B16.11
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E
S	SOCKOLET - SW END - TB RAC 5380
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

GENERAL NOTES

1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.

2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.

3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).

4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

5) Specified Thickness are suitable to withstand Full Vacuum condition.

PIPING MATERIAL SPECIFICATION

 CCS JV MOZAMBIQUE LNG	PIPING MATERIAL SPECIFICATION	JOB 032243														
		Piping Class:		03CB1S01												
		Sh. 2 of 4		Rev. <table><tr><td>A</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					A	0	1	2	3			
A	0	1	2	3												

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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FITTINGS

	1/2	1 1/2	LATROLET - SW END - MSS-SP97	SW\BW	3000	ASTM A105 Normalized
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GASKETS

	26	56	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
73	1/2	1 1/2	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS

	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)
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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
1	2	24	GA-E-60117	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
2	26	48	GA-E-60511	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
4	2	12	GA-E-60217	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
5	1/2	1 1/2	GA-E-67200	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	2	10	GA-E-60322	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	12	24	GA-E-60323	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	4	4	GA-E-60420	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
7	6	24	GA-E-60421	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
7	30	30	GA-E-67198	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
8	1/2	1 1/2	GA-E-60419	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
8	2	4	GA-E-67170	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60786	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
11	1/2	1 1/2	GA-E-60583	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
14	1/2	1 1/2	GA-E-60148	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
14	2	8	GA-E-67061	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
15	2	2	GA-E-60126	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
19	1/2	1 1/2	GA-E-67001	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
62	2	10	GA-E-60703	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
64	42	56	GA-E-60383	Nozzle Check-Long-Axial non slam-Thdd seat - API 6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
69	42	42	GA-E-60349	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
69	56	56	GA-E-60718	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
80	1/2	1 1/2	GA-E-67196	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
82	1/2	1 1/2	GA-E-60755	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	4	4	GA-E-67168	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
101	2	2	GA-E-60591	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67075	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
140	2	6	GA-E-67364	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
163	3	3	GA-E-67313	Gate-Ext. Stem (2300mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
780	2	3	GA-E-67659	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 03CB1S01

Rev.					
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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
801	1/2	1 1/2	GA-E-67135	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
840	3	3	GA-E-67693	Ball-Interlock System-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
840	10	10	GA-E-67294	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
890	1/2	1 1/2	GA-E-67653	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+ Nipple - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
902	30	42	GA-E-69079	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
907	6	14	GA-E-69011	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
977	6	6	GA-E-69102	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
991	1	1	GA-E-69045	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	24	GA-E-60607	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3
1	30	56	GA-E-60610	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3
2	24	24	GA-E-60644	Angle T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3
8	56	56	GA-E-60611	Angle T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

90 Degrees																													
RunSize																													
1/2	A																												
3/4	A	A																											
1	A	A	A																										
1 1/2	A	A	A	A																									
2	S	S	T	T	T																								
2 1/2																													
3	S	S	S	S	W	T																							
4	S	S	S	S	W	T	T																						
6	S	S	S	S	W	W	T	T																					
8	S	S	S	S	W	W	W	T	T																				
10	S	S	S	S	W	W	W	W	T	T																			
12	S	S	S	S	W	W	W	W	W	T	T																		
14	S	S	S	S	W	W	W	W	W	P	T	T																	
16	S	S	S	S	W	W	W	W	W	P	P	T	T																
18	S	S	S	S	W	W	W	W	W	P	P	P	T	T															
20	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T														
24	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T													
26	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T												
28	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	T	T											
30	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	T	T										
36	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	P	T	T									
42	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	P	T	T									
48	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	P	P	T	T								
56	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	P	P	T	T	T							
BranchSize																													
Legend																													
A	TEE - SW ENDS - ASME-B16.11																												
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPM-T-012-E																												
S	SOCKOLET - SW END - MSS-SP97																												
T	TEE - ASME-B16.9																												
T1	TEE - TB RAC 5061																												
W	WELDOLET - MSS-SP97																												

RunSize		45 degrees																											
		L	L	L	L	PP																							
2		L	L	L	L	PP																							
3		L	L	L	L	LB	PP																						
4		L	L	L	L	LB	LS	PP																					
6		L	L	L	L	LB	LS	LS	PP																				
8		L	L	L	L	LB	LS	LS	LS	PP																			
10		L	L	L	L	LB	LS	LS	LS	LS	PP																		
12		L	L	L	L	LB	LS	LS	LS	LS	PP	PP																	
14		L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP																
16		L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP															
18		L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP														
20		L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP													
24		L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP												
26		L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP											
28		L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP										
30		L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP									
36		L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP								
42		L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP							
48		L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP						
56		L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	
BranchSize		1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	26	28	30	36	42	48	56					
Legenda																													
L		LATROLET - SW END - MSS-SP97																											
LB		LATROLET - BW END - MSS-SP97																											
LS		SPECIAL LATROLET - <MFR Std>																											
PP		PIPE TO PIPE WITH FULL ENCIRCLEMENT SLEEVE:TS-COR-ENG-PIPMT-012-E																											

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **03CB1S02**

Rev.				
A	0	1	2	3

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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
1	2	24	GA-E-60117	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
2	26	42	GA-E-60511	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
4	2	14	GA-E-60217	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	2	10	GA-E-60322	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	12	24	GA-E-60323	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	6	24	GA-E-60421	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
8	1/2	1 1/2	GA-E-60419	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60786	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
11	1/2	1 1/2	GA-E-60583	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
41	1 1/2	1 1/2	GA-E-67412	Globe-BB-Red B.-Thdd seat - API602	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
62	3	3	GA-E-60703	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
62	12	24	GA-E-60322	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
72	2	2	GA-E-67167	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	1/2	1 1/2	GA-E-60755	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	2	2	GA-E-67168	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	6	24	GA-E-67169	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
101	2	24	GA-E-60591	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
102	2	2	GA-E-67089	Gate-BB-FB-Flex wdg-Thdd seat - API600	BW	CL300	Body: ASTM A216 WCB Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67075	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
140	2	4	GA-E-67364	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
159	2	2	GA-E-67314	Gate-Ext. Stem (1200mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
159	10	10	GA-E-67314	Gate-Ext. Stem (1200mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
160	6	6	GA-E-67315	Gate-Ext. Stem (1400mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
450	2	2	GA-E-60298	Globe-Ext. Stem (1200mm)-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
780	2	2	GA-E-67659	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
781	2	3	GA-E-67660	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
801	1/2	1 1/2	GA-E-67135	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
824	14	14	GA-E-67618	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
907	2	4	GA-E-69010	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
907	6	24	GA-E-69011	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
908	24	24	GA-E-69094	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
972	2	4	GA-E-69051	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
972	6	24	GA-E-69052	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	4	16	GA-E-60634	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3
1	30	30	GA-E-60635	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																			
1/2	A																				
3/4	A	A																			
1	A	A	A																		
1 1/2	A	A	A	A																	
2	S	S	T	T	T																
2 1/2	S	S	S	S	T	T															
3	S	S	S	S	S	W	T	T													
4	S	S	S	S	S	W	W	T	T												
6	S	S	S	S	S	W	W	W	T	T											
8	S	S	S	S	S	W	W	W	W	T	T										
10	S	S	S	S	S	W	W	W	W	W	T	T									
12	S	S	S	S	S	W	W	W	W	W	W	T	T								
14	S	S	S	S	S	W	W	W	W	W	W	P	T	T							
16	S	S	S	S	S	W	W	W	W	W	W	P	P	T	T						
18	S	S	S	S	S	W	W	W	W	W	W	P	P	P	T	T					
20	S	S	S	S	S	W	W	W	W	W	W	P	P	P	P	T	T				
24	S	S	S	S	S	W	W	W	W	W	W	P	P	P	P	P	T	T			
30	S	S	S	S	S	W	W	W	W	W	W	P	P	P	P	P	P	T	T		
32	S	S	S	S	S	W	W	W	W	W	W	P	P	P	P	P	P	T	T		
36	S	S	S	S	S	W	W	W	W	W	W	P	P	P	P	P	P	P	T	T	
42	S	S	S	S	S	W	W	W	W	W	W	P	P	P	P	P	P	P	P	T	T
BranchSize	1/2	3/4	1	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24	30	32	36	42
Legenda																					
A	TEE - SW ENDS - ASME-B16.11																				
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																				
S	SOCKOLET - SW END - MSS-SP97																				
T	TEE - ASME-B16.9																				
W	WELDOLET - MSS-SP97																				

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.

<div><div><div>CCS</div><div>JV</div></div><div><div>Mozambique</div><div>LNG</div></div></div>		PIPING MATERIAL SPECIFICATION														JOB 032243															
																Piping Class:										03CB1S05					
																Sh.		1		of		3		Rev.							
		A		0		1																									

Base Material : CARBON STEEL																		Design code : ASME B 31.3 2016																	
Nom. Rating : CL300																		PWHT : AS PER CODE (NOTE 1)																	
Facing/Finishing : RF																		Valve Trim : 12 - SS316/HF																	
Corrosion Allow. : 1.5 mm																		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																	
Temp. Limit : 0 °C to 180 °C																																			
Service: MEG - Monoethylene Glycol																																			
Pipe Thickness																																			
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24																			
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	12.7	12.7	12.7	17.48																			
SCH.	XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	XS	XS	XS	40																			
Nipple Thickness																																			
NPS	1/2	3/4	1	1 1/2	2																														
Thk.mm	4.78	5.56	6.35	7.14	8.74																														
SCH.	160	160	160	160	160																														

PRESSURE - TEMPERATURE Ratings																	
NPS	Press. bar	51.02	46.88	45.16	ASME B16.5												
1/2 - 24	Temp. °C	37.78	93.33	148.9	Material Group 1.1												

opt.	Size		Item Description	Ends	Rating/Facing	Material
from	to					

PIPE						
	1/2	24	PIPE	BW		ASTM A106 GR.B - SMLS

FLANGES						
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 FF	ASTM A105 Normalized
63	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
73	2	2	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
5	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A105 Normalized

SPECTACLE BLIND						
	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	14	24	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
5	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		CL300 RF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	24	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	24	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM\PE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	24	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	2	8	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A105 Normalized

MISCELLANEOUS						
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5		CL300 RF	GRE LAMINATED + TFE (MAX T 180 C)
	6	6	SPECIAL TEMPORARY STRAINER - <MFR Std - Metallic>		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)

GASKETS						
12	2	24	FLAT NON MET. GASKET - ASME-B16.21			ARAMIDIC FIBER (13%)
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60167	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
1	2	24	GA-E-60119	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
4	1/2	1 1/2	GA-E-60259	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
4	2	12	GA-E-60219	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
5	1/2	1 1/2	GA-E-67205	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 03CB1S05

Sh. 2 of 3				Rev.			
A	0	1					


VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	1/2	1 1/2	GA-E-60375	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
6	2	10	GA-E-60325	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
6	12	24	GA-E-60326	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
7	2	4	GA-E-60420	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
7	6	24	GA-E-67117	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60419	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
8	3	4	GA-E-67170	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
10	3/4	1 1/2	GA-E-60197	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
14	2	2	GA-E-67392	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
15	2	2	GA-E-60128	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 316 / HF
62	3	3	GA-E-60704	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
72	2	4	GA-E-67167	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
72	6	6	GA-E-67171	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	1/2	1 1/2	GA-E-60755	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67012	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
101	2	24	GA-E-67027	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
130	1/2	1 1/2	GA-E-67077	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
410	1/2	1 1/2	GA-E-67400	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
710	2	2	GA-E-67273	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67135	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
907	2	4	GA-E-69010	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
907	12	16	GA-E-69011	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	6	GA-E-60634	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

<div></div>		PIPING MATERIAL SPECIFICATION																		JOB 032243													
																				Piping Class:										03CB1S60			
																				Sh.		1		of		3		Rev.					
		A		0																													

Base Material : CARBON STEEL										Design code : ASME B 31.3 2016											
Nom. Rating : CL300										PWHT : AS PER CODE (NOTE 1)											
Facing/Finishing : RF										Valve Trim : 8 - 13Cr/ HF											
Corrosion Allow. : 1.5 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -29 °C to 230 °C																					
Service: [AIV] BOG - Boil Off Gas DFG - Dry Fuel Gas MR - Mixed Refrigerant NG - Natural Gas PC - Process Condensate WF - Wet (Warm) Flare																					

Pipe Thickness																							
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	26	28	30	36	42	48	56
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	9.53	9.53	12.7	12.7	12.7	17.48	15.88	17.48	19.05	19.05	22.23	25.4	25.4
SCH.	XS	XS	XS	XS	XS	STD	STD	STD	STD	STD	STD	STD	XS	XS	XS	40							

Nipple Thickness											
NPS	1/2	3/4	1	1 1/2	2						
Thk.mm	4.78	5.56	6.35	7.14	8.74						
SCH.	160	160	160	160	160						

PRESSURE - TEMPERATURE Ratings											
NPS	Press. bar	51.02	51.02	46.88	45.16	43.78	ASME B16.5/ASME B16.47				
1/2 - 30	Temp. °C	-28.9	37.78	93.33	148.9	204.4	Material Group 1.1				
NPS	Press. bar	45									
36 - 56	Temp. °C	150									

opt.	Size		Item Description	Ends	Rating/Facing	Material
	from	to				


PIPE						
	1/2	20	PIPE	BW		ASTM A106 GR.B - SMLS
	22	24	PIPE	BW		ASTM A333 GR.6 - SMLS
	26	42	PIPE	BW		ASTM A671 GR.CC65 CL.12 - EFW + S2 (-46°C)
	44	56	PIPE	BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)

FLANGES						
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
	26	56	WN FLANGE - ASME-B16.47 series.A	BW	CL300 RF	ASTM A105 Normalized
	5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF
5	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
5	26	56	WN FLANGE - ASME-B16.47 series.A	BW	CL600 RF	ASTM A105 Normalized
63	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
3	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
	26	56	BLIND FLANGE - ASME-B16.47 series.A		CL300 RF	ASTM A105 Normalized
	3/4	3/4	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
	5	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF
14	2	2	SW REDUCING FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A105 Normalized

SPECTACLE BLIND						
	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	14	24	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	30	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060015		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
2	1/2	12	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)


FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		CL300 RF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	20	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	24	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	48	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	50	56	LONG RADIUS ELBOW - TB RAC 5060	BW		ASTM A420 WPL6W - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	20	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	24	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	30	48	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	50	56	REDUCER, LARGE BORE - TB RAC 5062	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	20	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	24	48	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	50	56	CAP - TB RAC 5064	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW/THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A106 GR.B - SMLS
	1/2	2	NIPPLE - THDD/THDD - ASME-B36.10	THDM		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	20	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	24	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	48	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	56	56	TEE - TB RAC 5061	BW		ASTM A420 WPL6W - WLDD
	2	24	SPECIAL SWEEPOLET - <MFR Std>	BW	3000	ASTM A105 Normalized


GASKETS						
	26	56	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING

	PIPING MATERIAL SPECIFICATION		JOB 032243											
			Piping Class:		03CB1S60									
			Sh. 2 of 3		Rev. <table><tr><td>A</td><td>0</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>			A	0					
A	0													

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
GASKETS						
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES								
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material	
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF	
1	2	24	GA-E-60117	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
2	26	48	GA-E-60511	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc	
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF	
4	2	12	GA-E-60217	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
5	1/2	1 1/2	GA-E-67200	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF	
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF	
6	2	10	GA-E-60322	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
6	12	24	GA-E-60323	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
7	4	4	GA-E-60420	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats	
7	6	24	GA-E-60421	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats	
7	30	30	GA-E-67198	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats	
8	1/2	1 1/2	GA-E-60419	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats	
8	4	4	GA-E-67170	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats	
8	6	24	GA-E-60786	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats	
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF	
11	1/2	1 1/2	GA-E-60583	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : 13CR / HF	
14	1/2	1 1/2	GA-E-60148	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF	
14	2	8	GA-E-67061	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
15	2	2	GA-E-60126	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
19	1/2	1 1/2	GA-E-67001	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF	
62	2	10	GA-E-60703	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
64	42	56	GA-E-60383	Nozzle Check-Long-Axial non slam-Thdd seat - API 6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
69	42	42	GA-E-60349	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
69	56	56	GA-E-60718	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
80	1/2	1 1/2	GA-E-67196	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats	
82	1/2	1 1/2	GA-E-60755	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
82	4	4	GA-E-67168	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF	
101	2	2	GA-E-60591	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
130	1/2	1 1/2	GA-E-67075	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF	
140	2	6	GA-E-67364	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
163	3	3	GA-E-67313	Gate-Ext. Stem (2300mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF	
780	2	2	GA-E-67659	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats	
801	1/2	1 1/2	GA-E-67135	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats	

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243									
												Piping Class:					03CB2B03				
												Sh. 1 of 2					Rev.				
A 0 1 2 3																					
Base Material : CARBON STEEL										Design code : ASME B 31.3 2016											
Nom. Rating : CL300										PWHT : YES (NOTE 1)											
Facing/Finishing : RF										Valve Trim : 12 - SS316/HF											
Corrosion Allow. : 3 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -29 °C to 130 °C																					
Service: [Amine Service] AL - Amine Lean (AG) PRW - Process Water																					
Pipe Thickness																					
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24					
Thk.mm	4.78	5.56	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	10.31	11.13	12.7	14.27	15.09	17.48					
SCH.	160	160	XS	XS	XS	STD	STD	STD	STD	STD	40	40	XS	40	40	40					
Nipple Thickness																					
NPS	1/2	3/4	1	1 1/2	2																
Thk.mm	4.78	5.56	6.35	7.14	8.74																
SCH.	160	160	160	160	160																
PRESSURE - TEMPERATURE Ratings																					
NPS	Press. bar	51.02	51.02	ASME B16.5																	
1/2 - 24	Temp. °C	-28.9	37.78	Material Group 1.1																	
opt.	Size from to		Item Description									Ends	Rating/Facing	Material							
PIPE																					
	1/2	16	PIPE									BW		ASTM A106 GR.B - SMLS							
	18	24	PIPE									BW		ASTM A333 GR.6 - SMLS							
FLANGES																					
5	1/2	24	WN FLANGE - ASME-B16.5									BW	CL300 RF	ASTM A105 Normalized							
	1/2	24	WN FLANGE - ASME-B16.5									BW	CL600 RF	ASTM A105 Normalized							
14	1/2	1/2	THD FLANGE - ASME-B16.5									THDF	CL300 RF	ASTM A105 Normalized							
63	3	24	WN FLANGE - ASME-B16.5									BW	CL900 RJ (F)	ASTM A105 Normalized							
	1/2	24	BLIND FLANGE - ASME-B16.5										CL300 RF	ASTM A105 Normalized							
14	3/4	2	THDD RED. FLANGE - ASME-B16.5									THDF	CL300 RF	ASTM A105 Normalized							
SPECTACLE BLIND																					
	1/2	12	SPECTACLE BLIND - ASME-B16.48										CL300 RF	ASTM A516 GR.70 + S5 (-46°C)							
	14	24	BLIND & SPACER - ASME-B16.48										CL300 RF	ASTM A516 GR.70 + S5 (-46°C)							
5	1/2	8	SPECTACLE BLIND - ASME-B16.48										CL600 RF	ASTM A516 GR.70 + S5 (-46°C)							
FITTINGS																					
	1/2	2	DRIP-RING - TB DRI 5011										CL300 RF	ASTM A105 Normalized							
	1/2	16	LONG RADIUS ELBOW - ASME-B16.9									BW		ASTM A234 WPB - SMLS							
	18	24	LONG RADIUS ELBOW - ASME-B16.9									BW		ASTM A420 WPL6 - SMLS							
	3/4	16	REDUCER - ASME-B16.9									BW		ASTM A234 WPB - SMLS							
	18	24	REDUCER - ASME-B16.9									BW		ASTM A420 WPL6 - SMLS							
	1/2	16	CAP - ASME-B16.9									BW		ASTM A234 WPB - SMLS							
	3/4	3/4	FEMALE CAP - THD END - ASME-B16.11									THDF	3000	ASTM A105 Normalized							
	18	24	CAP - ASME-B16.9									BW		ASTM A420 WPL6 - SMLS							
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11									THDM		ASTM A105 Normalized							
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10									THDM/PE		ASTM A106 GR.B - SMLS							
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95									PE/THDM		ASTM A234 WPB - SMLS							
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95									PE		ASTM A234 WPB - SMLS							
	1/2	16	TEE - ASME-B16.9									BW		ASTM A234 WPB - SMLS							
	18	24	TEE - ASME-B16.9									BW		ASTM A420 WPL6 - SMLS							
	1/2	8	WELDOLET - MSS-SP97									BW		ASTM A105 Normalized							
GASKETS																					
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20											304 SS+GRAPH 98% - C.S. OUT.RING							
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20											SOFT IRON							
BOLTS																					
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368											ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)							
VALVES																					
pos.	from	Size to	Data Sheet	Item Description							Ends	Rating/Facing	Material								
1	1/2	1 1/2	GA-E-60124	Gate-BB-Red.B-Solid wdg-Exp.seat + Nipples - API602							BW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF								
1	2	24	GA-E-60119	Gate-BB-FB-Flex wdg-Thdd seat - API600							FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF								
4	1/2	1 1/2	GA-E-60211	Globe-BB-Red B.-Thdd seat + Nipples - API602							BW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF								
4	2	12	GA-E-60219	Globe-BB-Disk-Thdd seat - API 623							FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF								
5	1/2	1 1/2	GA-E-67211	Globe-BB-Red.B-Needle-Thdd seat+Nipples - ASME-B16.34							BW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF								
6	1/2	1 1/2	GA-E-60315	Check-BB-Red.B-Piston-Thdd seat + Nipples - API602							BW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF								
6	2	10	GA-E-60325	Check-BB- FB- Swing - API594							FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF								
6	12	24	GA-E-60326	Check-Flanged -Dual plate-Wlidd seat - API594							FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF								
7	6	24	GA-E-60424	Ball-Split body-Red.B-Trunnion ball - API6D							FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats								
8	1/2	1 1/2	GA-E-60422	Ball-End entry -FB-Float.ball -Frgd body - API608							FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats								
10	1/2	1 1/2	GA-E-67023	Gate-BB-Red.B-Solid wdg-Exp.seat + Nipples - API602							BW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 316 / HF								
82	1/2	1 1/2	GA-E-60755	Ball-End entry -FB-Float.ball -Frgd body - API608							FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.								



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class:03CB2B03

Sh. 2 of 2

Rev.


A0123

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
89	1/2	1 1/2	GA-E-60796	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - API608	BW/TH DF	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
140	4	4	GA-E-67365	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
159	4	4	GA-E-67316	Gate-Ext. Stem (1200mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
160	4	4	GA-E-67317	Gate-Ext. Stem (1400mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
907	2	2	GA-E-69010	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats

BRANCH TABLES											
90 Degrees											
RunSize											
1/2	T										
3/4	T	T									
1	T	T	T								
1 1/2	T	T	T	T							
2	W	W	T	T	T						
3	W	W	W	W	W	T					
4	W	W	W	W	W	T	T				
6	W	W	W	W	W	W	T	T			
8	W	W	W	W	W	W	W	T	T		
10	W	W	W	W	W	W	W	W	T	T	
12	W	W	W	W	W	W	W	W	T	T	
14	W	W	W	W	W	W	W	W	P	T	T
16	W	W	W	W	W	W	W	W	P	P	T
18	W	W	W	W	W	W	W	W	P	P	P
20	W	W	W	W	W	W	W	W	P	P	P
24	W	W	W	W	W	W	W	W	P	P	P
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12
Legenda											
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E										
T	TEE - ASME-B16.9										
W	WELDOLET - MSS-SP97										

GENERAL NOTES											
1) PWHT is mandatory for all tiickness.											
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.											
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exced 200°C).											
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.											

<div></div>																	PIPING MATERIAL SPECIFICATION																	JOB 032243			Piping Class: 03CB2B09					
																																		Sh. 1 of 2								
																																					A			0		

Base Material : CARBON STEEL										Design code : ASME B 31.3 2016															
Nom. Rating : CL300										PWHT : YES (NOTE 1)															
Facing/Finishing : RF										Valve Trim : 12 - SS316/HF															
Corrosion Allow. : 3 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013															
Temp. Limit : -5 °C to 130 °C																									
Service: [Amine Service] AL - Amine Lean (UG)																									
Pipe Thickness																									
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24									
Thk.mm	4.78	5.56	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	10.31	11.13	12.7	14.27	15.09	17.48									
SCH.	160	160	XS	XS	XS	STD	STD	STD	STD	STD	40	40	XS	40	40	40									
Nipple Thickness																									
NPS	1/2	3/4	1	1 1/2	2																				
Thk.mm	4.78	5.56	6.35	7.14	8.74																				
SCH.	160	160	160	160	160																				
PRESSURE - TEMPERATURE Ratings																									
NPS	Press. bar	51.02	46.88	ASME B16.5																					
1/2 - 24	Temp. °C	37.78	93.33	Material Group 1.1																					


opt.	from	Size to	Item Description	Ends	Rating/Facing	Material	
PIPE							
	1/2	24	PIPE	BW		ASTM A106 GR.B - SMLS	
FLANGES							
5 63 14	1/2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized	
	1/2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized	
	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized	
	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized	
	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A105 Normalized	
SPECTACLE BLIND							
	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)	
	14	24	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)	
FITTINGS							
	1/2	2	DRIP-RING - TB DRI 5011	BW	CL300 RF	ASTM A105 Normalized	
	1/2	24	LONG RADIUS ELBOW - ASME-B16.9			ASTM A234 WPB - SMLS	
	3/4	24	REDUCER - ASME-B16.9			ASTM A234 WPB - SMLS	
	1/2	24	CAP - ASME-B16.9			ASTM A234 WPB - SMLS	
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM	ASTM A105 Normalized		
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE	ASTM A106 GR.B - SMLS		
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM	ASTM A234 WPB - SMLS		
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE	ASTM A234 WPB - SMLS		
	1/2	24	TEE - ASME-B16.9	BW	ASTM A234 WPB - SMLS		
	1/2	8	WELDOLET - MSS-SP97	BW	ASTM A105 Normalized		
	GASKETS						
	63 73	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
3		24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON	
1/2		24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON	
BOLTS							
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED	
VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3/4	3/4	GA-E-60124	Gate-BB-Red.B-Solid wdg-Exp.seat + Nipples - API602	BW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF

BRANCH TABLES

RunSize		90 Degrees															
1/2	T																
3/4	T	T															
1	T	T	T														
1 1/2	T	T	T	T													
2	W	W	T	T	T												
3	W	W	W	W	W	T											
4	W	W	W	W	W	T	T										
6	W	W	W	W	W	W	T	T									
8	W	W	W	W	W	W	W	T	T								
10	W	W	W	W	W	W	W	W	T	T							
12	W	W	W	W	W	W	W	W	W	T	T						
14	W	W	W	W	W	W	W	W	W	P	T	T					
16	W	W	W	W	W	W	W	W	W	P	P	T	T				
18	W	W	W	W	W	W	W	W	W	P	P	P	T	T			
20	W	W	W	W	W	W	W	W	W	P	P	P	P	T	T		
24	W	W	W	W	W	W	W	W	W	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Legenda																	
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) PWHT is mandatory for all tiickness.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div> MOZAMBIQUE LNG</div>		PIPING MATERIAL SPECIFICATION										JOB 032243									
												Piping Class:						03CB2B10			
												Sh.		1		of		2		Rev.	
		A		0		1															

Base Material : CARBON STEEL										Design code : ASME B 31.3 2016									
Nom. Rating : CL300										PWHT : YES (NOTE 1)									
Facing/Finishing : RF										Valve Trim : 9 - Monel									
Corrosion Allow. : 3 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013									
Temp. Limit : 0 °C to 75 °C																			
Service: [Caustic Service] NA - Caustic																			
Pipe Thickness																			
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24			
Thk.mm	4.78	5.56	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	10.31	11.13	12.7	14.27	15.09	17.48			
SCH.	160	160	XS	XS	XS	STD	STD	STD	STD	STD	40	40	XS	40	40	40			
Nipple Thickness																			
NPS	1/2	3/4	1	1 1/2	2														
Thk.mm	4.78	5.56	6.35	7.14	8.74														
SCH.	160	160	160	160	160														
PRESSURE - TEMPERATURE Ratings																			
NPS		Press. bar		51.02		ASME B16.5													
1/2 - 24		Temp. °C		37.78		Material Group 1.1													

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
PIPE						
	1/2	24	PIPE	BW		ASTM A106 GR.B - SMLS
FLANGES						
5 63 14	1/2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
	1/2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A105 Normalized	
SPECTACLE BLIND						
	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	14	24	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
FITTINGS						
	1/2	2	DRIP-RING - TB DRI 5011	BW BW BW THDM THDMPE PE\THDM PE BW BW	CL300 RF	ASTM A105 Normalized
	1/2	24	LONG RADIUS ELBOW - ASME-B16.9			ASTM A234 WPB - SMLS
	3/4	24	REDUCER - ASME-B16.9			ASTM A234 WPB - SMLS
	1/2	24	CAP - ASME-B16.9			ASTM A234 WPB - SMLS
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11			ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10			ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95			ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95			ASTM A234 WPB - SMLS
	1/2	24	TEE - ASME-B16.9			ASTM A234 WPB - SMLS
	1/2	8	WELDOLET - MSS-SP97			ASTM A105 Normalized
GASKETS						
63 73	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60169	Gate-BB-Red.B-Solid wdg-Integral seat + Nipples - API602	BW	CL800	Body: ASTM A105 Normalized Trim : Monel
1	2	24	GA-E-60191	Gate-BB-FB-Flex wdg-Wlidd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Monel
4	1/2	1 1/2	GA-E-60261	Globe-BB-Red B.-Integral seat + Nipples - API602	BW	CL800	Body: ASTM A105 Normalized Trim : Monel
4	2	12	GA-E-60272	Globe-BB-Disk-Wlidd seat - API 623	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Monel
6	1/2	1 1/2	GA-E-60377	Check-BB-Red.B-Piston-Integral seat + Nipples - API602	BW	CL800	Body: ASTM A105 Normalized Trim : Monel
6	2	10	GA-E-60396	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Monel
6	12	24	GA-E-60397	Check-Flanged -Dual plate-Wlidd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Monel
7	6	24	GA-E-60494	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-MONEL trim - RPTFE seats
8	1/2	1 1/2	GA-E-60495	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-MONEL trim - RPTFE seats

	PIPING MATERIAL SPECIFICATION	JOB 032243				
		Piping Class:	03CB2B10			
		Sh. 2 of 2	Rev.			
			A	0	1	

BRANCH TABLES

RunSize		90 Degrees															
1/2	T																
3/4	T	T															
1	T	T	T														
1 1/2	T	T	T	T													
2	W	W	T	T	T												
3	W	W	W	W	W	T											
4	W	W	W	W	W	T	T										
6	W	W	W	W	W	W	T	T									
8	W	W	W	W	W	W	W	T	T								
10	W	W	W	W	W	W	W	W	T	T							
12	W	W	W	W	W	W	W	W	W	T	T						
14	W	W	W	W	W	W	W	W	W	P	T	T					
16	W	W	W	W	W	W	W	W	W	P	P	T	T				
18	W	W	W	W	W	W	W	W	W	P	P	P	T	T			
20	W	W	W	W	W	W	W	W	W	P	P	P	P	T	T		
24	W	W	W	W	W	W	W	W	W	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Legenda																	
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) PWHT is mandatory for all tiickness.
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exced 200°C).
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
5) Specified Thickness are suitable to withstand Full Vacuum condition.

PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **03CB2S01**

Sh. 1 of 2	Rev.				
	A	0	1	2	3

Base Material	: CARBON STEEL	Design code	: ASME B 31.3 2016
Nom. Rating	: CL300	PWHT	: AS PER CODE (NOTE 1)
Facing/Finishing	: RF	Valve Trim	: 8 - 13Cr/ HF
Corrosion Allow.	: 3 mm	Welding Spec	: MZ-000-CCX-MC-SPC-00009/00013
Temp. Limit	: -29 °C to 210 °C		

Service: BWF - Liquid Blowdown Warm Flare HL - Hydrocarbon Liquid HV - Hydrocarbon Vapour NG - Natural Gas

Pipe Thickness

NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
Thk.mm	4.78	5.56	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	10.31	11.13	12.7	14.27	15.09	17.48
SCH.	160	160	XS	XS	XS	STD	STD	STD	STD	STD	40	40	XS	40	40	40

Nipple Thickness

NPS	1/2	3/4	1	1 1/2	2
Thk.mm	4.78	5.56	6.35	7.14	8.74
SCH.	160	160	160	160	160

PRESSURE - TEMPERATURE Ratings

NPS	Press. bar	51.02	51.02	46.88	45.16	ASME B16.5
1/2 · 24	Temp. °C	-28.9	37.78	93.33	148.9	Material Group 1.1

opt.	Size from to	Item Description	Ends	Rating/Facing	Material
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PIPE

1/2	16	PIPE	BW	ASTM A106 GR.B - SMLS
18	24	PIPE	BW	ASTM A333 GR.6 - SMLS

FLANGES

5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized
7	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
63	2	24	WN FLANGE - ASME-B16.5	BW	CL1500 RF	ASTM A105 Normalized
	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
14	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A105 Normalized

	W	L	E
SPECTACLE BLIND			

5	1/2	12	SPECTACLE BLIND - ASME-B16.48	CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	14	24	BLIND & SPACER - ASME-B16.48	CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	1/2	8	SPECTACLE BLIND - ASME-B16.48	CL600 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS

1/2	3	DRIP-RING - TB DRI 5011		CL300 RF	ASTM A105 Normalized
1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
2	16	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
18	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
2	16	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
18	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A105 Normalized
1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	6000	ASTM A105 Normalized
2	16	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
18	24	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW/THDF	3000	ASTM A105 Normalized
1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A106 GR.B - SMLS
3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM		ASTM A234 WPB - SMLS
1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
2	16	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
18	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
2	8	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized
1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW/BW	6000	ASTM A105 Normalized

GASKETS

63	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20		304 SS+GRAPH 98% - C.S. OUT.RING
	3	24	OCTAGONAL RJ GASKET - ASME-B16.20		SOFT IRON
73	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20		SOFT IRON

BOLTS

1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368	ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)
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VALVES

Size			Data Sheet	Item Description	Ends	Rating/Facing	Material
pos.	from	to					
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
1	2	24	GA-E-60117	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
4	2	12	GA-E-60217	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	2	10	GA-E-60322	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 03CB2S01

Sh.		2		Rev.	
				A	0
				1	2
				3	

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	12	24	GA-E-60323	Check-Flanged -Dual plate-Widd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	6	24	GA-E-60421	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
8	1/2	1 1/2	GA-E-60419	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60786	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
62	2	2	GA-E-60703	Check-Flanged -Dual plate-Widd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
82	1/2	1 1/2	GA-E-60755	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
101	2	2	GA-E-60591	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67075	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
140	3	3	GA-E-67364	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
159	3	3	GA-E-67314	Gate-Ext. Stem (1200mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
801	1/2	1 1/2	GA-E-67135	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
907	2	6	GA-E-69010	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
972	2	6	GA-E-69051	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
972	8	24	GA-E-69052	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	6	GA-E-60634	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees															
1/2	A																
3/4	A	A															
1	A	A	A														
1 1/2	A	A	A	A													
2	S	S	T	T	T												
3	S	S	S	S	W	T											
4	S	S	S	S	W	T	T										
6	S	S	S	S	W	W	T	T									
8	S	S	S	S	W	W	W	T	T								
10	S	S	S	S	W	W	W	W	T	T							
12	S	S	S	S	W	W	W	W	W	T	T						
14	S	S	S	S	W	W	W	W	W	P	T	T					
16	S	S	S	S	W	W	W	W	W	P	P	T	T				
18	S	S	S	S	W	W	W	W	W	P	P	P	T	T			
20	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T		
24	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Legenda																	
A	TEE - SW ENDS - ASME-B16.11																
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																
S	SOCKOLET - SW END - MSS-SP97																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243							
												Piping Class:				03CB2S02			
												Sh.		1 of 3		Rev.			
				A		0		1		2		3							

Base Material : CARBON STEEL										Design code : ASME B 31.3 2016									
Nom. Rating : CL300										PWHT : AS PER CODE (NOTE 1)									
Facing/Finishing : RF										Valve Trim : 8 - 13Cr/ HF									
Corrosion Allow. : 3 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013									
Temp. Limit : 0 °C to 180 °C																			
Service: FG - Fuel Gas HL - Hydrocarbon Liquid NG - Natural Gas PRW - Process Water V - Vent																			

Pipe Thickness																
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
Thk.mm	4.78	5.56	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	10.31	11.13	12.7	14.27	15.09	17.48
SCH.	160	160	XS	XS	XS	STD	STD	STD	STD	STD	40	40	XS	40	40	40

Nipple Thickness																	
NPS	1/2	3/4	1	1 1/2	2												
Thk.mm	4.78	5.56	6.35	7.14	8.74												
SCH.	160	160	160	160	160												

PRESSURE - TEMPERATURE Ratings																	
NPS	Press. bar	51.02	46.88	45.16	ASME B16.5												
1/2 - 24	Temp. °C	37.78	93.33	148.9	Material Group 1.1												

opt.	Size from to		Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	24	PIPE	BW		ASTM A106 GR.B - SMLS

FLANGES						
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
73	2	24	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized
5	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A105 Normalized
14	2	2	SW REDUCING FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A105 Normalized

SPECTACLE BLIND						
5	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	14	24	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		CL300 RF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	24	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	24	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW/THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM		ASTM A234 WPB - SMLS
	3/4	3	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	24	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	2	8	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW/BW	6000	ASTM A105 Normalized

GASKETS						
63	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368	ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)		

VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
1	2	24	GA-E-60117	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
4	2	12	GA-E-60217	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	2	10	GA-E-60322	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	12	24	GA-E-60323	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 03CB2S02

Rev.					
Sh.	2	of	3	A	0
				1	2
				3	

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
7	6	24	GA-E-60421	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
8	1/2	1 1/2	GA-E-60419	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
8	2	2	GA-E-67170	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60786	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
15	2	2	GA-E-60126	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
62	2	4	GA-E-60739	Check-Lug wafer-Dual plate-Wlidd seat - API594	WAFER LUG	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
82	1/2	1 1/2	GA-E-60755	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
101	2	2	GA-E-60591	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67075	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
780	2	2	GA-E-67659	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67135	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
840	6	10	GA-E-67294	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
840	12	12	GA-E-67294	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
907	2	6	GA-E-69010	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
907	12	16	GA-E-69011	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	3	GA-E-60634	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3


BRANCH TABLES

RunSize		90 Degrees																	
1/2	A																		
3/4	A	A																	
1	A	A	A																
1 1/2	A	A	A	A															
2	S	S	T	T	T														
3	S	S	S	S	W	T													
4	S	S	S	S	W	T	T												
6	S	S	S	S	W	W	T	T											
8	S	S	S	S	W	W	W	T	T										
10	S	S	S	S	W	W	W	W	T	T									
12	S	S	S	S	W	W	W	W	W	T	T								
14	S	S	S	S	W	W	W	W	W	P	T	T							
16	S	S	S	S	W	W	W	W	W	P	P	T	T						
18	S	S	S	S	W	W	W	W	W	P	P	P	T	T					
20	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T				
24	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T			
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24			
Legenda																			
A	TEE - SW ENDS - ASME-B16.11																		
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMPT-012-E																		
S	SOCKOLET - SW END - MSS-SP97																		
T	TEE - ASME-B16.9																		
W	WELDOLET - MSS-SP97																		

GENERAL NOTES

- PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).

	PIPING MATERIAL SPECIFICATION	JOB 032243						
		Piping Class:		03CB2S02				
		Sh. 3 of 3	Rev.					
			A	0	1	2	3	
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.								

<div></div>		PIPING MATERIAL SPECIFICATION												JOB 032243																							
														Piping Class:					03CB2S05																		
														Sh. 1 of 3		Rev.																					
		A		0		1		2		3																											
Base Material : CARBON STEEL																			Design code : ASME B 31.3 2016																		
Nom. Rating : CL300																			PWHT : AS PER CODE (NOTE 1)																		
Facing/Finishing : RF																			Valve Trim : 12 - SS316/HF																		
Corrosion Allow. : 3 mm																			Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																		
Temp. Limit : -29 °C to 180 °C																																					
Service: HL - Hydrocarbon Liquid MEG - Monoethylene Glycol OW - Oily Water WEG - Water/Ethylene Glycol WF - Wet (Warm) Flare																																					
Pipe Thickness																																					
NPS		1/2		3/4		1		1 1/2		2		3		4		6		8		10		12		14		16		18		20		24					
Thk.mm		4.78		5.56		4.55		5.08		5.54		5.49		6.02		7.11		8.18		9.27		10.31		11.13		12.7		14.27		15.09		17.48					
SCH.		160		160		XS		XS		XS		STD		STD		STD		STD		STD		40		40		XS		40		40		40					
Nipple Thickness																																					
NPS		1/2		3/4		1		1 1/2		2																											
Thk.mm		4.78		5.56		6.35		7.14		8.74																											
SCH.		160		160		160		160		160																											
PRESSURE - TEMPERATURE Ratings																																					
NPS		Press. bar		51.02		46.88		45.16		ASME B16.5																											
1/2 - 24		Temp. °C		37.78		93.33		148.9		Material Group 1.1																											
opt.		from		Size to		Item Description												Ends		Rating/Facing		Material															
PIPE																																					
		1/2		16		PIPE												BW				ASTM A106 GR.B - SMLS															
		18		24		PIPE												BW				ASTM A333 GR.6 - SMLS															
FLANGES																																					
5		1/2		1 1/2		SW FLANGE - ASME-B16.5												SW		CL300 RF		ASTM A105 Normalized															
		2		24		WN FLANGE - ASME-B16.5												BW		CL300 RF		ASTM A105 Normalized															
		1/2		1 1/2		SW FLANGE - ASME-B16.5												SW		CL600 RF		ASTM A105 Normalized															
		2		24		WN FLANGE - ASME-B16.5												BW		CL600 RF		ASTM A105 Normalized															
63		3		24		WN FLANGE - ASME-B16.5												BW		CL900 RJ (F)		ASTM A105 Normalized															
73		1/2		1 1/2		SW FLANGE - ASME-B16.5												SW		CL1500 RJ (F)		ASTM A105 Normalized															
		1/2		24		BLIND FLANGE - ASME-B16.5														CL300 RF		ASTM A105 Normalized															
		2		2		SW REDUCING FLANGE - ASME-B16.5												SW		CL300 RF		ASTM A105 Normalized															
14		2		2		THDD RED. FLANGE - ASME-B16.5												THDF		CL300 RF		ASTM A105 Normalized															
SPECTACLE BLIND																																					
		1/2		12		SPECTACLE BLIND - ASME-B16.48														CL300 RF		ASTM A516 GR.70 + S5 (-46°C)															
		14		24		BLIND & SPACER - ASME-B16.48														CL300 RF		ASTM A516 GR.70 + S5 (-46°C)															
5		4		4		SPECTACLE BLIND - ASME-B16.48														CL600 RF		ASTM A516 GR.70 + S5 (-46°C)															
FITTINGS																																					
		1/2		3		DRIP-RING - TB DRI 5011														CL300 RF		ASTM A105 Normalized															
		1/2		1 1/2		ELBOW - SW ENDS - ASME-B16.11												SW		6000		ASTM A105 Normalized															
		2		16		LONG RADIUS ELBOW - ASME-B16.9												BW				ASTM A234 WPB - SMLS															
		18		24		LONG RADIUS ELBOW - ASME-B16.9												BW				ASTM A420 WPL6 - SMLS															
		3/4		1 1/2		RED. COUPLING - SW ENDS - ASME-B16.11												SW		6000		ASTM A105 Normalized															
		2		16		REDUCER - ASME-B16.9												BW				ASTM A234 WPB - SMLS															
		18		24		REDUCER - ASME-B16.9												BW				ASTM A420 WPL6 - SMLS															
		1/2		1 1/2		FEMALE CAP - THD END - ASME-B16.11												THDF		3000		ASTM A105 Normalized															
		1/2		1 1/2		FEMALE CAP - SW END - ASME-B16.11												SW		6000		ASTM A105 Normalized															
		2		16		CAP - ASME-B16.9												BW				ASTM A234 WPB - SMLS															
		18		24		CAP - ASME-B16.9												BW				ASTM A420 WPL6 - SMLS															
		1/2		1 1/2		COUPLING - SW/THDD ENDS - ASME-B16.11												SW\THDF		3000		ASTM A105 Normalized															
		1/2		1 1/2		COUPLING - SW ENDS - ASME-B16.11												SW		6000		ASTM A105 Normalized															
		1/2		1 1/2		THD MALE PLUG - RND HEAD - ASME-B16.11												THDM				ASTM A105 Normalized															
		1/2		2		NIPPLE - THDD/PE - ASME-B36.10												THDM/PE				ASTM A106 GR.B - SMLS															
		3/4		2		SWAGE NIPPLE - PE/PE - MSS-SP95												PE				ASTM A234 WPB - SMLS															
		3/4		2		SWAGE NIPPLE - PE/THDD - MSS-SP95												PE\THDM				ASTM A234 WPB - SMLS															
		1/2		1 1/2		TEE - SW ENDS - ASME-B16.11												SW		6000		ASTM A105 Normalized															
		2		16		TEE - ASME-B16.9												BW				ASTM A234 WPB - SMLS															
		18		24		TEE - ASME-B16.9												BW				ASTM A420 WPL6 - SMLS															
		2		8		WELDOLET - MSS-SP97												BW				ASTM A105 Normalized															
		1/2		1 1/2		SOCKOLET - SW END - MSS-SP97												SW\BW		6000		ASTM A105 Normalized															
MISCELLANEOUS																																					
		1/2		24		KIT FOR INSULATING FLANGE - ASME-B16.5														CL300 RF		GRE LAMINATED + TFE (MAX T 180 C)															
		6		6		SPECIAL TEMPORARY STRAINER - <MFR Std - Metallic>														CL300 RF		ASTM A516 GR.70 + S5 (-46°C)															
GASKETS																																					
		1/2		24		SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20																304 SS+GRAPH 98% - C.S. OUT.RING															
5		4		4		SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20																304 SS+GRAPH 98% - C.S. OUT.RING															
63		3		24		OCTAGONAL RJ GASKET - ASME-B16.20																SOFT IRON															
73		1/2		1 1/2		OCTAGONAL RJ GASKET - ASME-B16.20																SOFT IRON															
BOLTS																																					
		1/2		4		ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368																ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)															
VALVES																																					
pos.		from		Size to		Data Sheet		Item Description										Ends		Rating/Facing		Material															
1		1/2		1 1/2		GA-E-60167		Gate-BB-Red.B-Solid wdg-Exp.seat - API602										SW		CL800		Body: ASTM A105 Normalized Trim : 316 / HF															
1		2		24		GA-E-60119		Gate-BB-FB-Flex wdg-Thdd seat - API600										FLGD		CL300 RF		Body: ASTM A216 WCB Trim : 316 / HF															
4		1/2		1 1/2		GA-E-60259		Globe-BB-Red B.-Thdd seat - API602										SW		CL800		Body: ASTM A105 Normalized Trim : 316 / HF															



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 03CB2S05

Rev.					
Sh.	2	of	3	A	0
				1	2
				3	


VALVES


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
4	2	12	GA-E-60219	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
5	1/2	1 1/2	GA-E-67205	Globe-BB-Red.B-Needle-Thdd seat - ASME-B16.34	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
6	1/2	1 1/2	GA-E-60375	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
6	2	10	GA-E-60325	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
6	12	24	GA-E-60326	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
7	2	4	GA-E-60420	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
7	6	24	GA-E-67117	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60419	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
8	2	3	GA-E-67170	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60197	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
62	2	10	GA-E-60704	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
72	2	4	GA-E-67167	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
72	6	24	GA-E-67171	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	1/2	1 1/2	GA-E-60755	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67012	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
101	2	2	GA-E-67027	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
130	1/2	1 1/2	GA-E-67077	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
801	1/2	1 1/2	GA-E-67135	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
907	6	6	GA-E-69011	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats

BRANCH TABLES

RunSize		90 Degrees																
1/2	A																	
3/4	A	A																
1	A	A	A															
1 1/2	A	A	A	A														
2	S	S	S	T	T													
3	S	S	S	S	W	T												
4	S	S	S	S	S	W	T	T										
6	S	S	S	S	S	W	W	T	T									
8	S	S	S	S	S	W	W	W	T	T								
10	S	S	S	S	S	W	W	W	W	T	T							
12	S	S	S	S	S	W	W	W	W	T	T	T						
14	S	S	S	S	S	W	W	W	W	P	T	T						
16	S	S	S	S	S	W	W	W	W	P	P	T	T					
18	S	S	S	S	S	W	W	W	W	P	P	P	T	T				
20	S	S	S	S	S	W	W	W	W	P	P	P	P	T	T			
24	S	S	S	S	S	W	W	W	W	P	P	P	P	P	T	T		
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24		
Legenda																		
A	TEE - SW ENDS - ASME-B16.11																	
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																	
S	SOCKOLET - SW END - MSS-SP97																	
T	TEE - ASME-B16.9																	
W	WELDOLET - MSS-SP97																	

GENERAL NOTES

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:	03CB2S05				
		Sh. 3 of 3	Rev.				
			A	0	1	2	3
1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013. 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment. 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C). 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.							

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243					
												Piping Class:		03CB2S60			
												Sh. 1 of 2		Rev.			
		A		0													

Base Material : CARBON STEEL										Design code : ASME B 31.3 2016									
Nom. Rating : CL300										PWHT : AS PER CODE (NOTE 1)									
Facing/Finishing : RF										Valve Trim : 8 - 13Cr/ HF									
Corrosion Allow. : 3 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013									
Temp. Limit : 0 °C to 130 °C																			
Service: [AIV] FG - Fuel Gas HL - Hydrocarbon Liquid NG - Natural Gas PRW - Process Water																			

Pipe Thickness																
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
Thk.mm	4.78	5.56	4.55	5.08	5.54	5.49	6.02	7.11	8.18	9.27	10.31	11.13	12.7	14.27	15.09	17.48
SCH.	160	160	XS	XS	XS	STD	STD	STD	STD	STD	40	40	XS	40	40	40

Nipple Thickness																
NPS	1/2	3/4	1	1 1/2	2											
Thk.mm	4.78	5.56	6.35	7.14	8.74											
SCH.	160	160	160	160	160											

PRESSURE - TEMPERATURE Ratings																
NPS	Press. bar	51.02	46.88	45.16	ASME B16.5											
1/2 - 24	Temp. °C	37.78	93.33	148.9	Material Group 1.1											

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	24	PIPE	BW		ASTM A106 GR.B - SMLS

FLANGES						
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
63	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
73	2	24	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
	2	2	SW REDUCING FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A105 Normalized

SPECTACLE BLIND						
	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	14	24	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		CL300 RF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	24	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	24	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDMPE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	24	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	2	8	SPECIAL SWEEPOLET - <MFR Std>	BW	6000	ASTM A105 Normalized

GASKETS						
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
73	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
1	2	24	GA-E-60117	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
4	2	12	GA-E-60217	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	2	10	GA-E-60322	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	12	24	GA-E-60323	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	6	24	GA-E-60421	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
8	1/2	1 1/2	GA-E-60419	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats

	PIPING MATERIAL SPECIFICATION		JOB 032243					
			Piping Class:		03CB2S60			
			Sh. 2 of 2		Rev.			
			A	0				

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
8	6	24	GA-E-60786	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
82	1/2	1 1/2	GA-E-60755	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
101	2	2	GA-E-60591	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67075	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
801	1/2	1 1/2	GA-E-67135	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	3	GA-E-60634	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3


BRANCH TABLES

RunSize		90 Degrees															
1/2	A																
3/4	A	A															
1	A	A	A														
1 1/2	A	A	A	A													
2					T												
3					T	T											
4					T	T	T										
6					SW	T	T	T									
8					SW	SW	T	T	T								
10					SW	SW	T	T	T	T							
12					SW	SW	SW	T	T	T	T						
14					SW	SW	SW	T	T	T	T	T					
16					SW	SW	SW	T	T	T	T	T	T				
18					SW	SW	SW	SW	T	T	T	T	T	T			
20					SW	SW	SW	SW	T	T	T	T	T	T	T		
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Legenda																	
A	TEE - SW ENDS - ASME-B16.11																
SW	SPECIAL SWEEPOLET - <MFR Std>																
T	TEE - ASME-B16.9																

GENERAL NOTES

1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
5) This piping class is created for lines subjected to Acoustic Induced Vibration.

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243																							
												Piping Class:					03CB4S01																		
												Sh. 1 of 2					Rev.																		
					A					0	1	2	3																						
Base Material : CARBON STEEL																	Design code : ASME B 31.3 2016																		
Nom. Rating : CL300																	PWHT : AS PER CODE (NOTE 1)																		
Facing/Finishing : RF																	Valve Trim : 8 - 13Cr/ HF																		
Corrosion Allow. : 6 mm																	Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																		
Temp. Limit : -29 °C to 90 °C																																			
Service: HV - Hydrocarbon Vapour																																			
Pipe Thickness																																			
NPS Thk.mm SCH. 1/2 7.47 XXS 3/4 7.82 XXS 1 9.09 XXS 1 1/2 10.15 XXS 2 8.74 160 3 11.13 160 4 11.13 120 6 10.97 XS 8 12.7 XS 10 12.7 XS 12 14.27 60 14 15.09 60																																			
Nipple Thickness																																			
NPS Thk.mm SCH. 1/2 7.47 XXS 3/4 7.82 XXS 1 9.09 XXS 1 1/2 10.15 XXS 2 8.74 160																																			
PRESSURE - TEMPERATURE Ratings																																			
NPS Press. bar 1/2 - 14 Temp. °C 51.02 -28.9 51.02 37.78 46.88 93.33 45.16 148.9 ASME B16.5 Material Group 1.1																																			
opt.		Size from to		Item Description													Ends		Rating/Facing		Material														
PIPE																																			
		1/2 12		10 14		PIPE													BW				ASTM A106 GR.B - SMLS												
																			BW				ASTM A333 GR.6 - SMLS												
FLANGES																																			
5		1/2 2		1 1/2 14		SW FLANGE - ASME-B16.5													SW		CL300 RF		ASTM A105 Normalized												
						WN FLANGE - ASME-B16.5													BW		CL300 RF		ASTM A105 Normalized												
		1/2 2		1 1/2 14		SW FLANGE - ASME-B16.5													SW		CL600 RF		ASTM A105 Normalized												
						WN FLANGE - ASME-B16.5													BW		CL600 RF		ASTM A105 Normalized												
		1/2 14		14 2		BLIND FLANGE - ASME-B16.5															CL300 RF		ASTM A105 Normalized												
		2 2				THDD RED. FLANGE - ASME-B16.5													THDF		CL300 RF		ASTM A105 Normalized												
SPECTACLE BLIND																																			
		1/2 14		12 14		SPECTACLE BLIND - ASME-B16.48 GA-E-060011															CL300 RF		ASTM A516 GR.70 + S5 (-46°C)												
						BLIND & SPACER - ASME-B16.48 GA-E-060011															CL300 RF		ASTM A516 GR.70 + S5 (-46°C)												
FITTINGS																																			
		1/2 1/2		3 1 1/2		DRIP-RING - TB DRI 5011															CL300 RF		ASTM A105 Normalized												
						ELBOW - SW ENDS - ASME-B16.11													SW		9000		ASTM A105 Normalized												
		2 12		10 14		LONG RADIUS ELBOW - ASME-B16.9													BW				ASTM A234 WPB - SMLS												
						LONG RADIUS ELBOW - ASME-B16.9													BW				ASTM A420 WPL6 - SMLS												
		3/4 2		1 1/2 10		RED. COUPLING - SW ENDS - ASME-B16.11													SW		9000		ASTM A105 Normalized												
						REDUCER - ASME-B16.9													BW				ASTM A234 WPB - SMLS												
		12 1/2		14 1 1/2		REDUCER - ASME-B16.9													BW				ASTM A420 WPL6 - SMLS												
						FEMALE CAP - THD END - ASME-B16.11													THDF		6000		ASTM A105 Normalized												
		1/2 2		1 1/2 10		FEMALE CAP - SW END - ASME-B16.11													SW		9000		ASTM A105 Normalized												
						CAP - ASME-B16.9													BW				ASTM A234 WPB - SMLS												
		12 1/2		14 1 1/2		CAP - ASME-B16.9													BW				ASTM A420 WPL6 - SMLS												
						COUPLING - SW ENDS - ASME-B16.11													SW		9000		ASTM A105 Normalized												
		1/2 1/2		1 1/2 1 1/2		COUPLING - SW/THDD ENDS - ASME-B16.11													SW\THDF		6000		ASTM A105 Normalized												
						THD MALE PLUG - RND HEAD - ASME-B16.11													THDM				ASTM A105 Normalized												
		1/2 3/4		2 2		NIPPLE - THDD/PE - ASME-B36.10													THDMPE				ASTM A106 GR.B - SMLS												
						SWAGE NIPPLE - PE/THDD - MSS-SP95													PE\THDM				ASTM A234 WPB - SMLS												
		3/4 1/2		2 1 1/2		SWAGE NIPPLE - PE/PE - MSS-SP95													PE				ASTM A234 WPB - SMLS												
						TEE - SW ENDS - ASME-B16.11													SW		9000		ASTM A105 Normalized												
		2 12		10 14		TEE - ASME-B16.9													BW				ASTM A234 WPB - SMLS												
						TEE - ASME-B16.9													BW				ASTM A420 WPL6 - SMLS												
		2 1/2		8 1 1/2		WELDOLET - MSS-SP97													BW				ASTM A105 Normalized												
						SOCKOLET - SW END - TB RAC 5380													SW\BW		9000		ASTM A105 Normalized												
		GASKETS																																	
				1/2 14		SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20																	304 SS+GRAPH 98% - C.S. OUT.RING												
		BOLTS																																	
		1/2 4		ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368																	ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)														
VALVES																																			
pos.		Size from to		Data Sheet		Item Description													Ends		Rating/Facing		Material												
1		1/2 1 1/2		GA-E-60164		Gate-WB-Red.B-Solid wdg-Exp.seat - API602													SW		CL1500		Body: ASTM A105 Normalized Trim : 13CR stellited												
1		2 14		GA-E-60125		Gate-BB-FB-Flex wdg-Thdd seat - API600													FLGD		CL300 RF		Body: ASTM A216 WCB Trim : 13CR / HF												
4		1/2 1 1/2		GA-E-60220		Globe-WB-Red.B-Thdd seat - API602													SW		CL1500		Body: ASTM A105 Normalized Trim : 13CR stellited												
4		2 14		GA-E-60221		Globe-BB-Disk-Thdd seat - API 623													FLGD		CL300 RF		Body: ASTM A216 WCB Trim : 13CR / HF												
6		1/2 1 1/2		GA-E-60348		Check-WB-Red.B-Piston-Int seat - API602													SW		CL1500		Body: ASTM A105 Normalized Trim : 13CR stellited												
6		2 14		GA-E-60327		Check-BB- FB- Swing - API594													FLGD		CL300 RF		Body: ASTM A216 WCB Trim : 13CR / HF												
7		6 14		GA-E-60427		Ball-Split body-Red.B-Trunnion ball - API6D													FLGD		CL300 RF		Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats												
8		1/2 1 1/2		GA-E-60425		Ball-End entry -FB-Float.ball -Frgd body - API608													FLGD		CL300 RF		Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats												
8		2 2		GA-E-67172		Ball-Split body-FB-Floating ball - API6D													FLGD		CL300 RF		Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats												



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class:

03CB4S01

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Rev.

A

0

1

2


3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
8	6	14	GA-E-67115	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats
10	1/2	1 1/2	GA-E-60182	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
82	1/2	1 1/2	GA-E-60756	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-67120	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67013	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
101	2	2	GA-E-67028	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67079	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
801	1/2	1 1/2	GA-E-67136	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - RPTFE seats
840	10	10	GA-E-67619	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-RPTFE seats

BRANCH TABLES												
90 Degrees												
RunSize												
1/2	A											
3/4	A	A										
1	A	A	A									
1 1/2	A	A	A	A								
2	S	S	T	T	T							
3	S	S	S	S	T	T						
4	S	S	S	S	W	T	T					
6	S	S	S	S	W	W	T	T				
8	S	S	S	S	W	W	W	T	T			
10	S	S	S	S	W	W	W	W	T	T		
12	S	S	S	S	W	W	W	W	W	T	T	
14	S	S	S	S	W	W	W	W	W	P	T	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14
Legenda												
A	TEE - SW ENDS - ASME-B16.11											
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPM-T-012-E											
S	SOCKOLET - SW END - TB RAC 5380											
T	TEE - ASME-B16.9											
W	WELDOLET - MSS-SP97											

GENERAL NOTES												
1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.												
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.												
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).												
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.												

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243																	
												Piping Class:					03CB4S02												
												Sh. 1 of 2					Rev.												
					A					0					1					2					3				
Base Material : CARBON STEEL											Design code : ASME B 31.3 2016																		
Nom. Rating : CL300											PWHT : AS PER CODE (NOTE 1)																		
Facing/Finishing : RF											Valve Trim : UNS S31803 (duplex)																		
Corrosion Allow. : 6 mm											Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																		
Temp. Limit : 0 °C to 180 °C																													
Service: CH - Chemical MEG - Monoethylene Glycol WEG - Water / Ethylene Glycol																													
Pipe Thickness																													
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12																		
Thk.mm	7.47	7.82	9.09	10.15	8.74	11.13	11.13	10.97	12.7	12.7	14.27																		
SCH.	XXS	XXS	XXS	XXS	160	160	120	XS	XS	XS	60																		
Nipple Thickness																													
NPS	1/2	3/4	1	1 1/2	2																								
Thk.mm	7.47	7.82	9.09	10.15	8.74																								
SCH.	XXS	XXS	XXS	XXS	160																								
PRESSURE - TEMPERATURE Ratings																													
NPS	Press. bar	51.02	46.88	45.16	ASME B16.5																								
1/2 - 12	Temp. °C	37.78	93.33	148.9	Material Group 1.1																								
opt.	Size from to		Item Description								Ends	Rating/Facing	Material																
PIPE																													
	1/2	12	PIPE								BW		ASTM A106 GR.B - SMLS																
FLANGES																													
5	1/2	1 1/2	SW FLANGE - ASME-B16.5								SW	CL300 RF	ASTM A105 Normalized																
	2	12	WN FLANGE - ASME-B16.5								BW	CL300 RF	ASTM A105 Normalized																
5	1/2	1 1/2	SW FLANGE - ASME-B16.5								SW	CL600 RF	ASTM A105 Normalized																
	2	12	WN FLANGE - ASME-B16.5								BW	CL600 RF	ASTM A105 Normalized																
14	1/2	12	BLIND FLANGE - ASME-B16.5									CL300 RF	ASTM A105 Normalized																
	2	2	THDD RED. FLANGE - ASME-B16.5								THDF	CL300 RF	ASTM A105 Normalized																
SPECTACLE BLIND																													
	1/2	12	SPECTACLE BLIND - ASME-B16.48 GA-E-060011									CL300 RF	ASTM A516 GR.70 + S5 (-46°C)																
FITTINGS																													
	1/2	3	DRIP-RING - TB DRI 5011									CL300 RF	ASTM A105 Normalized																
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11								SW	9000	ASTM A105 Normalized																
	2	12	LONG RADIUS ELBOW - ASME-B16.9								BW		ASTM A234 WPB - SMLS																
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11								SW	9000	ASTM A105 Normalized																
	2	12	REDUCER - ASME-B16.9								BW		ASTM A234 WPB - SMLS																
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11								SW	9000	ASTM A105 Normalized																
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11								THDF	6000	ASTM A105 Normalized																
	2	12	CAP - ASME-B16.9								BW		ASTM A234 WPB - SMLS																
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11								SW	9000	ASTM A105 Normalized																
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11								SW\THDF	6000	ASTM A105 Normalized																
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11								THDM		ASTM A105 Normalized																
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10								THDMPE		ASTM A106 GR.B - SMLS																
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95								PE		ASTM A234 WPB - SMLS																
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95								PE\THDM		ASTM A234 WPB - SMLS																
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11								SW	9000	ASTM A105 Normalized																
	2	12	TEE - ASME-B16.9								BW		ASTM A234 WPB - SMLS																
	2	8	WELDOLET - MSS-SP97								BW		ASTM A105 Normalized																
	1/2	1 1/2	SOCKOLET - SW END - TB RAC 5380								SW\BW	9000	ASTM A105 Normalized																
MISCELLANEOUS																													
	10	12	SPECIAL TEMPORARY STRAINER - <MFR Std - Metallic>									CL300 RF	ASTM A516 GR.70 + S5 (-46°C)																
GASKETS																													
	1/2	12	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20										S31803+GRAPH 98%-S31803 OUT.RING																
BOLTS																													
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368										ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)																
VALVES																													
pos.	Size from to		Data Sheet	Item Description					Ends	Rating/Facing	Material																		
1	1/2	1 1/2	GA-E-60122	Gate-WB-Red.B-Solid wdg-Exp.seat - API602					SW	CL1500	Body: ASTM A105 Normalized Trim : Duplex S.31803																		
1	2	12	GA-E-60168	Gate-BB-FB-Flex wdg-Thdd seat - API600					FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Duplex S.31803																		
4	1/2	1 1/2	GA-E-60215	Globe-WB-Red.B-Thdd seat - API602					SW	CL1500	Body: ASTM A105 Normalized Trim : Duplex S.31803																		
4	2	8	GA-E-60260	Globe-BB-Disk-Thdd seat - API 623					FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Duplex S.31803																		
6	1/2	1 1/2	GA-E-60320	Check-WB-Red.B-Piston-Int seat - API602					SW	CL1500	Body: ASTM A105 Normalized Trim : Duplex S.31803																		
6	2	12	GA-E-60376	Check-BB- FB- Swing - API594					FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Duplex S.31803																		
7	2	3	GA-E-67173	Ball-Split body-Red.B-Floating ball - API6D					FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-S.31803 trim - RPTFE seats																		
8	1/2	1 1/2	GA-E-60759	Ball-End entry -FB-Float.ball -Frgd body - API608					FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-S.31803 trim - RPTFE seats																		
8	2	2	GA-E-67174	Ball-Split body-FB-Floating ball - API6D					FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-S.31803 trim - RPTFE seats																		
8	6	12	GA-E-67159	Ball-Split body-FB-Trunnion ball - API6D					FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-S.31803 trim - RPTFE seats																		
10	1/2	1 1/2	GA-E-60576	Gate-WB-Red.B-Solid wdg-Exp.seat - API602					SW/THDF	CL1500	Body: ASTM A105 Normalized Trim : Duplex S.31803																		



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 03CB4S02

Rev.				
A	0	1	2	3

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VALVES


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
62	2	8	GA-E-60738	Check-Lug wafer-Dual plate-Wldd seat - API594	WAFER LUG	CL300 RF	Body: ASTM A216 WCB Trim : Duplex S.31803
82	1/2	1 1/2	GA-E-60758	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-S.31803 trim-GRAPH.
82	2	3	GA-E-67190	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-S.31803 trim-GRAPH.
82	6	12	GA-E-67191	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-S.31803 trim-GRAPH.
89	1/2	1 1/2	GA-E-60498	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-S.31803 trim-GRAPH.
101	1/2	1 1/2	GA-E-67014	Gate-Stem Extension-WB-Red.B-Solid wdg- Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : Duplex S.31803
101	2	2	GA-E-67029	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Duplex S.31803
130	1/2	1 1/2	GA-E-67080	Gate-Stem Extension-WB-Red.B-Solid wdg- Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : Duplex S.31803
801	1/2	1 1/2	GA-E-67137	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-S.31803 trim - RPTFE seats
810	1/2	1 1/2	GA-E-67274	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Soft seat-S.31803 trim - RPTFE seats
810	12	12	GA-E-67275	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-S.31803 trim - RPTFE seats
820	1/2	1 1/2	GA-E-67289	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A105 Normalized Trim : Metal seat-S.31803 trim-GRAPH.
820	12	12	GA-E-67288	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-S.31803 trim-GRAPH.
824	2	2	GA-E-67621	Ball-Split body-FB-Floating ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-S.31803 trim-GRAPH.
824	8	8	GA-E-67622	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-S.31803 trim-GRAPH.
907	6	8	GA-E-69012	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Metal seat-S.31803 trim-RPTFE
908	2	2	GA-E-69077	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats

BRANCH TABLES

90 Degrees													
RunSize													
1/2	A												
3/4	A	A											
1	A	A	A										
1 1/2	A	A	A	A									
2	S	S	T	T	T								
3	S	S	S	S	T	T							
4	S	S	S	S	W	T	T						
6	S	S	S	S	W	W	T	T					
8	S	S	S	S	W	W	W	T	T				
10	S	S	S	S	W	W	W	W	T	T			
12	S	S	S	S	W	W	W	W	W	T	T		
BranchSize 1/2 3/4 1 1 1/2 2 3 4 6 8 10 12													
Legenda													
A	TEE - SW ENDS - ASME-B16.11												
S	SOCKOLET - SW END - TB RAC 5380												
T	TEE - ASME-B16.9												
W	WELDOLET - MSS-SP97												

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 4) Specified Thickness are suitable to withstand Full Vacuum condition.

<div> MOZAMBIQUE LNG</div>		PIPING MATERIAL SPECIFICATION										JOB 032243							
												Piping Class:		03CB4S05					
												Sh. 1 of 2		Rev.					
A	0	1																	

Base Material : CARBON STEEL										Design code : ASME B 31.3 2016									
Nom. Rating : CL300										PWHT : AS PER CODE (NOTE 1)									
Facing/Finishing : RF										Valve Trim : 12 - SS316/HF									
Corrosion Allow. : 6 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013									
Temp. Limit : -29 °C to 220 °C																			
Service: HL - Hydrocarbon Liquid WEG - Water / Ethylene Glycol																			

Pipe Thickness																
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
Thk.mm	7.47	7.82	9.09	10.15	8.74	11.13	11.13	10.97	12.7	12.7	14.27	15.09	15.88	17.48	17.48	20.62
SCH.	XXS	XXS	XXS	XXS	160	160	120	XS	XS	XS	60	60				

Nipple Thickness																
NPS	1/2	3/4	1	1 1/2	2											
Thk.mm	7.47	7.82	9.09	10.15	8.74											
SCH.	XXS	XXS	XXS	XXS	160											

PRESSURE - TEMPERATURE Ratings																
NPS	Press. bar	51.02	51.02	46.88	45.16	43.78	ASME B16.5									
1/2 - 24	Temp. °C	-28.9	37.78	93.33	148.9	204.4	Material Group 1.1									

opt.	Size from to		Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	10	PIPE	BW		ASTM A106 GR.B - SMLS
	12	24	PIPE	BW		ASTM A333 GR.6 - SMLS

FLANGES						
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A105 Normalized
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
	3	10	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A105 Normalized
	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A105 Normalized
	14					

SPECTACLE BLIND						
	1/2	12	SPECTACLE BLIND - ASME-B16.48 GA-E-060011		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)
	14	24	BLIND & SPACER - ASME-B16.48 GA-E-060011		CL300 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
63	1/2	3	DRIP-RING - TB DRI 5011		CL300 RF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
	2	10	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	12	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
	2	10	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	12	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	6000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	9000	ASTM A105 Normalized
	2	10	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	12	24	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	6000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM\PE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
	2	10	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	12	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	2	8	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized
	1/2	1 1/2	SOCKOLET - SW END - TB RAC 5380	SW\BW	9000	ASTM A105 Normalized

GASKETS						
63	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			316 SS+GRAPH 98% - C.S. OUT.RING
	3	10	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 316

BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60186	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF
1	2	24	GA-E-60192	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
4	1/2	1 1/2	GA-E-60267	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF
4	2	12	GA-E-60273	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
6	1/2	1 1/2	GA-E-60390	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF
6	2	24	GA-E-60398	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : 316 / HF
7	2	2	GA-E-60426	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats
7	6	24	GA-E-67118	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - RPTFE seats


<div><div><div>CCS JV</div><div>MOZAMBIQUE LNG</div></div></div>		PIPING MATERIAL SPECIFICATION			JOB 032243				
					Piping Class:		03CB4S05		
					Sh. 2 of 2		Rev.		
						A		0	1

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
8	1/2	1 1/2	GA-E-60425	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body:ASTM A105 Normalized Trim :Soft seat-316 trim - RPTFE seats
8	2	2	GA-E-67172	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body:ASTM A216 WCB Trim :Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-67059	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body:ASTM A105 Normalized Trim :316 / HF
11	1/2	1 1/2	GA-E-60189	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body:ASTM A105 Normalized Trim :316 / HF
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body:ASTM A105 Normalized Trim :Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67082	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body:ASTM A105 Normalized Trim :316 / HF
102	2	2	GA-E-67327	Gate-BB-FB-Flex wdg-Thdd seat - API600	BW	CL300	Body:ASTM A216 WCB Trim :316 / HF
140	2	6	GA-E-67367	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body:ASTM A216 WCB Trim :316 / HF
780	2	2	GA-E-67661	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body:ASTM A105 Normalized Trim :Soft seat-316 trim - RPTFE seats
907	6	6	GA-E-69010	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body:ASTM A216 WCB Trim :Soft seat-316 trim - RPTFE seats

BRANCH TABLES	
90 Degrees	
RunSize	
1/2	A
3/4	A A
1	A A A
1 1/2	A A A A
2	S S T T T
3	S S S S W T
4	S S S S W T T
6	S S S S W W T T
8	S S S S W W W T T
10	S S S S W W W W T T
12	S S S S W W W W W T T
14	S S S S W W W W W P T T
16	S S S S W W W W W P P T T
18	S S S S W W W W W P P P T T
20	S S S S W W W W W P P P P T T
24	S S S S W W W W W P P P P P T T
BranchSize	1/2 3/4 1 1 1/2 2 3 4 6 8 10 12 14 16 18 20 24
Legenda	
A	TEE - SW ENDS - ASME-B16.11
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E
S	SOCKOLET - SW END - TB RAC 5380
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

GENERAL NOTES	
1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.	
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.	
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).	
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.	
5) Specified Thickness are suitable to withstand Full Vacuum condition.	

	PIPING MATERIAL SPECIFICATION	JOB 032243													
		Piping Class:	03LT0F50												
		Sh. 2 of 2	Rev. <table><tr><td>A</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					A	0	1	2	3			
A	0	1	2	3											
GENERAL NOTES															
<div>1) Plastic lining in pipe shall be in accordance with ASTM F1545 standard specification for PTFE plastic-lined ferrous metal pipe, fittings, and flanges. Pipe shall have Class 300 flanged ends.</div> <div>2) Welding or heating of metal surfaces of plastic-lined pipe shall not be permitted.</div> <div>3) Piping layout configuration shall ensure lining integrity</div>															

PIPING MATERIAL SPECIFICATION



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 03SA0B01

Sh. 2 of 3			Rev.				
			A	0	1	2	3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60142	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
1	2	24	GA-E-60150	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
4	1/2	1 1/2	GA-E-60234	Globe-BB-Red B.-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	12	GA-E-60243	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	1/2	1 1/2	GA-E-60341	Check-BB-Red.B-Piston-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60355	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60356	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	6	24	GA-E-60448	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60446	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-67026	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
14	2	6	GA-E-60179	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
80	1/2	1 1/2	GA-E-60472	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
82	1/2	1 1/2	GA-E-60760	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60476	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60593	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	24	GA-E-60594	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
106	8	8	GA-E-67703	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL900 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
401	1/2	1 1/2	GA-E-60283	Globe-Stem Extension-BB-Red B.-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
401	2	12	GA-E-60284	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
701	6	24	GA-E-60788	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67138	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
801	6	24	GA-E-60789	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
841	8	10	GA-E-67623	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
920	26	48	GA-E-69013	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
920	50	60	GA-E-69044	Special Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
920	62	68	GA-E-69014	Special Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - <MFR Std>	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
972	2	6	GA-E-69015	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
976	2	2	GA-E-69098	Ball-Stem Extension-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
976	6	8	GA-E-69099	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	68	68	GA-E-60612	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3
2	68	68	GA-E-60627	Angle T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **03SA0B30**

Rev.					
A	0	1	2	3	

Sh. 2 of 3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60144	Cryo.Gate-Extend.BB-Red.B-Solid wdg-Wldd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
1	2	24	GA-E-60152	Cryo.Gate-Extend.BB-FB-Flex wdg-Thd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
2	26	42	GA-E-60513	Cryog.Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
4	1/2	1 1/2	GA-E-60236	Cryo.Globe-Extend.BB-Red.B-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	18	GA-E-60245	Cryo.Globe-Extend.BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	1/2	1 1/2	GA-E-60344	Cryo.Check-BB-Red.B-Piston-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60352	Cryo.Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60353	Cryo.Check-Flanged-Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	26	36	GA-E-60392	Cryo.Check-Flanged-Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	2	4	GA-E-60450	Cryo.Ball-Ext.bnt-Split body-Red.B-Float.ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
7	6	24	GA-E-60451	Cryo.Ball-Ext.bnt-Split body-Red.B-Trun.ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
8	1/2	1 1/2	GA-E-60449	Cryo.Ball-Ext.bnt-Split body-FB-Floating ball - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Crio Soft seal-316 trim - KEL.F seats
8	2	3	GA-E-67239	Cryo.Ball-Ext.bnt-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
8	6	24	GA-E-67175	Cryo.Ball-Ext.bnt-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
11	1/2	1 1/2	GA-E-67350	Cryo.Gate-Extend.BB-Red.B-Solid wdg-Wldd seat - API602	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
15	3	3	GA-E-60156	Cryo.Gate-Extend.BB-FB-Flex wdg-Thd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
17	2	2	GA-E-60596	Cryo.Gate-Extend.BB-FB-Flex wdg-Thd seat - API600	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF
19	1/2	1 1/2	GA-E-67041	Cryo.Gate-Extend.BB-Red.B-Solid wdg-Wldd seat - API602	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
62	2	10	GA-E-60705	Cryo.Check-Flanged-Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
69	18	18	GA-E-60748	Cryo.Check-Flanged-Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
162	2	2	GA-E-67322	Cryo.Gate-Extend. Stem (1800mm)-BB-FB-Flex wdg-Thd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
780	2	3	GA-E-67662	Cryo.DBL Block&Bleed Ball valve-Ext.bnt-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Crio Soft seal-316 trim - KEL.F seats
781	2	2	GA-E-67663	Cryo.DBL Block&Bleed Ball valve-Ext.bnt-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
840	10	10	GA-E-67624	Cryo.Ball-Ext.bnt-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
907	1	1	GA-E-69103	Cryo.Ball-Ext.bnt-Split body-Red.B-Float.ball - API6D	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Crio Soft seal-316 trim - KEL.F seats
907	3	3	GA-E-69089	Cryo.Ball-Ext.bnt-Split body-Red.B-Float.ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
907	6	20	GA-E-69087	Cryo.Ball-Ext.bnt-Split body-Red.B-Trun.ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
908	8	8	GA-E-69088	Cryo.Ball-Ext.bnt-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
917	2	6	GA-E-69054	Cryo.Ball-Top Entry-Ext.bnt-Red.B-Float.ball - API6D + Pup Pieces	BW	CL300	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
920	36	42	GA-E-69086	Cryog.Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1	1	GA-E-60648	Y Strainer - Bolted cover - ASME-B16.34	FLGD	CL300 RF	Body : ASTM A182 F316/F316L DUAL GRADE Screen: 316 - CLOTH - MESH 3
1	6	6	GA-E-60622	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304S/304LS DUAL GRADE - SMLS Screen: 316 - CLOTH - MESH 3
1	8	8	GA-E-60614	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3
1	24	24	GA-E-60614	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES


RunSize		90 Degrees																					
1/2	T																						
3/4	T	T																					
1	T	T	T																				
1 1/2	T	T	T	T																			
2	W	W	T	T	T																		
2 1/2																							
3	W	W	W	W	W		T																
4	W	W	W	W	W		T	T															
6	W	W	W	W	W		W	T	T														
8	W	W	W	W	W		W	W	T	T													
10	W	W	W	W	W		W	W	W	T	T												
12	W	W	W	W	W		W	W	W	W	T	T											
14	W	W	W	W	W		W	W	W	W	P	T	T										
16	W	W	W	W	W		W	W	W	W	P	P	T	T									
18	W	W	W	W	W		W	W	W	W	P	P	P	T	T								
20	W	W	W	W	W		W	W	W	W	P	P	P	P	T	T							
24	W	W	W	W	W		W	W	W	W	P	P	P	P	P	T	T						
28	W	W	W	W	W		W	W	W	W	P	P	P	P	P	P	T	T	T				
30	W	W	W	W	W		W	W	W	W	P	P	P	P	P	P	P	T	T	T			
36	W	W	W	W	W		W	W	W	W	P	P	P	P	P	P	P	P	T	T	T		
42	W	W	W	W	W		W	W	W	W	P	P	P	P	P	P	P	P	P	T	T		
BranchSize	1/2	3/4	1	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24	28	30	36	42		
Legenda																							
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																						
T	TEE - ASME-B16.9																						
W	WELDOLET - MSS-SP97																						

GENERAL NOTES

1) Use of threaded connections is prohibited except for instrument impulse lines.

2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.

3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION															JOB 032243															
																	Piping Class:										03SA0B60					
																	Sh.		1		of		3		Rev.							
		A		0		1																										

Base Material : STAINLESS STEEL 304/304L DUAL GRADE										Design code : ASME B 31.3 2016																
Nom. Rating : CL300										PWHT : NO																
Facing/Finishing : RF										Valve Trim : 12 - SS316/HF																
Corrosion Allow. : 0 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																
Temp. Limit : -175 °C to 230 °C																										
Service: [AIV] ER - Ethane / Ethilene Refrigerant MR - Mixed Refrigerant PG - Process Gas / Purge Gas PR - Propane Refrigerant																										
Pipe Thickness																										
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	40	42	46	48	54	56	60	62
Thk.mm	2.77	2.87	3.38	3.68	3.91	3.05	3.05	7.11	6.35	6.35	8.38	7.92	9.53	9.53	12.7	12.7	11.13	12.7	14.27	15.88	15.88	15.88	17.48	17.48	19.05	19.05
SCH.	40S	40S	40S	40S	40S	10S	10S	40S					40S	40S	80S	80S			14.27	14.27						
	66	68																								
	19.05	20.62																								

Nipple Thickness																						
NPS	1/2	3/4	1	1 1/2	2																	
Thk.mm	3.73	3.91	4.55	5.08	5.54																	
SCH.	80S	80S	80S	80S	80S																	

PRESSURE - TEMPERATURE Ratings																						
NPS	Press. bar	49.64	49.64	41.37	37.23	ASME B16.5																
1/2 - 24	Temp. °C	-28.9	37.78	93.33	148.9	Material Group 2.1																
NPS	Press. bar	25																				
30 - 36	Temp. °C	230																				
NPS	Press. bar	30																				
40 - 68	Temp. °C	180																				

opt.	Size		Item Description	Ends	Rating/Facing	Material
	from	to				

PIPE						
	1/2	6	PIPE	BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	8	68	PIPE	BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW

FLANGES						
5	1/2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A182 F304/304L DUAL GRADE
	26	60	WN FLANGE - ASME-B16.47 series.A	BW	CL300 RF	ASTM A182 F304/304L DUAL GRADE
	68	68	SPECIAL WN FLANGE - <MFR Std> GA-E-060015	BW	CL300 RF	ASTM A182 F304/304L DUAL GRADE
14	1/2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE
	1/2	1/2	THD FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A182 F304/304L DUAL GRADE
	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE
63	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A182 F304/304L DUAL GRADE
	26	60	BLIND FLANGE - ASME-B16.47 series.A		CL300 RF	ASTM A182 F304/304L DUAL GRADE
	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A182 F304/304L DUAL GRADE
5	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A182 F304/304L DUAL GRADE
	3/4	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A182 F304/304L DUAL GRADE

SPECTACLE BLIND						
2	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A240 TP304
	14	24	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A240 TP304
	68	68	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060015		CL300 RF	ASTM A240 TP304
5	1/2	12	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A240 TP304
	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A240 TP304
25	1/2	8	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A240 TP304

FITTINGS						
63	1/2	2	DRIP-RING - TB DRI 5011		CL300 RF	ASTM A182 F304/304L DUAL GRADE
	1/2	6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	48	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	50	68	LONG RADIUS ELBOW - TB RAC 5060	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	3/4	6	REDUCER - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	48	REDUCER - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	50	68	REDUCER, LARGE BORE - TB RAC 5062	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	1/2	2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	48	CAP - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	50	68	CAP - TB RAC 5064	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A182 F304/304L DUAL GRADE
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDMPE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	1/2	2	NIPPLE - THDD/THDD - ASME-B36.10	THDM		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95	THDMPE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
63	1/2	6	TEE - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	48	TEE - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	54	68	TEE - TB RAC 5061	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	2	36	SPECIAL SWEEPOLET - <MFR Std>	BW		ASTM A182 F304/304L DUAL GRADE

GASKETS						
63	26	60	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE
	68	68	FLAT GASKET - GROOVED - <MFR Std> GA-E-060015			AISI 316L+GRAPHITE
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304

BOLTS						
63	1/2	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A320 B8 CL.2 + ASTM A194 GR.8
	1 5/8	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A453 GR. 660



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **03SA0B60**

Sh. 2 of 3				Rev.			
A	0	1					

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60142	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
1	2	24	GA-E-60150	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
4	1/2	1 1/2	GA-E-60234	Globe-BB-Red B.-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	12	GA-E-60243	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	1/2	1 1/2	GA-E-60341	Check-BB-Red.B-Piston-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60355	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60356	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	6	24	GA-E-60448	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60446	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-67026	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
80	1/2	1 1/2	GA-E-60472	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
82	1/2	1 1/2	GA-E-60760	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60476	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60593	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	24	GA-E-60594	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
130	1/2	1 1/2	GA-E-67393	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
401	1/2	1 1/2	GA-E-60283	Globe-Stem Extension-BB-Red B.-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
401	2	12	GA-E-60284	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
701	6	24	GA-E-60788	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67138	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
801	6	24	GA-E-60789	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
4	68	68	GA-E-60652	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3
5	68	68	GA-E-60653	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 03SA0S01

Rev.				
A	0	1	2	3

Base Material	: STAINLESS STEEL 304/304L DUAL GRADE	Design code	: ASME B 31.3 2016
Nom. Rating	: CL300	PWHT	: NO
Facing/Finishing	: RF	Valve Trim	: 12 - SS316/HF
Corrosion Allow.	: 0 mm	Welding Spec	: MZ-000-CCX-MC-SPC-00009/00013
Temp. Limit	: -101 °C to 230 °C		

Service: BD - Blowdown CI - Chemical injection DMW - Demineralized Water ER - Ethane / Ethelene Refrigerant FG - Fuel Gas HL - Hydrocarbon Liquid HV - Hydrocarbon Vapour
PC - Process Condensate PG - Process Gas / Purge Gas PRW - Process Water

Pipe Thickness

NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	26	30	36	40	42	46	48	54	56	60
Thk.mm	2.77	2.87	3.38	3.68	3.91	3.05	3.05	7.11	6.35	6.35	8.38	7.92	9.53	9.53	12.7	12.7	9.53	11.13	12.7	14.27	14.27	15.88	15.88	15.88	17.48	17.48
SCH.	40S	40S	40S	40S	40S	10S	10S	40S					40S	40S	80S	80S										
	62	66	68																							
	19.05	19.05	20.62																							

Nipple Thickness

NPS	1/2	3/4	1	1 1/2	2
Thk.mm	3.73	3.91	4.55	5.08	5.54
SCH.	80S	80S	80S	80S	80S

PRESSURE - TEMPERATURE Ratings

NPS	Press. bar	49.64	49.64	41.37	37.23	34.13	32.06	30.34	29.65	28.96	28.61	ASME B16.5	
1/2 - 24	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	315.6	343.3	371.1	398.9	Material Group 2.1	
NPS	Press. bar	35											
26 - 26	Temp. °C	120											
NPS	Press. bar	30											
30 - 68	Temp. °C	180											

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
PIPE						
	1/2	6	PIPE	BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	8	68	PIPE	BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW

FLANGES

5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL300 RF	ASTM A182 F304/304L DUAL GRADE
	2	24	WN FLANGE - ASME-B16.5	BW	CL300 RF	ASTM A182 F304/304L DUAL GRADE
	26	60	WN FLANGE - ASME-B16.47 series.A	BW	CL300 RF	ASTM A182 F304/304L DUAL GRADE
	68	68	SPECIAL WN FLANGE - <MFR Std> GA-E-060015	BW	CL300 RF	ASTM A182 F304/304L DUAL GRADE
5	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A182 F304/304L DUAL GRADE
5	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE
63	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE
73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
73	2	2	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	1/2	24	BLIND FLANGE - ASME-B16.5		CL300 RF	ASTM A182 F304/304L DUAL GRADE
	26	60	BLIND FLANGE - ASME-B16.47 series.A		CL300 RF	ASTM A182 F304/304L DUAL GRADE
5	2	2	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A182 F304/304L DUAL GRADE
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL300 RF	ASTM A182 F304/304L DUAL GRADE

SPECTACLE BLIND

	1/2	12	SPECTACLE BLIND - ASME-B16.48		CL300 RF	ASTM A240 TP304
	14	24	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A240 TP304
2	1/2	12	BLIND & SPACER - ASME-B16.48		CL300 RF	ASTM A240 TP304
5	2	6	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A240 TP304

FITTINGS

	1/2	3	DRIP-RING - TB DRI 5011		CL300 RF	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	48	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	50	68	LONG RADIUS ELBOW - TB RAC 5060	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	REDUCER - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	48	REDUCER - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	50	68	REDUCER, LARGE BORE - TB RAC 5062	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	48	CAP - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	50	68	CAP - TB RAC 5064	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A182 F304/304L DUAL GRADE
	1/2	2	NIPPLE - PE/PE - ASME-B36.10	PE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	1/2	2	NIPPLE - THDD/THDD - ASME-B36.10	THDM		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDMPE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95	THDMPE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - THDD/THDD - MSS-SP95	THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	TEE - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	48	TEE - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	54	68	TEE - TB RAC 5061	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	2	8	WELDOLET - MSS-SP97	BW		ASTM A182 F304/304L DUAL GRADE
	2	2	LATROLET - BW END - MSS-SP97	BW	3000	ASTM A182 F304/304L DUAL GRADE
	3	8	SPECIAL LATROLET - <MFR Std>	BW		ASTM A182 F304/304L DUAL GRADE

	PIPING MATERIAL SPECIFICATION					JOB 032243									
						Piping Class:					03SA0S01				
						Sh.		2	of	4	Rev.				
											A	0	1	2	3

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
FITTINGS						
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	LATROLET - SW END - MSS-SP97	SW\BW	3000	ASTM A182 F304/304L DUAL GRADE
GASKETS						
	26	60	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE
	68	68	FLAT GASKET - GROOVED - <MFR Std> GA-E-060015			AISI 316L+GRAPHITE
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
5	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304
BOLTS						
	1/2	2 1/8	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A320 L7 + ASTM A194 GR.7 - PTFE COATED

VALVES								
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material	
1	1/2	1 1/2	GA-E-60146	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
1	2	24	GA-E-60150	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF	
4	1/2	1 1/2	GA-E-60239	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
4	2	12	GA-E-60243	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF	
6	1/2	1 1/2	GA-E-60347	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
6	2	10	GA-E-60355	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF	
6	12	24	GA-E-60356	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF	
7	2	2	GA-E-60447	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats	
7	6	24	GA-E-60448	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats	
8	1/2	1 1/2	GA-E-60446	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats	
8	2	2	GA-E-67260	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats	
8	6	24	GA-E-60790	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats	
10	1/2	1 1/2	GA-E-60178	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
11	1/2	1 1/2	GA-E-60597	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
14	1/2	1 1/2	GA-E-60127	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
14	2	24	GA-E-60179	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF	
15	2	3	GA-E-60154	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF	
19	1/2	1 1/2	GA-E-60134	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
62	1	1	GA-E-67512	Check-BB-Red.B-Swing-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
62	2	2	GA-E-60706	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF	
64	4	6	GA-E-60394	Nozzle Check-Long-Axial non slam-Thdd seat - API 6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF	
69	4	6	GA-E-60706	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF	
80	1/2	1 1/2	GA-E-60472	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats	
82	1/2	1 1/2	GA-E-60760	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
84	1/2	1 1/2	GA-E-67682	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
89	1/2	1 1/2	GA-E-60475	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
101	1/2	1 1/2	GA-E-60593	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
101	2	24	GA-E-60594	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF	
105	2	2	GA-E-60155	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF	
130	1/2	1 1/2	GA-E-67083	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
140	1	1	GA-E-67368	Gate-BB-Red.B-Solid wdg-Exp.seat - API602 - Interlock System	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
140	2	4	GA-E-67369	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF	
141	2	2	GA-E-67370	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF	



PIPING MATERIAL SPECIFICATION

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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
145	2	2	GA-E-60188	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
145	3	3	GA-E-60188	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
159	2	2	GA-E-67319	Gate-Ext. Stem (1200mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
163	6	8	GA-E-67318	Gate-Ext. Stem (2300mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
401	1/2	1 1/2	GA-E-67410	Globe-Stem Extension-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
401	2	12	GA-E-60284	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
701	8	24	GA-E-60788	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
780	2	2	GA-E-67664	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
781	2	2	GA-E-67665	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
782	2	2	GA-E-67666	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
783	2	2	GA-E-67689	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
785	2	2	GA-E-67667	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
801	1/2	1 1/2	GA-E-67138	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
801	6	24	GA-E-60789	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
840	6	10	GA-E-67625	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
840	14	16	GA-E-67625	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
841	6	10	GA-E-67623	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
907	2	6	GA-E-69015	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
907	8	12	GA-E-69047	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PTFE seats
920	26	48	GA-E-69013	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
972	2	4	GA-E-69047	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PTFE seats
972	6	24	GA-E-69055	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	6	GA-E-60622	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304S/304LS DUAL GRADE - SMLS Screen: 316 - CLOTH - MESH 3
1	68	68	GA-E-60646	T Strainer-BW Special - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

<div></div>		PIPING MATERIAL SPECIFICATION												JOB 032243					
														Piping Class:		03SA0S02			
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Base Material : STAINLESS STEEL 304/304L DUAL GRADE														Design code : ASME B 31.3 2016					
Nom. Rating : CL300														PWHT : NO					
Facing/Finishing : RF														Valve Trim : 12 - SS316/HF					
Corrosion Allow. : 0 mm														Welding Spec : MZ-000-CCX-MC-SPC-00009/00013					
Temp. Limit : 0 °C to 180 °C																			
Service: [Amine Service] AL - Amine Lean PRW - Process Water																			
Pipe Thickness																			
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24			
Thk.mm	2.77	2.87	3.38	3.68	3.91	3.05	3.05	7.11	6.35	6.35	8.38	7.92	9.53	9.53	12.7	12.7			
SCH.	40S	40S	40S	40S	40S	10S	10S	40S					40S	40S	80S	80S			
Nipple Thickness																			
NPS	1/2	3/4	1	1 1/2	2														
Thk.mm	3.73	3.91	4.55	5.08	5.54														
SCH.	80S	80S	80S	80S	80S														
PRESSURE - TEMPERATURE Ratings																			
NPS	Press. bar	49.64	41.37	37.23	ASME B16.5														
1/2 - 24	Temp. °C	37.78	93.33	148.9	Material Group 2.1														
opt.	Size from to		Item Description									Ends	Rating/Facing	Material					
PIPE																			
	1/2	6	PIPE									BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS					
	8	24	PIPE									BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW					
FLANGES																			
5	1/2	1 1/2	SW FLANGE - ASME-B16.5									SW	CL300 RF	ASTM A182 F304/304L DUAL GRADE					
	2	24	WN FLANGE - ASME-B16.5									BW	CL300 RF	ASTM A182 F304/304L DUAL GRADE					
	1/2	1 1/2	SW FLANGE - ASME-B16.5									SW	CL600 RF	ASTM A182 F304/304L DUAL GRADE					
	2	24	WN FLANGE - ASME-B16.5									BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE					
	63	3	24	WN FLANGE - ASME-B16.5									BW	CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE				
5	1/2	24	BLIND FLANGE - ASME-B16.5										CL300 RF	ASTM A182 F304/304L DUAL GRADE					
	1/2	24	BLIND FLANGE - ASME-B16.5										CL600 RF	ASTM A182 F304/304L DUAL GRADE					
14	2	2	THDD RED. FLANGE - ASME-B16.5									THDF	CL300 RF	ASTM A182 F304/304L DUAL GRADE					
34	2	2	THDD RED. FLANGE - ASME-B16.5									THDF	CL300 RF	ASTM A182 F304/304L DUAL GRADE					
SPECTACLE BLIND																			
5	1/2	12	SPECTACLE BLIND - ASME-B16.48										CL300 RF	ASTM A240 TP304					
	14	24	BLIND & SPACER - ASME-B16.48										CL300 RF	ASTM A240 TP304					
	1/2	8	SPECTACLE BLIND - ASME-B16.48										CL600 RF	ASTM A240 TP304					
	5	10	24	BLIND & SPACER - ASME-B16.48										CL600 RF	ASTM A240 TP304				
FITTINGS																			
5	1/2	2	DRIP-RING - TB DRI 5011										CL300 RF	ASTM A182 F304/304L DUAL GRADE					
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11									SW	3000	ASTM A182 F304/304L DUAL GRADE					
	2	6	LONG RADIUS ELBOW - ASME-B16.9									BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	8	24	LONG RADIUS ELBOW - ASME-B16.9									BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD					
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11									SW	3000	ASTM A182 F304/304L DUAL GRADE					
	2	6	REDUCER - ASME-B16.9									BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	8	24	REDUCER - ASME-B16.9									BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD					
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11									SW	3000	ASTM A182 F304/304L DUAL GRADE					
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11									THDF	3000	ASTM A182 F304/304L DUAL GRADE					
	2	24	CAP - ASME-B16.9									BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11									SW	3000	ASTM A182 F304/304L DUAL GRADE					
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11									SW\THDF	3000	ASTM A182 F304/304L DUAL GRADE					
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11									THDM		ASTM A182 F304/304L DUAL GRADE					
	1/2	2	NIPPLE - THDD/THDD - ASME-B36.10									THDM		ASTM A312 TP304/TP304L DUAL GRADE - SMLS					
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10									THDMPE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS					
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95									PE\THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95									PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95									THDMPE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11									SW	3000	ASTM A182 F304/304L DUAL GRADE					
	2	6	TEE - ASME-B16.9									BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS					
	8	24	TEE - ASME-B16.9									BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD					
	2	8	WELDOLET - MSS-SP97									BW		ASTM A182 F304/304L DUAL GRADE					
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97									SW\BW	3000	ASTM A182 F304/304L DUAL GRADE					
GASKETS																			
63	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20											304 SS+GRAPH 98% - C.S. OUT.RING					
	3	24	OCTAGONAL RJ GASKET - ASME-B16.20											AISI 304					
BOLTS																			
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368									ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED							
VALVES																			
pos.	from	Size to	Data Sheet	Item Description								Ends	Rating/Facing	Material					
1	1/2	1 1/2	GA-E-60146	Gate-BB-Red.B-Solid wdg-Exp.seat - API602								SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF					
1	2	24	GA-E-60150	Gate-BB-FB-Flex wdg-Thdd seat - API600								FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF					
4	1/2	1 1/2	GA-E-60239	Globe-BB-Red B.-Thdd seat - API602								SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF					
4	2	16	GA-E-60243	Globe-BB-Disk-Thdd seat - API 623								FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF					
6	1/2	1 1/2	GA-E-60347	Check-BB-Red.B-Piston-Thdd seat - API602								SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF					



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pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	2	10	GA-E-60355	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60356	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	6	24	GA-E-60483	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60481	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-67277	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60178	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	1/2	1 1/2	GA-E-60597	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
15	2	2	GA-E-60154	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
19	1/2	1 1/2	GA-E-60134	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
62	2	10	GA-E-60706	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
82	1/2	1 1/2	GA-E-60760	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60475	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67016	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
130	1/2	1 1/2	GA-E-67083	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
140	4	4	GA-E-67369	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
701	8	24	GA-E-67278	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
801	1/2	1 1/2	GA-E-67279	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
840	6	8	GA-E-67625	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	3	GA-E-60613	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304S/304LS DUAL GRADE - SMLS Screen: 316 - CLOTH - MESH 3
1	12	12	GA-E-60614	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																
1/2	A																	
3/4	A	A																
1	A	A	A															
1 1/2	A	A	A	A														
2	S	S	T	T	T													
3	S	S	S	S	S	W	T											
4	S	S	S	S	S	W	T	T										
6	S	S	S	S	S	W	W	T	T									
8	S	S	S	S	S	W	W	W	T	T								
10	S	S	S	S	S	W	W	W	W	T	T							
12	S	S	S	S	S	W	W	W	W	W	T	T						
14	S	S	S	S	S	W	W	W	W	W	P	T	T					
16	S	S	S	S	S	W	W	W	W	W	P	P	T	T				
18	S	S	S	S	S	W	W	W	W	W	T	T	T	T	T			
20	S	S	S	S	S	W	W	W	W	W	T	T	T	T	T	T		
24	S	S	S	S	S	W	W	W	W	W	P	T	T	T	T	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24		
Legenda																		
A	TEE - SW ENDS - ASME-B16.11																	
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																	
S	SOCKOLET - SW END - MSS-SP97																	
T	TEE - ASME-B16.9																	
W	WELDOLET - MSS-SP97																	

GENERAL NOTES

1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.

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2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).

3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

4) Specified Thickness are suitable to withstand Full Vacuum condition.



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opt.	Size		Item Description	Ends	Rating/Facing	Material	
	from	to					
GASKETS							
	26	60	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE	
	68	68	FLAT GASKET - GROOVED - <MFR Std> GA-E-060015			AISI 316L+GRAPHITE	
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING	
5	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING	
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304	
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304	
BOLTS							
	1/2	2 1/8	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A320 L7 + ASTM A194 GR.7 - PTFE COATED	
VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60146	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
1	2	24	GA-E-60150	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
4	1/2	1 1/2	GA-E-60239	Globe-BB-Red B. -Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	12	GA-E-60243	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	1/2	1 1/2	GA-E-60347	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60355	Check-BB- FB- Swing - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60356	Check-Flanged -Dual plate-Wlidd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	2	2	GA-E-60447	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
7	6	24	GA-E-60448	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60446	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
8	2	2	GA-E-67260	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
8	6	24	GA-E-60790	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
10	1/2	1 1/2	GA-E-60178	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	1/2	1 1/2	GA-E-60597	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
14	1/2	1 1/2	GA-E-60127	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
14	2	24	GA-E-60179	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
15	2	2	GA-E-60154	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
19	1/2	1 1/2	GA-E-60134	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
62	1	1	GA-E-67512	Check-BB-Red.B-Swing-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
62	2	2	GA-E-60706	Check-Flanged -Dual plate-Wlidd seat - API594	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
64	4	6	GA-E-60394	Nozzle Check-Long-Axial non slam-Thdd seat - API 6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
80	1/2	1 1/2	GA-E-60472	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
82	1/2	1 1/2	GA-E-60760	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
84	1/2	1 1/2	GA-E-67682	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60475	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60593	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	24	GA-E-60594	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
105	2	2	GA-E-60155	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
130	1/2	1 1/2	GA-E-67083	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
140	1	1	GA-E-67368	Gate-BB-Red.B-Solid wdg-Exp.seat - API602 - Interlock System	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
140	2	4	GA-E-67369	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
141	2	2	GA-E-67370	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
145	2	2	GA-E-60188	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
145	3	3	GA-E-60188	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
159	2	2	GA-E-67319	Gate-Ext. Stem (1200mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **03SA0S60**

Sh. **3** of **4**

Rev.

A

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
163	6	8	GA-E-67318	Gate-Ext. Stem (2300mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
401	1/2	1 1/2	GA-E-67410	Globe-Stem Extension-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
401	2	12	GA-E-60284	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : 316 / HF
701	8	24	GA-E-60788	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
780	2	2	GA-E-67664	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
781	2	2	GA-E-67665	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
782	2	2	GA-E-67666	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
783	2	2	GA-E-67689	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
785	2	2	GA-E-67667	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
801	1/2	1 1/2	GA-E-67138	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
801	6	24	GA-E-60789	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
840	6	10	GA-E-67625	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
840	14	14	GA-E-67625	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
841	6	10	GA-E-67623	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - RPTFE seats
907	2	6	GA-E-69015	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
920	26	48	GA-E-69013	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - API609	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
972	2	4	GA-E-69047	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PTFE seats
972	6	24	GA-E-69055	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	6	GA-E-60622	T Strainer-BW - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304S/304LS DUAL GRADE - SMLS Screen: 316 - CLOTH - MESH 3
1	68	68	GA-E-60646	T Strainer-BW Special - <MFR Std - Metallic>	BW	CL300 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class:

03SA0S60

Rev.

Sh. 4 of 4

A

90 Degrees

RunSize

[illegible]

Legenda

A	TEE - SW ENDS - ASME-B16.11
SW	SPECIAL SWEEPolet - <MFR Std>
T	TEE - ASME-B16.9
T1	TEE - TB RAC 5061

45 degrees

RunSize
BranchSize

Legenda

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 4) This piping class is created for lines subjected to Acoustic Induced Vibration.

<div><div><div>CCS</div><div>JV</div></div><div><div><div>Mozambique</div><div>LNG</div></div></div></div>		PIPING MATERIAL SPECIFICATION														JOB 032243											
																Piping Class:				03SD0S01							
																Sh.		1 of 2		Rev.							
		A		0		1																					

Base Material : STAINLESS STEEL 316/316L DUAL GRADE														Design code : ASME B 31.3 2016																			
Nom. Rating : CL300														PWHT : NO																			
Facing/Finishing : RF														Valve Trim : 12 - SS316/HF																			
Corrosion Allow. : 0 mm														Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																			
Temp. Limit : -45 °C to 400 °C																																	
Service: AV - Atmospheric Vent DMW - Demineralized Water FG - Fuel Gas MR - Mixed Refrigerant PR - Propane Refrigerant PRW - Process Water																																	
Pipe Thickness																																	
NPS		1/2		3/4		1		1 1/2		2		3		4		6		8		10		12		14		16		18		20		24	
Thk.mm		2.77		2.87		3.38		3.68		3.91		3.05		3.05		7.11		6.35		6.35		7.14		7.92		9.53		9.53		11.13		12.7	
SCH.		40S		40S		40S		40S		40S		10S		10S		40S										40S		40S				80S	
Nipple Thickness																																	
NPS		1/2		3/4		1		1 1/2		2																							
Thk.mm		3.73		3.91		4.55		5.08		5.54																							
SCH.		80S		80S		80S		80S		80S																							
PRESSURE - TEMPERATURE Ratings																																	
NPS		Press. bar		49.64		49.64		42.75		38.61		35.51		33.09		31.03		30.34		29.99		29.3		ASME B16.5									
1/2 - 24		Temp. °C		-28.9		37.78		93.33		148.9		204.4		260		315.6		343.3		371.1		398.9		Material Group 2.2									

opt.	Size		Item Description										Ends	Rating/Facing	Material
	from	to													

PIPE																
	1/2	6	PIPE										BW		ASTM A312 TP316/TP316L DUAL GRADE - SMLS	
	8	24	PIPE										BW		ASTM A358 TP316/TP316L CL.1 DUAL GRADE - EFW	
FLANGES																
5	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL300 RF	ASTM A182 F316/F316L DUAL GRADE	
	2	24	WN FLANGE - ASME-B16.5										BW	CL300 RF	ASTM A182 F316/F316L DUAL GRADE	
	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL600 RF	ASTM A182 F316/F316L DUAL GRADE	
	2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A182 F316/F316L DUAL GRADE	
	1/2	24	BLIND FLANGE - ASME-B16.5										CL300 RF	ASTM A182 F316/F316L DUAL GRADE		
14	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL300 RF	ASTM A182 F316/F316L DUAL GRADE	
SPECTACLE BLIND																
	1/2	12	SPECTACLE BLIND - ASME-B16.48											CL300 RF	ASTM A240 TP316	
	14	24	BLIND & SPACER - ASME-B16.48											CL300 RF	ASTM A240 TP316	
2	1/2	12	BLIND & SPACER - ASME-B16.48											CL300 RF	ASTM A240 TP316	
FITTINGS																
	1/2	3	DRIP-RING - TB DRI 5011											CL300 RF	ASTM A182 F316/F316L DUAL GRADE	
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F316/F316L DUAL GRADE	
	2	6	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS	
	8	24	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A403 WP316WX/WP316LWX DUAL GRADE - WLDD	
	1/2	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F316/F316L DUAL GRADE	
	2	6	REDUCER - ASME-B16.9										BW		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS	
	8	24	REDUCER - ASME-B16.9										BW		ASTM A403 WP316WX/WP316LWX DUAL GRADE - WLDD	
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11										THDF	3000	ASTM A182 F316/F316L DUAL GRADE	
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11										SW	3000	ASTM A182 F316/F316L DUAL GRADE	
	2	24	CAP - ASME-B16.9										BW		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS	
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11										SW\THDF	3000	ASTM A182 F316/F316L DUAL GRADE	
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F316/F316L DUAL GRADE	
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A182 F316/F316L DUAL GRADE	
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDMPE		ASTM A312 TP316/TP316L DUAL GRADE - SMLS	
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE\THDM		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS	
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS	
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F316/F316L DUAL GRADE	
	2	6	TEE - ASME-B16.9										BW		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS	
	8	24	TEE - ASME-B16.9										BW		ASTM A403 WP316WX/WP316LWX DUAL GRADE - WLDD	
	2	8	WELDOLET - MSS-SP97										BW		ASTM A182 F316/F316L DUAL GRADE	
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97										SW\BW	3000	ASTM A182 F316/F316L DUAL GRADE	
GASKETS																
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												316 SS+GRAPH 98% - C.S. OUT.RING	
BOLTS																
	1/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368												ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED	
VALVES																
pos.	from	Size	Data Sheet	Item Description										Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60146	Gate-BB-Red.B-Solid wdg-Exp.seat - API602										SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF
1	2	24	GA-E-60150	Gate-BB-FB-Flex wdg-Thdd seat - API600										FLGD	CL300 RF	Body: ASTM A351 CF8M Trim :316 / HF
4	1/2	1 1/2	GA-E-60239	Globe-BB-Red B.-Thdd seat - API602										SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF
4	2	12	GA-E-60243	Globe-BB-Disk-Thdd seat - API 623										FLGD	CL300 RF	Body: ASTM A351 CF8M Trim :316 / HF
6	1/2	1 1/2	GA-E-60347	Check-BB-Red.B-Piston-Thdd seat - API602										SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF
6	2	10	GA-E-60355	Check-BB- FB- Swing - API594										FLGD	CL300 RF	Body: ASTM A351 CF8M Trim :316 / HF
6	12	24	GA-E-60356	Check-Flanged -Dual plate-Wldd seat - API594										FLGD	CL300 RF	Body: ASTM A351 CF8M Trim :316 / HF
7	6	24	GA-E-60448	Ball-Split body-Red.B-Trunnion ball - API6D										FLGD	CL300 RF	Body: ASTM A351 CF8M Trim :Soft seat-316 trim - RPTFE seats
8	1/2	1 1/2	GA-E-60446	Ball-End entry -FB-Float.ball -Frgd body - API608										FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim :Soft seat-316 trim - RPTFE seats



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 03SD0S01

Sh. 2 of 2

Rev.

A	0	1		

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
10	1/2	1 1/2	GA-E-60178	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	1/2	1 1/2	GA-E-60597	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
89	1/2	1 1/2	GA-E-60475	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67016	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
801	1/2	1 1/2	GA-E-67138	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL300 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats

BRANCH TABLES

90 Degrees

RunSize


1/2	A																		
3/4	A	A																	
1	A	A	A																
1 1/2	A	A	A	A															
2	S	S	T	T	T														
3	S	S	S	S	S	W	T												
4	S	S	S	S	S	W	T	T											
6	S	S	S	S	S	W	W	T	T										
8	S	S	S	S	S	W	W	W	T	T									
10	S	S	S	S	S	W	W	W	W	T	T								
12	S	S	S	S	S	W	W	W	W	T	T	T							
14	S	S	S	S	S	W	W	W	W	P	T	T	T						
16	S	S	S	S	S	W	W	W	W	P	P	T	T	T					
18	S	S	S	S	S	W	W	W	W	T	T	T	T	T	T				
20	S	S	S	S	S	W	W	W	W	T	T	T	T	T	T	T			
24	S	S	S	S	S	W	W	W	W	P	T	T	T	T	T	T	T		
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24			


Legenda

A	TEE - SW ENDS - ASME-B16.11
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPM-T-012-E
S	SOCKOLET - SW END - MSS-SP97
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 4) Specified Thickness are suitable to withstand Full Vacuum condition.

<div></div>		PIPING MATERIAL SPECIFICATION				JOB 032243						
						Piping Class:		03SP0S01				
						Sh. 1 of 2		Rev.				
A	0	1										
Base Material : DUPLEX STAINLESS STEEL UNS S31803						Design code : ASME B 31.3 2016						
Nom. Rating : CL300						PWHT : NO						
Facing/Finishing : RF						Valve Trim : UNS S31803 (duplex)						
Corrosion Allow. : 0 mm						Welding Spec : MZ-000-CCX-MC-SPC-00009/00011/00013						
Temp. Limit : 0 °C to 250 °C												
Service: GD - Glycol Drain WEG - Water / Ethylene Glycol												
Pipe Thickness												
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10		
Thk.mm	2.77	2.87	3.38	3.68	3.91	3.05	3.05	3.4	3.76	4.19		
SCH.	40S	40S	40S	40S	40S	10S	10S	10S	10S	10S		
Nipple Thickness												
NPS	1/2	3/4	1	1 1/2	2							
Thk.mm	3.73	3.91	4.55	5.08	5.54							
SCH.	80S	80S	80S	80S	80S							
PRESSURE - TEMPERATURE Ratings												
NPS	Press. bar	51.71	51.37	45.85	42.4	ASME B16.5						
1/2 - 10	Temp. °C	37.78	93.33	148.9	204.4	Material Group 2.8						
opt.	Size from to		Item Description			Ends	Rating/Facing	Material				
PIPE												
	1/2	6	PIPE			BW		ASTM A790 UNS S31803 - SMLS				
	8	10	PIPE			BW		ASTM A928 UNS S31803 CL.1 - EFW				
FLANGES												
5	1/2	1 1/2	SW FLANGE - ASME-B16.5			SW	CL300 RF	ASTM A182 GR.F51 (UNS S31803)				
	2	10	WN FLANGE - ASME-B16.5			BW	CL300 RF	ASTM A182 GR.F51 (UNS S31803)				
	1/2	1 1/2	SW FLANGE - ASME-B16.5			SW	CL600 RF	ASTM A182 GR.F51 (UNS S31803)				
	2	10	WN FLANGE - ASME-B16.5			BW	CL600 RF	ASTM A182 GR.F51 (UNS S31803)				
	1/2	10	BLIND FLANGE - ASME-B16.5				CL300 RF	ASTM A182 GR.F51 (UNS S31803)				
14	2	2	THDD RED. FLANGE - ASME-B16.5			THDF	CL300 RF	ASTM A182 GR.F51 (UNS S31803)				
SPECTACLE BLIND												
	1/2	10	SPECTACLE BLIND - ASME-B16.48				CL300 RF	ASTM A240 UNS S31803				
FITTINGS												
	1/2	3	DRIP-RING - TB DRI 5011				CL300 RF	ASTM A182 GR.F51 (UNS S31803)				
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11			SW	3000	ASTM A182 GR.F51 (UNS S31803)				
	2	6	LONG RADIUS ELBOW - ASME-B16.9			BW		ASTM A815 UNS S31803 - SMLS				
	8	10	LONG RADIUS ELBOW - ASME-B16.9			BW		ASTM A815 UNS S31803 WP-WX				
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11			SW	3000	ASTM A182 GR.F51 (UNS S31803)				
	2	6	REDUCER - ASME-B16.9			BW		ASTM A815 UNS S31803 - SMLS				
	8	10	REDUCER - ASME-B16.9			BW		ASTM A815 UNS S31803 WP-WX				
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11			THDF	3000	ASTM A182 GR.F51 (UNS S31803)				
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11			SW	3000	ASTM A182 GR.F51 (UNS S31803)				
	2	10	CAP - ASME-B16.9			BW		ASTM A815 UNS S31803 - SMLS				
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11			SW\THDF	3000	ASTM A182 GR.F51 (UNS S31803)				
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11			SW	3000	ASTM A182 GR.F51 (UNS S31803)				
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11			THDM		ASTM A182 GR.F51 (UNS S31803)				
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10			THDM\PE		ASTM A790 UNS S31803 - SMLS				
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95			PE\THDM		ASTM A790 UNS S31803 - SMLS				
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95			THDM\PE		ASTM A815 UNS S31803 - SMLS				
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95			PE		ASTM A815 UNS S31803 - SMLS				
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11			SW	3000	ASTM A182 GR.F51 (UNS S31803)				
	2	6	TEE - ASME-B16.9			BW		ASTM A815 UNS S31803 - SMLS				
	8	10	TEE - ASME-B16.9			BW		ASTM A815 UNS S31803 WP-WX				
	2	8	WELDOLET - MSS-SP97			BW		ASTM A182 GR.F51 (UNS S31803)				
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97			SW\BW	3000	ASTM A182 GR.F51 (UNS S31803)				
	MISCELLANEOUS											
		1/2	10	KIT FOR INSULATING FLANGE - ASME-B16.5				CL300 RF	GRE LAMINATED + TFE (MAX T 180 C)			
	GASKETS											
	1/2	10	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20					S31803+GRAPH 99,8% - C.S. OUT. RING				
BOLTS												
	1/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED				
VALVES												
pos.	from	Size to	Data Sheet	Item Description		Ends	Rating/Facing	Material				
1	1/2	1 1/2	GA-E-60160	Gate-BB-Red.B-Solid wdg-Exp.seat - API602		SW	CL800	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Duplex S.31803				
1	2	10	GA-E-60570	Gate-BB-FB-Flex wdg-Thdd seat - API600		FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803				
4	1/2	1 1/2	GA-E-60253	Globe-BB-Red B.-Thdd seat - API602		SW	CL800	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Duplex S.31803				
4	2	10	GA-E-60271	Globe-BB-Disk-Thdd seat - API 623		FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803				
6	1/2	1 1/2	GA-E-60366	Check-BB-Red.B-Piston-Thdd seat - API602		SW	CL800	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Duplex S.31803				
6	2	10	GA-E-60730	Check-BB- FB- Swing - API594		FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Duplex S.31803				
8	1/2	1 1/2	GA-E-67290	Ball-End entry -FB-Float.ball -Frgd body - API608		FLGD	CL300 RF	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Soft seat-S.31803 trim - PEEK seats				
8	2	3	GA-E-67261	Ball-Split body-FB-Floating ball - API6D		FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats				
8	6	10	GA-E-67262	Ball-Split body-FB-Trunnion ball - API6D		FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats				



PIPING MATERIAL SPECIFICATION

JOB

032243

Piping Class:

03SP0S01

Sh. 2 of 2

Rev.


A	0	1		

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
10	1/2	1 1/2	GA-E-60571	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Duplex S.31803
82	2	4	GA-E-60407	Ball-Split body-FB-Floating ball - API6D	FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Metal seat-S.31803 trim-GRAPH.
82	6	10	GA-E-67299	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Metal seat-S.31803 trim-GRAPH.
89	1/2	1 1/2	GA-E-60477	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 GR.F51 (UNS S31803) Trim : Metal seat-S.31803 trim-GRAPH.
840	2	2	GA-E-67627	Ball-Split body-FB-Floating ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats
840	10	10	GA-E-67626	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL300 RF	Body: ASTM A995 GR.4A (UNS J92205, CD3MN) Trim : Soft seat-S.31803 trim - PEEK seats

BRANCH TABLES										
<div> <div>RunSize</div> <div> <div>1/2</div> <div>A</div> </div> <div> <div>3/4</div> <div>A</div> <div>A</div> </div> <div> <div>1</div> <div>A</div> <div>A</div> <div>A</div> </div> <div> <div>1 1/2</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> </div> <div> <div>2</div> <div>S</div> <div>S</div> <div>T</div> <div>T</div> <div>T</div> </div> <div> <div>3</div> <div>S</div> <div>S</div> <div>S</div> <div>S</div> <div>W</div> <div>T</div> </div> <div> <div>4</div> <div>S</div> <div>S</div> <div>S</div> <div>S</div> <div>W</div> <div>T</div> <div>T</div> </div> <div> <div>6</div> <div>S</div> <div>S</div> <div>S</div> <div>S</div> <div>W</div> <div>W</div> <div>T</div> <div>T</div> </div> <div> <div>8</div> <div>S</div> <div>S</div> <div>S</div> <div>S</div> <div>W</div> <div>W</div> <div>W</div> <div>T</div> <div>T</div> </div> <div> <div>10</div> <div>S</div> <div>S</div> <div>S</div> <div>S</div> <div>W</div> <div>W</div> <div>W</div> <div>W</div> <div>T</div> <div>T</div> </div> <div> <div>BranchSize</div> <div>1/2</div> <div>3/4</div> <div>1</div> <div>1 1/2</div> <div>2</div> <div>3</div> <div>4</div> <div>6</div> <div>8</div> <div>10</div> </div> </div>										
<div> <div>90 Degrees</div> </div>										
<div> <div>Legenda</div> <div> <div>A</div> <div>TEE - SW ENDS - ASME-B16.11</div> </div> <div> <div>P</div> <div>PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E</div> </div> <div> <div>S</div> <div>SOCKOLET - SW END - MSS-SP97</div> </div> <div> <div>T</div> <div>TEE - ASME-B16.9</div> </div> <div> <div>W</div> <div>WELDOLET - MSS-SP97</div> </div> </div>										



GENERAL NOTES	
<div>1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.</div> <div>2) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.</div> <div>3) Specified Thickness are suitable to withstand Full Vacuum condition.</div>	

<div><div></div></div>										PIPING MATERIAL SPECIFICATION										JOB 032243														
																				Piping Class:										06CA1S01				
																				Sh.		1		of		3		Rev.						
		A		0		1		2		3																								

Base Material : LOW TEMP. CARBON STEEL										Design code : ASME B 31.3 2016													
Nom. Rating : CL600										PWHT : AS PER CODE (NOTE 1)													
Facing/Finishing : RF										Valve Trim : 12 - SS316/HF													
Corrosion Allow. : 1.5 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013													
Temp. Limit : -45 °C to 220 °C																							
Service: CF - Dry (Cold) Flare MR - Mixed Refrigerant NG - Natural Gas PR - Propane Refrigerant																							
Pipe Thickness																							
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	26	28	30	36	40	42	48
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	8.56	10.97	12.7	15.09	17.48	19.05	14.27	15.88	17.48	20.62	22.23	22.23	25.4	30.18	33	35	39
SCH.	XS	XS	XS	XS	XS	STD	XS	XS	XS	80	80	80											
Nipple Thickness																							
NPS	1/2	3/4	1	1 1/2	2																		
Thk.mm	4.78	5.56	6.35	7.14	8.74																		
SCH.	160	160	160	160	160																		

PRESSURE - TEMPERATURE Ratings													
NPS	Press. bar	102.0	102.0	93.77	90.32	87.22	83.08	78.26	75.84	ASME B16.5			
1/2 - 14	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	315.6	343.3	Material Group 1.1			
NPS	Press. bar	75											
16 - 48	Temp. °C	85											

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material	
PIPE							
	1/2	24	PIPE	BW		ASTM A333 GR.6 - SMLS	
	26	28	PIPE	BW		ASTM A671 GR.CC65 CL.12 - EFW + S2 (-46°C)	
	30	48	PIPE	BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)	
FLANGES							
6	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A350 LF2 - CL.1	
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A350 LF2 - CL.1	
	26	48	WN FLANGE - ASME-B16.47 series.A	BW	CL600 RF	ASTM A350 LF2 - CL.1	
	3	20	WN FLANGE - ASME-B16.5	BW	CL900 RF	ASTM A350 LF2 - CL.1	
	26	48	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RF	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RF	ASTM A350 LF2 - CL.1	
	2	20	WN FLANGE - ASME-B16.5	BW	CL1500 RF	ASTM A350 LF2 - CL.1	
	3	20	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A350 LF2 - CL.1	
	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RJ (F)	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1	
	2	2	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1	
	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A350 LF2 - CL.1	
	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL600 RF	ASTM A350 LF2 - CL.1	
	SPECTACLE BLIND						
2	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.60 + S5 (-46°C)	
	10	24	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.60 + S5 (-46°C)	
	30	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060016		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)	
	36	36	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060016		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)	
	48	48	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060016		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)	
	1/2	8	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)	
FITTINGS							
63	1/2	3	DRIP-RING - TB DRI 5011		CL600 RF	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1	
	2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	26	48	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD	
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1	
	2	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	26	48	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD	
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1	
	2	48	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW/THDF	3000	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1	
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A350 LF2 - CL.1	
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDMPE		ASTM A333 GR.6 - SMLS	
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM		ASTM A420 WPL6 - SMLS	
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A420 WPL6 - SMLS	
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1	
	2	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	26	48	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD	
	2	8	WELDOLET - MSS-SP97	BW		ASTM A350 LF2 - CL.1	
	2	2	LATROLET - BW END - MSS-SP97	BW	3000	ASTM A350 LF2 - CL.1	
	3	8	SPECIAL LATROLET - <MFR Std>	BW		ASTM A350 LF2 - CL.1	
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW/BW	3000	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	LATROLET - SW END - MSS-SP97	SW/BW	3000	ASTM A350 LF2 - CL.1	
	MISCELLANEOUS						
		1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5		CL600 RF	GRE LAMINATED + TFE (MAX T 180 C)
	GASKETS						
63	26	48	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE	
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING	
	3	36	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON	
	73	1/2	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON	

<div> </div>			PIPING MATERIAL SPECIFICATION			JOB 032243			
						Piping Class: 06CA1S01			
						Sh. 2 of 3			
				Rev.					
				A		0	1	2	3

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
BOLTS						
	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)
	2 3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7M + ASTM A194 GR.2HM (HotDip 153)

VALVES								
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material	
1	1/2	1 1/2	GA-E-60100	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim :316 / HF	
1	2	24	GA-E-60105	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :316 / HF	
2	26	48	GA-E-60515	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :Metal seat - 316 - LT C.S. disc	
4	1/2	1 1/2	GA-E-60200	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim :316 / HF	
4	2	12	GA-E-60205	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :316 / HF	
6	1/2	1 1/2	GA-E-60300	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim :316 / HF	
6	2	10	GA-E-60308	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :316 / HF	
6	12	24	GA-E-60309	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :316 / HF	
6	26	36	GA-E-60324	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :316 / HF	
7	2	2	GA-E-67645	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :Soft seat-316 trim - PEEK seats	
7	6	24	GA-E-60408	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :Soft seat-316 trim - PEEK seats	
8	1/2	1 1/2	GA-E-60406	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim :Soft seat-316 trim - PEEK seats	
10	1/2	1 1/2	GA-E-60173	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim :316 / HF	
14	1/2	1 1/2	GA-E-60174	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim :316 / HF	
14	2	24	GA-E-60577	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :316 / HF	
19	1/2	1 1/2	GA-E-60176	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim :316 / HF	
64	36	36	GA-E-60722	Nozzle Check-Long-Axial non slam-Thdd seat - API 6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :316 / HF	
69	36	36	GA-E-60350	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :316 / HF	
80	1/2	1 1/2	GA-E-60761	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim :Soft seat-316 trim - PEEK seats	
82	1/2	1 1/2	GA-E-67119	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim :Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
89	1/2	1 1/2	GA-E-60496	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim :Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
101	1/2	1 1/2	GA-E-60147	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim :316 / HF	
101	2	3	GA-E-60598	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :316 / HF	
130	1/2	1 1/2	GA-E-67074	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim :316 / HF	
140	4	4	GA-E-67371	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :316 / HF	
201	26	36	GA-E-60523	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :Metal seat - 316 - LT C.S. disc	
401	2	2	GA-E-60285	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :316 / HF	
782	2	2	GA-E-67690	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim :Soft seat-316 trim - PEEK seats	
801	1/2	1 1/2	GA-E-67139	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim :Soft seat-316 trim - PEEK seats	
907	2	4	GA-E-69016	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim :Soft seat-316 trim - PEEK seats	
908	1	1	GA-E-69104	Ball-Split body-FB-Floating ball - API6D	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim :Soft seat-316 trim - PEEK seats	

STRAINERS								
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material	
1	3	24	GA-E-60615	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3	
1	30	30	GA-E-60616	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3	



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 06CA1S02

Rev.				
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Base Material	: LOW TEMP. CARBON STEEL	Design code	: ASME B 31.3 2016
Nom. Rating	: CL600	PWHT	: AS PER CODE (NOTE 1)
Facing/Finishing	: RF	Valve Trim	: 12 - SS316/HF
Corrosion Allow.	: 1.5 mm	Welding Spec	: MZ-000-CCX-MC-SPC-00009/00013
Temp. Limit	: -45 °C to 100 °C		

Service: NG - Natural Gas

Pipe Thickness

NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	26	28	30	36
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49	8.56	10.97	12.7	15.09	17.48	19.05	16.66	19.05	20.62	24.61	25.4	27	28.58	33
SCH.	XS	XS	XS	XS	XS	STD	XS	XS	XS	80	80	80	60	60	60	60				

Nipple Thickness

NPS	1/2	3/4	1	1 1/2	2
Thk.mm	4.78	5.56	6.35	7.14	8.74
SCH.	160	160	160	160	160

PRESSURE - TEMPERATURE Ratings

NPS	Press. bar	102.0	102.0	93.77	90.32	87.22	83.08	78.26	75.84	ASME B16.5
1/2 - 14	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	315.6	343.3	Material Group 1.1
NPS	Press. bar	89								
16 - 24	Temp. °C	100								
NPS	Press. bar	91								
26 - 36	Temp. °C	70								

opt.	Size from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	24	PIPE	BW		ASTM A333 GR.6 - SMLS
	26	36	PIPE	BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)

FLANGES						
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A350 LF2 - CL.1
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A350 LF2 - CL.1
	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL600 RF	ASTM A350 LF2 - CL.1
6	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RF	ASTM A350 LF2 - CL.1
	6	26	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RF	ASTM A350 LF2 - CL.1
7	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RF	ASTM A350 LF2 - CL.1
7	2	20	WN FLANGE - ASME-B16.5	BW	CL1500 RF	ASTM A350 LF2 - CL.1
63	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A350 LF2 - CL.1
	63	26	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RJ (F)	ASTM A350 LF2 - CL.1
73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1
73	2	2	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1
	1/2	14	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A350 LF2 - CL.1
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL600 RF	ASTM A350 LF2 - CL.1

SPECTACLE BLIND						
	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.60 + S5 (-46°C)
	10	24	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.60 + S5 (-46°C)
2	1/2	8	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		CL600 RF	ASTM A350 LF2 - CL.1
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
	2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	36	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
	2	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	36	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A350 LF2 - CL.1
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
	2	36	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A350 LF2 - CL.1
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A350 LF2 - CL.1
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM\PE		ASTM A333 GR.6 - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A420 WPL6 - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A420 WPL6 - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A350 LF2 - CL.1
	2	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	36	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	2	8	WELDOLET - MSS-SP97	BW		ASTM A350 LF2 - CL.1
	2	2	LATROLET - BW END - MSS-SP97	BW	3000	ASTM A350 LF2 - CL.1
	3	8	SPECIAL LATROLET - <MFR Std>	BW		ASTM A350 LF2 - CL.1
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A350 LF2 - CL.1
	1/2	1 1/2	LATROLET - SW END - MSS-SP97	SW\BW	3000	ASTM A350 LF2 - CL.1

MISCELLANEOUS						
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5		CL600 RF	GRE LAMINATED + TFE (MAX T 180 C)

GASKETS						
	26	36	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
63	3	36	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS						
	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)
	2 3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7M + ASTM A194 GR.2HM (HotDip 153)



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **06CA1S02**

Rev.				
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A	0	1		

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60100	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
1	2	24	GA-E-60105	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
2	26	36	GA-E-60515	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
4	1/2	1 1/2	GA-E-60200	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
4	2	12	GA-E-60205	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	1/2	1 1/2	GA-E-60300	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
6	2	10	GA-E-60308	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	12	24	GA-E-60309	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	26	36	GA-E-60324	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
7	6	24	GA-E-60408	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60406	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60173	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	1/2	1 1/2	GA-E-60174	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	2	24	GA-E-60577	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
19	1/2	1 1/2	GA-E-60176	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
64	36	36	GA-E-60722	Nozzle Check-Long-Axial non slam-Thdd seat - API 6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
69	36	36	GA-E-60350	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
80	1/2	1 1/2	GA-E-60761	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
82	1/2	1 1/2	GA-E-67119	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60496	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60147	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
101	2	24	GA-E-60598	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
201	26	36	GA-E-60523	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
401	2	2	GA-E-60285	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
801	1/2	1 1/2	GA-E-67139	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
907	2	2	GA-E-69081	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
907	24	24	GA-E-69081	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats

BRANCH TABLES



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **06CA1S60**

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Rev.

A				

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60100	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
1	2	24	GA-E-60105	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
2	26	48	GA-E-60515	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
4	1/2	1 1/2	GA-E-60200	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
4	2	12	GA-E-60205	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	1/2	1 1/2	GA-E-60300	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
6	2	10	GA-E-60308	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	12	24	GA-E-60309	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	26	36	GA-E-60324	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
7	2	2	GA-E-67645	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
7	6	24	GA-E-60408	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60406	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60173	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	1/2	1 1/2	GA-E-60174	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	2	24	GA-E-60577	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
19	1/2	1 1/2	GA-E-60176	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
64	36	36	GA-E-60722	Nozzle Check-Long-Axial non slam-Thdd seat - API 6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
69	36	36	GA-E-60350	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
80	1/2	1 1/2	GA-E-60761	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
82	1/2	1 1/2	GA-E-67119	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60496	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60147	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
101	2	3	GA-E-60598	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
130	1/2	1 1/2	GA-E-67074	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
140	4	4	GA-E-67371	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
201	26	36	GA-E-60523	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
401	2	2	GA-E-60285	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
782	2	2	GA-E-67690	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
801	1/2	1 1/2	GA-E-67139	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
907	2	4	GA-E-69016	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	24	GA-E-60615	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3
1	30	30	GA-E-60616	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																							
1/2	A																								
3/4	A	A																							
1	A	A	A																						
1 1/2	A	A	A	A																					
2					T																				
3					T	T																			
4					T	T	T																		
6					SW	T	T	T																	
8					SW	SW	T	T	T																
10					SW	SW	T	T	T	T															
12					SW	SW	SW	T	T	T	T														
14					SW	SW	SW	T	T	T	T	T													
16					SW	SW	SW	T	T	T	T	T	T												
18					SW	SW	SW	SW	T	T	T	T	T	T											
20					SW	SW	SW	SW	T	T	T	T	T	T	T										
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T									
26					SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T								
28					SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T							
30					SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T	T	T						
36					SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T	T					
40					SW	SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T				
42					SW	SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T	T			
48					SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T		
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	26	28	30	36	40	42	48		
Legenda																									
A	TEE - SW ENDS - ASME-B16.11																								
SW	SPECIAL SWEEPOLET - <MFR Std>																								
T	TEE - ASME-B16.9																								

RunSize		45 degrees																							
BranchSize																									
Legenda																									

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) This piping class is created for lines subjected to Acoustic Induced Vibration.



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 06CA2S01

Rev.				
A	0	1	2	3

Sh. 2 of 3

VALVES


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	1/2	1 1/2	GA-E-60300	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
6	2	10	GA-E-60308	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	12	24	GA-E-60309	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
7	6	24	GA-E-60408	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
7	30	30	GA-E-67678	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60406	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
8	6	24	GA-E-67250	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60173	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	1/2	1 1/2	GA-E-60174	Gate-Stem Extension-BB-Red.B-Solid wdg- Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	2	14	GA-E-60577	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
19	1/2	1 1/2	GA-E-60176	Gate-Stem Extension-BB-Red.B-Solid wdg- Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
80	1/2	1 1/2	GA-E-60761	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
82	1/2	1 1/2	GA-E-67119	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60496	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60147	Gate-Stem Extension-BB-Red.B-Solid wdg- Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
101	2	3	GA-E-60598	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
130	1/2	1 1/2	GA-E-67074	Gate-Stem Extension-BB-Red.B-Solid wdg- Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
401	2	2	GA-E-60285	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
801	1/2	1 1/2	GA-E-67139	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
801	6	24	GA-E-60423	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
907	2	6	GA-E-69016	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	12	12	GA-E-60615	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																
1/2	A																	
3/4	A	A																
1	A	A	A															
1 1/2	A	A	A	A														
2	S	S	T	T	T													
3	S	S	S	S	W	T												
4	S	S	S	S	W	T	T											
6	S	S	S	S	W	W	T	T										
8	S	S	S	S	W	W	W	T	T									
10	S	S	S	S	W	W	W	W	T	T								
12	S	S	S	S	W	W	W	W	W	T	T							
14	S	S	S	S	W	W	W	W	W	P	T	T						
16	S	S	S	S	W	W	W	W	W	P	P	T	T					
18	S	S	S	S	W	W	W	W	W	P	P	P	T	T				
20	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T			
24	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T		
30	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	
Legenda																		
A	TEE - SW ENDS - ASME-B16.11																	
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																	
S	SOCKOLET - SW END - MSS-SP97																	
T	TEE - ASME-B16.9																	
W	WELDOLET - MSS-SP97																	

	PIPING MATERIAL SPECIFICATION		JOB 032243				
			Piping Class:		06CA2S01		
			Sh. 3 of 3		Rev.		
A	0	1			2	3	

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div><div><div>CCS</div><div>JV</div></div><div><div><div>Mozambique</div><div>LNG</div></div></div></div>		PIPING MATERIAL SPECIFICATION												JOB 032243			
														Piping Class:		06CA2S60	
														Sh. 1 of 2		Rev.	
		A		0													

Base Material : LOW TEMP. CARBON STEEL												Design code : ASME B 31.3 2016											
Nom. Rating : CL600												PWHT : AS PER CODE (NOTE 1)											
Facing/Finishing : RF												Valve Trim : 12 - SS316/HF											
Corrosion Allow. : 3 mm												Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -45 °C to 70 °C																							
Service: [AIV] HL - Hydrocarbon Liquid NG - Natural Gas																							
Pipe Thickness																							
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24							
Thk.mm	4.78	5.56	6.35	7.14	8.74	7.62	8.56	10.97	12.7	15.09	17.48	19.05	19.05	20.62	22.23	26.97							
SCH.	160	160	160	160	160	80	XS	XS	XS	80	80	80											
Nipple Thickness																							
NPS	1/2	3/4	1	1 1/2	2																		
Thk.mm	7.47	7.82	9.09	10.15	11.07																		
SCH.	XXS	XXS	XXS	XXS	XXS																		
PRESSURE - TEMPERATURE Ratings																							
NPS	Press. bar	102.0	102.0	ASME B16.5																			
1/2 - 14	Temp. °C	-28.9	37.78	Material Group 1.1																			
NPS	Press. bar	91																					
16 - 24	Temp. °C	70																					

opt.	Size from to		Item Description	Ends	Rating/Facing	Material	
PIPE							
	1/2	24	PIPE	BW		ASTM A333 GR.6 - SMLS	
FLANGES							
63	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A350 LF2 - CL.1	
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A350 LF2 - CL.1	
	3	14	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A350 LF2 - CL.1	
	73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1
73	2	6	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1	
	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A350 LF2 - CL.1	
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL600 RF	ASTM A350 LF2 - CL.1	
SPECTACLE BLIND							
2	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.60 + S5 (-46°C)	
	10	24	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.60 + S5 (-46°C)	
	1/2	8	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)	
FITTINGS							
	1/2	3	DRIP-RING - TB DRI 5011		CL600 RF	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	6000	ASTM A350 LF2 - CL.1	
	2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A350 LF2 - CL.1	
	2	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	6000	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A350 LF2 - CL.1	
	2	24	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A350 LF2 - CL.1	
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A350 LF2 - CL.1	
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A350 LF2 - CL.1	
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM\PE		ASTM A333 GR.6 - SMLS	
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A420 WPL6 - SMLS	
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A420 WPL6 - SMLS	
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	6000	ASTM A350 LF2 - CL.1	
	2	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	2	8	SPECIAL SWEEPOLET - <MFR Std>	BW	6000	ASTM A350 LF2 - CL.1	
GASKETS							
63	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING	
	3	14	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON	
	73	1/2	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON	
BOLTS							
	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)	
	2 3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7M + ASTM A194 GR.2HM (HotDip 153)	
VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60100	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
1	2	24	GA-E-60105	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
4	1/2	1 1/2	GA-E-60200	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
4	2	12	GA-E-60205	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	1/2	1 1/2	GA-E-60300	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
6	2	10	GA-E-60308	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
6	12	24	GA-E-60309	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
7	6	24	GA-E-60408	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60406	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 06CA2S60

Rev.				
A	0			

Sh. 2 of 2

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
8	6	24	GA-E-67250	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60173	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	1/2	1 1/2	GA-E-60174	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	2	14	GA-E-60577	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
19	1/2	1 1/2	GA-E-60176	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
80	1/2	1 1/2	GA-E-60761	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
82	1/2	1 1/2	GA-E-67119	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60496	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60147	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
101	2	3	GA-E-60598	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
130	1/2	1 1/2	GA-E-67074	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
401	2	2	GA-E-60285	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : 316 / HF
801	1/2	1 1/2	GA-E-67139	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
801	6	24	GA-E-60423	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats

BRANCH TABLES

RunSize		90 Degrees															
1/2	A																
3/4	A	A															
1	A	A	A														
1 1/2	A	A	A	A													
2					T												
3					T	T											
4					T	T	T										
6					SW	T	T	T									
8					SW	SW	T	T	T								
10					SW	SW	T	T	T	T							
12					SW	SW	SW	T	T	T	T						
14					SW	SW	SW	T	T	T	T	T					
16					SW	SW	SW	T	T	T	T	T	T				
18					SW	SW	SW	SW	T	T	T	T	T	T			
20					SW	SW	SW	SW	T	T	T	T	T	T	T		
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Legenda																	
A	TEE - SW ENDS - ASME-B16.11																
SW	SPECIAL SWEEPOLET - <MFR Std>																
T	TEE - ASME-B16.9																

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 06CB1S01

Rev.					
Sh.	1	of	4	A	0

Base Material : CARBON STEEL	Design code : ASME B 31.3 2016
Nom. Rating : CL600	PWHT : AS PER CODE (NOTE 1)
Facing/Finishing : RF	Valve Trim : 8 - 13Cr/ HF
Corrosion Allow. : 1.5 mm	Welding Spec : MZ-000-CCX-MC-SPC-00009/00013
Temp. Limit : -29 °C to 320 °C	

Service: BOG - Boil Off Gas MR - Mixed Refrigerant NG - Natural Gas PC - Process Condensate PG - Process Gas / Purge Gas

Pipe Thickness

NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30	36	42	56
Thk.mm	3.73	3.91	4.55	5.08	5.54	7.62	8.56	10.97	12.7	15.09	17.48	19.05	17.48	19.05	20.62	23.83	24.61	26	28	30.18	30.18	35	39
SCH.	XS	XS	XS	XS	XS	XS	XS	XS	XS	80	80	80		60	60		60						

Nipple Thickness

NPS	1/2	3/4	1	1 1/2	2	3
Thk.mm	4.78	5.56	6.35	7.14	8.74	7.62
SCH.	160	160	160	160	160	XS

PRESSURE - TEMPERATURE Ratings

NPS	Press. bar	102.0	102.0	93.77	90.32	87.22	83.08	78.26	ASME B16.5
1/2 - 14	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	315.6	Material Group 1.1
NPS	Press. bar	91							
16 - 30	Temp. °C	70							
NPS	Press. bar	75							
36 - 56	Temp. °C	150							

opt.	Size from	Size to	Item Description	Ends	Rating/Facing	Material
	1/2	8	PIPE	BW		ASTM A106 GR.B - SMLS
	10	24	PIPE	BW		ASTM A333 GR.6 - SMLS
	26	56	PIPE	BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)

FLANGES


6	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
	26	56	WN FLANGE - ASME-B16.47 series.A	BW	CL600 RF	ASTM A105 Normalized
	3	20	WN FLANGE - ASME-B16.5	BW	CL900 RF	ASTM A105 Normalized
6	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RF	ASTM A105 Normalized
7	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RF	ASTM A105 Normalized
7	2	20	WN FLANGE - ASME-B16.5	BW	CL1500 RF	ASTM A105 Normalized
63	3	20	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
63	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RJ (F)	ASTM A105 Normalized
73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
73	2	2	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A105 Normalized
	26	56	BLIND FLANGE - ASME-B16.47 series.A		CL600 RF	ASTM A105 Normalized
	6	6	WN REDUCING FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL600 RF	ASTM A105 Normalized

SPECTACLE BLIND

	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)
	10	20	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)
	24	24	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)
	30	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060016		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)
	36	36	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060016		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)
2	1/2	8	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS

	1/2	3	DRIP-RING - TB DRI 5011		CL600 RF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	8	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	10	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	48	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	50	56	LONG RADIUS ELBOW - TB RAC 5060	BW		ASTM A420 WPL6W - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	8	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	10	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	48	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	50	56	REDUCER, LARGE BORE - TB RAC 5062	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	8	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	10	48	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	50	56	CAP - TB RAC 5064	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW/THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A106 GR.B - SMLS
	3/4	2	NIPPLE - THDD/THDD - ASME-B36.10	THDM		ASTM A106 GR.B - SMLS
	3/4	3	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	8	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	10	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	42	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	56	56	TEE - TB RAC 5061	BW		ASTM A420 WPL6W - WLDD

<div></div>			PIPING MATERIAL SPECIFICATION				JOB 032243							
							Piping Class:			06CB1S01				
							Sh. 2 of 4			Rev.				
									A	0	1	2	3	

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material	
FITTINGS							
	2	8	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized	
	2	2	LATROLET - BW END - MSS-SP97	BW	3000	ASTM A105 Normalized	
	3	8	SPECIAL LATROLET - <MFR Std>	BW	3000	ASTM A105 Normalized	
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A105 Normalized	
	1/2	1 1/2	LATROLET - SW END - MSS-SP97	SW\BW	3000	ASTM A105 Normalized	
GASKETS							
	26	56	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE	
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING	
63	3	36	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON	
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON	
BOLTS							
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368	ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)			
VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
1	2	24	GA-E-60126	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
2	26	42	GA-E-60517	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
4	2	12	GA-E-60223	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	2	10	GA-E-60329	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	12	24	GA-E-60330	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	2	2	GA-E-60429	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
7	6	24	GA-E-60430	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1/2	1 1/2	GA-E-60428	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
8	4	4	GA-E-60792	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	6	24	GA-E-60792	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
11	1/2	1 1/2	GA-E-60599	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
14	1/2	1 1/2	GA-E-60148	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
14	2	24	GA-E-60149	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
17	2	2	GA-E-67704	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR / HF
19	1/2	1 1/2	GA-E-67001	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
64	8	12	GA-E-60393	Nozzle Check-Long-Axial non slam-Thdd seat - API 6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
64	36	36	GA-E-60743	Nozzle Check-Long-Axial non slam-Thdd seat - API 6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
69	8	12	GA-E-67511	Check-Lug wafer-Dual plate-Wldd seat - API594	WAFER LUG	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
69	36	56	GA-E-60331	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
80	1/2	1 1/2	GA-E-60757	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
82	1/2	1 1/2	GA-E-60762	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	6	24	GA-E-60793	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
84	1/2	1 1/2	GA-E-67683	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
101	2	24	GA-E-60151	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67075	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
140	2	4	GA-E-67372	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
161	10	10	GA-E-67320	Gate-Ext. Stem (1600mm)-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 06CB1S01

Sh.		3		of		4		Rev.				
								A	0	1	2	3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
201	26	42	GA-E-60524	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
401	2	12	GA-E-60218	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
701	6	24	GA-E-60768	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
740	2	2	GA-E-67628	Ball-Split body-Red.B-Floating ball - API6D - Interlock System	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
740	12	12	GA-E-67629	Ball-Split body-Red.B-Trunnion ball - API6D - Interlock System	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
801	1/2	1 1/2	GA-E-67140	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
824	8	8	GA-E-67630	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
840	2	2	GA-E-67694	Ball-Interlock System-Split body-FB-Floating ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
840	4	8	GA-E-67631	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
907	8	12	GA-E-69080	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	4	4	GA-E-60617	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3
1	8	8	GA-E-60617	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3
1	10	24	GA-E-60615	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3
2	24	24	GA-E-60645	Angle T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3
2	30	42	GA-E-60628	Angle T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A420 WPL6W - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																					
1/2	A																						
3/4	A	A																					
1	A	A	A																				
1 1/2	A	A	A	A																			
2	S	S	T	T	T																		
3	S	S	S	S	S	W	T																
4	S	S	S	S	S	W	T	T															
6	S	S	S	S	S	W	W	T	T														
8	S	S	S	S	S	W	W	W	T	T													
10	S	S	S	S	S	W	W	W	W	T													
12	S	S	S	S	S	W	W	W	W	W	T	T											
14	S	S	S	S	S	W	W	W	W	W	P	T	T										
16	S	S	S	S	S	W	W	W	W	W	P	P	T	T									
18	S	S	S	S	S	W	W	W	W	W	P	P	P	T	T								
20	S	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T							
22	S	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T	T						
24	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T	T					
26	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T	T				
28	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T	T	T			
30	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	T	T	T	T		
36	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	T	T	T		
42	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	P	T	T		
56	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30	36	42	56
Legenda																							
A	TEE - SW ENDS - ASME-B16.11																						
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																						
S	SOCKOLET - SW END - MSS-SP97																						
T	TEE - ASME-B16.9																						
T1	TEE - TB RAC 5061																						
W	WELDOLET - MSS-SP97																						

45 degrees																								
RunSize																								
2	L	L	L	L	PP																			
3	L	L	L	L	LB	PP																		
4	L	L	L	L	LB	LS	PP																	
6	L	L	L	L	LB	LS	LS	PP																
8	L	L	L	L	LB	LS	LS	LS	PP															
10	L	L	L	L	LB	LS	LS	LS	LS	PP														
12	L	L	L	L	LB	LS	LS	LS	LS	PP	PP													
14	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP												
16	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP											
18	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP										
20	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP									
22	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP								
24	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP							
26	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP						
28	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP					
30	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP				
36	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP			
42	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP		
56	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30	36	42	56	
Legenda																								
L	LATROLET - SW END - MSS-SP97																							
LB	LATROLET - BW END - MSS-SP97																							
LS	SPECIAL LATROLET - <MFR Std>																							
PP	PIPE TO PIPE WITH FULL ENCIRCLEMENT SLEEVE:TS-COR-ENG-PIPMT-012-E																							

GENERAL NOTES																															
1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.																															
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.																															
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).																															
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.																															
5) Specified Thickness are suitable to withstand Full Vacuum condition.																															



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 06CB1S60

Rev.				
A	0			

Base Material	: CARBON STEEL	Design code	: ASME B 31.3 2016
Nom. Rating	: CL600	PWHT	: AS PER CODE (NOTE 1)
Facing/Finishing	: RF	Valve Trim	: 8 - 13Cr/ HF
Corrosion Allow.	: 1.5 mm	Welding Spec	: MZ-000-CCX-MC-SPC-00009/00013
Temp. Limit	: -29 °C to 320 °C		

Service: [AIV] BOG - Boil Off Gas MR - Mixed Refrigerant NG - Natural Gas PC - Process Condensate PG - Process Gas / Purge Gas

Pipe Thickness

NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30	36	42	56
Thk.mm	3.73	3.91	4.55	5.08	5.54	7.62	8.56	10.97	12.7	15.09	17.48	19.05	17.48	19.05	20.62	23.83	24.61	26	28	30.18	30.18	35	39
SCH.	XS	XS	XS	XS	XS	XS	XS	XS	XS	80	80	80		60	60		60						

Nipple Thickness

NPS	1/2	3/4	1	1 1/2	2	3
Thk.mm	4.78	5.56	6.35	7.14	8.74	7.62
SCH.	160	160	160	160	160	XS

PRESSURE - TEMPERATURE Ratings

NPS	Press. bar	102.0	102.0	93.77	90.32	87.22	83.08	78.26	ASME B16.5
1/2 - 14	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	315.6	Material Group 1.1
NPS	Press. bar	91							
16 - 30	Temp. °C	70							
NPS	Press. bar	75							
36 - 56	Temp. °C	150							

opt.	Size from	Size to	Item Description	Ends	Rating/Facing	Material
PIPE						
	1/2	8	PIPE	BW		ASTM A106 GR.B - SMLS
	10	24	PIPE	BW		ASTM A333 GR.6 - SMLS
	26	56	PIPE	BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)

FLANGES

6	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
	26	56	WN FLANGE - ASME-B16.47 series.A	BW	CL600 RF	ASTM A105 Normalized
	3	20	WN FLANGE - ASME-B16.5	BW	CL900 RF	ASTM A105 Normalized
6	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RF	ASTM A105 Normalized
7	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RF	ASTM A105 Normalized
7	2	20	WN FLANGE - ASME-B16.5	BW	CL1500 RF	ASTM A105 Normalized
63	3	20	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
63	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RJ (F)	ASTM A105 Normalized
73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
73	2	2	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A105 Normalized
	26	56	BLIND FLANGE - ASME-B16.47 series.A		CL600 RF	ASTM A105 Normalized
	6	6	WN REDUCING FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL600 RF	ASTM A105 Normalized

SPECTACLE BLIND

	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)
	10	20	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)
	24	24	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)
	36	36	SPECIAL BLIND & SPACER - <MFR Std>		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)
2	1/2	8	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS

	1/2	3	DRIP-RING - TB DRI 5011		CL600 RF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	8	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	10	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	48	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	50	56	LONG RADIUS ELBOW - TB RAC 5060	BW		ASTM A420 WPL6W - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	8	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	10	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	48	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	50	56	REDUCER, LARGE BORE - TB RAC 5062	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A105 Normalized
	2	8	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	10	48	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	50	56	CAP - TB RAC 5064	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW/THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A106 GR.B - SMLS
	1/2	2	NIPPLE - THDD/THDD - ASME-B36.10	THDM		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM		ASTM A234 WPB - SMLS
	3/4	3	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	8	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	10	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	42	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	56	56	TEE - TB RAC 5061	BW		ASTM A420 WPL6W - WLDD
	2	8	SPECIAL SWEEPOLET - <MFR Std>	BW	3000	ASTM A105 Normalized



JOB
032243

Piping Class:

06CB1S60

Rev

Sh. 2 of 3

A

0

FITTINGS	

10

24

SPECIAL SWEEPOLET - <MFR Std>

| BW

ASTM A350 LF2 - CL.1

GASKETS

26

56

FLAT GASKET - GROOVED - <MFR Std>

 $\frac{1}{2}$

24

SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20

3

36

OCTAGONAL RJ GASKET - ASME-B16.20

1/2

2

OCTAGONAL RJ GASKET - ASME-B16.20

AISI 316L+GRAPHITE

304 SS+GRAPH 98% - C.S. OUT.RING

SOFT IRON

SOFT IRON

BOLTS

1/2



4

ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368

ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES

pos.	Size from to	Data Sheet	Item Description	Ends	Rating/Facing	Material	
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
1	2	24	GA-E-60126	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
2	26	42	GA-E-60517	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
4	2	12	GA-E-60223	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	2	10	GA-E-60329	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	12	24	GA-E-60330	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	2	2	GA-E-60429	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
7	6	24	GA-E-60430	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1/2	1 1/2	GA-E-60428	Ball-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
8	4	4	GA-E-60792	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	6	24	GA-E-60792	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
11	1/2	1 1/2	GA-E-60599	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
14	1/2	1 1/2	GA-E-60148	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
14	2	24	GA-E-60149	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
19	1/2	1 1/2	GA-E-67001	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
69	8	12	GA-E-60721	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
69	36	42	GA-E-60331	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
80	1/2	1 1/2	GA-E-60757	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
82	1/2	1 1/2	GA-E-60762	Ball-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	6	24	GA-E-60793	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
84	1/2	1 1/2	GA-E-67683	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball - Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
101	2	24	GA-E-60151	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67075	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
201	26	42	GA-E-60524	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
401	2	12	GA-E-60218	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
701	6	24	GA-E-60768	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
801	1/2	1 1/2	GA-E-67140	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats

<div><div> </div></div>		PIPING MATERIAL SPECIFICATION														JOB 032243																			
																Piping Class:						06CB2B03													
																Sh. 1 of 2						Rev.													
						A						0						1						2						3					


Base Material : CARBON STEEL														Design code : ASME B 31.3 2016													
Nom. Rating : CL600														PWHT : YES (NOTE 1)													
Facing/Finishing : RF														Valve Trim : 12 - SS316/HF													
Corrosion Allow. : 3 mm														Welding Spec : MZ-000-CCX-MC-SPC-00009/00013													
Temp. Limit : -29 °C to 130 °C																											
Service: [Amine Service] NG - Natural Gas PRW - Process Water																											

Pipe Thickness																												
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36										
Thk.mm	4.78	5.56	6.35	7.14	8.74	7.62	8.56	10.97	12.7	15.09	17.48	19.05	19.05	20.62	22.23	26.97	31.75	36										
SCH.	160	160	160	160	160	XS	XS	XS	XS	80	80	80																

Nipple Thickness																												
NPS	1/2	3/4	1	1 1/2	2																							
Thk.mm	4.78	5.56	6.35	7.14	8.74																							
SCH.	160	160	160	160	160																							

PRESSURE - TEMPERATURE Ratings																												
NPS	Press. bar	102.0	102.0	93.77	ASME B16.5																							
1/2 - 14	Temp. °C	-28.9	37.78	93.33	Material Group 1.1																							
NPS	Press. bar	91																										
16 - 36	Temp. °C	130																										

opt.	Size from to		Item Description	Ends	Rating/Facing	Material	
PIPE							
	1/2	8	PIPE	BW		ASTM A106 GR.B - SMLS	
	10	24	PIPE	BW		ASTM A333 GR.6 - SMLS	
	26	36	PIPE	BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)	
FLANGES							
63	1/2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized	
	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL600 RF	ASTM A105 Normalized	
73	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized	
	1/2	2	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized	
	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A105 Normalized	
	26	36	BLIND FLANGE - ASME-B16.47 series.A		CL600 RF	ASTM A105 Normalized	
14	3/4	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL600 RF	ASTM A105 Normalized	
SPECTACLE BLIND							
	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)	
	10	24	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)	
	36	36	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060019		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)	
FITTINGS							
	1/2	2	DRIP-RING - TB DRI 5011		CL600 RF	ASTM A105 Normalized	
	1/2	8	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS	
	10	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	26	36	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD	
	3/4	8	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS	
	10	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	26	36	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD	
	1/2	2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A105 Normalized	
	1/2	8	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS	
	10	36	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized	
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A106 GR.B - SMLS	
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM		ASTM A234 WPB - SMLS	
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS	
	1/2	8	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS	
	10	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS	
	30	36	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD	
	1/2	8	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized	
GASKETS							
	26	36	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE	
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING	
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON	
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON	
BOLTS							
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)	
VALVES							
pos.	Size from to		Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60124	Gate-BB-Red.B-Solid wdg-Exp.seat + Nipples - API602	BW	CL800	Body:ASTM A105 Normalized Trim : 316 / HF
1	2	24	GA-E-60128	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body:ASTM A216 WCB Trim : 316 / HF
4	1/2	1 1/2	GA-E-60211	Globe-BB-Red B.-Thdd seat + Nipples - API602	BW	CL800	Body:ASTM A105 Normalized Trim : 316 / HF
4	2	16	GA-E-60225	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body:ASTM A216 WCB Trim : 316 / HF
6	1/2	1 1/2	GA-E-60315	Check-BB-Red.B-Piston-Thdd seat + Nipples - API602	BW	CL800	Body:ASTM A105 Normalized Trim : 316 / HF
6	2	10	GA-E-60332	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body:ASTM A216 WCB Trim : 316 / HF
6	12	24	GA-E-60333	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body:ASTM A216 WCB Trim : 316 / HF

			PIPING MATERIAL SPECIFICATION			JOB 032243						
						Piping Class:		06CB2B03				
						Sh. 2 of 2		Rev.				
								A	0	1	2	3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
7	6	24	GA-E-60433	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60431	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-67023	Gate-BB-Red.B-Solid wdg-Exp.seat + Nipples - API602	BW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 316 / HF
82	1/2	1 1/2	GA-E-60762	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60796	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - API608	BW/TH DF	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
140	3	4	GA-E-67373	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 316 / HF

BRANCH TABLES

RunSize		90 Degrees																			
1/2	T																				
3/4	T	T																			
1	T	T	T																		
1 1/2	T	T	T	T																	
2	W	W	T	T	T																
3	W	W	W	W	W	T															
4	W	W	W	W	W	T	T														
6	W	W	W	W	W	W	T	T													
8	W	W	W	W	W	W	W	T	T												
10	W	W	W	W	W	W	W	W	T	T											
12	W	W	W	W	W	W	W	W	W	T	T										
14	W	W	W	W	W	W	W	W	W	P	T	T									
16	W	W	W	W	W	W	W	W	W	P	P	T	T								
18	W	W	W	W	W	W	W	W	W	P	P	P	T	T							
20	W	W	W	W	W	W	W	W	W	P	P	P	P	T	T						
24	W	W	W	W	W	W	W	W	W	P	P	P	P	P	T	T					
30	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	T	T				
36	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	P	T	T			
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36			


Legenda

P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

GENERAL NOTES

- 1) PWHT is mandatory for all tiickness.
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exced 200°C).
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION												JOB 032243																				
														Piping Class:					06CB2B04															
														Sh. 1 of 2					Rev.															
										A					0					1					2					3				
Base Material : CARBON STEEL												Design code : ASME B 31.3 2016																						
Nom. Rating : CL600												PWHT : AS PER CODE (NOTE 1)																						
Facing/Finishing : RF												Valve Trim : 8 - 13Cr/ HF																						
Corrosion Allow. : 3 mm												Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																						
Temp. Limit : -29 °C to 320 °C																																		
Service: [SEVERE CYCLIC SERVICE] NG - Natural Gas																																		
Pipe Thickness																																		
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24																		
Thk.mm	4.78	5.56	6.35	7.14	8.74	7.62	8.56	10.97	12.7	15.09	17.48	19.05	19.05	12.7	15.09	15.88																		
SCH.	160	160	160	160	160	XS	XS	XS	XS	80	80	80		XS	40																			
Nipple Thickness																																		
NPS	1/2	3/4	1	1 1/2	2																													
Thk.mm	4.78	5.56	6.35	7.14	8.74																													
SCH.	160	160	160	160	160																													
PRESSURE - TEMPERATURE Ratings																																		
NPS	Press. bar	102.0	102.0	93.77	90.32	87.22	83.08	78.26	ASME B16.5																									
1/2 - 14	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	315.6	Material Group 1.1																									
NPS	Press. bar	44																																
16 - 24	Temp. °C	320																																
opt.	Size from to		Item Description										Ends	Rating/Facing	Material																			
PIPE																																		
	1/2	8	PIPE										BW		ASTM A106 GR.B - SMLS																			
	10	24	PIPE										BW		ASTM A333 GR.6 - SMLS																			
FLANGES																																		
63	1/2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A105 Normalized																			
	3	16	WN FLANGE - ASME-B16.5										BW	CL900 RJ (F)	ASTM A105 Normalized																			
73	1/2	2	WN FLANGE - ASME-B16.5										BW	CL1500 RJ (F)	ASTM A105 Normalized																			
14	1/2	24	BLIND FLANGE - ASME-B16.5											CL600 RF	ASTM A105 Normalized																			
	3/4	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL600 RF	ASTM A105 Normalized																			
SPECTACLE BLIND																																		
	1/2	8	SPECTACLE BLIND - ASME-B16.48											CL600 RF	ASTM A516 GR.70 + S5 (-46°C)																			
	10	24	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A516 GR.70 + S5 (-46°C)																			
FITTINGS																																		
	1/2	2	DRIP-RING - TB DRI 5011											CL600 RF	ASTM A105 Normalized																			
	1/2	8	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A234 WPB - SMLS																			
	10	24	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																			
	3/4	8	REDUCER - ASME-B16.9										BW		ASTM A234 WPB - SMLS																			
	10	24	REDUCER - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																			
	1/2	8	CAP - ASME-B16.9										BW		ASTM A234 WPB - SMLS																			
	10	24	CAP - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																			
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A105 Normalized																			
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDMPE		ASTM A106 GR.B - SMLS																			
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE\THDM		ASTM A234 WPB - SMLS																			
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A234 WPB - SMLS																			
	1/2	8	TEE - ASME-B16.9										BW		ASTM A234 WPB - SMLS																			
	10	24	TEE - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																			
	1/2	8	WELDOLET - MSS-SP97										BW		ASTM A105 Normalized																			
	GASKETS																																	
	63	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												304 SS+GRAPH 98% - C.S. OUT.RING																		
3		16	OCTAGONAL RJ GASKET - ASME-B16.20												SOFT IRON																			
73		1/2	OCTAGONAL RJ GASKET - ASME-B16.20												SOFT IRON																			
BOLTS																																		
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368												ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)																			
VALVES																																		
pos.	Size from to		Data Sheet	Item Description						Ends	Rating/Facing	Material																						
1	1/2	1 1/2	GA-E-60129	Gate-BB-Red.B-Solid wdg-Exp.seat - API602						BW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF																						
1	2	14	GA-E-60126	Gate-BB-FB-Flex wdg-Thdd seat - API600						FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF																						
4	1/2	1 1/2	GA-E-60222	Globe-BB-Red B.-Thdd seat - API602						BW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF																						
4	2	12	GA-E-60223	Globe-BB-Disk-Thdd seat - API 623						FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF																						
6	1/2	1 1/2	GA-E-60328	Check-BB-Red.B-Piston-Thdd seat - API602						BW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF																						
6	2	10	GA-E-60329	Check-BB- FB- Swing - API594						FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF																						
6	12	14	GA-E-60330	Check-Flanged -Dual plate-Wldd seat - API594						FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF																						
7	6	14	GA-E-60430	Ball-Split body-Red.B-Trunnion ball - API6D						FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats																						
8	1/2	1 1/2	GA-E-60428	Ball-End entry -FB-Float.ball -Frgd body - API608						FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats																						
10	1/2	1 1/2	GA-E-67030	Gate-BB-Red.B-Solid wdg-Exp.seat - API602						BW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF																						
72	6	14	GA-E-67108	Ball-Split body-Red.B-Trunnion ball - API6D						FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.																						
80	1/2	1 1/2	GA-E-60757	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608						FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats																						

	PIPING MATERIAL SPECIFICATION				JOB 032243						
					Piping Class:		06CB2B04				
					Sh. 2 of 2		Rev.				
A	0	1	2	3							

VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
82	1/2	1 1/2	GA-E-60762	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	6	14	GA-E-60793	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60796	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - API608	BW/TH DF	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
824	10	10	GA-E-67636	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.


BRANCH TABLES

90 Degrees												
RunSize												
1/2	T											
3/4	T	T										
1	T	T	T									
1 1/2	T	T	T	T								
2	W	W	T	T	T							
3	W	W	W	W	W	T						
4	W	W	W	W	W	T	T					
6	W	W	W	W	W	W	T	T				
8	W	W	W	W	W	W	W	T	T			
10	W	W	W	W	W	W	W	T	T			
12	W	W	W	W	W	W	W	T	T	T		
14	W	W	W	W	W	W	W	W	P	T	T	
16	W	W	W	W	W	W	W	W	P	P	T	T
18	W	W	W	W	W	W	W	W	P	P	P	T
20	W	W	W	W	W	W	W	W	P	P	P	T
24	W	W	W	W	W	W	W	W	P	P	P	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14
Legend												
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E											
T	TEE - ASME-B16.9											
W	WELDOLET - MSS-SP97											

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) This piping Class is for SEVERE CYCLIC SERVICE (Severe Cyclic Service definition: More than 7000 cycles expected during service life).
- 3) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 4) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 5) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

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	PIPING MATERIAL SPECIFICATION		JOB 032243	
			Piping Class: 06CB2B60	
			Sh. 2 of 2	
		Rev.		
		A		


VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
82	1/2	1 1/2	GA-E-60762	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	6	14	GA-E-60793	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60796	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - API608	BW/TH DF	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
824	10	10	GA-E-67636	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

BRANCH TABLES

90 Degrees																		
RunSize																		
1/2	T																	
3/4	T	T																
1	T	T	T															
1 1/2	T	T	T	T														
2					T													
3					T	T												
4					T	T	T											
6					SW	T	T	T										
8					SW	SW	T	T	T									
10					SW	SW	T	T	T	T								
12					SW	SW	SW	T	T	T	T							
14					SW	SW	SW	T	T	T	T	T						
16					SW	SW	SW	T	T	T	T	T	T					
18					SW	SW	SW	SW	T	T	T	T	T	T				
20					SW	SW	SW	SW	T	T	T	T	T	T	T			
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T		
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24		
Legenda																		
SW	SPECIAL SWEEPOLET - <MFR Std>																	
T	TEE - ASME-B16.9																	

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
2) This piping Class is for SEVERE CYCLIC SERVICE (Severe Cyclic Service definition: More than 7000 cycles expected during service life).
3) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
4) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
5) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
6) This piping class is created for lines subjected to Acoustic Induced Vibration.

<div></div>		PIPING MATERIAL SPECIFICATION														JOB 032243																				
																Piping Class:										06CB2S01										
																Sh. 1 of 3		Rev.																		
A	0	1	2	3																																
Base Material : CARBON STEEL																		Design code : ASME B 31.3 2016																		
Nom. Rating : CL600																		PWHT : AS PER CODE (NOTE 1)																		
Facing/Finishing : RF																		Valve Trim : 8 - 13Cr/ HF																		
Corrosion Allow. : 3 mm																		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																		
Temp. Limit : -29 °C to 320 °C																																				
Service: HL - Hydrocarbon Liquid HV - Hydrocarbon Vapour NG - Natural Gas PRW - Process Water																																				
Pipe Thickness																																				
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36																		
Thk.mm	4.78	5.56	6.35	7.14	8.74	7.62	8.56	10.97	12.7	15.09	17.48	19.05	19.05	20.62	22.23	26.97	31.75	35																		
SCH.	160	160	160	160	160	XS	XS	XS	XS	80	80	80																								
Nipple Thickness																																				
NPS	1/2	3/4	1	1 1/2	2	3																														
Thk.mm	4.78	5.56	6.35	7.14	8.74	7.62																														
SCH.	160	160	160	160	160	XS																														
PRESSURE - TEMPERATURE Ratings																																				
NPS	Press. bar	102.0	102.0	93.77	90.32	87.22	83.08	ASME B16.5																												
1/2 - 14	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	Material Group 1.1																												
NPS	Press. bar	91																																		
16 - 36	Temp. °C	70																																		
opt.	Size		Item Description										Ends	Rating/Facing	Material																					
from	to																																			
PIPE																																				
	1/2	8	PIPE										BW		ASTM A106 GR.B - SMLS																					
	10	24	PIPE										BW		ASTM A333 GR.6 - SMLS																					
	26	36	PIPE										BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)																					
FLANGES																																				
	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL600 RF	ASTM A105 Normalized																					
	2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A105 Normalized																					
	26	36	WN FLANGE - ASME-B16.47 series.A										BW	CL600 RF	ASTM A105 Normalized																					
7	2	2	WN FLANGE - ASME-B16.5										BW	CL1500 RF	ASTM A105 Normalized																					
63	3	24	WN FLANGE - ASME-B16.5										BW	CL900 RJ (F)	ASTM A105 Normalized																					
63	26	36	WN FLANGE - ASME-B16.47 series.A										BW	CL900 RJ (F)	ASTM A105 Normalized																					
73	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL1500 RJ (F)	ASTM A105 Normalized																					
73	2	2	WN FLANGE - ASME-B16.5										BW	CL1500 RJ (F)	ASTM A105 Normalized																					
	1/2	24	BLIND FLANGE - ASME-B16.5											CL600 RF	ASTM A105 Normalized																					
	26	36	BLIND FLANGE - ASME-B16.47 series.A											CL600 RF	ASTM A105 Normalized																					
14	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL600 RF	ASTM A105 Normalized																					
SPECTACLE BLIND																																				
	1/2	8	SPECTACLE BLIND - ASME-B16.48											CL600 RF	ASTM A516 GR.70 + S5 (-46°C)																					
	10	24	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A516 GR.70 + S5 (-46°C)																					
	30	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060019											CL600 RF	ASTM A516 GR.70 + S5 (-46°C)																					
2	1/2	8	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A516 GR.70 + S5 (-46°C)																					
7	2	2	SPECTACLE BLIND - ASME-B16.48											CL1500 RF	ASTM A516 GR.70 + S5 (-46°C)																					
27	2	2	BLIND & SPACER - ASME-B16.48											CL1500 RJ (F)	ASTM A105 Normalized																					
73	1/2	8	SPECTACLE BLIND - ASME-B16.48											CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)																					
FITTINGS																																				
	1/2	3	DRIP-RING - TB DRI 5011											CL600 RF	ASTM A105 Normalized																					
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11										SW	6000	ASTM A105 Normalized																					
	2	8	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A234 WPB - SMLS																					
	10	24	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																					
	26	36	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A420 WPL6W - WLDD																					
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11										SW	6000	ASTM A105 Normalized																					
	2	8	REDUCER - ASME-B16.9										BW		ASTM A234 WPB - SMLS																					
	10	24	REDUCER - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																					
	26	36	REDUCER - ASME-B16.9										BW		ASTM A420 WPL6W - WLDD																					
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11										THDF	3000	ASTM A105 Normalized																					
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11										SW	6000	ASTM A105 Normalized																					
	2	8	CAP - ASME-B16.9										BW		ASTM A234 WPB - SMLS																					
	10	36	CAP - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																					
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11										SW	6000	ASTM A105 Normalized																					
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11										SW/THDF	3000	ASTM A105 Normalized																					
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A105 Normalized																					
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDM/PE		ASTM A106 GR.B - SMLS																					
	3/4	3	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A234 WPB - SMLS																					
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE/THDM		ASTM A234 WPB - SMLS																					
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11										SW	6000	ASTM A105 Normalized																					
	2	8	TEE - ASME-B16.9										BW		ASTM A234 WPB - SMLS																					
	10	24	TEE - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																					
	26	36	TEE - ASME-B16.9										BW		ASTM A420 WPL6W - WLDD																					
	2	8	WELDOLET - MSS-SP97										BW		ASTM A105 Normalized																					
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97										SW/BW	6000	ASTM A105 Normalized																					
GASKETS																																				
	26	36	FLAT GASKET - GROOVED - <MFR Std>												AISI 316L+GRAPHITE																					
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												304 SS+GRAPH 98% - C.S. OUT.RING																					
63	3	36	OCTAGONAL RJ GASKET - ASME-B16.20												SOFT IRON																					
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20												SOFT IRON																					
BOLTS																																				
	1/2	4	ST BOLT+2 NUTS - ANSI Thdd - TB BUL 5368												ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)																					



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **06CB2S01**

Sh. 2 of 3

Rev.

A	0	1	2	3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
1	2	24	GA-E-60126	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
2	26	36	GA-E-60517	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
4	2	12	GA-E-60223	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	2	10	GA-E-60329	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	12	24	GA-E-60330	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	6	24	GA-E-60430	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
7	30	30	GA-E-60473	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1/2	1 1/2	GA-E-60428	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
8	6	24	GA-E-60792	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
11	1/2	1 1/2	GA-E-60599	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
72	6	24	GA-E-67108	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	1/2	1 1/2	GA-E-60762	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
101	2	3	GA-E-60151	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
111	1/2	1 1/2	GA-E-67394	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67075	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
140	3	4	GA-E-67372	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
201	30	30	GA-E-60524	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
401	2	2	GA-E-60218	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
780	2	2	GA-E-67668	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
781	2	2	GA-E-67669	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
782	2	2	GA-E-67670	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
801	1/2	1 1/2	GA-E-67140	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
840	6	6	GA-E-67631	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
907	2	6	GA-E-69017	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
972	2	4	GA-E-69056	Ball-Split body-Red.B-Floating ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	6	GA-E-60617	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																		
1/2	A																			
3/4	A	A																		
1	A	A	A																	
1 1/2	A	A	A	A																
2	S	S	T	T																
3	S	S	S	S	W	T														
4	S	S	S	S	W	T	T													
6	S	S	S	S	W	W	T	T												
8	S	S	S	S	W	W	W	T	T											
10	S	S	S	S	W	W	W	W	T	T										
12	S	S	S	S	S	W	W	W	W	W	T	T								
14	S	S	S	S	S	W	W	W	W	W	P	T	T							
16	S	S	S	S	S	W	W	W	W	W	P	P	T	T						
18	S	S	S	S	S	W	W	W	W	W	P	P	P	T	T					
20	S	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T				
24	S	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T				
30	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T			
36	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T		
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36		
Legenda																				
A	TEE - SW ENDS - ASME-B16.11																			
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																			
S	SOCKOLET - SW END - MSS-SP97																			
T	TEE - ASME-B16.9																			
W	WELDOLET - MSS-SP97																			

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>										PIPING MATERIAL SPECIFICATION										JOB 032243									
																				Piping Class:						06CB2S60			
																				Sh. 1 of 3						Rev.			
						A		0																					

Base Material : CARBON STEEL										Design code : ASME B 31.3 2016											
Nom. Rating : CL600										PWHT : AS PER CODE (NOTE 1)											
Facing/Finishing : RF										Valve Trim : 8 - 13Cr/ HF											
Corrosion Allow. : 3 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -29 °C to 320 °C																					
Service: [AIV] HL - Hydrocarbon Liquid HV - Hydrocarbon Vapour NG - Natural Gas PRW - Process Water																					

Pipe Thickness																					
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36			
Thk.mm	4.78	5.56	6.35	7.14	8.74	7.62	8.56	10.97	12.7	15.09	17.48	19.05	19.05	20.62	22.23	26.97	31.75	35			
SCH.	160	160	160	160	160	XS	XS	XS	XS	80	80	80									

Nipple Thickness																					
NPS	1/2	3/4	1	1 1/2	2	3															
Thk.mm	4.78	5.56	6.35	7.14	8.74	7.62															
SCH.	160	160	160	160	160	XS															

PRESSURE - TEMPERATURE Ratings																					
NPS	Press. bar	102.0	102.0	93.77	90.32	87.22	83.08	ASME B16.5													
1/2 - 14	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	Material Group 1.1													
NPS	Press. bar	91																			
16 - 36	Temp. °C	70																			

opt.	Size from to		Item Description	Ends	Rating/Facing	Material
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PIPE

	1/2	8	PIPE	BW		ASTM A106 GR.B - SMLS
	10	24	PIPE	BW		ASTM A333 GR.6 - SMLS
	26	36	PIPE	BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)

FLANGES

	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL600 RF	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A105 Normalized
	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL600 RF	ASTM A105 Normalized
63	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
63	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RJ (F)	ASTM A105 Normalized
73	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
73	2	2	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A105 Normalized
	26	36	BLIND FLANGE - ASME-B16.47 series.A		CL600 RF	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL600 RF	ASTM A105 Normalized

SPECTACLE BLIND

	1/2	8	SPECTACLE BLIND - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)
	10	24	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS

	1/2	3	DRIP-RING - TB DRI 5011		CL600 RF	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	8	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	10	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	36	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	8	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	10	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	36	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	6000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A105 Normalized
	2	8	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	10	36	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW/THDF	3000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM		ASTM A234 WPB - SMLS
	3/4	3	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	6000	ASTM A105 Normalized
	2	8	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	10	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	30	36	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	2	8	SPECIAL SWEEPOLET - <MFR Std>	BW	6000	ASTM A105 Normalized
	10	14	SPECIAL SWEEPOLET - <MFR Std>	BW		ASTM A350 LF2 - CL.1

GASKETS

	26	36	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
63	3	36	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS

	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368	ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)		
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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60112	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
1	2	24	GA-E-60126	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 06CB2S60

Rev.				
A	0			

Sh. 2 of 3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
2	26	36	GA-E-60517	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
4	1/2	1 1/2	GA-E-60209	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
4	2	12	GA-E-60223	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	1/2	1 1/2	GA-E-60312	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
6	2	10	GA-E-60329	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	12	24	GA-E-60330	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	6	24	GA-E-60430	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
7	30	30	GA-E-60473	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1/2	1 1/2	GA-E-60428	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
8	6	24	GA-E-60792	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
10	1/2	1 1/2	GA-E-60177	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
72	6	24	GA-E-67108	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	1/2	1 1/2	GA-E-60762	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60474	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67011	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
101	2	2	GA-E-60151	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
130	1/2	1 1/2	GA-E-67075	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A105 Normalized Trim : 13CR / HF
201	30	30	GA-E-60524	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Metal seat - 13CR - C.S. disc
401	2	2	GA-E-60218	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
801	1/2	1 1/2	GA-E-67140	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats


STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	6	GA-E-60617	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A234 WPB - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																			
1/2	A																				
3/4	A	A																			
1	A	A	A																		
1 1/2	A	A	A	A																	
2					T																
3					T	T															
4					T	T	T														
6					SW	T	T	T													
8					SW	SW	T	T	T												
10					SW	SW	T	T	T	T											
12					SW	SW	SW	T	T	T	T										
14					SW	SW	SW	T	T	T	T	T									
16					SW	SW	SW	T	T	T	T	T	T								
18					SW	SW	SW	SW	T	T	T	T	T	T							
20					SW	SW	SW	SW	T	T	T	T	T	T	T						
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T					
30					SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T				
36					SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T			
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36			
Legenda																					
A	TEE - SW ENDS - ASME-B16.11																				
SW	SPECIAL SWEEPOLET - <MFR Std>																				
T	TEE - ASME-B16.9																				

GENERAL NOTES

	PIPING MATERIAL SPECIFICATION	JOB 032243				
		Piping Class:	06CB2S60			
		Sh. 3 of 3	Rev.			
			A	0		

1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
5) This piping class is created for lines subjected to Acoustic Induced Vibration.



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 06CB4S01

Rev.					
A	0	1	2	3	

Sh. 2 of 2

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
4	1	1 1/2	GA-E-60220	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
4	2	12	GA-E-60226	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	1	1 1/2	GA-E-60348	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
6	2	24	GA-E-60334	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	6	24	GA-E-60436	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1	1 1/2	GA-E-60434	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
8	6	24	GA-E-67109	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
10	1	1 1/2	GA-E-60182	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
11	1	1 1/2	GA-E-60115	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : 13CR stellited
82	1	1 1/2	GA-E-67248	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1	1 1/2	GA-E-67120	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	2	2	GA-E-67048	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
780	2	2	GA-E-67671	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
801	1	1 1/2	GA-E-67154	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
840	6	6	GA-E-67295	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats

BRANCH TABLES

RunSize		90 Degrees															
1	A																
1 1/2	A	A															
2	T	T	T														
3	S	S	W	T													
4	S	S	W	T	T												
6	S	S	W	W	T	T											
8	S	S	W	W	W	T	T										
10	S	S	W	W	W	W	T	T									
12	S	S	W	W	W	W	W	T	T								
14	S	S	W	W	W	W	W	P	T	T							
16	S	S	W	W	W	W	W	P	P	T	T						
18	S	S	W	W	W	W	W	P	P	P	T	T					
20	S	S	W	W	W	W	W	P	P	P	P	T	T				
24	S	S	W	W	W	W	W	P	P	P	P	P	T	T			
30	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T		
36	S	S	W	W	W	W	W	P	P	P	P	P	P	P	T	T	
40	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	T	T
BranchSize	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	40
Legenda																	
A	TEE - SW ENDS - ASME-B16.11																
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																
S	SOCKOLET - SW END - TB RAC 5380																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

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	PIPING MATERIAL SPECIFICATION	JOB 032243						
		Piping Class:		06CB4S60				
		Sh. 2 of 2		Rev.				
				A				

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
4	1	1 1/2	GA-E-60220	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
4	2	12	GA-E-60226	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
6	1	1 1/2	GA-E-60348	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
6	2	24	GA-E-60334	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
7	6	24	GA-E-60436	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1	1 1/2	GA-E-60434	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
8	6	24	GA-E-67109	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
10	1	1 1/2	GA-E-60182	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
11	1	1 1/2	GA-E-60115	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : 13CR stellited
82	1	1 1/2	GA-E-67248	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1	1 1/2	GA-E-67120	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	2	2	GA-E-67048	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : 13CR / HF
780	2	2	GA-E-67671	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
801	1	1 1/2	GA-E-67154	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
840	6	6	GA-E-67295	Ball-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL600 RF	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats

BRANCH TABLES

RunSize		90 Degrees																	
1	A																		
1 1/2	A	A																	
2	T	T																	
3			T	T															
4			T	T	T														
6			SW	T	T	T													
8			SW	SW	T	T	T												
10			SW	SW	T	T	T	T											
12			SW	SW	SW	T	T	T	T										
14			SW	SW	SW	T	T	T	T	T									
16			SW	SW	SW	T	T	T	T	T	T								
18			SW	SW	SW	SW	T	T	T	T	T	T							
20			SW	SW	SW	SW	T	T	T	T	T	T	T						
24			SW	SW	SW	SW	SW	T	T	T	T	T	T	T					
30			SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T				
36			SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T			
40			SW	SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T		
BranchSize	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	40		
Legenda																			
A	TEE - SW ENDS - ASME-B16.11																		
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																		
S	SOCKOLET - SW END - TB RAC 5380																		
SW	SPECIAL SWEEPOLET - <MFR Std>																		
T	TEE - ASME-B16.9																		
W	WELDOLET - MSS-SP97																		

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) This piping class is created for lines subjected to Acoustic Induced Vibration.



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class:

06SA0B01

Sh. 2 of 3

Rev.

A	0	1	2	3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	2	24	GA-E-60154	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
4	1/2	1 1/2	GA-E-60234	Globe-BB-Red B.-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	12	GA-E-60247	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	1/2	1 1/2	GA-E-60341	Check-BB-Red.B-Piston-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60358	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60359	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	26	36	GA-E-60351	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	3	3	GA-E-60454	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
7	6	24	GA-E-60454	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60452	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-67026	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	1/2	1 1/2	GA-E-60153	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
14	1/2	1 1/2	GA-E-60140	Gate-Stem Extension-BB-Red.B-Solid wdg- Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
14	2	24	GA-E-60188	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
19	1/2	1 1/2	GA-E-67081	Gate-Stem Extension-BB-Red.B-Solid wdg- Exp.seat - API602	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
62	2	10	GA-E-60710	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
62	36	36	GA-E-67503	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
69	30	36	GA-E-60395	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
80	1/2	1 1/2	GA-E-60797	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
82	1/2	1 1/2	GA-E-60763	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60476	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60593	Gate-Stem Extension-BB-Red.B-Solid wdg- Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	24	GA-E-60155	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
111	1/2	1 1/2	GA-E-67303	Gate-Stem Extension-BB-Red.B-Solid wdg- Exp.seat - API602	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
201	26	36	GA-E-60525	Butterfly-Stem Extension-Flanged-Triple Off Set- Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
401	2	12	GA-E-60224	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
701	6	24	GA-E-60799	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
701	26	36	GA-E-67111	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
801	1/2	1 1/2	GA-E-67141	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
801	6	24	GA-E-60798	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
841	6	8	GA-E-67632	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	30	36	GA-E-60618	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 40


BRANCH TABLES

RunSize		90 Degrees																					
1/2	T																						
3/4	T	T																					
1	T	T	T																				
1 1/2	T	T	T	T																			
2	W	W	T	T	T																		
3	W	W	W	W	W	T																	
4	W	W	W	W	W	T	T																
6	W	W	W	W	W	W	T	T															
8	W	W	W	W	W	W	W	T	T														
10	W	W	W	W	W	W	W	W	T	T													
12	W	W	W	W	W	W	W	W	W	T	T												
14	W	W	W	W	W	W	W	W	W	P	T	T											
16	W	W	W	W	W	W	W	W	W	P	P	T	T										
18	W	W	W	W	W	W	W	W	W	P	P	P	T	T									
20	W	W	W	W	W	W	W	W	W	P	P	P	P	T	T								
24	W	W	W	W	W	W	W	W	W	P	P	P	P	P	T	T							
26	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	T	T						
28	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	P	T	T					
30	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	P	P	T	T				
36	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	P	P	P	T	T			
40	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	P	P	P	P	T	T		
48	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	26	28	30	36	40	48	
Legenda																							
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																						
T	TEE - ASME-B16.9																						
W	WELDOLET - MSS-SP97																						

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

		PIPING MATERIAL SPECIFICATION														JOB 032243													
																Piping Class: 06SA0B30													
																Sh. 1 of 3		Rev. A 0 1 2 3											
Base Material : STAINLESS STEEL 304/304L DUAL GRADE																		Design code : ASME B 31.3 2016											
Nom. Rating : CL600																		PWHT : NO											
Facing/Finishing : RF																		Valve Trim : 12 - SS316/HF											
Corrosion Allow. : 0 mm																		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -175 °C to 220 °C																													
Service: [Cryogenic Service] ER - Ethane / Ethilene Refrigerant LNG - Liquefied Natural Gas MR - Mixed Refrigerant NG - Natural Gas PC - Process Condensate PR - Propane Refrigerant																													
Pipe Thickness																													
NPS	1/2	3/4	1	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18	20	22	24	28	30	32	36	40	42	48				
Thk.mm	2.77	2.87	3.38	3.68	3.91	5.16	5.49	6.02	7.11	10.31	12.7	14.27	15.09	16.66	19.05	20.62	23.83	24.61	22.23	23.83	25.4	28.58	31.75	33	38				
SCH.	40S	40S	40S	40S	40S	40S	40S	40S	40S		80S																		
Nipple Thickness																													
NPS	1/2	3/4	1	1 1/2	2	3																							
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49																							
SCH.	80S	80S	80S	80S	80S	40S																							
PRESSURE - TEMPERATURE Ratings																													
NPS	Press. bar		99.28	99.28	82.74	74.12	68.6	ASME B16.5																					
1/2 - 24	Temp. °C		-28.9	37.78	93.33	148.9	204.4	Material Group 2.1																					
NPS	Press. bar		75																										
28 - 48	Temp. °C		70																										
opt.	Size from to		Item Description										Ends	Rating/Facing	Material														
PIPE																													
	1/2	6	PIPE										BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS														
	8	48	PIPE										BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW														
FLANGES																													
6	1/2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE														
	26	48	WN FLANGE - ASME-B16.47 series.A										BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE														
14	3	24	WN FLANGE - ASME-B16.5										BW	CL900 RF	ASTM A182 F304/304L DUAL GRADE														
	1/2	1/2	THD FLANGE - ASME-B16.5										THDF	CL600 RF	ASTM A182 F304/304L DUAL GRADE														
63	3	24	WN FLANGE - ASME-B16.5										BW	CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE														
	1/2	2	WN FLANGE - ASME-B16.5										BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE														
99	1/2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE														
	26	48	WN FLANGE - ASME-B16.47 series.A										BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE														
99	1/2	24	BLIND FLANGE - ASME-B16.5											CL600 RF	ASTM A182 F304/304L DUAL GRADE														
	26	48	BLIND FLANGE - ASME-B16.47 series.A											CL600 RF	ASTM A182 F304/304L DUAL GRADE														
99	1/2	24	BLIND FLANGE - ASME-B16.5											CL600 RF	ASTM A182 F304/304L DUAL GRADE														
	26	48	BLIND FLANGE - ASME-B16.47 series.A											CL600 RF	ASTM A182 F304/304L DUAL GRADE														
14	2	2	WN REDUCING FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE														
	3/4	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL600 RF	ASTM A182 F304/304L DUAL GRADE														
99	3/4	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL600 RF	ASTM A182 F304/304L DUAL GRADE														
SPECTACLE BLIND																													
	1/2	20	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A240 TP304														
	24	24	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A240 TP304														
	28	28	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060016											CL600 RF	ASTM A240 TP304														
	36	36	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060016											CL600 RF	ASTM A240 TP304														
	42	42	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060016											CL600 RF	ASTM A240 TP304														
	48	48	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060016											CL600 RF	ASTM A240 TP304														
99	1/2	20	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A240 TP304														
FITTINGS																													
99	1/2	3	DRIP-RING - TB DRI 5011											CL600 RF	ASTM A182 F304/304L DUAL GRADE														
	1/2	3	DRIP-RING - TB DRI 5011											CL600 RF	ASTM A182 F304/304L DUAL GRADE														
	1/2	6	LONG RADIUS ELBOW - ASME-B16.9						BW	ASTM A403 WP304S/304LS DUAL GRADE - SMLS																			
	8	48	LONG RADIUS ELBOW - ASME-B16.9						BW	ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD																			
4	40	40	SHORT RADIUS ELBOW - <MFR Std>										BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD														
	3/4	6	REDUCER - ASME-B16.9						BW	ASTM A403 WP304S/304LS DUAL GRADE - SMLS																			
	8	48	REDUCER - ASME-B16.9						BW	ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD																			
	1/2	48	CAP - ASME-B16.9						BW	ASTM A403 WP304S/304LS DUAL GRADE - SMLS																			
	1/2	2	FEMALE CAP - THD END - ASME-B16.11						THDF	3000 ASTM A182 F304/304L DUAL GRADE																			
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11						THDM	ASTM A182 F304/304L DUAL GRADE																			
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10						THDMPE	ASTM A312 TP304/TP304L DUAL GRADE - SMLS																			
	3/4	3	SWAGE NIPPLE - PE/PE - MSS-SP95						PE	ASTM A403 WP304S/304LS DUAL GRADE - SMLS																			
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95						THDMPE	ASTM A403 WP304S/304LS DUAL GRADE - SMLS																			
	3/4	2	SWAGE NIPPLE - THDD/THDD - MSS-SP95						THDM	ASTM A403 WP304S/304LS DUAL GRADE - SMLS																			
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95						PE/THDM	ASTM A403 WP304S/304LS DUAL GRADE - SMLS																			
	1/2	6	TEE - ASME-B16.9						BW	ASTM A403 WP304S/304LS DUAL GRADE - SMLS																			
	8	48	TEE - ASME-B16.9						BW	ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD																			
	1/2	8	WELDOLET - MSS-SP97						BW	ASTM A182 F304/304L DUAL GRADE																			
	1/2	2	LATROLET - BW END - MSS-SP97						BW	ASTM A182 F304/304L DUAL GRADE																			
	3	8	SPECIAL LATROLET - <MFR Std>						BW	ASTM A182 F304/304L DUAL GRADE																			
MISCELLANEOUS																													
	36	36	SPECIAL TEMPORARY STRAINER - <MFR Std - Metallic>											CL600 RF	ASTM A240 TP304														
GASKETS																													
	26	48	FLAT GASKET - GROOVED - <MFR Std>												AISI 316L+GRAPHITE														
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												304 SS+GRAPH 98% - 304 OUT.RING														
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20												AISI 304														
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20												AISI 304														

<div></div>		PIPING MATERIAL SPECIFICATION																		JOB 032243							
																				Piping Class:		06SA0B31					
																				Sh. 1 of 2		Rev.					
		A		0		1																					

Base Material : STAINLESS STEEL 304/304L DUAL GRADE												Design code : ASME B 31.3 2016											
Nom. Rating : CL600												PWHT : NO											
Facing/Finishing : RF												Valve Trim : 12 - SS316/HF											
Corrosion Allow. : 0 mm												Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -175 °C to 105 °C																							
Service: [Cryogenic Service] NG - Natural Gas																							
Pipe Thickness																							
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	22	24	28	30	32	36		
Thk.mm	2.77	2.87	3.38	3.68	3.91	5.49	6.02	7.11	10.31	12.7	14.27	15.09	16.66	19.05	20.62	23.83	24.61	28.33	25.4	26.97	30.18		
SCH.	40S	40S	40S	40S	40S	40S	40S	40S		80S													
Nipple Thickness																							
NPS	1/2	3/4	1	1 1/2	2	3																	
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49																	
SCH.	80S	80S	80S	80S	80S	40S																	

PRESSURE - TEMPERATURE Ratings																							
NPS	Press. bar	99.28	99.28	82.74	74.12	68.6	ASME B16.5																
1/2 - 24	Temp. °C	-28.9	37.78	93.33	148.9	204.4	Material Group 2.1																
NPS	Press. bar	80																					
28 - 36	Temp. °C	105																					

opt.	Size from to		Item Description	Ends	Rating/Facing	Material	
PIPE							
	1/2	6	PIPE	BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS	
	8	36	PIPE	BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW	
FLANGES							
6	1/2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE	
	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE	
	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RF	ASTM A182 F304/304L DUAL GRADE	
14	1/2	1/2	THD FLANGE - ASME-B16.5	THDF	CL600 RF	ASTM A182 F304/304L DUAL GRADE	
63	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE	
99	1/2	24	WN FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE	
99	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE	
	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A182 F304/304L DUAL GRADE	
	26	36	BLIND FLANGE - ASME-B16.47 series.A		CL600 RF	ASTM A182 F304/304L DUAL GRADE	
99	1/2	24	BLIND FLANGE - ASME-B16.5		CL600 RF	ASTM A182 F304/304L DUAL GRADE	
99	26	36	BLIND FLANGE - ASME-B16.47 series.A		CL600 RF	ASTM A182 F304/304L DUAL GRADE	
	2	2	WN REDUCING FLANGE - ASME-B16.5	BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE	
14	3/4	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL600 RF	ASTM A182 F304/304L DUAL GRADE	
99	3/4	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL600 RF	ASTM A182 F304/304L DUAL GRADE	
SPECTACLE BLIND							
	1/2	20	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A240 TP304	
	24	24	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A240 TP304	
99	1/2	20	BLIND & SPACER - ASME-B16.48		CL600 RF	ASTM A240 TP304	
FITTINGS							
99	1/2	3	DRIP-RING - TB DRI 5011		CL600 RF	ASTM A182 F304/304L DUAL GRADE	
	1/2	3	DRIP-RING - TB DRI 5011		CL600 RF	ASTM A182 F304/304L DUAL GRADE	
	1/2	6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	8	36	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD	
	3/4	6	REDUCER - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	8	36	REDUCER - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD	
	1/2	2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A182 F304/304L DUAL GRADE	
	1/2	36	CAP - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A182 F304/304L DUAL GRADE	
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDMPE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS	
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95	THDMPE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	3/4	3	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	1/2	6	TEE - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	8	36	TEE - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD	
1/2	8	WeldoLET - MSS-SP97	BW		ASTM A182 F304/304L DUAL GRADE		
MISCELLANEOUS							
	36	36	SPECIAL TEMPORARY STRAINER - <MFR Std - Metallic>		CL600 RF	ASTM A240 TP304	
GASKETS							
	26	36	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE	
	1/2	24	SP.WOUND GSKT-with OUT. & INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - 304 OUT.RING	
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304	
BOLTS							
	1/2	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A320 B8 CL.2 + ASTM A194 GR.8	
	1 5/8	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A453 GR. 660	
99	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A453 GR. 660 - PTFE COATED	
VALVES							
pos.	Size from to		Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60144	Cryo.Gate-Extend.BB-Red.B-Solid wdg-Wldd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
1	2	24	GA-E-60156	Cryo.Gate-Extend.BB-FB-Flex wdg-Thd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
2	26	36	GA-E-60519	Cryog.Butterfly-Flanged-Triple Offset-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 06SA0B31

Rev.				
Sh.	2	of	2	
A	0	1		

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
4	1/2	1 1/2	GA-E-60236	Cryo.Globe-Extend.BB-Red.B-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	12	GA-E-60249	Cryo.Globe-Extend.BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	1/2	1 1/2	GA-E-60344	Cryo.Check-BB-Red.B-Piston-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60361	Cryo.Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60362	Cryo.Check-Flanged-Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	26	36	GA-E-60354	Cryo.Check-Flanged-Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	6	24	GA-E-60457	Cryo.Ball-Ext.bnt-Split body-Red.B-Trun.ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
8	1/2	1 1/2	GA-E-60455	Cryo.Ball-Ext.bnt-Split body-FB-Floating ball - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Crio Soft seal-316 trim - KEL.F seats
8	6	24	GA-E-60765	Cryo.Ball-Ext.bnt-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
19	1/2	1 1/2	GA-E-67041	Cryo.Gate-Extend.BB-Red.B-Solid wdg-Wldd seat - API602	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
62	2	10	GA-E-60711	Cryo.Check-Flanged-Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
69	36	36	GA-E-60737	Cryo.Check-Flanged-Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	3	GA-E-60623	Y Strainer-Bolted cover - ASME-B16.34	FLGD	CL600 RF	Body : ASTM A351 CF8M Screen: 316 - PERF.PLATE - 18 Holes/Cm2
1	36	36	GA-E-60618	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 40
2	14	24	GA-E-60624	Angle T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 40

BRANCH TABLES

RunSize		90 Degrees																											
1/2	T																												
3/4	T	T																											
1	T	T	T																										
1 1/2	T	T	T	T																									
2	W	W	T	T	T																								
3	W	W	W	W	W	T																							
4	W	W	W	W	W	T	T																						
6	W	W	W	W	W	W	T	T																					
8	W	W	W	W	W	W	W	T	T																				
10	W	W	W	W	W	W	W	W	T	T																			
12	W	W	W	W	W	W	W	W	W	T	T																		
14	W	W	W	W	W	W	W	W	W	P	T	T																	
16	W	W	W	W	W	W	W	W	W	P	P	T	T																
18	W	W	W	W	W	W	W	W	W	P	P	P	T	T															
20	W	W	W	W	W	W	W	W	W	P	P	P	P	T	T														
22	W	W	W	W	W	W	W	W	W	P	P	P	P	T	T	T													
24	W	W	W	W	W	W	W	W	W	P	P	P	P	P	T	T	T												
28	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	T	T	T											
30	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	P	T	T	T										
32	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	P	P	T	T	T									
36	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	P	P	P	T	T	T								
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	22	24	28	30	32	36								
Legenda																													
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																												
T	TEE - ASME-B16.9																												
W	WELDOLET - MSS-SP97																												

GENERAL NOTES

- 1) Use of threaded connections is prohibited except for instrument impulse lines.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 06SA0B60

Rev.			
Sh.	2	of	3
A	0		

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
4	1/2	1 1/2	GA-E-60234	Globe-BB-Red B.-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	12	GA-E-60247	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	1/2	1 1/2	GA-E-60341	Check-BB-Red.B-Piston-Thdd seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60358	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60359	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	26	36	GA-E-60351	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	3	3	GA-E-60454	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
7	6	24	GA-E-60454	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60452	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-67026	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	1/2	1 1/2	GA-E-60153	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
14	1/2	1 1/2	GA-E-60140	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
14	2	24	GA-E-60188	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
19	1/2	1 1/2	GA-E-67081	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
62	2	10	GA-E-60710	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
69	36	36	GA-E-60395	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
80	1/2	1 1/2	GA-E-60797	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - RPTFE seats
82	1/2	1 1/2	GA-E-60763	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60476	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	BW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-60593	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	BW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	24	GA-E-60155	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
201	26	36	GA-E-60525	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
401	2	12	GA-E-60224	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
701	6	24	GA-E-60799	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
701	26	36	GA-E-67111	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
801	1/2	1 1/2	GA-E-67141	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
801	6	24	GA-E-60798	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats

STRAINERS



pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	36	36	GA-E-60618	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 40


BRANCH TABLES

RunSize		90 Degrees																						
1/2	T																							
3/4	T	T																						
1	T	T	T																					
1 1/2	T	T	T	T																				
2					T																			
3					T	T																		
4					T	T	T																	
6					SW	T	T	T																
8					SW	SW	T	T	T															
10					SW	SW	T	T	T	T														
12					SW	SW	SW	T	T	T	T													
14					SW	SW	SW	T	T	T	T	T												
16					SW	SW	SW	T	T	T	T	T	T											
18					SW	SW	SW	SW	T	T	T	T	T	T										
20					SW	SW	SW	SW	T	T	T	T	T	T	T									
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T								
26					SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T							
28					SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T						
30					SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T	T					
36					SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T				
40					SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T			
48					SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T		
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	26	28	30	36	40	48		
Legenda																								
SW	SPECIAL SWEEPOLET - <MFR Std>																							
T	TEE - ASME-B16.9																							

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 4) This piping class is created for lines subjected to Acoustic Induced Vibration.

<div> </div>		PIPING MATERIAL SPECIFICATION										JOB 032243											
												Piping Class:						06SA0B61					
												Sh. 1 of 2		Rev.				A 0					
Base Material : STAINLESS STEEL 304/304L DUAL GRADE																		Design code : ASME B 31.3 2016					
Nom. Rating : CL600																		PWHT : NO					
Facing/Finishing : RF																		Valve Trim : 12 - SS316/HF					
Corrosion Allow. : 0 mm																		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013					
Temp. Limit : -175 °C to 220 °C																							
Service: [AIV] [Cryogenic Service] ER - Ethane / Ethilene Refrigerant LNG - Liquefied Natural Gas MR - Mixed Refrigerant NG - Natural Gas PC - Process Condensate PR - Propane Refrigerant																							
Pipe Thickness																							
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24							
Thk.mm	2.77	2.87	3.38	3.68	3.91	5.49	6.02	7.11	10.31	12.7	14.27	15.09	16.66	19.05	20.62	24.61							
SCH.	40S	40S	40S	40S	40S	40S	40S	40S		80S													
Nipple Thickness																							
NPS	1/2	3/4	1	1 1/2	2	3																	
Thk.mm	3.73	3.91	4.55	5.08	5.54	5.49																	
SCH.	80S	80S	80S	80S	80S	40S																	
PRESSURE - TEMPERATURE Ratings																							
NPS	Press. bar	99.28	99.28	82.74	74.12	68.6	ASME B16.5																
1/2 - 24	Temp. °C	-28.9	37.78	93.33	148.9	204.4	Material Group 2.1																
opt. from Size to Item Description Ends Rating/Facing Material																							
PIPE																							
	1/2	6	PIPE										BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS								
	8	48	PIPE										BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW								
FLANGES																							
6	1/2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE								
	3	24	WN FLANGE - ASME-B16.5										BW	CL900 RF	ASTM A182 F304/304L DUAL GRADE								
14	1/2	24	THD FLANGE - ASME-B16.5										THDF	CL600 RF	ASTM A182 F304/304L DUAL GRADE								
63	3	24	WN FLANGE - ASME-B16.5										BW	CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE								
73	1/2	2	WN FLANGE - ASME-B16.5										BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE								
99	1/2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE								
	1/2	24	BLIND FLANGE - ASME-B16.5											CL600 RF	ASTM A182 F304/304L DUAL GRADE								
99	1/2	24	BLIND FLANGE - ASME-B16.5											CL600 RF	ASTM A182 F304/304L DUAL GRADE								
	2	2	WN REDUCING FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE								
14	3/4	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL600 RF	ASTM A182 F304/304L DUAL GRADE								
99	3/4	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL600 RF	ASTM A182 F304/304L DUAL GRADE								
SPECTACLE BLIND																							
	1/2	20	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A240 TP304								
	24	24	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A240 TP304								
99	1/2	20	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A240 TP304								
FITTINGS																							
99	1/2	3	DRIP-RING - TB DRI 5011											CL600 RF	ASTM A182 F304/304L DUAL GRADE								
	1/2	3	DRIP-RING - TB DRI 5011											CL600 RF	ASTM A182 F304/304L DUAL GRADE								
	1/2	6	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS								
	8	24	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD								
	3/4	6	REDUCER - ASME-B16.9										BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS								
	8	24	REDUCER - ASME-B16.9										BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD								
	1/2	24	CAP - ASME-B16.9										BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS								
	1/2	2	FEMALE CAP - THD END - ASME-B16.11										THDF	3000	ASTM A182 F304/304L DUAL GRADE								
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A182 F304/304L DUAL GRADE								
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDMPE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS								
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE/THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS								
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95										THDMPE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS								
	3/4	3	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS								
		1/2	6	TEE - ASME-B16.9										BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS							
	8	24	TEE - ASME-B16.9										BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD								
	2	8	SPECIAL SWEEPOLET - <MFR Std>										BW		ASTM A182 F304/304L DUAL GRADE								
GASKETS																							
14	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												304 SS+GRAPH 98% - 304 OUT.RING								
	2	2	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												304 SS+GRAPH 98% - 304 OUT.RING								
63	3	24	OCTAGONAL RJ GASKET - ASME-B16.20												AISI 304								
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20												AISI 304								
BOLTS																							
	1/2	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368												ASTM A320 B8 CL.2 + ASTM A194 GR.8								
	1 5/8	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368												ASTM A453 GR. 660								
99	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368												ASTM A453 GR. 660 - PTFE COATED								
VALVES																							
pos. from Size to Data Sheet Item Description Ends Rating/Facing Material																							
1	1/2	1 1/2	GA-E-60144	Cryo.Gate-Extend.BB-Red.B-Solid wdg-Wlidd seat - API602						BW	CL800	Body:ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF											
1	2	24	GA-E-60156	Cryo.Gate-Extend.BB-FB-Flex wdg-Thd seat - API600						FLGD	CL600 RF	Body:ASTM A351 CF8M Trim :316 / HF											
2	26	42	GA-E-60519	Cryog.Butterfly-Flanged-Triple Offset-Int.seat-Fire safe - ASME-B16.34						FLGD	CL600 RF	Body:ASTM A351 CF8M Trim :Metal seat - 316 - 316 disc											
4	1/2	1 1/2	GA-E-60236	Cryo.Globe-Extend.BB-Red.B-Thdd seat - API602						BW	CL800	Body:ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF											
4	2	12	GA-E-60249	Cryo.Globe-Extend.BB-Disk-Thdd seat - API 623						FLGD	CL600 RF	Body:ASTM A351 CF8M Trim :316 / HF											
6	1/2	1 1/2	GA-E-60344	Cryo.Check-BB-Red.B-Piston-Thdd seat - API602						BW	CL800	Body:ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF											



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class:

06SA0B61

Sh. 2 of 2

Rev.


A	0			

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	2	10	GA-E-60361	Cryo.Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60362	Cryo.Check-Flanged-Dual plate-Widd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	26	36	GA-E-60354	Cryo.Check-Flanged-Dual plate-Widd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	2	2	GA-E-60456	Cryo.Ball-Ext.bnt-Split body-Red.B-Float.ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
7	3	24	GA-E-60457	Cryo.Ball-Ext.bnt-Split body-Red.B-Trun.ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats
8	1/2	1 1/2	GA-E-60455	Cryo.Ball-Ext.bnt-Split body-FB-Floating ball - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Crio Soft seal-316 trim - KEL.F seats
8	3	24	GA-E-60765	Cryo.Ball-Ext.bnt-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats

BRANCH TABLES									
90 Degrees									
RunSize									
1/2	T								
3/4	T								
1	T	T							
1 1/2	T	T	T						
2				T					
3				T	T				
4				T	T	T			
6				SW	T	T	T		
8				SW	SW	T	T	T	
10				SW	SW	T	T	T	T
12				SW	SW	SW	T	T	T
14				SW	SW	SW	T	T	T
16				SW	SW	SW	T	T	T
18				SW	SW	SW	SW	T	T
20				SW	SW	SW	SW	T	T
24				SW	SW	SW	SW	SW	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8

GENERAL NOTES									
1) Use of threaded connections is prohibited except for instrument impulse lines.									
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.									
3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.									

<div></div>		PIPING MATERIAL SPECIFICATION																JOB 032243														
																		Piping Class:										06SA0S01				
																		Sh. 1 of 3		Rev.												
A	0	1	2	3																												
Base Material : STAINLESS STEEL 304/304L DUAL GRADE																		Design code : ASME B 31.3 2016														
Nom. Rating : CL600																		PWHT : NO														
Facing/Finishing : RF																		Valve Trim : 12 - SS316/HF														
Corrosion Allow. : 0 mm																		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013														
Temp. Limit : -101 °C to 230 °C																																
Service: FG - Fuel Gas HL - Hydrocarbon Liquid HV - Hydrocarbon Vapour NG - Natural Gas WF - Wet (Warm) Flare																																
Pipe Thickness																																
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	28	30	36													
Thk.mm	2.77	2.87	3.38	3.68	3.91	5.49	6.02	7.11	10.31	12.7	14.27	15.09	16.66	19.05	20.62	24.61	22.23	23.83	28.58													
SCH.	40S	40S	40S	40S	40S	40S	40S	40S		80S																						
Nipple Thickness																																
NPS	1/2	3/4	1	1 1/2	2																											
Thk.mm	3.73	3.91	4.55	5.08	5.54																											
SCH.	80S	80S	80S	80S	80S																											
PRESSURE - TEMPERATURE Ratings																																
NPS	Press. bar	99.28	99.28	82.74	74.12	68.6	ASME B16.5																									
1/2 - 24	Temp. °C	-28.9	37.78	93.33	148.9	204.4	Material Group 2.1																									
NPS	Press. bar	75																														
28 - 36	Temp. °C	70																														
opt.	Size from to		Item Description										Ends	Rating/Facing	Material																	
PIPE																																
	1/2	6	PIPE										BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS																	
	8	36	PIPE										BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW																	
FLANGES																																
	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL600 RF	ASTM A182 F304/304L DUAL GRADE																	
	2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE																	
	26	36	WN FLANGE - ASME-B16.47 series.A										BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE																	
6	6	6	WN FLANGE - ASME-B16.5										BW	CL900 RF	ASTM A182 F304/304L DUAL GRADE																	
63	6	6	WN FLANGE - ASME-B16.5										BW	CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE																	
73	1/2	2	WN FLANGE - ASME-B16.5										BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE																	
	1/2	24	BLIND FLANGE - ASME-B16.5											CL600 RF	ASTM A182 F304/304L DUAL GRADE																	
	26	36	BLIND FLANGE - ASME-B16.47 series.A											CL600 RF	ASTM A182 F304/304L DUAL GRADE																	
14	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL600 RF	ASTM A182 F304/304L DUAL GRADE																	
SPECTACLE BLIND																																
	1/2	8	SPECTACLE BLIND - ASME-B16.48											CL600 RF	ASTM A240 TP304																	
	10	24	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A240 TP304																	
	36	36	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060016											CL600 RF	ASTM A240 TP304																	
2	1/2	8	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A240 TP304																	
6	6	6	SPECTACLE BLIND - ASME-B16.48											CL900 RF	ASTM A240 TP304																	
73	2	2	SPECTACLE BLIND - ASME-B16.48											CL1500 RJ (F)	ASTM A240 TP304																	
FITTINGS																																
	1/2	3	DRIP-RING - TB DRI 5011											CL600 RF	ASTM A182 F304/304L DUAL GRADE																	
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F304/304L DUAL GRADE																	
	2	6	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS																	
	8	36	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD																	
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F304/304L DUAL GRADE																	
	2	6	REDUCER - ASME-B16.9										BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS																	
	8	36	REDUCER - ASME-B16.9										BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD																	
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11										THDF	3000	ASTM A182 F304/304L DUAL GRADE																	
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11										SW	3000	ASTM A182 F304/304L DUAL GRADE																	
	2	24	CAP - ASME-B16.9										BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS																	
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F304/304L DUAL GRADE																	
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11										SW/THDF	3000	ASTM A182 F304/304L DUAL GRADE																	
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A182 F304/304L DUAL GRADE																	
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDM/PE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS																	
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE/THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS																	
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95										THDM/PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS																	
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS																	
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F304/304L DUAL GRADE																	
	2	6	TEE - ASME-B16.9										BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS																	
	8	36	TEE - ASME-B16.9										BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD																	
	2	8	WELDOLET - MSS-SP97										BW		ASTM A182 F304/304L DUAL GRADE																	
	2	2	LATROLET - BW END - MSS-SP97										BW	3000	ASTM A182 F304/304L DUAL GRADE																	
	3	8	SPECIAL LATROLET - <MFR Std>										BW		ASTM A182 F304/304L DUAL GRADE																	
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97										SW/BW	3000	ASTM A182 F304/304L DUAL GRADE																	
	1/2	1 1/2	LATROLET - SW END - MSS-SP97										SW/BW	3000	ASTM A182 F304/304L DUAL GRADE																	
GASKETS																																
	26	36	FLAT GASKET - GROOVED - <MFR Std>												AISI 316L+GRAPHITE																	
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												304 SS+GRAPH 98% - C.S. OUT.RING																	
6	6	6	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												304 SS+GRAPH 98% - C.S. OUT.RING																	
63	6	6	OCTAGONAL RJ GASKET - ASME-B16.20												AISI 304																	
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20												AISI 304																	
BOLTS																																
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368												ASTM A320 L7 + ASTM A194 GR.7 - PTFE COATED																	



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 06SA0S01

Rev.				
A	0	1	2	3

Sh. 2 of 3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60146	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
1	2	24	GA-E-60154	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
4	1/2	1 1/2	GA-E-60239	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	12	GA-E-60247	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	1/2	1 1/2	GA-E-60347	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	10	GA-E-60358	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	12	24	GA-E-60359	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	26	36	GA-E-60351	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	6	24	GA-E-60454	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60452	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
8	6	24	GA-E-67100	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60178	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
14	2	24	GA-E-60188	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
62	2	10	GA-E-60710	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
64	6	6	GA-E-60389	Nozzle Check-Long-Axial non slam-Thdd seat - API 6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
69	6	6	GA-E-67513	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
69	36	36	GA-E-60395	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
82	1/2	1 1/2	GA-E-60763	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60475	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67016	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	24	GA-E-60155	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
130	1/2	1 1/2	GA-E-67083	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
140	2	3	GA-E-67375	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
201	26	36	GA-E-60529	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
401	2	12	GA-E-60224	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
701	8	8	GA-E-60799	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
780	2	2	GA-E-67674	DBL Block&Bleed Ball valve-SplitBdy-RB-Float.ball - <MFR Std>	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
801	1/2	1 1/2	GA-E-67141	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
801	3	24	GA-E-60798	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
841	6	6	GA-E-67632	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
907	2	6	GA-E-69018	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	6	GA-E-60640	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A403 WP304S/304LS DUAL GRADE - SMLS Screen: 316 - CLOTH - MESH 3
1	30	36	GA-E-60618	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 40

BRANCH TABLES



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 06SA0S01

Sh. 3 of 3

Rev.

A	0	1	2	3

RunSize		90 Degrees																			
1/2	A																				
3/4	A	A																			
1	A	A	A																		
1 1/2	A	A	A	A																	
2	S	S	T	T	T																
3	S	S	S	S	S	W	T														
4	S	S	S	S	S	W	T	T													
6	S	S	S	S	S	W	W	T	T												
8	S	S	S	S	S	W	W	W	T	T											
10	S	S	S	S	S	W	W	W	W	T	T										
12	S	S	S	S	S	W	W	W	W	W	T	T									
14	S	S	S	S	S	W	W	W	W	W	P	T	T								
16	S	S	S	S	S	W	W	W	W	W	P	P	T	T							
18	S	S	S	S	S	W	W	W	W	W	P	P	P	T	T						
20	S	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T					
24	S	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T	T				
28	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T	T			
30	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T	T		
36	S	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	T	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	28	30	36		

Legenda

A	TEE - SW ENDS - ASME-B16.11
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPM-T-012-E
S	SOCKOLET - SW END - MSS-SP97
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

45 degrees

RunSize		45 degrees																			
2	L	L	L	L	PP																
3	L	L	L	L	LB	PP															
4	L	L	L	L	LB	LS	PP														
6	L	L	L	L	LB	LS	LS	PP													
8	L	L	L	L	LB	LS	LS	LS	PP												
10	L	L	L	L	LB	LS	LS	LS	LS	PP											
12	L	L	L	L	LB	LS	LS	LS	LS	PP	PP										
14	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP									
16	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP								
18	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP							
20	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP						
24	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP					
28	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP				
30	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP			
36	L	L	L	L	LB	LS	LS	LS	LS	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP		
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	28	30	36		

Legenda

L	LATROLET - SW END - MSS-SP97
LB	LATROLET - BW END - MSS-SP97
LS	SPECIAL LATROLET - <MFR Std>
PP	PIPE TO PIPE WITH FULL ENCIRCLEMENT SLEEVE:TS-COR-ENG-PIPM-T-012-E

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div><div><div>CCS TV</div><div>MOZAMBIQUE LNG</div></div></div>		PIPING MATERIAL SPECIFICATION																JOB 032243													
																		Piping Class:										06SA0S60			
																		Sh.		1		of		3		Rev.					
		A		0																											

Base Material : STAINLESS STEEL 304/304L DUAL GRADE																		Design code : ASME B 31.3 2016																		
Nom. Rating : CL600																		PWHT : NO																		
Facing/Finishing : RF																		Valve Trim : 12 - SS316/HF																		
Corrosion Allow. : 0 mm																		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																		
Temp. Limit : -100 °C to 220 °C																																				
Service: [AIV] FG - Fuel Gas HV - Hydrocarbon Vapour NG - Natural Gas																																				
Pipe Thickness																																				
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	28	30	36																	
Thk.mm	2.77	2.87	3.38	3.68	3.91	5.49	6.02	7.11	10.31	12.7	14.27	15.09	16.66	19.05	20.62	24.61	22.23	23.83	28.58																	
SCH.	40S	40S	40S	40S	40S	40S	40S	40S		80S																										
Nipple Thickness																																				
NPS	1/2	3/4	1	1 1/2	2																															
Thk.mm	3.73	3.91	4.55	5.08	5.54																															
SCH.	80S	80S	80S	80S	80S																															
PRESSURE - TEMPERATURE Ratings																																				
NPS	Press. bar		99.28	99.28	82.74	74.12	ASME B16.5																													
1/2 - 24	Temp. °C		-28.9	37.78	93.33	148.9	Material Group 2.1																													
NPS	Press. bar		75																																	
28 - 36	Temp. °C		70																																	

opt.	Size		Item Description										Ends	Rating/Facing	Material
	from	to													

PIPE															
	1/2	6	PIPE										BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	8	36	PIPE										BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW

FLANGES															
73	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL600 RF	ASTM A182 F304/304L DUAL GRADE
	2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE
	26	36	WN FLANGE - ASME-B16.47 series.A										BW	CL600 RF	ASTM A182 F304/304L DUAL GRADE
	1/2	2	WN FLANGE - ASME-B16.5										BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	1/2	24	BLIND FLANGE - ASME-B16.5											CL600 RF	ASTM A182 F304/304L DUAL GRADE
	26	36	BLIND FLANGE - ASME-B16.47 series.A											CL600 RF	ASTM A182 F304/304L DUAL GRADE
14	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL600 RF	ASTM A182 F304/304L DUAL GRADE

SPECTACLE BLIND															
	1/2	8	SPECTACLE BLIND - ASME-B16.48											CL600 RF	ASTM A240 TP304
	10	24	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A240 TP304
	36	36	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060016											CL600 RF	ASTM A240 TP304
2	1/2	8	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A240 TP304

FITTINGS															
	1/2	3	DRIP-RING - TB DRI 5011											CL600 RF	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	36	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	REDUCER - ASME-B16.9										BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	36	REDUCER - ASME-B16.9										BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11										THDF	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11										SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	24	CAP - ASME-B16.9										BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11										SW\THDF	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A182 F304/304L DUAL GRADE
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDMPE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE\THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95										THDMPE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	TEE - ASME-B16.9										BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	36	TEE - ASME-B16.9										BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	2	14	SPECIAL SWEEPOLET - <MFR Std>										BW	3000	ASTM A182 F304/304L DUAL GRADE

GASKETS															
	26	36	FLAT GASKET - GROOVED - <MFR Std>												AISI 316L+GRAPHITE
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												304 SS+GRAPH 98% - C.S. OUT.RING
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20												AISI 304

BOLTS																
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368										ASTM A320 L7 + ASTM A194 GR.7 - PTFE COATED			

VALVES													
pos.	Size		Data Sheet	Item Description	Ends	Rating/Facing	Material						
	from	to											
1	1/2	1 1/2	GA-E-60146	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF						
1	2	24	GA-E-60154	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim :316 / HF						
4	1/2	1 1/2	GA-E-60239	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF						
4	2	12	GA-E-60247	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim :316 / HF						
6	1/2	1 1/2	GA-E-60347	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF						
6	2	10	GA-E-60358	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim :316 / HF						



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 06SA0S60

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A	0			

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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	12	24	GA-E-60359	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
6	26	36	GA-E-60351	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
7	6	24	GA-E-60454	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60452	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
8	6	24	GA-E-67100	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60178	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
14	2	24	GA-E-60188	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
62	2	10	GA-E-60710	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
69	36	36	GA-E-60395	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
82	1/2	1 1/2	GA-E-60763	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60475	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67016	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	24	GA-E-60155	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
130	1/2	1 1/2	GA-E-67083	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
201	26	36	GA-E-60529	Butterfly-Stem Extension-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Metal seat - 316 - 316 disc
401	2	12	GA-E-60224	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
701	6	24	GA-E-60799	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
801	1/2	1 1/2	GA-E-67141	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
5	36	36	GA-E-60655	T Strainer-BW - <MFR Std - Metallic>	BW	CL600 RF	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 30


BRANCH TABLES

RunSize		90 Degrees																		
1/2	A																			
3/4	A	A																		
1	A	A	A																	
1 1/2	A	A	A	A																
2					T															
3					T	T														
4					T	T	T													
6					SW	T	T	T												
8					SW	SW	T	T	T											
10					SW	SW	T	T	T	T										
12					SW	SW	SW	T	T	T	T									
14					SW	SW	SW	T	T	T	T	T								
16					SW	SW	SW	T	T	T	T	T	T							
18					SW	SW	SW	SW	T	T	T	T	T	T						
20					SW	SW	SW	SW	T	T	T	T	T	T	T					
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T				
28					SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T			
30					SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T		
36					SW	SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	T	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	28	30	36	
Legenda																				
A	TEE - SW ENDS - ASME-B16.11																			
SW	SPECIAL SWEEPOLET - <MFR Std>																			
T	TEE - ASME-B16.9																			

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).

	PIPING MATERIAL SPECIFICATION	JOB 032243						
		Piping Class:		06SA0S60				
		Sh. 3 of 3		Rev.				
				A	0			
3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010. 4) This piping class is created for lines subjected to Acoustic Induced Vibration.								

<div></div>		PIPING MATERIAL SPECIFICATION														JOB 032243											
																Piping Class:						06SD0S01					
																Sh.		1		of		2		Rev.			
				A		0																					

Base Material : STAINLESS STEEL 316/316L DUAL GRADE														Design code : ASME B 31.3 2016													
Nom. Rating : CL600														PWHT : NO													
Facing/Finishing : RF														Valve Trim : 12 - SS316/HF													
Corrosion Allow. : 0 mm														Welding Spec : MZ-000-CCX-MC-SPC-00009/00013													
Temp. Limit : -29 °C to 150 °C																											
Service: MR - Mixed Refrigerant																											

Pipe Thickness																											
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24											
Thk.mm	2.77	2.87	3.38	3.68	3.91	5.49	6.02	7.11	12.7	14.27	15.09	17.48	19.05	20.62	25.4												
SCH.	40S	40S	40S	40S	40S	40S	40S	40S	80S	80S																	

Nipple Thickness																												
NPS	1/2	3/4	1	1 1/2	2																							
Thk.mm	3.73	3.91	4.55	5.08	5.54																							
SCH.	80S	80S	80S	80S	80S																							

PRESSURE - TEMPERATURE Ratings																												
NPS	Press. bar	99.28	99.28	85.49	77.22	ASME B16.5																						
1/2 - 24	Temp. °C	-28.9	37.78	93.33	148.9	Material Group 2.2																						

opt.	Size		Item Description										Ends	Rating/Facing	Material
	from	to													

PIPE															
	1/2	6	PIPE										BW		ASTM A312 TP316/TP316L DUAL GRADE - SMLS
	8	24	PIPE										BW		ASTM A358 TP316/TP316L CL.1 DUAL GRADE - EFW

FLANGES															
73	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL600 RF	ASTM A182 F316/F316L DUAL GRADE
	2	24	WN FLANGE - ASME-B16.5										BW	CL600 RF	ASTM A182 F316/F316L DUAL GRADE
	1/2	2	WN FLANGE - ASME-B16.5										BW	CL1500 RJ (F)	ASTM A182 F316/F316L DUAL GRADE
	1/2	24	BLIND FLANGE - ASME-B16.5										CL600 RF	ASTM A182 F316/F316L DUAL GRADE	
14	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL600 RF	ASTM A182 F316/F316L DUAL GRADE

SPECTACLE BLIND															
	1/2	8	SPECTACLE BLIND - ASME-B16.48											CL600 RF	ASTM A240 TP316
	10	24	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A240 TP316
2	1/2	8	BLIND & SPACER - ASME-B16.48											CL600 RF	ASTM A240 TP316

FITTINGS															
	1/2	3	DRIP-RING - TB DRI 5011											CL600 RF	ASTM A182 F316/F316L DUAL GRADE
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F316/F316L DUAL GRADE
	2	6	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	8	24	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A403 WP316WX/WP316LWX DUAL GRADE - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F316/F316L DUAL GRADE
	2	6	REDUCER - ASME-B16.9										BW		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	8	24	REDUCER - ASME-B16.9										BW		ASTM A403 WP316WX/WP316LWX DUAL GRADE - WLDD
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11										THDF	3000	ASTM A182 F316/F316L DUAL GRADE
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11										SW	3000	ASTM A182 F316/F316L DUAL GRADE
	2	24	CAP - ASME-B16.9										BW		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11										SW/THDF	3000	ASTM A182 F316/F316L DUAL GRADE
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F316/F316L DUAL GRADE
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A182 F316/F316L DUAL GRADE
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDM/PE		ASTM A312 TP316/TP316L DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE/THDM		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - THDD/PE - MSS-SP95										THDM/PE		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11										SW	3000	ASTM A182 F316/F316L DUAL GRADE
	2	6	TEE - ASME-B16.9										BW		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	8	24	TEE - ASME-B16.9										BW		ASTM A403 WP316WX/WP316LWX DUAL GRADE - WLDD
	2	8	WELDOLET - MSS-SP97										BW		ASTM A182 F316/F316L DUAL GRADE
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97										SW/BW	3000	ASTM A182 F316/F316L DUAL GRADE

GASKETS															
	1/2	24	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20												316 SS+GRAPH 98% - C.S. OUT.RING
73	1/2	2	OCTAGONAL RJ GASKET - ASME-B16.20												AISI 316

BOLTS																
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368										ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED			

VALVES													
pos.	from	Size	to	Data Sheet	Item Description	Ends	Rating/Facing	Material					
1	1/2	1 1/2		GA-E-60146	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF					
1	2	24		GA-E-60154	Gate-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF					
4	1/2	1 1/2		GA-E-60239	Globe-BB-Red B.-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF					
4	2	12		GA-E-60247	Globe-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF					
6	1/2	1 1/2		GA-E-60347	Check-BB-Red.B-Piston-Thdd seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF					
6	2	10		GA-E-60358	Check-BB- FB- Swing - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF					
6	12	24		GA-E-60359	Check-Flanged -Dual plate-Wlidd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF					
7	6	24		GA-E-60454	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats					
8	1/2	1 1/2		GA-E-60452	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats					



PIPING MATERIAL
SPECIFICATION

JOB
032243

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VALVES


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
8	6	24	GA-E-67100	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60178	Gate-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
14	2	24	GA-E-60188	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
62	2	10	GA-E-60710	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
64	6	6	GA-E-60389	Nozzle Check-Long-Axial non slam-Thdd seat - API 6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
82	1/2	1 1/2	GA-E-60763	Ball-End entry -FB-Float.ball -Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60475	Ball-End entry -FB-Float.ball -Frgd body+nipples - API608	PE/THD F	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67016	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	24	GA-E-60155	Gate-Stem Extension-BB-FB-Flex wdg-Thdd seat - API600	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
130	1/2	1 1/2	GA-E-67083	Gate-Stem Extension-BB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL800	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
140	2	3	GA-E-67375	Gate-BB-FB-Flex wdg-Thdd seat - API600 - Interlock System	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
401	2	12	GA-E-60224	Globe-Stem Extension-BB-Disk-Thdd seat - API 623	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : 316 / HF
701	8	8	GA-E-60799	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
801	1/2	1 1/2	GA-E-67141	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body - API608	FLGD	CL600 RF	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
801	3	24	GA-E-60798	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
841	6	6	GA-E-67632	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D - Interlock System	FLGD	CL600 RF	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats

BRANCH TABLES

RunSize		90 Degrees															
1/2	A																
3/4	A	A															
1	A	A	A														
1 1/2	A	A	A	A													
2	S	S	S	T	T	T											
3	S	S	S	S	S	W	T										
4	S	S	S	S	S	W	T	T									
6	S	S	S	S	S	W	W	T	T								
8	S	S	S	S	S	W	W	W	T	T							
10	S	S	S	S	S	W	W	W	W	T	T						
12	S	S	S	S	S	W	W	W	W	P	T	T					
14	S	S	S	S	S	W	W	W	W	P	P	T	T				
16	S	S	S	S	S	W	W	W	W	P	P	P	T	T			
18	S	S	S	S	S	W	W	W	W	P	P	P	P	T	T		
20	S	S	S	S	S	W	W	W	W	P	P	P	P	P	T	T	
24	S	S	S	S	S	W	W	W	W	P	P	P	P	P	P	T	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Legenda																	
A	TEE - SW ENDS - ASME-B16.11																
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																
S	SOCKOLET - SW END - MSS-SP97																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243									
												Piping Class:						09CA2S01			
												Sh. 1 of 2						Rev. A 0 1			
Base Material : LOW TEMP. CARBON STEEL										Design code : ASME B 31.3 2016											
Nom. Rating : CL900										PWHT : AS PER CODE (NOTE 1)											
Facing/Finishing : RJ (F)										Valve Trim : 12 - SS316/HF											
Corrosion Allow. : 3 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -45 °C to 70 °C																					
Service: NG - Natural Gas																					
Pipe Thickness																					
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24					
Thk.mm	4.78	5.56	6.35	7.14	8.74	11.13	11.13	14.27	15.88	20.62	22.23	23.83	26.19	29.36	32.54	38.1					
SCH.	160	160	160	160	160	160	120	120				100	100	100	100						
Nipple Thickness																					
NPS	1/2	3/4	1	1 1/2	2																
Thk.mm	7.47	7.82	9.09	10.15	11.07																
SCH.	XXS	XXS	XXS	XXS	XXS																
PRESSURE - TEMPERATURE Ratings																					
NPS	Press. bar	153.1	153.1	ASME B16.5																	
1/2 - 6	Temp. °C	-28.9	37.78	Material Group 1.1																	
NPS	Press. bar	140																			
8 - 24	Temp. °C	70																			
opt.	Size from to		Item Description								Ends	Rating/Facing	Material								
PIPE																					
	1/2	24	PIPE								BW		ASTM A333 GR.6 - SMLS								
FLANGES																					
7	1/2	1 1/2	SW FLANGE - ASME-B16.5								SW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1								
	2	24	WN FLANGE - ASME-B16.5								BW	(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A350 LF2 - CL.1								
	3	24	WN FLANGE - ASME-B16.5								BW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1								
	1/2	24	BLIND FLANGE - ASME-B16.5									(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A350 LF2 - CL.1								
14	2	2	THDD RED. FLANGE - ASME-B16.5								THDF	CL1500 RJ (F)	ASTM A350 LF2 - CL.1								
SPECTACLE BLIND																					
7	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48									CL1500 RJ (F)	ASTM A516 GR.60 + S5 (-46°C)								
	2	24	BLIND & SPACER - ASME-B16.48									(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A516 GR.60 + S5 (-46°C)								
	2	24	BLIND & SPACER - ASME-B16.48									CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)								
FITTINGS																					
7	2	2	DRIP-RING - TB DRI 5011								SW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1								
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11									9000	ASTM A350 LF2 - CL.1								
	2	24	LONG RADIUS ELBOW - ASME-B16.9								BW		ASTM A420 WPL6 - SMLS								
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11								SW	9000	ASTM A350 LF2 - CL.1								
	2	24	REDUCER - ASME-B16.9								BW		ASTM A420 WPL6 - SMLS								
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11								THDF	6000	ASTM A350 LF2 - CL.1								
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11								SW	9000	ASTM A350 LF2 - CL.1								
	2	24	CAP - ASME-B16.9								BW		ASTM A420 WPL6 - SMLS								
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11								SW	9000	ASTM A350 LF2 - CL.1								
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11								SW/THDF	6000	ASTM A350 LF2 - CL.1								
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11								THDM		ASTM A350 LF2 - CL.1								
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10								THDM/PE		ASTM A333 GR.6 - SMLS								
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95								PE		ASTM A420 WPL6 - SMLS								
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95								PE/THDM		ASTM A420 WPL6 - SMLS								
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11								SW	9000	ASTM A350 LF2 - CL.1								
	2	24	TEE - ASME-B16.9								BW		ASTM A420 WPL6 - SMLS								
	2	8	WELDOLET - MSS-SP97								BW		ASTM A350 LF2 - CL.1								
	1/2	1 1/2	SOCKOLET - SW END - TB RAC 5380								SW/BW	9000	ASTM A350 LF2 - CL.1								
GASKETS																					
	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20										SOFT IRON								
BOLTS																					
	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368								ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)										
	2 3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368								ASTM A193 B7M + ASTM A194 GR.2HM (HotDip 153)										
VALVES																					
pos.	Size from to		Data Sheet	Item Description						Ends	Rating/Facing	Material									
1	1/2	1 1/2	GA-E-60193	Gate-WB-Red.B-Solid wdg-Exp.seat - API602						SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF									
1	2	2	GA-E-60194	Gate-PS-FB-Flex wdg-Widd seat - ASME-B16.34						BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF									
1	3	24	GA-E-67066	Gate-PS-FB-Flex wdg-Widd seat - ASME-B16.34						BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF									
4	1/2	1 1/2	GA-E-60274	Globe-WB-Red.B-Thdd seat - API602						SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF									
4	2	2	GA-E-60275	Globe-PS-Disk-Integral seat - ASME-B16.34						BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF									
4	3	12	GA-E-60281	Globe-PS-Disk-Integral seat - ASME-B16.34						BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF									

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:		09CA2S01			
		Sh. 2 of 2		Rev.			
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VALVES


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	2	2	GA-E-60399	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
6	3	24	GA-E-60731	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
8	1/2	1 1/2	GA-E-67238	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-67073	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
11	2	2	GA-E-67396	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : 316 / HF
64	10	10	GA-E-60388	Nozzle Check-Long-Axial non slam-Thdd seat - API 6D	FLGD	CL900 RJ (F)	Body: ASTM A352 LCC Trim : 316 / HF
89	1/2	1 1/2	GA-E-67247	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67302	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
111	2	2	GA-E-67342	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : 316 / HF
801	1	1	GA-E-67292	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
907	2	2	GA-E-69020	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
907	3	24	GA-E-69019	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
917	2	2	GA-E-69021	Ball-Top entry-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
917	3	24	GA-E-69022	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
974	3	24	GA-E-69057	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.


BRANCH TABLES

RunSize		90 Degrees															
1/2	A																
3/4	A	A															
1	A	A	A														
1 1/2	A	A	A	A													
2	S	S	T	T	T												
3	S	S	S	S	S	W	T										
4	S	S	S	S	S	W	T	T									
6	S	S	S	S	S	W	W	T	T								
8	S	S	S	S	S	W	W	W	T	T							
10	S	S	S	S	S	W	W	W	W	T	T						
12	S	S	S	S	S	W	W	W	W	W	T	T					
14	S	S	S	S	S	W	W	W	W	P	T	T					
16	S	S	S	S	S	W	W	W	W	P	P	T	T				
18	S	S	S	S	S	W	W	W	W	P	P	P	T	T			
20	S	S	S	S	S	W	W	W	W	P	P	P	P	T	T		
24	S	S	S	S	S	W	W	W	W	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Legenda																	
A	TEE - SW ENDS - ASME-B16.11																
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																
S	SOCKOLET - SW END - TB RAC 5380																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.

<div></div>		PIPING MATERIAL SPECIFICATION												JOB 032243											
														Piping Class:					09CA4S01						
														Sh. 1 of 3		Rev.					A 0 1 2 3				
Base Material : LOW TEMP. CARBON STEEL												Design code : ASME B 31.3 2016													
Nom. Rating : CL900												PWHT : AS PER CODE (NOTE 1)													
Facing/Finishing : RJ (F)												Valve Trim : 12 - SS316/HF													
Corrosion Allow. : 6 mm												Welding Spec : MZ-000-CCX-MC-SPC-00009/00013													
Temp. Limit : -45 °C to 90 °C																									
Service: FG - Fuel Gas HL - Hydrocarbon Liquid NG - Natural Gas																									
Pipe Thickness																									
NPS	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	28	30	32	36	38	40	42	46	48		
Thk.mm	9.09	10.15	11.07	15.24	17.12	18.26	20.62	25.4	25.4	27.79	30.96	34.93	38.1	46.02	40	42	45	49	52	54	56	61	63		
SCH.	XXS	XXS	XXS	XXS	XXS	160	140	XXS	XXS	120	120	120	120	120											
Nipple Thickness																									
NPS	1	1 1/2	2																						
Thk.mm	9.09	10.15	11.07																						
SCH.	XXS	XXS	XXS																						
PRESSURE - TEMPERATURE Ratings																									
NPS	Press. bar	153.1	153.1	140.3	135.5	131	124.8	117.6	113.8	ASME B16.5															
1 - 6	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	315.6	343.3	Material Group 1.1															
NPS	Press. bar	140																							
8 - 48	Temp. °C	90																							
opt.	Size from to		Item Description										Ends	Rating/Facing	Material										
PIPE																									
	1	24	PIPE										BW		ASTM A333 GR.6 - SMLS										
	26	48	PIPE										BW		API 5L GR.X65 PSL2 - SAW										
FLANGES																									
	1	1 1/2	SW FLANGE - ASME-B16.5										SW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1										
	2	24	WN FLANGE - ASME-B16.5										BW	(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A350 LF2 - CL.1										
	26	36	WN FLANGE - ASME-B16.47 series.A										BW	CL900 RJ (F)	ASTM A350 LF2 - CL.1										
	38	38	SPECIAL WN FLANGE - <MFR Std> GA-E-060099										BW	CL900 RJ (F)	ASTM A350 LF2 - CL.1										
	42	48	SPECIAL WN FLANGE - <MFR Std> GA-E-060099										BW	CL900 RJ (F)	ASTM A350 LF2 - CL.1										
7	3	24	WN FLANGE - ASME-B16.5										BW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1										
7	30	30	SPECIAL WN FLANGE - <MFR Std> GA-E-060099										BW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1										
	1	24	BLIND FLANGE - ASME-B16.5											(1->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A350 LF2 - CL.1										
	26	36	BLIND FLANGE - ASME-B16.47 series.A											CL900 RJ (F)	ASTM A350 LF2 - CL.1										
	42	42	SPECIAL BLIND FLANGE - <MFR Std> GA-E-060099											CL900 RJ (F)	ASTM A350 LF2 - CL.1										
14	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL1500 RJ (F)	ASTM A350 LF2 - CL.1										
SPECTACLE BLIND																									
	1	1 1/2	SPECTACLE BLIND - ASME-B16.48 GA-E-060011											CL1500 RJ (F)	ASTM A516 GR.60 + S5 (-46°C)										
	2	24	BLIND & SPACER - ASME-B16.48 GA-E-060011											(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A516 GR.60 + S5 (-46°C)										
	30	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060099											CL900 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)										
2	2	2	BLIND & SPACER - ASME-B16.48											CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)										
7	12	12	BLIND & SPACER - ASME-B16.48											CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)										
FITTINGS																									
	2	2	DRIP-RING - TB DRI 5011											CL1500 RJ (F)	ASTM A350 LF2 - CL.1										
	1	1 1/2	ELBOW - SW ENDS - ASME-B16.11										SW	9000	ASTM A350 LF2 - CL.1										
	2	24	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS										
	26	48	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A860 WPHY65 - WLDD										
	1	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11										SW	9000	ASTM A350 LF2 - CL.1										
	2	24	REDUCER - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS										
	26	48	REDUCER - ASME-B16.9										BW		ASTM A860 WPHY65 - WLDD										
	1	1 1/2	FEMALE CAP - THD END - ASME-B16.11										THDF	6000	ASTM A350 LF2 - CL.1										
	1	1 1/2	FEMALE CAP - SW END - ASME-B16.11										SW	9000	ASTM A350 LF2 - CL.1										
	2	24	CAP - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS										
	26	48	CAP - ASME-B16.9										BW		ASTM A860 WPHY65 - SMLS										
	1	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11										SW\THDF	6000	ASTM A350 LF2 - CL.1										
	1	1 1/2	COUPLING - SW ENDS - ASME-B16.11										SW	9000	ASTM A350 LF2 - CL.1										
	1	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A350 LF2 - CL.1										
	1	2	NIPPLE - THDD/PE - ASME-B36.10										THDM\PE		ASTM A333 GR.6 - SMLS										
	1	2	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A420 WPL6 - SMLS										
	1	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE\THDM		ASTM A420 WPL6 - SMLS										
	1	1 1/2	TEE - SW ENDS - ASME-B16.11										SW	9000	ASTM A350 LF2 - CL.1										
	2	24	TEE - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS										
	28	48	TEE - ASME-B16.9										BW		ASTM A860 WPHY65 - WLDD										
	2	8	WELDOLET - MSS-SP97										BW		ASTM A350 LF2 - CL.1										
	1	1 1/2	SOCKOLET - SW END - TB RAC 5380										SW\BW	9000	ASTM A350 LF2 - CL.1										
MISCELLANEOUS																									
	2	24	KIT FOR INSULATING FLANGE - ASME-B16.5											(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	GRE LAMINATED + TFE (MAX T 180 C)										
GASKETS																									
	1	36	OCTAGONAL RJ GASKET - ASME-B16.20												SOFT IRON										

<div></div>			PIPING MATERIAL SPECIFICATION				JOB 032243										
							Piping Class:			09CA4S01							
							Sh. 2 of 3			Rev. <table><tr><td>A</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					A	0	1
A	0	1	2	3													

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material	
GASKETS							
7	30	48	OCTAGONAL RJ GASKET - <MFR Std> GA-E-060099			SOFT IRON	
BOLTS							
	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)	
	2 3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7M + ASTM A194 GR.2HM (HotDip 153)	
VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1	1 1/2	GA-E-60109	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
1	2	2	GA-E-60110	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
1	3	32	GA-E-60111	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
4	1	1 1/2	GA-E-60206	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
4	2	2	GA-E-60207	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
4	3	12	GA-E-60208	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
6	2	2	GA-E-60311	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
6	3	30	GA-E-60310	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
7	2	2	GA-E-67103	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
7	6	24	GA-E-60458	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
8	1	1 1/2	GA-E-60409	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
8	2	2	GA-E-67188	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
8	6	24	GA-E-67102	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
10	1	1 1/2	GA-E-60183	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
11	2	2	GA-E-60190	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : 316 / HF
14	1	1 1/2	GA-E-60578	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	2	2	GA-E-60108	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
19	1	1 1/2	GA-E-60579	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
80	1	1 1/2	GA-E-60764	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
82	1	1 1/2	GA-E-67684	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1	1 1/2	GA-E-67101	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1	1 1/2	GA-E-67031	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
101	2	2	GA-E-67004	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
101	3	42	GA-E-67003	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
111	2	2	GA-E-67397	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : 316 / HF
114	2	2	GA-E-67088	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : 316 / HF
141	2	2	GA-E-67376	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34 - Interlock System	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
141	12	12	GA-E-67377	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34 - Interlock System	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
201	42	42	GA-E-60548	Butterfly-Stem Extension-BWend-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
401	1	1 1/2	GA-E-67403	Globe-Stem Extension-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
401	2	2	GA-E-60202	Globe-Stem Extension-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
401	3	12	GA-E-60237	Globe-Stem Extension-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
701	30	30	GA-E-67236	Ball-Stem Extension-Top entry-Red.B-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
801	1	1 1/2	GA-E-60766	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
801	2	2	GA-E-67176	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
801	6	24	GA-E-60791	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 09CA4S01

Rev.					
A	0	1	2	3	

Sh. 3 of 3

VALVES


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
830	1	1 1/2	GA-E-67240	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
840	8	8	GA-E-67634	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D - Interlock System	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
841	6	16	GA-E-67635	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D - Interlock System	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
902	26	36	GA-E-69023	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A352 LCC Trim : Metal seat - 316 - 316 disc
902	38	48	GA-E-69024	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A352 LCC Trim : Metal seat - 316 - 316 disc
907	2	2	GA-E-69020	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
907	3	24	GA-E-69019	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
917	2	2	GA-E-69021	Ball-Top entry-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
917	3	24	GA-E-69022	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
921	30	42	GA-E-69059	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : Metal seat - 316 - 316 disc
972	3	24	GA-E-69058	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
974	3	24	GA-E-69057	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

BRANCH TABLES

RunSize		90 Degrees																							
1	A																								
1 1/2	A	A																							
2	T	T	T																						
3	S	S	W	T																					
4	S	S	W	T	T																				
6	S	S	W	W	T	T																			
8	S	S	W	W	W	T	T																		
10	S	S	W	W	W	W	T	T																	
12	S	S	W	W	W	W	W	T	T	T															
14	S	S	W	W	W	W	W	P	T	T															
16	S	S	W	W	W	W	W	P	P	T	T														
18	S	S	W	W	W	W	W	P	P	P	T	T													
20	S	S	W	W	W	W	W	P	P	P	P	T	T												
24	S	S	W	W	W	W	W	P	P	P	P	P	T	T											
28	S	S	W	W	W	W	W	P	P	P	P	P	T	T	T										
30	S	S	W	W	W	W	W	P	P	P	P	P	T	T	T	T									
32	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T	T	T								
36	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T	T	T	T							
38	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T	T	T	T	T						
40	S	S	W	W	W	W	W	P	P	P	P	P	P	P	T	T	T	T	T	T					
42	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	T	T	T	T	T	T				
46	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	P	T	T	T	T	T	T			
48	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	P	P	T	T	T	T	T	T		
BranchSize	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	28	30	32	36	38	40	42	46	48		
Legenda																									
A	TEE - SW ENDS - ASME-B16.11																								
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																								
S	SOCKOLET - SW END - TB RAC 5380																								
T	TEE - ASME-B16.9																								
W	WELDOLET - MSS-SP97																								


GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.

<div></div>		PIPING MATERIAL SPECIFICATION								JOB 032243								
										Piping Class:				09CA4S40				
										Sh. 1 of 2				Rev.				
				A				0	1	2	3							

Base Material : LOW TEMP. CARBON STEEL										Design code : ASME B 31.8-2018									
Nom. Rating : CL900										PWHT : AS PER CODE									
Facing/Finishing : RJ (F)										Valve Trim : 12 - SS316/HF									
Corrosion Allow. : 6 mm										Welding Spec : MZ-010-CCX-MC-SPC-00001									
Temp. Limit : -45 °C to 70 °C																			
Service: [ASME B31.8] VT - Vessel Trim - (Aboveground)																			
Pipe Thickness																			
NPS	1/2	3/4	1	1 1/2	2	3	4	6	30										
Thk.mm	7.47	7.82	9.09	10.15	11.07	11.13	13.49	14.27	43										
SCH.	XXS	XXS	XXS	XXS	XXS	160	160	120											
Nipple Thickness																			
NPS	1/2	3/4	1	1 1/2	2														
Thk.mm	7.47	7.82	9.09	10.15	11.07														
SCH.	XXS	XXS	XXS	XXS	XXS														
PRESSURE - TEMPERATURE Ratings																			
NPS	Press. bar		140																
1/2 - 30	Temp. °C		70																

opt.	Size		Item Description	Ends	Rating/Facing	Material		
from	to							
PIPE								
	1/2	24	PIPE	BW		ASTM A333 GR.6 - SMLS		
	26	30	PIPE	BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)		
FLANGES								
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1		
	2	6	WN FLANGE - ASME-B16.5	BW	(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A350 LF2 - CL.1		
	1/2	6	BLIND FLANGE - ASME-B16.5		(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A350 LF2 - CL.1		
SPECTACLE BLIND								
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48 GA-E-060011		CL1500 RJ (F)	ASTM A516 GR.60 + S5 (-46°C)		
	2	6	BLIND & SPACER - ASME-B16.48 GA-E-060011		(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A516 GR.60 + S5 (-46°C)		
FITTINGS								
	2	3	DRIP-RING - TB DRI 5011		(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A350 LF2 - CL.1		
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	9000	ASTM A350 LF2 - CL.1		
	2	6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS		
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	9000	ASTM A350 LF2 - CL.1		
	2	6	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS		
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	9000	ASTM A350 LF2 - CL.1		
	2	6	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS		
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW/THDF	6000	ASTM A350 LF2 - CL.1		
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	9000	ASTM A350 LF2 - CL.1		
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A350 LF2 - CL.1		
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A333 GR.6 - SMLS		
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A420 WPL6 - SMLS		
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A420 WPL6 - SMLS		
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	9000	ASTM A350 LF2 - CL.1		
	2	6	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS		
	2	6	WELDOLET - MSS-SP97	BW		ASTM A350 LF2 - CL.1		
	1/2	1 1/2	SOCKOLET - SW END - TB RAC 5380	SW\BW	9000	ASTM A350 LF2 - CL.1		
GASKETS								
	1/2	6	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON		
BOLTS								
	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)		
	2 3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7M + ASTM A194 GR.2HM (HotDip 153)		
VALVES								
pos.	from	Size	to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	1 1/2	GA-E-60109	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
1	2	2	2	GA-E-60110	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
10	1/2	1 1/2	1 1/2	GA-E-60183	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/THDF	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
11	2	2	2	GA-E-60190	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : 316 / HF
11	3	3	3	GA-E-67090	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A352 LCC Trim : 316 / HF
82	1/2	1 1/2	1 1/2	GA-E-67686	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	1 1/2	GA-E-67687	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

	PIPING MATERIAL SPECIFICATION	JOB 032243													
		Piping Class:	09CA4S40												
		Sh. 2 of 2	Rev. <table><tr><td>A</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					A	0	1	2	3			
A	0	1	2	3											

BRANCH TABLES

90 Degrees											
RunSize											
1/2	A										
3/4	A	A									
1	A	A	A								
1 1/2	A	A	A	A							
2	S	S	T	T	T						
3	S	S	S	S	W	T					
4	S	S	S	S	W	T	T				
6	S	S	S	S	W	W	T	T			
30											
BranchSize 1/2 3/4 1 1 1/2 2 3 4 6 30											
Legenda											
A	TEE - SW ENDS - ASME-B16.11										
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E										
S	SOCKOLET - SW END - TB RAC 5380										
T	TEE - ASME-B16.9										
W	WELDOLET - MSS-SP97										

GENERAL NOTES

1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
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PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **09CA4S60**

Rev.				
A				

Sh. 2 of 3

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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BOLTS

	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)
	2 3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7M + ASTM A194 GR.2HM (HotDip 153)

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1	1 1/2	GA-E-60109	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
1	2	2	GA-E-60110	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
1	3	32	GA-E-60111	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
4	1	1 1/2	GA-E-60206	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
4	2	2	GA-E-60207	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
4	3	12	GA-E-60208	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
6	2	2	GA-E-60311	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
6	3	30	GA-E-60310	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
7	2	2	GA-E-67103	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
7	6	24	GA-E-60458	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
8	1	1 1/2	GA-E-60409	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
8	2	2	GA-E-67188	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
8	6	24	GA-E-67102	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
10	1	1 1/2	GA-E-60183	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
11	2	2	GA-E-60190	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : 316 / HF
14	1	1 1/2	GA-E-60578	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
14	2	2	GA-E-60108	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
19	1	1 1/2	GA-E-60579	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
80	1	1 1/2	GA-E-60764	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
82	1	1 1/2	GA-E-67684	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1	1 1/2	GA-E-67101	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1	1 1/2	GA-E-67031	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
101	2	2	GA-E-67004	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
101	3	42	GA-E-67003	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
111	2	2	GA-E-67397	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : 316 / HF
114	2	2	GA-E-67088	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : 316 / HF
141	2	2	GA-E-67376	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34 - Interlock System	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
141	12	12	GA-E-67377	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34 - Interlock System	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
201	42	42	GA-E-60548	Butterfly-Stem Extension-BWend-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : Metal seat - 316 - LT C.S. disc
401	1	1 1/2	GA-E-67403	Globe-Stem Extension-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
401	2	2	GA-E-60202	Globe-Stem Extension-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
401	3	12	GA-E-60237	Globe-Stem Extension-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : 316 / HF
701	30	30	GA-E-67236	Ball-Stem Extension-Top entry-Red.B-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
801	1	1 1/2	GA-E-60766	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
801	2	2	GA-E-67176	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
801	6	24	GA-E-60791	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 09CA4S60

Sh. 3 of 3

Rev.

A				

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
830	1	1 1/2	GA-E-67240	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
840	8	8	GA-E-67634	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D - Interlock System	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
841	6	16	GA-E-67635	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D - Interlock System	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
902	26	36	GA-E-69023	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A352 LCC Trim : Metal seat - 316 - 316 disc
902	38	48	GA-E-69024	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A352 LCC Trim : Metal seat - 316 - 316 disc
907	2	2	GA-E-69020	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
907	3	24	GA-E-69019	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
917	2	2	GA-E-69021	Ball-Top entry-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
917	3	24	GA-E-69022	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
921	30	42	GA-E-69059	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34	BW	CL900	Body: ASTM A352 LCC Trim : Metal seat - 316 - 316 disc
972	3	24	GA-E-69058	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
974	3	24	GA-E-69057	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A352 LCC Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

BRANCH TABLES

RunSize		90 Degrees	
1	A		
1 1/2	A A		
2		T	
3		T T	
4		T T T	
6		SW T T T	
8		SW SW T T T	
10		SW SW T T T T	
12		SW SW SW T T T T	
14		SW SW SW T T T T T	
16		SW SW SW T T T T T T	
18		SW SW SW SW T T T T T T	
20		SW SW SW SW T T T T T T T	
24		SW SW SW SW SW T T T T T T T T	
28		SW SW SW SW SW SW T T T T T T T T T	
30		SW SW SW SW SW SW T T T T T T T T T T	
32		SW SW SW SW SW SW SW T T T T T T T T T T	
36		SW SW SW SW SW SW SW SW T T T T T T T T T T	
38		SW SW SW SW SW SW SW SW T T T T T T T T T T T	
40		SW SW SW SW SW SW SW SW T T T T T T T T T T T T	
42		SW SW SW SW SW SW SW SW T T T T T T T T T T T T T	
46		SW SW SW SW SW SW SW SW SW T T T T T T T T T T T T T	
48		SW SW SW SW SW SW SW SW SW SW T T T T T T T T T T T T T T	
BranchSize		1 1 1/2 2 3 4 6 8 10 12 14 16 18 20 24 28 30 32 36 38 40 42 46 48	
Legenda			
A	TEE - SW ENDS - ASME-B16.11		
SW	SPECIAL SWEEPOLET - <MFR Std>		
T	TEE - ASME-B16.9		

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.
- 6) This piping class is created for lines subjected to Acoustic Induced Vibration.

PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **09CB1D04**

Sh. 1 of 2	Rev.				
	A	0	1	2	3

Base Material	: CARBON STEEL	Design code	: ASME B 31.3 2016
Nom. Rating	: CL900	PWHT	: AS PER CODE (NOTE 1)
Facing/Finishing	: RJ (F)	Valve Trim	: 5 - 13Cr Stel
Corrosion Allow.	: 1.5 mm	Welding Spec	: MZ-000-CCX-MC-SPC-00009/00013
Temp. Limit	: -29 °C to 320 °C		
Service: [SEVERE CYCLIC SERVICE] NG - Natural Gas			

Pipe Thickness

NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	
Thk.mm	3.73	3.91	4.55	5.08	5.54	7.62	11.13	12.7	18.26	14.27	15.88	17.48	19.05	20.62	23.83	26.97	35	
SCH.	XS	XS	XS	XS	XS	XS	120		120									

Nipple Thickness

NPS	1/2	3/4	1	1 1/2	2
Thk.mm	4.78	5.56	6.35	7.14	8.74
SCH.	160	160	160	160	160

PRESSURE - TEMPERATURE Ratings

[illegible]

opt.	Size		Item Description	Ends	Rating/Facing	Material
	from	to				

PIPE

1/2	6	PIPE	BW	ASTM A106 GR.B - SMLS
8	24	PIPE	BW	ASTM A333 GR.6 - SMLS
26	30	PIPE	BW	ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)

FLANGES

14	1/2	24	WN FLANGE - ASME-B16.5	BW	(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized
	26	30	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized
	26	30	BLIND FLANGE - ASME-B16.47 series.A		CL900 RJ (F)	ASTM A105 Normalized
	3/4	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL1500 RJ (F)	ASTM A105 Normalized

SPECTACLE BLIND

1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48	CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)
2	24	BLIND & SPACER - ASME-B16.48	(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS

1/2	6	LONG RADIUS ELBOW - ASME-B16.9	BW	ASTM A234 WPB - SMLS
8	24	LONG RADIUS ELBOW - ASME-B16.9	BW	ASTM A420 WPL6 - SMLS
26	30	LONG RADIUS ELBOW - ASME-B16.9	BW	ASTM A420 WPL6W - WLDD
3/4	6	REDUCER - ASME-B16.9	BW	ASTM A234 WPB - SMLS
8	24	REDUCER - ASME-B16.9	BW	ASTM A420 WPL6 - SMLS
26	30	REDUCER - ASME-B16.9	BW	ASTM A420 WPL6W - WLDD
1/2	6	CAP - ASME-B16.9	BW	ASTM A234 WPB - SMLS
8	30	CAP - ASME-B16.9	BW	ASTM A420 WPL6 - SMLS
1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM	ASTM A105 Normalized
1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE	ASTM A106 GR.B - SMLS
3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM	ASTM A234 WPB - SMLS
3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE	ASTM A234 WPB - SMLS
1/2	6	TEE - ASME-B16.9	BW	ASTM A234 WPB - SMLS
8	24	TEE - ASME-B16.9	BW	ASTM A420 WPL6 - SMLS
26	30	TEE - ASME-B16.9	BW	ASTM A420 WPL6W - WLDD
1/2	8	Weldolet - MSS-SP97	BW	ASTM A105 Normalized

GASKETS


1/2	30	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
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BOLTS

1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368	ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)
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VALVES

pos.	Size from	to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60131	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	BW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
1	2	2	GA-E-60132	Gate-PS-FB-Flex wdg-Widd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
1	3	24	GA-E-60133	Gate-PS-FB-Flex wdg-Widd seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
4	1/2	1 1/2	GA-E-60227	Globe-WB-Red.B-Thdd seat - API602	BW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
4	2	2	GA-E-60228	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
4	3	8	GA-E-60229	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
6	1/2	1 1/2	GA-E-60335	Check-WB-Red.B-Piston-Int seat - API602	BW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited



JOB

032243

Piping Class:

09CB1D04

Sh. 2 of 2

Rev.

A	0	1	2	3

PIPING MATERIAL SPECIFICATION

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	2	2	GA-E-60336	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
6	3	24	GA-E-60337	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
7	6	24	GA-E-60460	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1/2	1 1/2	GA-E-60459	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	BW	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
11	2	2	GA-E-60580	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
62	16	16	GA-E-60387	Check-Flanged -Dual plate-Wldd seat - API594	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
80	1/2	1 1/2	GA-E-67142	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+nipples - ASME-B16.34	BW	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
82	1/2	1 1/2	GA-E-60771	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	BW	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-67146	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	BW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.


BRANCH TABLES

RunSize		90 Degrees																
1/2	T																	
3/4	T	T																
1	T	T	T															
1 1/2	T	T	T	T														
2	W	W	T	T	T													
3	W	W	W	W	W	T												
4	W	W	W	W	W	T	T											
6	W	W	W	W	W	W	T	T										
8	W	W	W	W	W	W	W	T	T									
10	W	W	W	W	W	W	W	W	T	T								
12	W	W	W	W	W	W	W	W	T	T	T							
14	W	W	W	W	W	W	W	W	W	P	T	T						
16	W	W	W	W	W	W	W	W	W	P	P	T	T					
18	W	W	W	W	W	W	W	W	W	P	P	P	T	T				
20	W	W	W	W	W	W	W	W	W	P	P	P	P	T	T			
24	W	W	W	W	W	W	W	W	W	P	P	P	P	P	T	T		
30	W	W	W	W	W	W	W	W	W	P	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	

Legenda	
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) This piping Class is for SEVERE CYCLIC SERVICE (Severe Cyclic Service definition: More than 7000 cycles expected during service life).
- 3) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 4) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 5) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION												JOB 032243															
														Piping Class:					09CB1S01										
														Sh. 1 of 3					Rev.										
					A					0					1					2					3				

Base Material : CARBON STEEL																	Design code : ASME B 31.3 2016																
Nom. Rating : CL900																	PWHT : AS PER CODE (NOTE 1)																
Facing/Finishing : RJ (F)																	Valve Trim : 5 - 13Cr Stel																
Corrosion Allow. : 1.5 mm																	Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																
Temp. Limit : -29 °C to 220 °C																																	
Service: FG - Fuel Gas NG - Natural Gas																																	

Pipe Thickness																	
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	
Thk.mm	3.73	3.91	4.55	5.08	5.54	7.62	11.13	12.7	18.26	12.7	14.27	15.09	17.48	19.05	22.23	24.61	
SCH.	XS	XS	XS	XS	XS	XS	120		120	XS	60	60		60		60	

Nipple Thickness																	
NPS	1/2	3/4	1	1 1/2	2												
Thk.mm	7.47	7.82	9.09	10.15	11.07												
SCH.	XXS	XXS	XXS	XXS	XXS												

PRESSURE - TEMPERATURE Ratings																	
NPS	Press. bar	153.1	153.1	140.3	135.5	131	ASME B16.5										
1/2 - 8	Temp. °C	-28.9	37.78	93.33	148.9	204.4	Material Group 1.1										
NPS	Press. bar	91															
10 - 24	Temp. °C	220															

opt.	Size from to		Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	6	PIPE	BW		ASTM A106 GR.B - SMLS
	8	24	PIPE	BW		ASTM A333 GR.6 - SMLS

FLANGES						
7	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	(2->2 1/2) CL1500 RJ (F) (3->24)	ASTM A105 Normalized
	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL1500 RJ (F) (1/2->2 1/2) CL1500 RJ (F) (3->24)	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL900 RJ (F) CL1500 RJ (F)	ASTM A105 Normalized

SPECTACLE BLIND						
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48		CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)
	2	24	BLIND & SPACER - ASME-B16.48		(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	8	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	3/4	1 1/2	RED. COUPLING - SW/THDD - ASME-B16.11	SW\THDF	3000	ASTM A105 Normalized
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	6	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	8	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1/2	2	FEMALE CAP - THD END - ASME-B16.11	THDF	6000 3000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	6	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	8	24	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	6000 3000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM\PE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	6	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	8	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	2	8	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A105 Normalized

GASKETS						
	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES							
pos.	Size from to		Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60120	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
1	2	2	GA-E-60132	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited

	PIPING MATERIAL SPECIFICATION		JOB 032243						
			Piping Class:		09CB1S01				
			Sh. 2 of 3		Rev.				
			A	0	1	2	3		


VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	24	GA-E-60136	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
4	1/2	1 1/2	GA-E-60213	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
4	2	2	GA-E-60228	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
4	3	12	GA-E-60229	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
6	1/2	1 1/2	GA-E-60318	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
6	2	2	GA-E-60336	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
6	3	24	GA-E-60337	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
7	6	24	GA-E-60460	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1/2	1 1/2	GA-E-60461	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
8	6	24	GA-E-67177	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
10	1/2	1 1/2	GA-E-60180	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
11	2	2	GA-E-60580	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
11	3	3	GA-E-60141	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
82	1/2	1 1/2	GA-E-60478	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60769	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67018	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
101	2	2	GA-E-60135	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
111	2	2	GA-E-67091	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
114	2	2	GA-E-60114	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
130	1/2	1 1/2	GA-E-67086	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
140	4	4	GA-E-67378	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34 - Interlock System	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
801	1/2	1 1/2	GA-E-67143	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
830	1/2	1 1/2	GA-E-67241	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
907	2	2	GA-E-69028	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
907	3	24	GA-E-69027	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
917	2	2	GA-E-69025	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
917	10	24	GA-E-69026	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	14	14	GA-E-60620	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3
1	18	18	GA-E-60620	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

<div></div>	PIPING MATERIAL SPECIFICATION										JOB 032243														
											Piping Class:										09CB1S01				
											Sh. 3 of 3										Rev. <table><tr><td>A</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>				
A	0	1	2	3																					
90 Degrees																									
RunSize																									
1/2	A																								
3/4	A	A																							
1	A	A	A																						
1 1/2	A	A	A	A																					
2	S	S	T	T	T																				
3	S	S	S	S	S	W	T																		
4	S	S	S	S	S	W	T	T																	
6	S	S	S	S	S	W	W	T	T																
8	S	S	S	S	S	W	W	W	T	T															
10	S	S	S	S	S	W	W	W	W	T	T														
12	S	S	S	S	S	W	W	W	W	W	T	T													
14	S	S	S	S	S	W	W	W	W	W	P	T	T												
16	S	S	S	S	S	W	W	W	W	W	P	P	T	T											
18	S	S	S	S	S	W	W	W	W	W	P	P	P	T	T										
20	S	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T									
24	S	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T									
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24									
Legenda																									
A	TEE - SW ENDS - ASME-B16.11																								
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																								
S	SOCKOLET - SW END - MSS-SP97																								
T	TEE - ASME-B16.9																								
W	WELDOLET - MSS-SP97																								

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 09CB1S02

Rev.				
A	0			

Base Material : CARBON STEEL	Design code : ASME B 31.3 2016
Nom. Rating : CL900	PWHT : AS PER CODE (NOTE 1)
Facing/Finishing : RJ (F)	Valve Trim : 5 - 13Cr Stel
Corrosion Allow. : 1.5 mm	Welding Spec : MZ-000-CCX-MC-SPC-00009/00013
Temp. Limit : -29 °C to 250 °C	

Service: HOR - Hot Oil Return HOS - Hot Oil Supply NG - Natural Gas

Pipe Thickness

NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36
Thk.mm	3.73	3.91	4.55	5.08	5.54	7.62	11.13	12.7	18.26	18.26	17.48	19.05	20.62	23.83	25.4	30.96	37	44
SCH.	XS	XS	XS	XS	XS	XS	120		120	100	80	80		80		80		

Nipple Thickness

NPS	1/2	3/4	1	1 1/2	2
Thk.mm	7.47	7.82	9.09	10.15	11.07
SCH.	XXS	XXS	XXS	XXS	XXS

PRESSURE - TEMPERATURE Ratings

NPS	Press. bar	153.1	153.1	140.3	135.5	131	ASME B16.5
1/2 - 8	Temp. °C	-28.9	37.78	93.33	148.9	204.4	Material Group 1.1
NPS	Press. bar	140					
10 - 10	Temp. °C	70					
NPS	Press. bar	110					
12 - 36	Temp. °C	250					

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
PIPE						
	1/2	6	PIPE	BW		ASTM A106 GR.B - SMLS
	8	24	PIPE	BW		ASTM A333 GR.6 - SMLS
	26	36	PIPE	BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)

FLANGES

7	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized
	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RJ (F)	ASTM A105 Normalized
	3	24	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized
14	1/2	24	BLIND FLANGE - ASME-B16.5		(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized
	26	36	BLIND FLANGE - ASME-B16.47 series.A		CL900 RJ (F)	ASTM A105 Normalized
	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL900 RJ (F)	ASTM A105 Normalized
					CL1500 RJ (F)	ASTM A105 Normalized

SPECTACLE BLIND

	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48		CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)
	2	24	BLIND & SPACER - ASME-B16.48		(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS

	1/2	3	DRIP-RING - TB DRI 5011		(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	8	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	36	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	3/4	1 1/2	RED. COUPLING - SW/THDD - ASME-B16.11	SW\THDF	3000	ASTM A105 Normalized
	2	6	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	8	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	36	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	1/2	2	FEMALE CAP - THD END - ASME-B16.11	THDF	6000 3000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	6	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	8	36	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	6000 3000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDMPE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	6	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	8	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	36	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	2	6	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized
	8	8	WELDOLET - MSS-SP97	BW		ASTM A350 LF2 - CL.1
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A105 Normalized

GASKETS

			OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
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	PIPING MATERIAL SPECIFICATION		JOB 032243											
			Piping Class:		09CB1S02									
			Sh. 2 of 3		Rev. <table><tr><td>A</td><td>0</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>			A	0					
A	0													

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
GASKETS						
	1/2	36				
BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES								
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material	
1	1/2	1 1/2	GA-E-60120	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited	
1	2	2	GA-E-60132	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited	
1	3	24	GA-E-60136	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited	
4	1/2	1 1/2	GA-E-60213	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited	
4	2	2	GA-E-60228	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited	
4	3	12	GA-E-60229	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited	
6	1/2	1 1/2	GA-E-60318	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited	
6	2	2	GA-E-60336	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited	
6	3	24	GA-E-60337	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited	
7	6	24	GA-E-60460	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats	
8	1/2	1 1/2	GA-E-60461	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats	
8	6	24	GA-E-67177	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats	
10	1/2	1 1/2	GA-E-60180	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited	
11	2	2	GA-E-60580	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited	
11	3	3	GA-E-60141	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited	
82	1/2	1 1/2	GA-E-60478	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
89	1/2	1 1/2	GA-E-60769	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
101	1/2	1 1/2	GA-E-67018	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited	
101	2	2	GA-E-60135	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited	
111	2	2	GA-E-67091	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited	
130	1/2	1 1/2	GA-E-67086	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited	
801	1/2	1 1/2	GA-E-67143	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats	
830	1/2	1 1/2	GA-E-67241	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats	
974	2	2	GA-E-69061	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
974	4	24	GA-E-69060	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	


STRAINERS								
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material	
1	14	14	GA-E-60620	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3	
1	18	18	GA-E-60620	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3	

BRANCH TABLES

RunSize		90 Degrees																	
1/2	A																		
3/4	A	A																	
1	A	A	A																
1 1/2	A	A	A	A															
2	S	S	T	T															
3	S	S	S	S	W	T													
4	S	S	S	S	W	T	T												
6	S	S	S	S	W	W	T	T											
8	S	S	S	S	W	W	W	T	T										
10	S	S	S	S	W	W	W	W	T	T									
12	S	S	S	S	W	W	W	W	W	T	T								
14	S	S	S	S	W	W	W	W	W	P	T	T							
16	S	S	S	S	W	W	W	W	W	P	P	T	T						
18	S	S	S	S	W	W	W	W	W	P	P	P	T	T					
20	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T				
24	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T			
30	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T		
36	S	S	S	S	W	W	W	W	W	P	P	P	P	P	P	P	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	
Legenda																			
A	TEE - SW ENDS - ASME-B16.11																		
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																		
S	SOCKOLET - SW END - MSS-SP97																		
T	TEE - ASME-B16.9																		
W	WELDOLET - MSS-SP97																		

GENERAL NOTES

1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243							
												Piping Class:				09CB1S60			
												Sh. 1 of 3		Rev.					
		A																	

Base Material : CARBON STEEL										Design code : ASME B 31.3 2016							
Nom. Rating : CL900										PWHT : AS PER CODE (NOTE 1)							
Facing/Finishing : RJ (F)										Valve Trim : 5 - 13Cr Stel							
Corrosion Allow. : 1.5 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013							
Temp. Limit : -29 °C to 220 °C																	
Service: [AIV] FG - Fuel Gas NG - Natural Gas																	

Pipe Thickness																
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24
Thk.mm	3.73	3.91	4.55	5.08	5.54	7.62	11.13	12.7	18.26	12.7	14.27	15.09	17.48	19.05	22.23	24.61
SCH.	XS	XS	XS	XS	XS	XS	120		120	XS	60	60		60		60

Nipple Thickness																	
NPS	1/2	3/4	1	1 1/2	2												
Thk.mm	7.47	7.82	9.09	10.15	11.07												
SCH.	XXS	XXS	XXS	XXS	XXS												

PRESSURE - TEMPERATURE Ratings																
NPS	Press. bar	153.06	153.06	140.31	135.48	131	ASME B16.5									
1/2 - 8	Temp. °C	-28.89	37.78	93.33	148.89	204.44	Material Group 1.1									
NPS	Press. bar	91														
10 - 24	Temp. °C	220														

opt.	Size from to		Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	6	PIPE	BW		ASTM A106 GR.B - SMLS
	8	24	PIPE	BW		ASTM A333 GR.6 - SMLS

FLANGES						
7	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	(2->2 1/2) CL1500 RJ (F) (3->24)	ASTM A105 Normalized
	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		CL1500 RJ (F) (1/2->2 1/2) CL1500 RJ (F) (3->24)	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL900 RJ (F) CL1500 RJ (F)	ASTM A105 Normalized

SPECTACLE BLIND						
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48		CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)
	2	24	BLIND & SPACER - ASME-B16.48		(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	8	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	3/4	1 1/2	RED. COUPLING - SW/THDD - ASME-B16.11	SW\THDF	3000	ASTM A105 Normalized
	2	6	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	8	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1/2	2	FEMALE CAP - THD END - ASME-B16.11	THDF	6000 3000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	6	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	8	24	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	6000 3000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM\PE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A105 Normalized
	2	6	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	8	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	2	6	SPECIAL SWEEPOLET - <MFR Std>	BW	3000	ASTM A105 Normalized
	8	8	SPECIAL SWEEPOLET - <MFR Std>	BW		ASTM A350 LF2 - CL.1

GASKETS						
	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES							
pos.	Size from to		Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60120	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
1	2	2	GA-E-60132	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 09CB1S60

Rev.				
A				

Sh. 2 of 3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	24	GA-E-60136	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
4	1/2	1 1/2	GA-E-60213	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
4	2	2	GA-E-60228	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
4	3	12	GA-E-60229	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
6	1/2	1 1/2	GA-E-60318	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
6	2	2	GA-E-60336	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
6	3	24	GA-E-60337	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
7	6	24	GA-E-60460	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1/2	1 1/2	GA-E-60461	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
8	6	24	GA-E-67177	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
10	1/2	1 1/2	GA-E-60180	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
11	2	2	GA-E-60580	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
11	3	3	GA-E-60141	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
82	1/2	1 1/2	GA-E-60478	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60769	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67018	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
101	2	2	GA-E-60135	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
111	2	2	GA-E-67091	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
114	2	2	GA-E-60114	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
130	1/2	1 1/2	GA-E-67086	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
140	4	4	GA-E-67378	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34 - Interlock System	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
801	1/2	1 1/2	GA-E-67143	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
830	1/2	1 1/2	GA-E-67241	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
907	2	2	GA-E-69028	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
907	3	24	GA-E-69027	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
917	2	2	GA-E-69025	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
917	3	24	GA-E-69026	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	14	14	GA-E-60620	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3
1	18	18	GA-E-60620	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3


BRANCH TABLES


RunSize		90 Degrees																	
1/2	A																		
3/4	A	A																	
1	A	A	A																
1 1/2	A	A	A	A															
2					T														
3					T	T													
4					T	T	T												
6					SW	T	T	T											
8					SW	SW	T	T	T										
10					SW	SW	T	T	T	T									
12					SW	SW	SW	T	T	T	T								
14					SW	SW	SW	T	T	T	T	T							
16					SW	SW	SW	T	T	T	T	T	T						
18					SW	SW	SW	SW	T	T	T	T	T	T					
20					SW	SW	SW	SW	T	T	T	T	T	T	T				
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T			
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24			

Legenda	
A	TEE - SW ENDS - ASME-B16.11
SW	SPECIAL SWEEPOLET - <MFR Std>
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) This piping class is created for lines subjected to Acoustic Induced Vibration.

<div></div>		PIPING MATERIAL SPECIFICATION				JOB 032243						
						Piping Class: 09CB2D03						
						Sh. 1 of 2		Rev.				
A	0	1	2	3								
Base Material : CARBON STEEL						Design code : ASME B 31.3 2016						
Nom. Rating : CL900						PWHT : YES (NOTE 1)						
Facing/Finishing : RJ (F)						Valve Trim : 12 - SS316/HF						
Corrosion Allow. : 3 mm						Welding Spec : MZ-000-CCX-MC-SPC-00009/00013						
Temp. Limit : 0 °C to 130 °C												
Service: [Amine Service] AL - Amine Lean												
Pipe Thickness												
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8			
Thk.mm	7.47	5.56	6.35	7.14	8.74	11.13	11.13	14.27	18.26			
SCH.	XXS	160	160	160	160	160	120	120	120			
Nipple Thickness												
NPS	1/2	3/4	1	1 1/2	2							
Thk.mm	7.47	7.82	9.09	10.15	11.07							
SCH.	XXS	XXS	XXS	XXS	XXS							
PRESSURE - TEMPERATURE Ratings												
NPS	Press. bar	153.1	140.3	ASME B16.5								
1/2 - 8	Temp. °C	37.78	93.33	Material Group 1.1								
opt.	from	Size to	Item Description			Ends	Rating/Facing	Material				
PIPE												
	1/2	8	PIPE			BW		ASTM A106 GR.B - SMLS				
FLANGES												
	1/2	8	WN FLANGE - ASME-B16.5			BW	(1/2->2 1/2) CL1500 RJ (F) (3->8) CL900 RJ (F)	ASTM A105 Normalized				
	1/2	8	BLIND FLANGE - ASME-B16.5				(1/2->2 1/2) CL1500 RJ (F) (3->8) CL900 RJ (F)	ASTM A105 Normalized				
14	3/4	2	THDD RED. FLANGE - ASME-B16.5			THDF	CL1500 RJ (F)	ASTM A105 Normalized				
SPECTACLE BLIND												
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48				CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)				
	2	8	BLIND & SPACER - ASME-B16.48				(2->2 1/2) CL1500 RJ (F) (3->8) CL900 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)				
FITTINGS												
	1/2	8	LONG RADIUS ELBOW - ASME-B16.9			BW		ASTM A234 WPB - SMLS				
	3/4	8	REDUCER - ASME-B16.9			BW		ASTM A234 WPB - SMLS				
	1/2	8	CAP - ASME-B16.9			BW		ASTM A234 WPB - SMLS				
	1/2	2	THD MALE PLUG - RND HEAD - ASME-B16.11			THDM		ASTM A105 Normalized				
	1/2	2	SWAGE NIPPLE - PE/THDD - MSS-SP95			PE\THDM		ASTM A234 WPB - SMLS				
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95			PE		ASTM A234 WPB - SMLS				
	1/2	8	TEE - ASME-B16.9			BW		ASTM A234 WPB - SMLS				
	1/2	6	WELDOLET - MSS-SP97			BW		ASTM A105 Normalized				
GASKETS												
	1/2	8	OCTAGONAL RJ GASKET - ASME-B16.20					SOFT IRON				
BOLTS												
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)				
VALVES												
pos.	from	Size to	Data Sheet	Item Description		Ends	Rating/Facing	Material				
1	1/2	1 1/2	GA-E-60137	Gate-WB-Red.B-Solid wdg-Exp.seat + Nipples - API602		BW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF				
1	2	2	GA-E-60138	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF				
1	3	8	GA-E-60139	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		BW	CL900	Body: ASTM A216 WCB Trim : 316 / HF				
4	1/2	1 1/2	GA-E-60231	Globe-WB-Red.B-Thdd seat + Nipples - API602		BW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF				
4	2	2	GA-E-60232	Globe-PS-Disk-Integral seat - ASME-B16.34		BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF				
4	3	8	GA-E-60233	Globe-PS-Disk-Integral seat - ASME-B16.34		BW	CL900	Body: ASTM A216 WCB Trim : 316 / HF				
6	1/2	1 1/2	GA-E-60338	Check-WB-Red.B-Piston-Int seat + Nipples - API602		BW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF				
6	2	2	GA-E-60339	Check-PS-FB-Swing-Integral seat - ASME-B16.34		BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF				
6	3	8	GA-E-60340	Check-PS-FB-Swing-Integral seat - ASME-B16.34		BW	CL900	Body: ASTM A216 WCB Trim : 316 / HF				
7	6	8	GA-E-60464	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D		BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
8	1/2	1 1/2	GA-E-60463	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34		BW	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats				
11	2	2	GA-E-60581	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 316 / HF				
11	3	8	GA-E-60582	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : 316 / HF				
82	1/2	1 1/2	GA-E-60770	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34		BW	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.				
82	6	8	GA-E-67105	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D		BW	CL900	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH				

	PIPING MATERIAL SPECIFICATION					JOB 032243										
						Piping Class: 09CB2D03										
						Sh. 2 of 2		Rev. <table><tr><td>A</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					A	0	1	2
A	0	1	2	3												

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
89	1/2	1 1/2	GA-E-67106	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	BW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

BRANCH TABLES									
90 Degrees									
RunSize									
1/2	T								
3/4	T	T							
1	T	T	T						
1 1/2	T	T	T	T					
2	W	W	T	T	T				
3	W	W	W	W	W	T			
4	W	W	W	W	W	T	T		
6	W	W	W	W	W	W	T	T	
8	W	W	W	W	W	W	W	T	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8
Legenda									
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E								
T	TEE - ASME-B16.9								
W	WELDOLET - MSS-SP97								

GENERAL NOTES	
<div>1) PWHT is mandatory for all thickness.</div> <div>2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.</div> <div>3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).</div> <div>4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.</div> <div>5) Specified Thickness are suitable to withstand Full Vacuum condition.</div>	

CCS

JV

MOZAMBIQUE

LNG

PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 09CB2D04

Sh. 2 of 2

Rev.



A0123

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	2	2	GA-E-60336	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
6	3	24	GA-E-60337	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
7	6	24	GA-E-67185	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1/2	1 1/2	GA-E-60459	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	BW	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
11	2	2	GA-E-60580	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
11	3	3	GA-E-60141	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
80	1/2	1 1/2	GA-E-67142	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+nipples - ASME-B16.34	BW	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
82	1/2	1 1/2	GA-E-60771	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	BW	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	6	24	GA-E-60772	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-67146	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	BW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

Branch Tables	
90 Degrees	
RunSize	
1/2	T
3/4	T T
1	T T T
1 1/2	T T T T
2	W W T T T
3	W W W W W T
4	W W W W W T T
6	W W W W W W T T
8	W W W W W W W T T
10	W W W W W W W W T T
12	W W W W W W W W W T T
14	W W W W W W W W W P T T
16	W W W W W W W W W P P T T
18	W W W W W W W W W P P P T T
20	W W W W W W W W W P P P P T T
24	W W W W W W W W W P P P P P T T
30	W W W W W W W W W P P P P P P T T
BranchSize	1/2 3/4 1 1 1/2 2 3 4 6 8 10 12 14 16 18 20 24 30
Legenda	
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

General Notes	
1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.	
2) This piping Class is for SEVERE CYCLIC SERVICE (Severe Cyclic Service definition: More than 7000 cycles expected during service life).	
3) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.	
4) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).	
5) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.	

<div><div></div><div></div></div>		PIPING MATERIAL SPECIFICATION														JOB 032243																			
																Piping Class:					09CB2S01														
																Sh. 1 of 3					Rev. A 0 1 2 3														
Base Material : CARBON STEEL																		Design code : ASME B 31.3 2016																	
Nom. Rating : CL900																		PWHT : AS PER CODE (NOTE 1)																	
Facing/Finishing : RJ (F)																		Valve Trim : 5 - 13Cr Stel																	
Corrosion Allow. : 3 mm																		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																	
Temp. Limit : -29 °C to 220 °C																																			
Service: HV - Hydrocarbon Vapour NG - Natural Gas																																			
Pipe Thickness																																			
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30																		
Thk.mm	7.47	5.56	6.35	7.14	8.74	11.13	11.13	14.27	18.26	14.27	15.88	17.48	19.05	20.62	23.83	26.97	32																		
SCH.	XXS	160	160	160	160	160	120	120	120																										
Nipple Thickness																																			
NPS	1/2	3/4	1	1 1/2	2																														
Thk.mm	7.47	7.82	9.09	10.15	11.07																														
SCH.	XXS	XXS	XXS	XXS	XXS																														
PRESSURE - TEMPERATURE Ratings																																			
NPS	Press. bar	153.1	153.1	140.3	135.5	131	124.8	117.6	ASME B16.5																										
1/2 - 8	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	315.6	Material Group 1.1																										
NPS	Press. bar	91																																	
10 - 30	Temp. °C	220																																	
opt.	Size from to		Item Description										Ends	Rating/Facing	Material																				
PIPE																																			
	1/2	4	PIPE										BW		ASTM A106 GR.B - SMLS																				
	5	24	PIPE										BW		ASTM A333 GR.6 - SMLS																				
	26	30	PIPE										BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)																				
FLANGES																																			
	1/2	1 1/2	SW FLANGE - ASME-B16.5										SW	CL1500 RJ (F)	ASTM A105 Normalized																				
	2	24	WN FLANGE - ASME-B16.5										BW	(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized																				
	26	30	WN FLANGE - ASME-B16.47 series.A										BW	CL900 RJ (F)	ASTM A105 Normalized																				
	1/2	24	BLIND FLANGE - ASME-B16.5											(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized																				
	26	30	BLIND FLANGE - ASME-B16.47 series.A											CL900 RJ (F)	ASTM A105 Normalized																				
14	2	2	THDD RED. FLANGE - ASME-B16.5										THDF	CL1500 RJ (F)	ASTM A105 Normalized																				
SPECTACLE BLIND																																			
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48											CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)																				
	2	24	BLIND & SPACER - ASME-B16.48											(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)																				
	30	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060019											CL900 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)																				
FITTINGS																																			
	1/2	3	DRIP-RING - TB DRI 5011											(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized																				
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11										SW	9000	ASTM A105 Normalized																				
	2	4	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A234 WPB - SMLS																				
	6	24	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																				
	26	30	LONG RADIUS ELBOW - ASME-B16.9										BW		ASTM A420 WPL6W - WLDD																				
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11										SW	9000	ASTM A105 Normalized																				
	3/4	1 1/2	RED. COUPLING - SW/THDD - ASME-B16.11										SW\THDF	6000	ASTM A105 Normalized																				
	2	4	REDUCER - ASME-B16.9										BW		ASTM A234 WPB - SMLS																				
	6	24	REDUCER - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																				
	26	30	REDUCER - ASME-B16.9										BW		ASTM A420 WPL6W - WLDD																				
	1/2	2	FEMALE CAP - THD END - ASME-B16.11										THDF	6000	ASTM A105 Normalized																				
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11										SW	9000	ASTM A105 Normalized																				
	2	4	CAP - ASME-B16.9										BW		ASTM A234 WPB - SMLS																				
	6	30	CAP - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																				
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11										SW\THDF	6000	ASTM A105 Normalized																				
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11										SW	9000	ASTM A105 Normalized																				
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11										THDM		ASTM A105 Normalized																				
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10										THDM\PE		ASTM A106 GR.B - SMLS																				
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95										PE\THDM		ASTM A234 WPB - SMLS																				
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95										PE		ASTM A234 WPB - SMLS																				
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11										SW	9000	ASTM A105 Normalized																				
	2	4	TEE - ASME-B16.9										BW		ASTM A234 WPB - SMLS																				
	6	24	TEE - ASME-B16.9										BW		ASTM A420 WPL6 - SMLS																				
	26	30	TEE - ASME-B16.9										BW		ASTM A420 WPL6W - WLDD																				
	2	8	WELDOLET - MSS-SP97										BW		ASTM A105 Normalized																				
	1/2	1 1/2	SOCKOLET - SW END - TB RAC 5380										SW\BW	9000	ASTM A105 Normalized																				
GASKETS																																			
	1/2	30	OCTAGONAL RJ GASKET - ASME-B16.20												SOFT IRON																				
BOLTS																																			
	1/2	4	ST BOLT+2 NUTS - ANSI Thdd - TB BUL 5368												ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)																				



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **09CB2S01**

Rev.				
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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60120	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
1	2	2	GA-E-60132	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
1	3	24	GA-E-60136	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
4	1/2	1 1/2	GA-E-60213	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
4	2	2	GA-E-60228	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
4	3	8	GA-E-60229	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
6	1/2	1 1/2	GA-E-60318	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
6	2	2	GA-E-60336	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
6	3	24	GA-E-60337	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
7	6	24	GA-E-67185	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1/2	1 1/2	GA-E-60461	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60180	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
11	2	2	GA-E-60580	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
11	3	3	GA-E-60141	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
82	1/2	1 1/2	GA-E-60478	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	6	24	GA-E-60772	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60769	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67018	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
101	2	2	GA-E-60135	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
111	2	2	GA-E-67091	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
114	2	2	GA-E-60114	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
130	1/2	1 1/2	GA-E-67086	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
140	3	3	GA-E-67378	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34 - Interlock System	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
801	1/2	1 1/2	GA-E-67143	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
830	1/2	1 1/2	GA-E-67241	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
907	2	2	GA-E-69028	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
907	3	24	GA-E-69027	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
917	2	2	GA-E-69025	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
917	3	24	GA-E-69026	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
974	2	2	GA-E-69061	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
974	3	24	GA-E-69060	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	6	GA-E-60620	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees																									
1/2	A																										
3/4	A	A																									
1	A	A	A																								
1 1/2	A	A	A	A	A																						
2	S	S	T	T		T																					
3	S	S	S	S	S	W		T																			
4	S	S	S	S	S	W		T																			
6	S	S	S	S	S	W	W	T		T																	
8	S	S	S	S	S	W	W	W		T																	
10	S	S	S	S	S	W	W	W	W	T		T															
12	S	S	S	S	S	W	W	W	W	W		T															
14	S	S	S	S	S	W	W	W	W	W		P		T													
16	S	S	S	S	S	W	W	W	W	W		P	P	T		T											
18	S	S	S	S	S	W	W	W	W	W		P	P	P	T	T											
20	S	S	S	S	S	W	W	W	W	W		P	P	P	P	T	T										
24	S	S	S	S	S	W	W	W	W	W		P	P	P	P	P	T		T								
30	S	S	S	S	S	W	W	W	W	W		P	P	P	P	P	P		T		T						
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30										
Legenda																											
A	TEE - SW ENDS - ASME-B16.11																										
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																										
S	SOCKOLET - SW END - TB RAC 5380																										
T	TEE - ASME-B16.9																										
TR	TEE-MSS SP 75																										
W	WELDOLET - MSS-SP97																										

GENERAL NOTES

1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION												JOB 032243									
														Piping Class:						09CB2S02			
														Sh. 1 of 3						Rev.			
A 0 1																							
Base Material : CARBON STEEL														Design code : ASME B 31.3 2016									
Nom. Rating : CL900														PWHT : AS PER CODE (NOTE 1)									
Facing/Finishing : RJ (F)														Valve Trim : 5 - 13Cr Stel									
Corrosion Allow. : 3 mm														Welding Spec : MZ-000-CCX-MC-SPC-00009/00013									
Temp. Limit : -29 °C to 70 °C																							
Service: HV - Hydrocarbon Vapour																							
Pipe Thickness																							
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24							
Thk.mm	7.47	5.56	6.35	7.14	8.74	11.13	11.13	14.27	18.26	20.62	22.23	23.83	26.19	29.36	32.54	38.1							
SCH.	XXS	160	160	160	160	160	120	120	120			100	100	100	100								
Nipple Thickness																							
NPS	1/2	3/4	1	1 1/2	2																		
Thk.mm	7.47	7.82	9.09	10.15	11.07																		
SCH.	XXS	XXS	XXS	XXS	XXS																		
PRESSURE - TEMPERATURE Ratings																							
NPS	Press. bar	153.1	153.1	140.3	135.5	131	124.8	117.6	ASME B16.5														
1/2 - 8	Temp. °C	-28.9	37.78	93.33	148.9	204.4	260	315.6	Material Group 1.1														
NPS	Press. bar	140																					
10 - 24	Temp. °C	70																					
opt.	Size		Item Description							Ends	Rating/Facing	Material											
	from	to																					
PIPE																							
	1/2	4	PIPE							BW		ASTM A106 GR.B - SMLS											
	5	24	PIPE							BW		ASTM A333 GR.6 - SMLS											
FLANGES																							
	1/2	1 1/2	SW FLANGE - ASME-B16.5							SW	CL1500 RJ (F)	ASTM A105 Normalized											
	2	24	WN FLANGE - ASME-B16.5							BW	(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized											
	1/2	24	BLIND FLANGE - ASME-B16.5								(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized											
14	2	2	THDD RED. FLANGE - ASME-B16.5							THDF	CL1500 RJ (F)	ASTM A105 Normalized											
SPECTACLE BLIND																							
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48								CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)											
	2	24	BLIND & SPACER - ASME-B16.48								(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)											
FITTINGS																							
	1/2	3	DRIP-RING - TB DRI 5011								(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized											
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11							SW	9000	ASTM A105 Normalized											
	2	4	LONG RADIUS ELBOW - ASME-B16.9							BW		ASTM A234 WPB - SMLS											
	6	24	LONG RADIUS ELBOW - ASME-B16.9							BW		ASTM A420 WPL6 - SMLS											
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11							SW	9000	ASTM A105 Normalized											
	3/4	1 1/2	RED. COUPLING - SW/THDD - ASME-B16.11							SW\THDF	6000	ASTM A105 Normalized											
	2	4	REDUCER - ASME-B16.9							BW		ASTM A234 WPB - SMLS											
	6	24	REDUCER - ASME-B16.9							BW		ASTM A420 WPL6 - SMLS											
	1/2	2	FEMALE CAP - THD END - ASME-B16.11							THDF	6000	ASTM A105 Normalized											
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11							SW	9000	ASTM A105 Normalized											
	2	4	CAP - ASME-B16.9							BW		ASTM A234 WPB - SMLS											
	6	24	CAP - ASME-B16.9							BW		ASTM A420 WPL6 - SMLS											
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11							SW	9000	ASTM A105 Normalized											
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11							SW\THDF	6000	ASTM A105 Normalized											
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11							THDM		ASTM A105 Normalized											
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10							THDM\PE		ASTM A106 GR.B - SMLS											
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95							PE\THDM		ASTM A234 WPB - SMLS											
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95							PE		ASTM A234 WPB - SMLS											
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11							SW	9000	ASTM A105 Normalized											
	2	4	TEE - ASME-B16.9							BW		ASTM A234 WPB - SMLS											
	6	24	TEE - ASME-B16.9							BW		ASTM A420 WPL6 - SMLS											
	2	4	WELDOLET - MSS-SP97							BW		ASTM A105 Normalized											
	5	8	WELDOLET - MSS-SP97							BW		ASTM A350 LF2 - CL.1											
	1/2	1 1/2	SOCKOLET - SW END - TB RAC 5380							SW\BW	9000	ASTM A105 Normalized											
GASKETS																							
	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20									SOFT IRON											
BOLTS																							
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368									ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)											
VALVES																							
pos.	Size		Data Sheet	Item Description				Ends	Rating/Facing	Material													
	from	to																					
1	1/2	1 1/2	GA-E-60120	Gate-WB-Red.B-Solid wdg-Exp.seat - API602				SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited													
1	2	2	GA-E-60132	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34				BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited													



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 09CB2S02

Rev.				
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VALVES


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	24	GA-E-60136	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
4	1/2	1 1/2	GA-E-60213	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
4	2	2	GA-E-60228	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
4	3	8	GA-E-60229	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
6	1/2	1 1/2	GA-E-60318	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
6	2	2	GA-E-60336	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
6	3	24	GA-E-60337	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
7	6	24	GA-E-67185	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1/2	1 1/2	GA-E-60461	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60180	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
11	2	2	GA-E-60580	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
11	3	3	GA-E-60141	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
82	1/2	1 1/2	GA-E-60478	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	6	24	GA-E-60772	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60769	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67018	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
101	2	2	GA-E-60135	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
401	2	2	GA-E-60276	Globe-Stem Extension-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
801	1/2	1 1/2	GA-E-67143	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
830	1/2	1 1/2	GA-E-67241	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
974	2	2	GA-E-69061	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
974	3	24	GA-E-69060	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

BRANCH TABLES

RunSize		90 Degrees																	
1/2	A																		
3/4	A	A																	
1	A	A	A																
1 1/2	A	A	A	A															
2	S	S	T	T															
3	S	S	S	S	W	T													
4	S	S	S	S	W	T	T												
6	S	S	S	S	W	W	T	T											
8	S	S	S	S	W	W	W	T	T										
10	S	S	S	S	W	W	W	W	T	T									
12	S	S	S	S	W	W	W	W	W	T	T								
14	S	S	S	S	W	W	W	W	W	P	T	T							
16	S	S	S	S	W	W	W	W	W	P	P	T	T						
18	S	S	S	S	W	W	W	W	W	P	P	P	T	T					
20	S	S	S	S	W	W	W	W	W	P	P	P	P	T	T				
24	S	S	S	S	W	W	W	W	W	P	P	P	P	P	T	T			
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24			

Legenda	
A	TEE - SW ENDS - ASME-B16.11
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPM-T-012-E
S	SOCKOLET - SW END - TB RAC 5380
T	TEE - ASME-B16.9
TR	TEE-MSS SP 75
W	WELDOLET - MSS-SP97

GENERAL NOTES	
1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.	
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.	
3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).	
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.	

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243					
												Piping Class:		09CB2S60			
Sh. 1 of 3		Rev.															
A																	

Base Material : CARBON STEEL

Nom. Rating : CL900

Facing/Finishing : RJ (F)

Corrosion Allow. : 3 mm

Temp. Limit : -29 °C to 220 °C

Service: [AIV] HV - Hydrocarbon Vapour NG - Natural Gas

Design code :ASME B 31.3 2016

PWHT :AS PER CODE (NOTE 1)

Valve Trim :5 - 13Cr Stel

Welding Spec : MZ-000-CCX-MC-SPC-00009/00013

NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30
Thk.mm	7.47	5.56	6.35	7.14	8.74	11.13	11.13	14.27	18.26	14.27	15.88	17.48	19.05	20.62	23.83	26.97	32
SCH.	XXS	160	160	160	160	160	120	120	120								

NPS	1/2	3/4	1	1 1/2	2
Thk.mm	7.47	7.82	9.09	10.15	11.07
SCH.	XXS	XXS	XXS	XXS	XXS

NPS	Press. bar	153.06	153.06	140.31	135.48	131	124.8	117.56	ASME B16.5
1/2 - 8	Temp. °C	-28.89	37.78	93.33	148.89	204.44	260	315.56	Material Group 1.1
NPS	Press. bar	91							
10 - 30	Temp. °C	220							

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
PIPE						
	1/2	4	PIPE	BW		ASTM A106 GR.B - SMLS
	5	24	PIPE	BW		ASTM A333 GR.6 - SMLS
	26	30	PIPE	BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)
FLANGES						
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized
	26	30	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RJ (F)	ASTM A105 Normalized
	1/2	24	BLIND FLANGE - ASME-B16.5		(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized
	26	30	BLIND FLANGE - ASME-B16.47 series.A		CL900 RJ (F)	ASTM A105 Normalized
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL1500 RJ (F)	ASTM A105 Normalized
SPECTACLE BLIND						
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48		CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)
	2	24	BLIND & SPACER - ASME-B16.48		(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)
	30	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060019		CL900 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)
FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
	2	4	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	6	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	30	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
	3/4	1 1/2	RED. COUPLING - SW/THDD - ASME-B16.11	SW\THDF	6000	ASTM A105 Normalized
	2	4	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	6	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	30	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	1/2	2	FEMALE CAP - THD END - ASME-B16.11	THDF	6000	ASTM A105 Normalized
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	9000	ASTM A105 Normalized
	2	4	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	6	30	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	6000	ASTM A105 Normalized
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDMPE		ASTM A106 GR.B - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A234 WPB - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	9000	ASTM A105 Normalized
	2	4	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	5	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	30	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	2	4	SPECIAL SWEEPOLET - <MFR Std>	BW	9000	ASTM A105 Normalized
	5	8	SPECIAL SWEEPOLET - <MFR Std>	BW		ASTM A350 LF2 - CL.1
GASKETS						
	1/2	30	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
BOLTS						
	1/2	4	ST BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **09CB2S60**

Sh. **2** of **3**

Rev.

A				

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60120	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
1	2	2	GA-E-60132	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
1	3	24	GA-E-60136	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
4	1/2	1 1/2	GA-E-60213	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
4	2	2	GA-E-60228	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
4	3	8	GA-E-60229	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
6	1/2	1 1/2	GA-E-60318	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
6	2	2	GA-E-60336	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
6	3	24	GA-E-60337	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
7	6	24	GA-E-67185	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-CS ENP 76,2µm trim-PEEK seats
8	1/2	1 1/2	GA-E-60461	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60180	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
11	2	2	GA-E-60580	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
11	3	3	GA-E-60141	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
82	1/2	1 1/2	GA-E-60478	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
82	6	24	GA-E-60772	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60769	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67018	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
101	2	2	GA-E-60135	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 13CR stellited
111	2	2	GA-E-67091	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
114	2	2	GA-E-60114	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 13CR stellited
130	1/2	1 1/2	GA-E-67086	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 13CR stellited
140	3	3	GA-E-67378	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34 - Interlock System	BW	CL900	Body: ASTM A216 WCB Trim : 13CR stellited
801	1/2	1 1/2	GA-E-67143	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
830	1/2	1 1/2	GA-E-67241	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
907	2	2	GA-E-69028	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
907	3	24	GA-E-69027	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
917	2	2	GA-E-69025	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
917	3	24	GA-E-69026	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
974	2	2	GA-E-69061	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
974	3	24	GA-E-69060	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	6	6	GA-E-60620	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

90 Degrees																		
RunSize																		
1/2	A																	
3/4	A	A																
1	A	A	A															
1 1/2	A	A	A	A														
2					T													
3					T	T												
4					T	T	T											
6					SW	T	T	T										
8					SW	SW	T	T	T									
10					SW	SW	T	T	T	T								
12					SW	SW	SW	T	T	T	T							
14					SW	SW	SW	T	T	T	T	T						
16					SW	SW	SW	T	T	T	T	T	T					
18					SW	SW	SW	SW	T	T	T	T	T	T				
20					SW	SW	SW	SW	T	T	T	T	T	T	T			
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T		
30					SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	
Legenda																		
A	TEE - SW ENDS - ASME-B16.11																	
SW	SPECIAL SWEEPOLET - <MFR Std>																	
T	TEE - ASME-B16.9																	

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) This piping class is created for lines subjected to Acoustic Induced Vibration.

PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **09CB4S01**

Sh. 1 of 3	Rev.				
	A	0	1		

Base Material	: CARBON STEEL	Design code	: ASME B 31.3 2016
Nom. Rating	: CL900	PWHT	: AS PER CODE (NOTE 1)
Facing/Finishing	: RJ (F)	Valve Trim	: 12 - SS316/HF
Corrosion Allow.	: 6 mm	Welding Spec	: MZ-000-CCX-MC-SPC-00009/00013
Temp. Limit	: -29 °C to 90 °C		

Service: HL - Hydrocarbon Liquid NG - Natural Gas

Pipe Thickness

NPS	1	1 1/2	2	3	4	6	8	12	14	16	18	20	24	30	32	42
Thk.mm	9.09	10.15	11.07	15.24	17.12	18.26	20.62	22.23	25.4	27.79	30.96	34.93	38.1	46.02	47	63
SCH.	XXS	XXS	XXS	XXS	XXS	160	140		XXS	120	120	120	120		50	

Nipple Thickness

NPS	1	1 1/2	2
Thk.mm	9.09	10.15	11.07
SCH.	XXS	XXS	XXS

PRESSURE - TEMPERATURE Ratings

NPS 1 - 6	Press. bar Temp. °C	153.1 -28.9	153.1 37.78	ASME B16.5 Material Group 1.1
NPS 8 - 24	Press. bar Temp. °C	140 90		
NPS 30 - 42	Press. bar Temp. °C	140 70		

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE						
1	2 1/2	PIPE		BW		ASTM A106 GR. B - SMLS
3	24	PIPE		BW		ASTM A333 GR. 6 - SMLS
26	42	PIPE		BW		ASTM A671 GR. CC65 CL. 22 - EFW + S2 (-46°C)

FLANGES						
7	1	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A105 Normalized
	2	24	WN FLANGE - ASME-B16.5	BW	(2->2 1/2) CL1500 RJ (F)	ASTM A105 Normalized
					(3->24)	
					CL900 RJ (F)	
	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RJ (F)	ASTM A105 Normalized
	42	42	SPECIAL WN FLANGE - <MFR Std> GA-E-060099	BW	CL900 RJ (F)	ASTM A105 Normalized
	3	24	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A105 Normalized
	1	24	BLIND FLANGE - ASME-B16.5		(1->2 1/2) CL1500 RJ (F)	ASTM A105 Normalized
					(3->24)	
					CL900 RJ (F)	
14	26	36	BLIND FLANGE - ASME-B16.47 series.A		CL900 RJ (F)	ASTM A105 Normalized
	42	42	SPECIAL BLIND FLANGE - <MFR Std> GA-E-060099		CL900 RJ (F)	ASTM A105 Normalized
	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL1500 RJ (F)	ASTM A105 Normalized

SPECTACLE BLIND			
1	1 1/2	SPECTACLE BLIND - ASME-B16.48	CL1500 RJ (F) ASTM A516 GR.70 + S5 (-46°C)
2	24	BLIND & SPACER - ASME-B16.48	(2->2 1/2) ASTM A516 GR.70 + S5 (-46°C)
			CL1500 RJ (F)
			(3->24)
			CL900 RJ (F)

FITTINGS						
1	3	DRIP-RING - TB DRI 5011			(1->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A105 Normalized
1	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	9000		ASTM A105 Normalized
2	2	LONG RADIUS ELBOW - ASME-B16.9	BW			ASTM A234 WPB - SMLS
3	24	LONG RADIUS ELBOW - ASME-B16.9	BW			ASTM A420 WPL6 - SMLS
26	42	LONG RADIUS ELBOW - ASME-B16.9	BW			ASTM A420 WPL6W - WLDD
1 1/2	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	9000		ASTM A105 Normalized
2	2	REDUCER - ASME-B16.9	BW			ASTM A234 WPB - SMLS
3	24	REDUCER - ASME-B16.9	BW			ASTM A420 WPL6 - SMLS
26	42	REDUCER - ASME-B16.9	BW			ASTM A420 WPL6W - WLDD
1	2	FEMALE CAP - THD END - ASME-B16.11	THDF	6000		ASTM A105 Normalized
1	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	9000		ASTM A105 Normalized
2	2	CAP - ASME-B16.9	BW			ASTM A234 WPB - SMLS
3	42	CAP - ASME-B16.9	BW			ASTM A420 WPL6 - SMLS
1	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW/THDF	6000		ASTM A105 Normalized
1	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	9000		ASTM A105 Normalized
1	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM			ASTM A105 Normalized
1	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE			ASTM A106 GR.B - SMLS
1 1/2	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE			ASTM A234 WPB - SMLS
1 1/2	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM			ASTM A234 WPB - SMLS
1	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	9000		ASTM A105 Normalized
2	2	TEE - ASME-B16.9	BW			ASTM A234 WPB - SMLS
3	24	TEE - ASME-B16.9	BW			ASTM A420 WPL6 - SMLS
30	42	TEE - ASME-B16.9	BW			ASTM A420 WPL6W - WLDD
2	8	WELDOLET - MSS-SP97	BW			ASTM A105 Normalized
1	1 1/2	SOCKOLET - SW END - TB RAC 5380	SW/BW	9000		ASTM A105 Normalized

GASKETS		1/2	SOURCE - SW END TB RAC 3300	SWBW	3000	ASTM A105 Normalized
1	36	OCTAGONAL RJ GASKET - ASME-B16.20				AISI 316
42	42	OCTAGONAL RJ GASKET - <MFR Std> GA-E-060099				AISI 316

<div></div>			PIPING MATERIAL SPECIFICATION				JOB 032243					
							Piping Class:		09CB4S01			
							Sh. 2 of 3		Rev. A 0 1			
opt.	from	Size to	Item Description			Ends	Rating/Facing	Material				
BOLTS												
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)				
VALVES												
pos.	from	Size to	Data Sheet	Item Description		Ends	Rating/Facing	Material				
1	1	1 1/2	GA-E-60186	Gate-WB-Red.B-Solid wdg-Exp.seat - API602		SW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF				
1	2	2	GA-E-60587	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF				
1	3	30	GA-E-60588	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		BW	CL900	Body: ASTM A216 WCB Trim : 316 / HF				
4	2	2	GA-E-60277	Globe-PS-Disk-Integral seat - ASME-B16.34		BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF				
4	3	10	GA-E-60278	Globe-PS-Disk-Integral seat - ASME-B16.34		BW	CL900	Body: ASTM A216 WCB Trim : 316 / HF				
6	2	2	GA-E-60360	Check-PS-FB-Swing-Integral seat - ASME-B16.34		BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF				
6	3	24	GA-E-60357	Check-PS-FB-Swing-Integral seat - ASME-B16.34		BW	CL900	Body: ASTM A216 WCB Trim : 316 / HF				
7	42	42	GA-E-67199	Ball-Top entry-Red.B-Trunnion ball + Pup Pieces - API6D		BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
8	1	1	GA-E-67242	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34		PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats				
8	2	2	GA-E-67149	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D		BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
10	1	1 1/2	GA-E-67059	Gate-WB-Red.B-Solid wdg-Exp.seat - API602		SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF				
11	2	2	GA-E-67092	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 316 / HF				
82	1	1 1/2	GA-E-67243	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34		PE	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.				
101	2	2	GA-E-67009	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF				
101	3	24	GA-E-60586	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		BW	CL900	Body: ASTM A216 WCB Trim : 316 / HF				
140	2	2	GA-E-67379	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34 - Interlock System		BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF				
140	4	10	GA-E-67380	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34 - Interlock System		BW	CL900	Body: ASTM A216 WCB Trim : 316 / HF				
141	3	3	GA-E-67381	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34 - Interlock System		BW	CL900	Body: ASTM A216 WCB Trim : 316 / HF				
201	42	42	GA-E-67800	Butterfly-Stem Extension-BWend-Triple Off Set-Int.seat-Fire safe - ASME-B16.34		BW	CL900	Body: ASTM A216 WCB Trim : Metal seat - 316 - 316 disc				
401	3	10	GA-E-60203	Globe-Stem Extension-PS-Disk-Integral seat - ASME-B16.34		BW	CL900	Body: ASTM A216 WCB Trim : 316 / HF				
701	2	2	GA-E-67186	Ball-Stem Extension-Top entry-Red.B-Trunnion ball + Pup Pieces - API6D		BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
701	42	42	GA-E-67195	Ball-Stem Extension-Top entry-Red.B-Trunnion ball + Pup Pieces - API6D		BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
801	2	2	GA-E-67149	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D		BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
840	2	2	GA-E-67637	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D - Interlock System		BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
840	6	6	GA-E-67638	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D - Interlock System		BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
902	26	36	GA-E-69030	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34		FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Metal seat - 316 - 316 disc				
902	38	42	GA-E-69029	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34		FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Metal seat - 316 - 316 disc				
907	2	2	GA-E-69028	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D		BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
907	3	24	GA-E-69027	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D		BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
917	2	2	GA-E-69025	Ball-Split body-Red.B-Trunnion ball - API6D		FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
917	3	24	GA-E-69026	Ball-Split body-Red.B-Trunnion ball - API6D		FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
921	26	42	GA-E-69062	Butterfly-Flanged-Triple Off Set-Int.seat-Fire safe - ASME-B16.34		BW	CL900	Body: ASTM A216 WCB Trim : Metal seat - 316 - 316 disc				
975	6	24	GA-E-69063	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D		FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
STRAINERS												
pos.	from	Size to	Data Sheet	Item Description		Ends	Rating/Facing	Material				
1	2	2	GA-E-60619	Y Strainer-Bolted cover - ASME-B16.34		BW	CL1500 RJ (F)	Body : ASTM A216 WCB Screen: 316 - PERF.PLATE - 18 Holes/Cm2				

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	10	10	GA-E-60620	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A420 WPL6 - SMLS Screen: 316 - CLOTH - MESH 3


BRANCH TABLES

RunSize		90 Degrees															
1	A																
1 1/2	A	A															
2	T	T	T														
3	S	S	W	T													
4	S	S	W	T	T												
6	S	S	W	W	T	T											
8	S	S	W	W	W	T	T										
10	S	S	W	W	W	W	T	T									
12	S	S	W	W	W	W	W	T	T								
14	S	S	W	W	W	W	W	P	T	T							
16	S	S	W	W	W	W	W	P	P	T	T						
18	S	S	W	W	W	W	W	P	P	P	T	T					
20	S	S	W	W	W	W	W	P	P	P	P	T	T				
24	S	S	W	W	W	W	W	P	P	P	P	P	T	T			
30	S	S	W	W	W	W	W	P	P	P	P	P	P	T	T		
32	S	S	W	W	W	W	W	P	P	P	P	P	P	P	T	T	
42	S	S	W	W	W	W	W	P	P	P	P	P	P	P	P	T	T
BranchSize	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	32	42
Legenda																	
A	TEE - SW ENDS - ASME-B16.11																
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																
S	SOCKOLET - SW END - TB RAC 5380																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
- 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 5) Specified Thickness are suitable to withstand Full Vacuum condition.

<div></div>										PIPING MATERIAL SPECIFICATION										JOB 032243														
																				Piping Class:										09CB4S40				
																				Sh. 1 of 2					Rev.					A 0 1 2 3				
Base Material : CARBON STEEL										Design code : ASME B 31.8-2018																								
Nom. Rating : CL900										PWHT : AS PER CODE																								
Facing/Finishing : RJ (F)										Valve Trim : 12 - SS316/HF																								
Corrosion Allow. : 6 mm										Welding Spec : MZ-010-CCX-MC-SPC-00001																								
Temp. Limit : -29 °C to 70 °C																																		
Service: [ASME B31.8] NG - Natural Gas - (Aboveground)																																		
Pipe Thickness																																		
NPS	1/2	3/4	1	1 1/2	2	3	4	6	24																									
Thk.mm	7.47	7.82	9.09	10.15	11.07	11.13	13.49	18.26	22.23																									
SCH.	XXS	XXS	XXS	XXS	XXS	160	160	160																										
Nipple Thickness																																		
NPS	1/2	3/4	1	1 1/2	2																													
Thk.mm	7.47	7.82	9.09	10.15	11.07																													
SCH.	XXS	XXS	XXS	XXS	XXS																													
PRESSURE - TEMPERATURE Ratings																																		
NPS	Press. bar	153.1	153.1	ASME B16.5																														
1/2 - 6	Temp. °C	-28.9	37.78	Material Group 1.1																														
NPS	Press. bar	140																																
24 - 24	Temp. °C	70																																
opt.	Size		Item Description							Ends	Rating/Facing	Material																						
	from	to																																
PIPE																																		
	1/2	20	PIPE							BW		ASTM A106 GR.B - SMLS																						
	22	24	PIPE							BW		API 5L GR.X65 PSL2 - SAW																						
FLANGES																																		
	1/2	1 1/2	SW FLANGE - ASME-B16.5							SW	CL1500 RJ (F)	ASTM A105 Normalized																						
	2	20	WN FLANGE - ASME-B16.5							BW	(2->2 1/2) CL1500 RJ (F) (3->24)	ASTM A105 Normalized																						
											CL900 RJ (F)																							
	22	24	WN FLANGE - ASME-B16.5							BW	CL900 RJ (F)	ASTM A694 F65																						
	1/2	20	BLIND FLANGE - ASME-B16.5								(1/2->2 1/2) CL1500 RJ (F) (3->24)	ASTM A105 Normalized																						
											CL900 RJ (F)																							
	22	24	BLIND FLANGE - ASME-B16.5								CL900 RJ (F)	ASTM A694 F65																						
SPECTACLE BLIND																																		
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48 GA-E-060011								CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)																						
	2	24	BLIND & SPACER - ASME-B16.48 GA-E-060011								(2->2 1/2) CL1500 RJ (F) (3->24)	ASTM A516 GR.70 + S5 (-46°C)																						
											CL900 RJ (F)																							
FITTINGS																																		
	1/2	3	DRIP-RING - TB DRI 5011								(1/2->2 1/2) CL1500 RJ (F) (3->24)	ASTM A105 Normalized																						
											CL900 RJ (F)																							
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11							SW	9000	ASTM A105 Normalized																						
	2	6	LONG RADIUS ELBOW - ASME-B16.9							BW		ASTM A234 WPB - SMLS																						
	24	24	LONG RADIUS ELBOW - ASME-B16.9							BW		ASTM A860 WPHY65 - WLDD																						
	24	24	HOT INDUCTION BENDS - ASME B16.49							BW		API 5L GR.X65 PSL2 - SAW																						
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11							SW	9000	ASTM A105 Normalized																						
	2	6	REDUCER - ASME-B16.9							BW		ASTM A234 WPB - SMLS																						
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11							SW	9000	ASTM A105 Normalized																						
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11							SW\THDF	6000	ASTM A105 Normalized																						
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11							THDM		ASTM A105 Normalized																						
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10							THDM\PE		ASTM A106 GR.B - SMLS																						
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95							PE\THDM		ASTM A234 WPB - SMLS																						
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95							PE		ASTM A234 WPB - SMLS																						
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11							SW	9000	ASTM A105 Normalized																						
	2	6	TEE - ASME-B16.9							BW		ASTM A234 WPB - SMLS																						
	24	24	TEE - BW BARRED TYPE - <MFR Std>							BW		ASTM A860 WPHY65 - WLDD																						
	24	24	TEE - ASME-B16.9							BW		ASTM A860 WPHY65 - WLDD																						
	2	6	WELDOLET - MSS-SP97							BW		ASTM A105 Normalized																						
	1/2	1 1/2	SOCKOLET - SW END - TB RAC 5380							SW\BW	9000	ASTM A105 Normalized																						
MISCELLANEOUS																																		
	1/2	24	KIT FOR INSULATING FLANGE - ASME-B16.5								(1/2->2 1/2) CL1500 RJ (F) (3->24)	GRE LAMINATED + TFE (MAX T 180 C)																						
											CL900 RJ (F)																							
GASKETS																																		
	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20									SOFT IRON																						
BOLTS																																		
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368									ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)																						
VALVES																																		
pos.	Size		Data Sheet	Item Description					Ends	Rating/Facing	Material																							
	from	to																																
1	3/4	3/4	GA-E-67335	Gate-WB-Red.B-Solid wdg-Exp.seat - API602					SW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF																							
1	2	2	GA-E-67340	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34					BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF																							

			PIPING MATERIAL SPECIFICATION			JOB 032243									
						Piping Class: 09CB4S40					Rev.				
						Sh. 2 of 2					A	0	1	2	3
VALVES															
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material								
1	3	4	GA-E-67341	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 316 / HF								
8	1	1	GA-E-67282	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats								
8	2	2	GA-E-67284	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats								
8	24	24	GA-E-67184	Ball-Top entry-FB-Trunnion ball+Pup Pieces - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : Metal seat-316+WV CARB. trim-(XM-19 stem)-GRAPH.								
10	1/2	1	GA-E-67336	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF								
11	2	2	GA-E-67060	Gate-BB-FB-Flex wdg-THdd seat - API600	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : 316 / HF								
89	1/2	1 1/2	GA-E-67283	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Metal seat-316+WV CARB. trim-(XM19 stem)-GRAPH.								
101	2	2	GA-E-67337	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF								
101	4	4	GA-E-67338	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL900	Body: ASTM A216 WCB Trim : 316 / HF								
801	2	2	GA-E-67178	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats								
830	1	1	GA-E-67685	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats								
907	2	2	GA-E-69028	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats								
907	3	24	GA-E-69027	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats								
917	2	2	GA-E-69025	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats								
917	3	24	GA-E-69026	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats								
918	3	24	GA-E-69064	Ball-Split body-FB-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats								

BRANCH TABLES															
90 Degrees															
RunSize 1/2 A 3/4 A A 1 A A A 1 1/2 A A A A 2 S S T T T 3 S S S S T T 4 S S S S W T T 6 S S S S W W T T 24 S S S S W W W W T BranchSize 1/2 3/4 1 1 1/2 2 3 4 6 24															
Legenda															
A	TEE - SW ENDS - ASME-B16.11														
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E														
S	SOCKOLET - SW END - TB RAC 5380														
T	TEE - ASME-B16.9														
W	WELDOLET - MSS-SP97														

GENERAL NOTES															
1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment. 2) Pipes wall Thickness have been calculated in accordance with ASME B31.8 considering Design Factor=0.6 3) Linepipe shall be in accordance with Specification MZ-010-CCX-PL-SPC-00005 Onshore Linepipe Specification 4) Hot induction Bends shall be in accordance with Specification MZ-010-CCX-PL-SPC-00006 Onshore Pipelines Hot Induction Bend 5) Barred Tee shall be in accordance with Specification MZ-010-CCX-PL-SPC-00007 Onshore Pipelines Barred Tee 6) Pipeline Fittings and Flanges shall be in accordance with Specification MZ-010-CCX-PL-SPC-00009 Onshore Pipelines Fittings 7) Monolithic Insulation Joints shall be in accordance with Specification MZ-010-CCX-PL-SPC-00008 Onshore Pipelines Monolithic Insulation Joint															





PIPING MATERIAL
SPECIFICATION

JOB 032243					
Piping Class:		09CB4S49			
Sh.	2	of	2	Rev.	
				A	0
				1	

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) Pipes wall Thickness have been calculated in accordance with ASME B31.8 considering Design Factor=0.6
- 3) Linepipe shall be in accordance with Specification MZ-010-CCX-PL-SPC-00005 Onshore Linepipe Specification
- 4) Hot induction Bends shall be in accordance with Specification MZ-010-CCX-PL-SPC-00006 Onshore Pipelines Hot Induction Bend
- 5) Barred Tee shall be in accordance with Specification MZ-010-CCX-PL-SPC-00007 Onshore Pipelines Barred Tee
- 6) Pipeline Fittings and Flanges shall be in accordance with Specification MZ-010-CCX-PL-SPC-00009 Onshore Pipelines Fittings
- 7) Monolithic Insulation Joints shall be in accordance with Specification MZ-010-CCX-PL-SPC-00008 Onshore Pipelines Monolithic Insulation Joint
- 8) Buried Carbon Steel piping shall be FBE external coated in accordance with Specification MZ-000-CCX-MC-SPC-00004 _External Coating for Buried Pipeline and Piping Components-FBE and FJC

<div></div>		PIPING MATERIAL SPECIFICATION				JOB 032243					
						Piping Class:		09SA0D01			
						Sh. 1 of 2		Rev. A 0 1			
Base Material : STAINLESS STEEL 304/304L DUAL GRADE						Design code : ASME B 31.3 2016					
Nom. Rating : CL900						PWHT : NO					
Facing/Finishing : RJ (F)						Valve Trim : 12 - SS316/HF					
Corrosion Allow. : 0 mm						Welding Spec : MZ-000-CCX-MC-SPC-00009/00013					
Temp. Limit : -120 °C to 180 °C											
Service: MR - Mixed Refrigerant											
Pipe Thickness											
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	
Thk.mm	2.77	2.87	3.38	3.68	3.91	5.49	8.56	10.97	10.31	12.7	
SCH.	40S	40S	40S	40S	40S	40S	80S	80S	60	80S	
Nipple Thickness											
NPS	1/2	3/4	1	1 1/2	2						
Thk.mm	3.73	3.91	4.55	5.08	5.54						
SCH.	80S	80S	80S	80S	80S						
PRESSURE - TEMPERATURE Ratings											
NPS	Press. bar	148.9	148.9	124.1	111.4	ASME B16.5					
1/2 - 6	Temp. °C	-28.9	37.78	93.33	148.9	Material Group 2.1					
NPS	Press. bar	75									
8 - 10	Temp. °C	180									
opt.	Size from to		Item Description				Ends	Rating/Facing	Material		
PIPE											
	1/2	6	PIPE				BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS		
	8	10	PIPE				BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW		
FLANGES											
7	1/2	10	WN FLANGE - ASME-B16.5				BW	(1/2->2 1/2) CL1500 RJ (F) (3->10) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE		
	3	6	WN FLANGE - ASME-B16.5				BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE		
	1/2	10	BLIND FLANGE - ASME-B16.5					(1/2->2 1/2) CL1500 RJ (F) (3->10) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE		
14	2	2	THDD RED. FLANGE - ASME-B16.5				THDF	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE		
SPECTACLE BLIND											
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48					CL1500 RJ (F)	ASTM A240 TP304		
	2	10	BLIND & SPACER - ASME-B16.48					(2->2 1/2) CL1500 RJ (F) (3->10) CL900 RJ (F)	ASTM A240 TP304		
FITTINGS											
	1/2	3	DRIP-RING - TB DRI 5011					(1/2->2 1/2) CL1500 RJ (F) (3->10) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE		
	1/2	6	LONG RADIUS ELBOW - ASME-B16.9				BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS		
	8	10	LONG RADIUS ELBOW - ASME-B16.9				BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD		
	3/4	6	REDUCER - ASME-B16.9				BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS		
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11				THDF	3000	ASTM A182 F304/304L DUAL GRADE		
	1/2	6	CAP - ASME-B16.9				BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS		
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11				THDM		ASTM A182 F304/304L DUAL GRADE		
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10				THDM/PE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS		
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95				PE\THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS		
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95				PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS		
	1/2	6	TEE - ASME-B16.9				BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS		
	8	10	TEE - ASME-B16.9				BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD		
	1/2	3	WELDOLET - MSS-SP97				BW		ASTM A182 F304/304L DUAL GRADE		
GASKETS											
	1/2	10	OCTAGONAL RJ GASKET - ASME-B16.20						AISI 304		
BOLTS											
	1/2	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368						ASTM A320 B8 CL.2 + ASTM A194 GR.8		
	1 5/8	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368						ASTM A453 GR. 660		
VALVES											
pos.	Size from to		Data Sheet	Item Description			Ends	Rating/Facing	Material		
1	1/2	1 1/2	GA-E-67067	Gate-WB-Red.B-Solid wdg-Exp.seat - API602			BW	CL1500	Body:ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF		
1	2	2	GA-E-60158	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34			BW	CL1500	Body:ASTM A351 CF8M Trim :316 / HF		
1	3	6	GA-E-60159	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34			BW	CL900	Body:ASTM A351 CF8M Trim :316 / HF		
4	1/2	1 1/2	GA-E-60289	Globe-WB-Red.B-Thdd seat - API602			BW	CL1500	Body:ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF		
4	2	2	GA-E-60251	Globe-PS-Disk-Integral seat - ASME-B16.34			BW	CL1500	Body:ASTM A351 CF8M Trim :316 / HF		
4	3	6	GA-E-60252	Globe-PS-Disk-Integral seat - ASME-B16.34			BW	CL900	Body:ASTM A351 CF8M Trim :316 / HF		
6	1/2	1 1/2	GA-E-60732	Check-WB-Red.B-Piston-Int seat - API602			BW	CL1500	Body:ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF		
6	2	2	GA-E-60364	Check-PS-FB-Swing-Integral seat - ASME-B16.34			BW	CL1500	Body:ASTM A351 CF8M Trim :316 / HF		

	PIPING MATERIAL SPECIFICATION				JOB 032243						
					Piping Class:		09SA0D01				
					Sh. 2 of 2		Rev.				
						A	0	1			


VALVES										
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material			
6	3	6	GA-E-60365	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF			
7	6	6	GA-E-60466	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats			
8	1/2	1 1/2	GA-E-67233	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	BW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats			


BRANCH TABLES

90 Degrees										
RunSize										
1/2	T									
3/4	T	T								
1	T	T	T							
1 1/2	T	T	T	T						
2	W	W	T	T	T					
3	W	W	W	W	W	T				
4	W	W	W	W	W	T	T			
6	W	W	W	W	W	W	T	T		
8	W	W	W	W	W	W	T	T	T	
10	W	W	W	W	W	W	T	T	T	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10
Legenda										
T	TEE - ASME-B16.9									
W	WELDOLET - MSS-SP97									

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION				JOB 032243					
						Piping Class:		09SA0D30			
						Sh. 1 of 2		Rev. A 0 1			
Base Material : STAINLESS STEEL 304/304L DUAL GRADE						Design code : ASME B 31.3 2016					
Nom. Rating : CL900						PWHT : NO					
Facing/Finishing : RJ (F)						Valve Trim : 12 - SS316/HF					
Corrosion Allow. : 0 mm						Welding Spec : MZ-000-CCX-MC-SPC-00009/00013					
Temp. Limit : -100 °C to 190 °C											
Service: [Cryogenic Service] ER - Ethane / Ethilene Refrigerant											
Pipe Thickness											
NPS	1/2	3/4	1	1 1/2	2	3	4	6			
Thk.mm	2.77	2.87	3.38	3.68	3.91	5.49	8.56	10.97			
SCH.	40S	40S	40S	40S	40S	40S	80S	80S			
Nipple Thickness											
NPS	1/2	3/4	1	1 1/2	2						
Thk.mm	3.73	3.91	4.55	5.08	5.54						
SCH.	80S	80S	80S	80S	80S						
PRESSURE - TEMPERATURE Ratings											
NPS	Press. bar	148.9	148.9	124.1	111.4	ASME B16.5					
1/2 - 6	Temp. °C	-28.9	37.78	93.33	148.9	Material Group 2.1					
opt.	Size from to		Item Description			Ends	Rating/Facing	Material			
PIPE											
	1/2	6	PIPE			BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS			
FLANGES											
7	1/2	6	WN FLANGE - ASME-B16.5			BW	(1/2->2 1/2) CL1500 RJ (F) (3->6) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
	3	6	WN FLANGE - ASME-B16.5			BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
	1/2	6	BLIND FLANGE - ASME-B16.5			BW	(1/2->2 1/2) CL1500 RJ (F) (3->6) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
14	2	2	THDD RED. FLANGE - ASME-B16.5			THDF	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
SPECTACLE BLIND											
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48				CL1500 RJ (F)	ASTM A240 TP304			
	2	6	BLIND & SPACER - ASME-B16.48				(2->2 1/2) CL1500 RJ (F) (3->6) CL900 RJ (F)	ASTM A240 TP304			
FITTINGS											
	1/2	3	DRIP-RING - TB DRI 5011				(1/2->2 1/2) CL1500 RJ (F) (3->6) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
	1/2	6	LONG RADIUS ELBOW - ASME-B16.9			BW	3000	ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	3/4	6	REDUCER - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	1/2	6	CAP - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11			THDF		ASTM A182 F304/304L DUAL GRADE			
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11			THDM		ASTM A182 F304/304L DUAL GRADE			
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10			THDMPE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS			
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95			PE\THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95			PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	1/2	6	TEE - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	1/2	3	WELDOLET - MSS-SP97			BW		ASTM A182 F304/304L DUAL GRADE			
GASKETS											
	1/2	6	OCTAGONAL RJ GASKET - ASME-B16.20					AISI 304			
BOLTS											
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED			
VALVES											
pos.	from	Size to	Data Sheet	Item Description		Ends	Rating/Facing	Material			
1	1/2	1 1/2	GA-E-67068	Cryo.Gate-Extend.WB-Red.B-Solid wdg-Wldd seat - API602		BW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF			
1	2	2	GA-E-67069	Cryo.Gate-Extend.BB-FB-Flex wdg-Thd seat - API600		BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF			
1	3	6	GA-E-67070	Cryo.Gate-Extend.PS-FB-Flex wdg-Wldd seat - ASME-B16.34		BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF			
4	1/2	1 1/2	GA-E-60290	Cryo.Globe-Extend.WB-Red.B-Thdd seat - API602		BW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF			
4	2	2	GA-E-60270	Cryo.Globe-Extend.BB-Disk-Thdd seat-API623		BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF			
4	3	6	GA-E-60292	Cryo.Globe-Extend.PS-Disk-Integral seat - ASME-B16.34		BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF			
6	1/2	1 1/2	GA-E-60733	Cryo.Check-WB-Red.B-Piston-Int seat - API602		BW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF			
6	2	2	GA-E-60734	Cryo.Check-Extend.PS-FB-Swing-Thdd seat - API594		BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF			
6	3	6	GA-E-60735	Cryo.Check-PS-FB-Swing-Integral seat - ASME-B16.34		BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF			
7	2	2	GA-E-67646	Cryo.Ball-Top Entry-Ext.bnt-Red.B-Trun.ball+ Pup Pieces - API6D		BW	CL1500	Body: ASTM A351 CF8M Trim : Crio Soft seal-316 trim - KEL.F seats			
8	1/2	1 1/2	GA-E-67165	Cryo.Ball-End Entry-Ext.bnt-FB-Float.ball+nipples - ASME-B16.34		BW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Crio Soft seal-316 trim - KEL.F seats			
89	1/2	1 1/2	GA-E-67643	Cryo.Ball-End Entry-Ext.bnt-FB-Float.ball+nipple - ASME-B16.34		BW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.			

<div></div>		PIPING MATERIAL SPECIFICATION				JOB 032243					
						Piping Class:		09SA0D60			
						Sh. 1 of 2		Rev.			
Base Material : STAINLESS STEEL 304/304L DUAL GRADE						Design code : ASME B 31.3 2016					
Nom. Rating : CL900						PWHT : NO					
Facing/Finishing : RJ (F)						Valve Trim : 12 - SS316/HF					
Corrosion Allow. : 0 mm						Welding Spec : MZ-000-CCX-MC-SPC-00009/00013					
Temp. Limit : -120°C to 180 °C											
Service: [AIV] MR - Mixed Refrigerant											
Pipe Thickness											
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	
Thk.mm	2.77	2.87	3.38	3.68	3.91	5.49	8.56	10.97	10.31	12.7	
SCH.	40S	40S	40S	40S	40S	40S	80S	80S	60	80S	
Nipple Thickness											
NPS	1/2	3/4	1	1 1/2	2						
Thk.mm	3.73	3.91	4.55	5.08	5.54						
SCH.	80S	80S	80S	80S	80S						
PRESSURE - TEMPERATURE Ratings											
NPS	Press. bar	148.93	148.93	124.11	111.35	ASME B16.5					
1/2 - 6	Temp. °C	-28.89	37.78	93.33	148.89	Material Group 2.1					
NPS	Press. bar	75									
8 - 10	Temp. °C	180									
opt.	Size from to		Item Description			Ends	Rating/Facing	Material			
PIPE											
	1/2	6	PIPE			BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS			
	8	10	PIPE			BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW			
FLANGES											
	1/2	10	WN FLANGE - ASME-B16.5			BW	(1/2->2 1/2) CL1500 RJ (F) (3->10) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
7	3	6	WN FLANGE - ASME-B16.5			BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
	1/2	10	BLIND FLANGE - ASME-B16.5				(1/2->2 1/2) CL1500 RJ (F) (3->10) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
14	2	2	THDD RED. FLANGE - ASME-B16.5			THDF	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
SPECTACLE BLIND											
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48				CL1500 RJ (F)	ASTM A240 TP304			
	2	10	BLIND & SPACER - ASME-B16.48				(2->2 1/2) CL1500 RJ (F) (3->10) CL900 RJ (F)	ASTM A240 TP304			
FITTINGS											
	1/2	3	DRIP-RING - TB DRI 5011				(1/2->2 1/2) CL1500 RJ (F) (3->10) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
	1/2	6	LONG RADIUS ELBOW - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	8	10	LONG RADIUS ELBOW - ASME-B16.9			BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD			
	3/4	6	REDUCER - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11			THDF	3000	ASTM A182 F304/304L DUAL GRADE			
	1/2	6	CAP - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11			THDM		ASTM A182 F304/304L DUAL GRADE			
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10			THDMPE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS			
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95			PE/THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95			PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	1/2	6	TEE - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	8	10	TEE - ASME-B16.9			BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD			
	2	3	SPECIAL SWEEPOLET - <MFR Std>			BW		ASTM A182 F304/304L DUAL GRADE			
GASKETS											
	1/2	10	OCTAGONAL RJ GASKET - ASME-B16.20					AISI 304			
BOLTS											
	1/2	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A320 B8 CL.2 + ASTM A194 GR.8			
	1 5/8	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A453 GR. 660			
VALVES											
pos.	from	Size to	Data Sheet	Item Description		Ends	Rating/Facing	Material			
1	1/2	1 1/2	GA-E-67067	Gate-WB-Red.B-Solid wdg-Exp.seat - API602		BW	CL1500	Body:ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF			
1	2	2	GA-E-60158	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		BW	CL1500	Body:ASTM A351 CF8M Trim :316 / HF			
1	3	6	GA-E-60159	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		BW	CL900	Body:ASTM A351 CF8M Trim :316 / HF			
4	1/2	1 1/2	GA-E-60289	Globe-WB-Red.B-Thdd seat - API602		BW	CL1500	Body:ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF			
4	2	2	GA-E-60251	Globe-PS-Disk-Integral seat - ASME-B16.34		BW	CL1500	Body:ASTM A351 CF8M Trim :316 / HF			
4	3	6	GA-E-60252	Globe-PS-Disk-Integral seat - ASME-B16.34		BW	CL900	Body:ASTM A351 CF8M Trim :316 / HF			
6	1/2	1 1/2	GA-E-60732	Check-WB-Red.B-Piston-Int seat - API602		BW	CL1500	Body:ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF			
6	2	2	GA-E-60364	Check-PS-FB-Swing-Integral seat - ASME-B16.34		BW	CL1500	Body:ASTM A351 CF8M Trim :316 / HF			



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 09SA0S01

Rev.					
A	0	1	2	3	

Base Material	: STAINLESS STEEL 304/304L DUAL GRADE	Design code	: ASME B 31.3 2016
Nom. Rating	: CL900	PWHT	: NO
Facing/Finishing	: RJ (F)	Valve Trim	: 12 - SS316/HF
Corrosion Allow.	: 0 mm	Welding Spec	: MZ-000-CCX-MC-SPC-00009/00013
Temp. Limit	: -101 °C to 230 °C		

Service: DMW - Demineralized Water HL - Hydrocarbon Liquid HV - Hydrocarbon Vapour NG - Natural Gas PRW - Process Water

Pipe Thickness

NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36
Thk.mm	2.77	2.87	3.38	3.68	3.91	5.49	8.56	10.97	10.31	12.7	14.27	15.09	16.66	17.48	20.62	24.61	28.58	34
SCH.	40S	40S	40S	40S	40S	40S	80S	80S		80S								

Nipple Thickness

NPS	1/2	3/4	1	1 1/2	2
Thk.mm	3.73	3.91	4.55	5.08	5.54
SCH.	80S	80S	80S	80S	80S

PRESSURE - TEMPERATURE Ratings

NPS	Press. bar	148.9	148.9	124.1	111.4	102.7	ASME B16.5
1/2 - 6	Temp. °C	-28.9	37.78	93.33	148.9	204.4	Material Group 2.1
NPS	Press. bar	105					
8 - 10	Temp. °C	70					
NPS	Press. bar	89					
12 - 12	Temp. °C	230					
NPS	Press. bar	91					
14 - 36	Temp. °C	130					

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
PIPE						
	1/2	6	PIPE	BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	8	36	PIPE	BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW
FLANGES						
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	2	24	WN FLANGE - ASME-B16.5	BW	(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE
7	3	24	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
13	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RF	ASTM A182 F304/304L DUAL GRADE
13	30	30	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RF	ASTM A182 F304/304L DUAL GRADE
	1/2	24	BLIND FLANGE - ASME-B16.5		(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	26	36	BLIND FLANGE - ASME-B16.47 series.A		CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE
13	26	36	BLIND FLANGE - ASME-B16.47 series.A		CL900 RF	ASTM A182 F304/304L DUAL GRADE
	2	2	SW REDUCING FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
SPECTACLE BLIND						
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48		CL1500 RJ (F)	ASTM A240 TP304
	2	24	BLIND & SPACER - ASME-B16.48		(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A240 TP304
	30	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060017		CL900 RJ (F)	ASTM A240 TP304
13	30	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060017		CL900 RF	ASTM A240 TP304
FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	36	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	3/4	1 1/2	RED. COUPLING - SW/THDD - ASME-B16.11	SW\THDF	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	REDUCER - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	36	REDUCER - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	36	CAP - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A182 F304/304L DUAL GRADE
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	TEE - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	36	TEE - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	2	8	WELDOLET - MSS-SP97	BW		ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A182 F304/304L DUAL GRADE

GASKETS



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **09SA0S01**

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opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
GASKETS						
13	30	30	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE
	1/2	36	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304
BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED

VALVES								
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material	
1	1/2	1 1/2	GA-E-60157	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
1	2	2	GA-E-60158	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF	
1	3	30	GA-E-60159	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF	
4	1/2	1 1/2	GA-E-60250	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
4	2	2	GA-E-60251	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF	
4	3	8	GA-E-60252	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF	
6	1/2	1 1/2	GA-E-60363	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
6	2	2	GA-E-60364	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF	
6	3	16	GA-E-60365	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF	
7	6	24	GA-E-60466	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats	
8	1/2	1 1/2	GA-E-60465	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats	
8	6	24	GA-E-67104	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats	
10	1/2	1 1/2	GA-E-60184	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
11	1/2	1 1/2	GA-E-67005	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
11	2	2	GA-E-60181	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
11	3	24	GA-E-60185	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
61	2	2	GA-E-67505	Check-PS-FB-Swing-Integral seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
61	4	4	GA-E-60749	Check-PS-FB-Swing-Integral seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
62	2	2	GA-E-60744	Check-Lug wafer-Dual plate-Wldd seat - API594	WAFER LUG	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
62	4	4	GA-E-60745	Check-Lug wafer-Dual plate-Wldd seat - API594	WAFER LUG	CL900 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
82	1/2	1 1/2	GA-E-60773	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
89	1/2	1 1/2	GA-E-60774	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
101	1/2	1 1/2	GA-E-67019	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
101	2	2	GA-E-67032	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF	
111	2	2	GA-E-67093	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
114	2	2	GA-E-67347	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
130	1/2	1 1/2	GA-E-67087	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
140	2	2	GA-E-67382	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34 - Interlock System	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF	
159	4	4	GA-E-67321	Gate-Ext. Stem (1200mm)-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF	
744	2	2	GA-E-60776	Ball-Dead Man Quick Opening Valve-Top entry-Red.B-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats	
780	2	2	GA-E-67675	DBL Block&Bleed Ball valve-SplitBdy-RB-Trunnion - <MFR Std>	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats	
780	3	3	GA-E-67676	DBL Block&Bleed Ball valve-SplitBdy-RB-Trunnion - <MFR Std>	FLGD	CL900 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats	
782	2	2	GA-E-67902	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Trunnion - <MFR Std>	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats	
783	2	2	GA-E-67905	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Trunnion - <MFR Std>	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats	
801	1/2	1 1/2	GA-E-67144	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats	
830	1/2	1 1/2	GA-E-67244	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats	



PIPING MATERIAL
SPECIFICATION

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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
840	6	6	GA-E-67639	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D - Interlock System	BW	CL900	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
907	2	2	GA-E-69033	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
907	3	24	GA-E-69034	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
917	4	4	GA-E-69031	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
917	6	24	GA-E-69032	Ball-Top entry-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
971	2	2	GA-E-69067	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
974	2	2	GA-E-69072	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
974	3	24	GA-E-69065	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	2	2	GA-E-60625	Y Strainer-Bolted cover - ASME-B16.34	FLGD	CL1500 RJ (F)	Body : ASTM A351 CF8M Screen: 316 - PERF.PLATE - 18 Holes/Cm2
1	4	4	GA-E-60642	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A403 WP304S/304LS DUAL GRADE - SMLS Screen: 316 - CLOTH - MESH 3
1	10	10	GA-E-60621	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

RunSize		90 Degrees	
1/2	A		
3/4	A	A	
1	A	A	A
1 1/2	A	A	A
2	S	S	T
3	S	S	S
4	S	S	S
6	S	S	S
8	S	S	S
10	S	S	S
12	S	S	S
14	S	S	S
16	S	S	S
18	S	S	S
20	S	S	S
24	S	S	S
30	S	S	S
36	S	S	S
BranchSize	1/2	3/4	1 1 1/2 2 3 4 6 8 10 12 14 16 18 20 24 30 36
Legenda			
A	TEE - SW ENDS - ASME-B16.11		
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E		
S	SOCKOLET - SW END - MSS-SP97		
T	TEE - ASME-B16.9		
W	WELDOLET - MSS-SP97		

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243																	
												Piping Class:					09SA0S02												
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					A					0					1					2					3				

Base Material : STAINLESS STEEL 304/304L DUAL GRADE															Design code : ASME B 31.3 2016																
Nom. Rating : CL900															PWHT : NO																
Facing/Finishing : RJ (F)															Valve Trim : 12 - SS316/HF																
Corrosion Allow. : 0 mm															Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																
Temp. Limit : -29 °C to 130 °C																															
Service: [Amine Service] AL - Amine Lean AR - Amine Rich																															
Pipe Thickness																															
NPS		1/2		3/4		1		1 1/2		2		3		4		6		8		10		12									
Thk.mm		2.77		2.87		3.38		3.68		3.91		5.49		8.56		10.97		10.31		12.7		14.27									
SCH.		40S		40S		40S		40S		40S		40S		80S		80S				80S											
Nipple Thickness																															
NPS		1/2		3/4		1		1 1/2		2																					
Thk.mm		3.73		3.91		4.55		5.08		5.54																					
SCH.		80S		80S		80S		80S		80S																					
PRESSURE - TEMPERATURE Ratings																															
NPS		Press. bar		148.9		148.9		124.1		ASME B16.5																					
1/2 - 6		Temp. °C		-28.9		37.78		93.33		Material Group 2.1																					
NPS		Press. bar		105																											
8 - 12		Temp. °C		130																											

opt.		Size from to		Item Description										Ends		Rating/Facing		Material													
PIPE																															
		1/2		6		PIPE										BW				ASTM A312 TP304/TP304L DUAL GRADE - SMLS											
		8		12		PIPE										BW				ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW											
FLANGES																															
		1/2		1 1/2		SW FLANGE - ASME-B16.5										SW		CL1500 RJ (F)		ASTM A182 F304/304L DUAL GRADE											
		2		12		WN FLANGE - ASME-B16.5										BW		(2->2 1/2) CL1500 RJ (F) (3->12) CL900 RJ (F)		ASTM A182 F304/304L DUAL GRADE											
		1/2		12		BLIND FLANGE - ASME-B16.5												(1/2->2 1/2) CL1500 RJ (F) (3->12) CL900 RJ (F)		ASTM A182 F304/304L DUAL GRADE											
14		2		2		THDD RED. FLANGE - ASME-B16.5										THDF		CL1500 RJ (F)		ASTM A182 F304/304L DUAL GRADE											
SPECTACLE BLIND																															
		1/2		1 1/2		SPECTACLE BLIND - ASME-B16.48												CL1500 RJ (F)		ASTM A240 TP304											
		2		12		BLIND & SPACER - ASME-B16.48												(2->2 1/2) CL1500 RJ (F) (3->12) CL900 RJ (F)		ASTM A240 TP304											
FITTINGS																															
		1/2		3		DRIP-RING - TB DRI 5011												(1/2->2 1/2) CL1500 RJ (F) (3->12) CL900 RJ (F)		ASTM A182 F304/304L DUAL GRADE											
		1/2		1 1/2		ELBOW - SW ENDS - ASME-B16.11										SW		3000		ASTM A182 F304/304L DUAL GRADE											
		2		6		LONG RADIUS ELBOW - ASME-B16.9										BW				ASTM A403 WP304S/304LS DUAL GRADE - SMLS											
		8		12		LONG RADIUS ELBOW - ASME-B16.9										BW				ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD											
		3/4		1 1/2		RED. COUPLING - SW ENDS - ASME-B16.11										SW		3000		ASTM A182 F304/304L DUAL GRADE											
		3/4		1 1/2		RED. COUPLING - SW/THDD - ASME-B16.11										SW\THDF		3000		ASTM A182 F304/304L DUAL GRADE											
		2		6		REDUCER - ASME-B16.9										BW				ASTM A403 WP304S/304LS DUAL GRADE - SMLS											
		8		12		REDUCER - ASME-B16.9										BW				ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD											
		1/2		1 1/2		FEMALE CAP - THD END - ASME-B16.11										THDF		3000		ASTM A182 F304/304L DUAL GRADE											
		1/2		1 1/2		FEMALE CAP - SW END - ASME-B16.11										SW		3000		ASTM A182 F304/304L DUAL GRADE											
		2		12		CAP - ASME-B16.9										BW				ASTM A403 WP304S/304LS DUAL GRADE - SMLS											
		1/2		1 1/2		COUPLING - SW ENDS - ASME-B16.11										SW		3000		ASTM A182 F304/304L DUAL GRADE											
		1/2		1 1/2		COUPLING - SW/THDD ENDS - ASME-B16.11										SW\THDF		3000		ASTM A182 F304/304L DUAL GRADE											
		1/2		1 1/2		THD MALE PLUG - RND HEAD - ASME-B16.11										THDM				ASTM A182 F304/304L DUAL GRADE											
		1/2		2		NIPPLE - THDD/PE - ASME-B36.10										THDMPE				ASTM A312 TP304/TP304L DUAL GRADE - SMLS											
		3/4		2		SWAGE NIPPLE - PE/THDD - MSS-SP95										PE\THDM				ASTM A403 WP304S/304LS DUAL GRADE - SMLS											
		3/4		2		SWAGE NIPPLE - PE/PE - MSS-SP95										PE				ASTM A403 WP304S/304LS DUAL GRADE - SMLS											
		1/2		1 1/2		TEE - SW ENDS - ASME-B16.11										SW		3000		ASTM A182 F304/304L DUAL GRADE											
		2		6		TEE - ASME-B16.9										BW				ASTM A403 WP304S/304LS DUAL GRADE - SMLS											
		8		12		TEE - ASME-B16.9										BW				ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD											
		2		8		WELDOLET - MSS-SP97										BW				ASTM A182 F304/304L DUAL GRADE											
		1/2		1 1/2		SOCKOLET - SW END - MSS-SP97										SW\BW		3000		ASTM A182 F304/304L DUAL GRADE											
GASKETS																															
		1/2		12		OCTAGONAL RJ GASKET - ASME-B16.20														AISI 304											
BOLTS																															
		1/2		4		ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368														ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED											
VALVES																															
pos.		from		Size to		Data Sheet		Item Description										Ends		Rating/Facing		Material									
1		1/2		1 1/2		GA-E-60157		Gate-WB-Red.B-Solid wdg-Exp.seat - API602										SW		CL1500		Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF									
1		2		2		GA-E-60158		Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34										BW		CL1500		Body: ASTM A351 CF8M Trim : 316 / HF									
1		3		12		GA-E-60159		Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34										BW		CL900		Body: ASTM A351 CF8M Trim : 316 / HF									
4		1/2		1 1/2		GA-E-60250		Globe-WB-Red.B-Thdd seat - API602										SW		CL1500		Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF									



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 09SA0S02

Rev.				
A	0	1	2	3

Sh. 2 of 3


VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
4	2	2	GA-E-60251	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
4	3	8	GA-E-60252	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF
6	1/2	1 1/2	GA-E-60363	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	2	GA-E-60364	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
6	3	12	GA-E-60365	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF
7	6	12	GA-E-60468	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60467	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60184	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	1/2	1 1/2	GA-E-67005	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	2	2	GA-E-60181	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF
11	3	12	GA-E-60185	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF
44	2	2	GA-E-60295	Globe-Dead Man Quick Opening Valve-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
82	1/2	1 1/2	GA-E-60773	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60774	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67019	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	2	GA-E-67032	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
111	2	2	GA-E-67093	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF
114	2	2	GA-E-67347	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF
130	1/2	1 1/2	GA-E-67087	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
744	2	2	GA-E-60751	Ball-Dead Man Quick Opening Valve-Top entry-Red.B-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
780	2	2	GA-E-67677	DBL Block&Bleed Ball valve-SplitBdy-RB-Trunnion - <MFR Std>	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
782	2	2	GA-E-67903	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Trunnion - <MFR Std>	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
783	2	2	GA-E-67904	DBL Block&Bleed Ball valve-Stem Extension-SplitBdy-RB-Trunnion - <MFR Std>	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
801	1/2	1 1/2	GA-E-67145	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
830	1/2	1 1/2	GA-E-67245	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	10	10	GA-E-60621	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

<div></div>	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:	09SA0S02				
		Sh. 3 of 3	Rev.				
		A	0	1	2	3	

90 Degrees												
RunSize												
1/2	A											
3/4	A	A										
1	A	A	A									
1 1/2	A	A	A	A								
2	S	S	T	T	T							
3	S	S	S	S	W	T						
4	S	S	S	S	W	T	T					
6	S	S	S	S	W	W	T	T				
8	S	S	S	S	W	W	W	T	T			
10	S	S	S	S	W	W	W	W	T	T		
12	S	S	S	S	W	W	W	W	W	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	


Legenda	
A	TEE - SW ENDS - ASME-B16.11
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E
S	SOCKOLET - SW END - MSS-SP97
T	TEE - ASME-B16.9
W	WELDOLET - MSS-SP97

GENERAL NOTES

1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.

2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exced 200°C).

3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION				JOB 032243					
						Piping Class:		09SA0S03			
						Sh. 1 of 3		Rev. A 0 1			
Base Material : STAINLESS STEEL 304/304L DUAL GRADE						Design code : ASME B 31.3 2016					
Nom. Rating : CL900						PWHT : NO					
Facing/Finishing : RJ (F)						Valve Trim : 12 - SS316/HF					
Corrosion Allow. : 0 mm						Welding Spec : MZ-000-CCX-MC-SPC-00009/00013					
Temp. Limit : -29 °C to 130 °C											
Service: [Amine Service] AL - Amine Lean											
Pipe Thickness											
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	
Thk.mm	2.77	2.87	3.38	3.68	3.91	5.49	8.56	10.97	12.7	14.27	
SCH.	40S	40S	40S	40S	40S	40S	80S	80S	80S		
Nipple Thickness											
NPS	1/2	3/4	1	1 1/2	2						
Thk.mm	3.73	3.91	4.55	5.08	5.54						
SCH.	80S	80S	80S	80S	80S						
PRESSURE - TEMPERATURE Ratings											
NPS	Press. bar	148.9	148.9	124.1	ASME B16.5						
1/2 - 6	Temp. °C	-28.9	37.78	93.33	Material Group 2.1						
NPS	Press. bar	125	105								
8 - 10	Temp. °C	90	130								
opt.	Size from to		Item Description			Ends	Rating/Facing	Material			
PIPE											
	1/2	6	PIPE			BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS			
	8	10	PIPE			BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW			
FLANGES											
7	1/2	1 1/2	SW FLANGE - ASME-B16.5			SW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
	2	10	WN FLANGE - ASME-B16.5			BW	(2->2 1/2) CL1500 RJ (F) (3->10)	ASTM A182 F304/304L DUAL GRADE			
	3	10	WN FLANGE - ASME-B16.5			BW	CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
	1/2	10	BLIND FLANGE - ASME-B16.5				CL1500 RJ (F) (1/2->2 1/2) CL1500 RJ (F) (3->10) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
7	3	10	BLIND FLANGE - ASME-B16.5			THDF	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
14	2	2	THDD RED. FLANGE - ASME-B16.5				CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
SPECTACLE BLIND											
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48				CL1500 RJ (F)	ASTM A240 TP304			
	2	10	BLIND & SPACER - ASME-B16.48				(2->2 1/2) CL1500 RJ (F) (3->10) CL900 RJ (F)	ASTM A240 TP304			
FITTINGS											
	1/2	3	DRIP-RING - TB DRI 5011				(1/2->2 1/2) CL1500 RJ (F) (3->10) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE			
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11			SW	3000	ASTM A182 F304/304L DUAL GRADE			
	2	6	LONG RADIUS ELBOW - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	8	10	LONG RADIUS ELBOW - ASME-B16.9			BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD			
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11			SW	3000	ASTM A182 F304/304L DUAL GRADE			
	3/4	1 1/2	RED. COUPLING - SW/THDD - ASME-B16.11			SW\THDF	3000	ASTM A182 F304/304L DUAL GRADE			
	2	6	REDUCER - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	8	10	REDUCER - ASME-B16.9			BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD			
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11			THDF	3000	ASTM A182 F304/304L DUAL GRADE			
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11			SW	3000	ASTM A182 F304/304L DUAL GRADE			
	2	10	CAP - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11			SW	3000	ASTM A182 F304/304L DUAL GRADE			
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11			SW\THDF	3000	ASTM A182 F304/304L DUAL GRADE			
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11			THDM		ASTM A182 F304/304L DUAL GRADE			
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10			THDMPE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS			
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95			PE\THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95			PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11			SW	3000	ASTM A182 F304/304L DUAL GRADE			
	2	6	TEE - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS			
	8	10	TEE - ASME-B16.9			BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD			
	2	6	WELDOLET - MSS-SP97			BW		ASTM A182 F304/304L DUAL GRADE			
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97			SW\BW	3000	ASTM A182 F304/304L DUAL GRADE			
GASKETS											
	1/2	10	OCTAGONAL RJ GASKET - ASME-B16.20					AISI 304			
BOLTS											
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED			
VALVES											
pos.	Size from to		Data Sheet	Item Description		Ends	Rating/Facing	Material			
1	1/2	1 1/2	GA-E-60157	Gate-WB-Red.B-Solid wdg-Exp.seat - API602		SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF			
1	2	2	GA-E-60158	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF			



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 09SA0S03

Rev.				
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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	3	10	GA-E-60159	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim :316 / HF
4	1/2	1 1/2	GA-E-60250	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF
4	2	2	GA-E-60251	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim :316 / HF
4	3	8	GA-E-60252	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim :316 / HF
6	1/2	1 1/2	GA-E-60363	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF
6	2	2	GA-E-60364	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim :316 / HF
6	3	10	GA-E-60365	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim :316 / HF
7	6	10	GA-E-60468	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60467	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60184	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF
11	1/2	1 1/2	GA-E-67005	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF
11	2	2	GA-E-60181	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim :316 / HF
11	3	10	GA-E-60185	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A351 CF8M Trim :316 / HF
44	2	2	GA-E-60295	Globe-Dead Man Quick Opening Valve-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim :316 / HF
61	8	8	GA-E-60749	Check-PS-FB-Swing-Integral seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A351 CF8M Trim :316 / HF
62	8	8	GA-E-60745	Check-Lug wafer-Dual plate-Wldd seat - API594	WAFER LUG	CL900 RJ (F)	Body: ASTM A351 CF8M Trim :316 / HF
82	1/2	1 1/2	GA-E-60773	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60774	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67019	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF
101	2	2	GA-E-67032	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim :316 / HF
801	1/2	1 1/2	GA-E-67145	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	10	10	GA-E-60621	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3

BRANCH TABLES

90 Degrees										
RunSize										
1/2	A									
3/4	A	A								
1	A	A	A							
1 1/2	A	A	A	A						
2	S	S	T	T	T					
3	S	S	S	S	W	T				
4	S	S	S	S	W	T	T			
6	S	S	S	S	W	W	T	T		
8	S	S	S	S	W	W	W	T	T	
10	S	S	S	S	W	W	W	W	T	T
BranchSize 1/2 3/4 1 1 1/2 2 3 4 6 8 10										
Legenda										
A	TEE - SW ENDS - ASME-B16.11									
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E									
S	SOCKOLET - SW END - MSS-SP97									
T	TEE - ASME-B16.9									
W	WELDOLET - MSS-SP97									

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).

	PIPING MATERIAL SPECIFICATION	JOB 032243													
		Piping Class:	09SA0S03												
		Sh. 3 of 3	Rev. <table><tr><td>A</td><td>0</td><td>1</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					A	0	1					
A	0	1													
3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.															



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 09SA0S60

Rev.				
A				

Sh. 1 of 3

Base Material : STAINLESS STEEL 304/304L DUAL GRADE
Nom. Rating : CL900
Facing/Finishing : RJ (F)
Corrosion Allow. : 0 mm
Temp. Limit : -101°C to 230 °C

Design code : ASME B 31.3 2016
PWHT : NO
Valve Trim : 12 - SS316/HF
Welding Spec : MZ-000-CCX-MC-SPC-00009/00013

Service: [AIV] DMW - Demineralized Water HL - Hydrocarbon Liquid HV - Hydrocarbon Vapour NG - Natural Gas PRW - Process Water

Pipe Thickness

NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36
Thk.mm	2.77	2.87	3.38	3.68	3.91	5.49	8.56	10.97	10.31	12.7	14.27	15.09	16.66	17.48	20.62	24.61	28.58	34
SCH.	40S	40S	40S	40S	40S	40S	80S	80S		80S								

Nipple Thickness

NPS	1/2	3/4	1	1 1/2	2
Thk.mm	3.73	3.91	4.55	5.08	5.54
SCH.	80S	80S	80S	80S	80S

PRESSURE - TEMPERATURE Ratings

NPS	Press. bar	148.93	148.93	124.11	111.35	102.73	ASME B16.5
1/2 - 6	Temp. °C	-28.89	37.78	93.33	148.89	204.44	Material Group 2.1
NPS	Press. bar	105					
8 - 10	Temp. °C	70					
NPS	Press. bar	89					
12 - 12	Temp. °C	230					
NPS	Press. bar	91					
14 - 36	Temp. °C	130					

opt.	from	to	Item Description	Ends	Rating/Facing	Material
PIPE						
	1/2	6	PIPE	BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	8	36	PIPE	BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW
FLANGES						
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	2	24	WN FLANGE - ASME-B16.5	BW	(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	26	36	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE
7	3	24	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
13	3	24	WN FLANGE - ASME-B16.5	BW	CL900 RF	ASTM A182 F304/304L DUAL GRADE
13	30	30	WN FLANGE - ASME-B16.47 series.A	BW	CL900 RF	ASTM A182 F304/304L DUAL GRADE
	1/2	24	BLIND FLANGE - ASME-B16.5		(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	26	36	BLIND FLANGE - ASME-B16.47 series.A		CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE
13	26	36	BLIND FLANGE - ASME-B16.47 series.A		CL900 RF	ASTM A182 F304/304L DUAL GRADE
	2	2	SW REDUCING FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
SPECTACLE BLIND						
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48		CL1500 RJ (F)	ASTM A240 TP304
	2	24	BLIND & SPACER - ASME-B16.48		(2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A240 TP304
	30	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060017		CL900 RJ (F)	ASTM A240 TP304
13	30	30	SPECIAL BLIND & SPACER - <MFR Std> GA-E-060017		CL900 RF	ASTM A240 TP304
FITTINGS						
	1/2	3	DRIP-RING - TB DRI 5011		(1/2->2 1/2) CL1500 RJ (F) (3->24) CL900 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	36	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	3/4	1 1/2	RED. COUPLING - SW/THDD - ASME-B16.11	SW\THDF	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	REDUCER - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	36	REDUCER - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	FEMALE CAP - THD END - ASME-B16.11	THDF	3000	ASTM A182 F304/304L DUAL GRADE
	2	36	CAP - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A182 F304/304L DUAL GRADE
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	TEE - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	36	TEE - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	2	14	SPECIAL SWEEPOLET - <MFR Std>	BW	3000	ASTM A182 F304/304L DUAL GRADE
GASKETS						
13	30	30	FLAT GASKET - GROOVED - <MFR Std>			AISI 316L+GRAPHITE



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: **09SA0S60**

Rev.				
A				

Sh. 2 of 3

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
GASKETS						
	1/2	36	OCTAGONAL RJ GASKET - ASME-B16.20			AIISI 304
BOLTS						
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED

VALVES								
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material	
1	1/2	1 1/2	GA-E-60157	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
1	2	2	GA-E-60158	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF	
1	3	30	GA-E-60159	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF	
4	1/2	1 1/2	GA-E-60250	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
4	2	2	GA-E-60251	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF	
4	3	8	GA-E-60252	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF	
6	1/2	1 1/2	GA-E-60363	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
6	2	2	GA-E-60364	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF	
6	3	16	GA-E-60365	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF	
7	6	24	GA-E-60466	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats	
8	1/2	1 1/2	GA-E-60465	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats	
8	6	24	GA-E-67104	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL900	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats	
10	1/2	1 1/2	GA-E-60184	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
11	1/2	1 1/2	GA-E-67005	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
11	2	2	GA-E-60181	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
11	3	24	GA-E-60185	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
61	2	2	GA-E-67505	Check-PS-FB-Swing-Integral seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
61	4	4	GA-E-60749	Check-PS-FB-Swing-Integral seat - ASME-B16.34	FLGD	CL900 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
62	2	2	GA-E-60744	Check-Lug wafer-Dual plate-Wlidd seat - API594	WAFER LUG	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
62	4	4	GA-E-60745	Check-Lug wafer-Dual plate-Wlidd seat - API594	WAFER LUG	CL900 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
82	1/2	1 1/2	GA-E-60773	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
89	1/2	1 1/2	GA-E-60774	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.	
101	1/2	1 1/2	GA-E-67019	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
101	2	2	GA-E-67032	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF	
111	2	2	GA-E-67093	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
114	2	2	GA-E-67347	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF	
130	1/2	1 1/2	GA-E-67087	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF	
140	2	2	GA-E-67382	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34 - Interlock System	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF	
159	4	4	GA-E-67321	Gate-Ext. Stem (1200mm)-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL900	Body: ASTM A351 CF8M Trim : 316 / HF	
744	2	2	GA-E-60776	Ball-Dead Man Quick Opening Valve-Top entry-Red.B-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats	
780	2	2	GA-E-67675	DBL Block&Bleed Ball valve-SplitBdy-RB-Trunnion - <MFR Std>	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats	
780	3	3	GA-E-67676	DBL Block&Bleed Ball valve-SplitBdy-RB-Trunnion - <MFR Std>	FLGD	CL900 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats	
801	1/2	1 1/2	GA-E-67144	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats	
830	1/2	1 1/2	GA-E-67244	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats	
840	6	6	GA-E-67639	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D - Interlock System	BW	CL900	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats	
907	2	2	GA-E-69033	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats	

	PIPING MATERIAL SPECIFICATION		JOB 032243						
			Piping Class:		09SA0S60				
			Sh. 3 of 3		Rev.				
			A						

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
907	3	24	GA-E-69034	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL900	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
917	2	2	GA-E-69031	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
917	3	24	GA-E-69032	Ball-Top entry-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
971	2	2	GA-E-69067	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
974	2	2	GA-E-69072	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
974	3	24	GA-E-69065	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL900 RJ (F)	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

STRAINERS


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	2	2	GA-E-60625	Y Strainer-Bolted cover - ASME-B16.34	FLGD	CL1500 RJ (F)	Body : ASTM A351 CF8M Screen: 316 - PERF.PLATE - 18 Holes/Cm2
1	4	4	GA-E-60642	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A403 WP304S/304LS DUAL GRADE - SMLS Screen: 316 - CLOTH - MESH 3
1	10	10	GA-E-60621	T Strainer-BW - <MFR Std - Metallic>	BW	CL900 RJ (F)	Body : ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD Screen: 316 - CLOTH - MESH 3


BRANCH TABLES

RunSize		90 Degrees																
1/2	A																	
3/4	A	A																
1	A	A	A															
1 1/2	A	A	A	A														
2					T													
3					T	T												
4					T	T	T											
6					SW	T	T	T										
8					SW	SW	T	T	T									
10					SW	SW	T	T	T	T								
12					SW	SW	SW	T	T	T	T							
14					SW	SW	SW	T	T	T	T	T						
16					SW	SW	SW	T	T	T	T	T	T					
18					SW	SW	SW	SW	T	T	T	T	T	T				
20					SW	SW	SW	SW	T	T	T	T	T	T	T			
24					SW	SW	SW	SW	SW	T	T	T	T	T	T	T		
30					SW	SW	SW	SW	SW	T	T	T	T	T	T	T	T	
36					SW	SW	SW	SW	SW	SW	SW	SW	T	T	T	T	T	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36
Legenda																		
A	TEE - SW ENDS - ASME-B16.11																	
SW	SPECIAL SWEEPOLET - <MFR Std>																	
T	TEE - ASME-B16.9																	

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C).
- 3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.
- 4) This piping class is created for lines subjected to Acoustic Induced Vibration.

<div><div></div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243							
												Piping Class:				15CA2S01			
												Sh. 1 of 2				Rev. A 0 1			
Base Material : LOW TEMP. CARBON STEEL										Design code : ASME B 31.3 2016									
Nom. Rating : CL1500										PWHT : AS PER CODE (NOTE 1)									
Facing/Finishing : RJ (F)										Valve Trim : 12 - SS316/HF									
Corrosion Allow. : 3 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013									
Temp. Limit : -45 °C to 160 °C																			
Service: FG - Fuel Gas																			
Pipe Thickness																			
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18					
Thk.mm	4.78	5.56	6.35	7.14	8.74	11.13	11.13	14.27	15.88	20.62	22.23	23.83	26.19	29.36					
SCH.	160	160	160	160	160	160	120	120				100	100	100					
Nipple Thickness																			
NPS	1/2	3/4	1	1 1/2	2														
Thk.mm	4.78	5.56	6.35	7.14	8.74														
SCH.	160	160	160	160	160														
PRESSURE - TEMPERATURE Ratings																			
NPS	Press. bar		140																
1/2 - 18	Temp. °C		160																
opt.	Size from to		Item Description							Ends	Rating/Facing	Material							
PIPE																			
	1/2	18	PIPE							BW		ASTM A333 GR.6 - SMLS							
FLANGES																			
14	1/2	1 1/2	SW FLANGE - ASME-B16.5							SW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1							
	2	18	WN FLANGE - ASME-B16.5							BW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1							
	1/2	18	BLIND FLANGE - ASME-B16.5								CL1500 RJ (F)	ASTM A350 LF2 - CL.1							
	2	2	THDD RED. FLANGE - ASME-B16.5							THDF	CL1500 RJ (F)	ASTM A350 LF2 - CL.1							
SPECTACLE BLIND																			
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48								CL1500 RJ (F)	ASTM A516 GR.60 + S5 (-46°C)							
	2	18	BLIND & SPACER - ASME-B16.48								CL1500 RJ (F)	ASTM A516 GR.60 + S5 (-46°C)							
FITTINGS																			
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11							SW	6000	ASTM A350 LF2 - CL.1							
	2	18	LONG RADIUS ELBOW - ASME-B16.9							BW		ASTM A420 WPL6 - SMLS							
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11							SW	6000	ASTM A350 LF2 - CL.1							
	2	18	REDUCER - ASME-B16.9							BW		ASTM A420 WPL6 - SMLS							
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11							SW	6000	ASTM A350 LF2 - CL.1							
	2	18	CAP - ASME-B16.9							BW		ASTM A420 WPL6 - SMLS							
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11							SW	6000	ASTM A350 LF2 - CL.1							
	1/2	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11							SW\THDF	3000	ASTM A350 LF2 - CL.1							
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11							THDM		ASTM A350 LF2 - CL.1							
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10							THDM/PE		ASTM A333 GR.6 - SMLS							
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95							PE		ASTM A420 WPL6 - SMLS							
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95							PE\THDM		ASTM A420 WPL6 - SMLS							
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11							SW	6000	ASTM A350 LF2 - CL.1							
	2	18	TEE - ASME-B16.9							BW		ASTM A420 WPL6 - SMLS							
	2	8	WELDOLET - MSS-SP97							BW		ASTM A350 LF2 - CL.1							
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97							SW\BW	6000	ASTM A350 LF2 - CL.1							
GASKETS																			
	1/2	18	OCTAGONAL RJ GASKET - ASME-B16.20									SOFT IRON							
BOLTS																			
	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368										ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)						
	2 3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368										ASTM A193 B7M + ASTM A194 GR.2HM (HotDip 153)						
VALVES																			
pos.	from	Size to	Data Sheet	Item Description					Ends	Rating/Facing	Material								
1	1/2	1 1/2	GA-E-60193	Gate-WB-Red.B-Solid wdg-Exp.seat - API602					SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF								
1	2	12	GA-E-60194	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34					BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF								
4	1 1/2	1 1/2	GA-E-60274	Globe-WB-Red.B-Thdd seat - API602					SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF								
4	2	8	GA-E-60275	Globe-PS-Disk-Integral seat - ASME-B16.34					BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF								
6	2	18	GA-E-60399	Check-PS-FB-Swing-Integral seat - ASME-B16.34					BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF								
8	3/4	1 1/2	GA-E-67238	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34					PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats								
8	6	18	GA-E-67246	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D					BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats								
10	1/2	1 1/2	GA-E-67073	Gate-WB-Red.B-Solid wdg-Exp.seat - API602					SW/THDF	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF								
89	1/2	1 1/2	GA-E-67247	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34					PE/THDF	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.								
907	2	18	GA-E-69020	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D					BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats								
917	2	18	GA-E-69021	Ball-Top entry-Red.B-Trunnion ball - API6D					FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats								


	PIPING MATERIAL SPECIFICATION	JOB 032243													
		Piping Class:	15CA2S01												
		Sh. 2 of 2	Rev. <table><tr><td>A</td><td>0</td><td>1</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					A	0	1					
A	0	1													

BRANCH TABLES

RunSize		90 Degrees															
1/2	A																
3/4	A	A															
1	A	A	A														
1 1/2	A	A	A	A													
2	S	S	T	T	T												
3	S	S	S	S	S	W	T										
4	S	S	S	S	S	W	T	T									
6	S	S	S	S	S	W	W	T	T								
8	S	S	S	S	S	W	W	W	T	T							
10	S	S	S	S	S	W	W	W	W	T	T						
12	S	S	S	S	S	W	W	W	W	T	T	T					
14	S	S	S	S	S	W	W	W	W	P	T	T					
16	S	S	S	S	S	W	W	W	W	P	P	T	T				
18	S	S	S	S	S	W	W	W	W	P	P	P	T	T			
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	14	16	18			
Legenda																	
A	TEE - SW ENDS - ASME-B16.11																
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E																
S	SOCKOLET - SW END - MSS-SP97																
T	TEE - ASME-B16.9																
W	WELDOLET - MSS-SP97																

GENERAL NOTES

1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION												JOB 032243															
														Piping Class:					15CA4S01										
														Sh. 1 of 2					Rev.										
					A					0					1					2					3				

Base Material : LOW TEMP. CARBON STEEL														Design code : ASME B 31.3 2016													
Nom. Rating : CL1500														PWHT : AS PER CODE (NOTE 1)													
Facing/Finishing : RJ (F)														Valve Trim : 12 - SS316/HF													
Corrosion Allow. : 6 mm														Welding Spec : MZ-000-CCX-MC-SPC-00009/00013													
Temp. Limit : -45 °C to 220 °C																											

Service: FG - Fuel Gas HL - Hydrocarbon Liquid NG - Natural Gas

Pipe Thickness															
NPS	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30
Thk.mm	9.09	10.15	11.07	15.24	17.12	18.26	20.62	25.4	25.4	27.79	30.96	34.93	38.1	46.02	51
SCH.	XXS	XXS	XXS	XXS	XXS	160	140	XXS	XXS	120	120	120	120	120	

Nipple Thickness			
NPS	1	1 1/2	2
Thk.mm	9.09	10.15	11.07
SCH.	XXS	XXS	XXS

PRESSURE - TEMPERATURE Ratings			
NPS	Press. bar	140	
1 - 30	Temp. °C	220	

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE

	1	24	PIPE	BW		ASTM A333 GR.6 - SMLS
	26	30	PIPE	BW		ASTM A671 GR.CC65 CL.22 - EFW + S2 (-46°C)

FLANGES

13	1	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1
	2	24	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1
	30	30	SPECIAL WN FLANGE - <MFR Std> GA-E-060099	BW	CL1500 RJ (F)	ASTM A350 LF2 - CL.1
	2	2	WN FLANGE - ASME-B16.5	BW	CL1500 RF	ASTM A350 LF2 - CL.1
	1	24	BLIND FLANGE - ASME-B16.5		CL1500 RJ (F)	ASTM A350 LF2 - CL.1
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL1500 RJ (F)	ASTM A350 LF2 - CL.1

SPECTACLE BLIND

	1	1 1/2	SPECTACLE BLIND - ASME-B16.48 GA-E-060011		CL1500 RJ (F)	ASTM A516 GR.60 + S5 (-46°C)
	2	24	BLIND & SPACER - ASME-B16.48 GA-E-060011		CL1500 RJ (F)	ASTM A516 GR.60 + S5 (-46°C)

FITTINGS

	1	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	9000	ASTM A350 LF2 - CL.1
	2	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	30	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	1 1/2	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	9000	ASTM A350 LF2 - CL.1
	2	24	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	26	30	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	1	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	9000	ASTM A350 LF2 - CL.1
	2	30	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1	1 1/2	COUPLING - SW/THDD ENDS - ASME-B16.11	SW\THDF	6000	ASTM A350 LF2 - CL.1
	1	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	9000	ASTM A350 LF2 - CL.1
	1	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A350 LF2 - CL.1
	1	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A333 GR.6 - SMLS
	2	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE\THDM		ASTM A420 WPL6 - SMLS
	2	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A420 WPL6 - SMLS
	1	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	9000	ASTM A350 LF2 - CL.1
	2	24	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	30	30	TEE - ASME-B16.9	BW		ASTM A420 WPL6W - WLDD
	2	8	WELDOLET - MSS-SP97	BW		ASTM A350 LF2 - CL.1
	1	1 1/2	SOCKOLET - SW END - TB RAC 5380	SW\BW	9000	ASTM A350 LF2 - CL.1

GASKETS


13	2	2	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
	1	24	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
	30	30	OCTAGONAL RJ GASKET - <MFR Std> GA-E-060099			SOFT IRON

BOLTS

	1/2	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)
	2 3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7M + ASTM A194 GR.2HM (HotDip 153)

VALVES


pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1	1 1/2	GA-E-60109	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
1	2	24	GA-E-60110	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
4	1	1 1/2	GA-E-60206	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF
4	2	8	GA-E-60207	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
6	2	16	GA-E-60311	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF
7	2	2	GA-E-67103	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
8	1	1 1/2	GA-E-60409	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats
8	2	2	GA-E-67188	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats
10	1	1 1/2	GA-E-60183	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/THDF	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF


	PIPING MATERIAL SPECIFICATION				JOB 032243								
					Piping Class:				15CA4S01				
					Sh. 2 of 2				Rev.				
								A	0	1	2	3	

VALVES												
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material					
14	1	1 1/2	GA-E-60578	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF					
14	2	24	GA-E-67004	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF					
19	1	1 1/2	GA-E-60579	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : 316 / HF					
80	1	1 1/2	GA-E-60764	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats					
101	2	10	GA-E-67004	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF					
114	2	2	GA-E-67088	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : 316 / HF					
401	2	2	GA-E-60202	Globe-Stem Extension-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A352 LCC Trim : 316 / HF					
801	2	2	GA-E-67176	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats					
830	1	1 1/2	GA-E-67240	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A350 LF2 - CL.1 Trim : Soft seat-316 trim - PEEK seats					
908	2	24	GA-E-69035	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats					
917	12	12	GA-E-69082	Ball-Top entry-FB-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats					
918	2	24	GA-E-69036	Ball-Top entry-FB-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A352 LCC Trim : Soft seat-316 trim - PEEK seats					

BRANCH TABLES												
90 Degrees												
RunSize												
1	A											
1 1/2	A	A										
2	T	T	T									
3	S	S	W	T								
4	S	S	W	T	T							
6	S	S	W	W	T	T						
8	S	S	W	W	W	T	T					
10	S	S	W	W	W	W	T	T				
12	S	S	W	W	W	W	W	T	T			
14	S	S	W	W	W	W	W	P	T	T		
16	S	S	W	W	W	W	W	P	P	T	T	
18	S	S	W	W	W	W	W	P	P	P	T	T
20	S	S	W	W	W	W	W	P	P	P	P	T
24	S	S	W	W	W	W	W	P	P	P	P	T
30	S	S	W	W	W	W	W	P	P	P	P	T
BranchSize	1	1 1/2	2	3	4	6	8	10	12	14	16	18
Legenda												
A	TEE - SW ENDS - ASME-B16.11											
P	PIPE TO PIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E											
S	SOCKOLET - SW END - TB RAC 5380											
T	TEE - ASME-B16.9											
W	WELDOLET - MSS-SP97											

GENERAL NOTES												
1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.												
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.												
3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.												

<div></div>		PIPING MATERIAL SPECIFICATION				JOB 032243					
						Piping Class:		15CB1S01			
						Sh. 1 of 2		Rev. A 0 1 2 3			
Base Material : CARBON STEEL						Design code : ASME B 31.3 2016					
Nom. Rating : CL1500						PWHT : AS PER CODE (NOTE 1)					
Facing/Finishing : RJ (F)						Valve Trim : 12 - SS316/HF					
Corrosion Allow. : 1.5 mm						Welding Spec : MZ-000-CCX-MC-SPC-00009/00013					
Temp. Limit : -29 °C to 120 °C											
Service: MEG - Monoethylene Glycol											
Pipe Thickness											
NPS	1/2	3/4	1	1 1/2	2	3	4	6			
Thk.mm	4.78	5.56	6.35	7.14	8.74	11.13	13.49	12.7			
SCH.	160	160	160	160	160	160	160				
Nipple Thickness											
NPS	1/2	3/4	1	1 1/2	2						
Thk.mm	7.47	7.82	9.09	10.15	11.07						
SCH.	XXS	XXS	XXS	XXS	XXS						
PRESSURE - TEMPERATURE Ratings											
NPS	Press. bar	255.5	234.1	225.5	ASME B16.5						
1/2 - 4	Temp. °C	37.78	93.33	148.9	Material Group 1.1						
NPS	Press. bar	165									
6 - 6	Temp. °C	120									
opt.	Size from to	Item Description				Ends	Rating/Facing	Material			
PIPE											
	1/2	3 1/2	PIPE			BW		ASTM A106 GR.B - SMLS			
	4	6	PIPE			BW		ASTM A333 GR.6 - SMLS			
FLANGES											
14	1/2	1 1/2	SW FLANGE - ASME-B16.5			SW	CL1500 RJ (F)	ASTM A105 Normalized			
	2	6	WN FLANGE - ASME-B16.5			BW	CL1500 RJ (F)	ASTM A105 Normalized			
	1/2	6	BLIND FLANGE - ASME-B16.5				CL1500 RJ (F)	ASTM A105 Normalized			
	2	2	THDD RED. FLANGE - ASME-B16.5			THDF	CL1500 RJ (F)	ASTM A105 Normalized			
SPECTACLE BLIND											
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48				CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)			
	2	6	BLIND & SPACER - ASME-B16.48				CL1500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)			
FITTINGS											
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11			SW	9000	ASTM A105 Normalized			
	2	3	LONG RADIUS ELBOW - ASME-B16.9			BW		ASTM A234 WPB - SMLS			
	4	6	LONG RADIUS ELBOW - ASME-B16.9			BW		ASTM A420 WPL6 - SMLS			
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11			SW	9000	ASTM A105 Normalized			
	2	3	REDUCER - ASME-B16.9			BW		ASTM A234 WPB - SMLS			
	4	6	REDUCER - ASME-B16.9			BW		ASTM A420 WPL6 - SMLS			
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11			SW	9000	ASTM A105 Normalized			
	2	3	CAP - ASME-B16.9			BW		ASTM A234 WPB - SMLS			
	4	6	CAP - ASME-B16.9			BW		ASTM A420 WPL6 - SMLS			
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11			SW	9000	ASTM A105 Normalized			
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11			THDM		ASTM A105 Normalized			
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10			THDM/PE		ASTM A106 GR.B - SMLS			
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95			PE/THDM		ASTM A234 WPB - SMLS			
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95			PE		ASTM A234 WPB - SMLS			
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11			SW	9000	ASTM A105 Normalized			
	2	3	TEE - ASME-B16.9			BW		ASTM A234 WPB - SMLS			
	4	6	TEE - ASME-B16.9			BW		ASTM A420 WPL6 - SMLS			
	2	3	WELDOLET - MSS-SP97			BW		ASTM A105 Normalized			
	1/2	1 1/2	SOCKOLET - SW END - TB RAC 5380			SW/BW	9000	ASTM A105 Normalized			
	GASKETS										
	1/2	6	OCTAGONAL RJ GASKET - ASME-B16.20					SOFT IRON			
BOLTS											
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368				ASTM A193 B7 + ASTM A194 GR.2H				
VALVES											
pos.	Size from to	Data Sheet	Item Description			Ends	Rating/Facing	Material			
1	1/2	1 1/2	GA-E-67388	Gate-WB-Red.B-Solid wdg-Exp.seat - API602		SW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF			
1	2	6	GA-E-60138	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34		BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF			
4	1/2	1 1/2	GA-E-67407	Globe-WB-Red.B-Thdd seat - API602		SW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF			
4	2	6	GA-E-60232	Globe-PS-Disk-Integral seat - ASME-B16.34		BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF			
6	1/2	1 1/2	GA-E-67509	Check-WB-Red.B-Piston-Int seat - API602		SW	CL1500	Body: ASTM A105 Normalized Trim : 316 / HF			
6	2	6	GA-E-60339	Check-PS-FB-Swing-Integral seat - ASME-B16.34		BW	CL1500	Body: ASTM A216 WCB Trim : 316 / HF			
7	2	2	GA-E-67650	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D		BW	CL1500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats			
8	1/2	1 1/2	GA-E-60461	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34		PE	CL1500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats			


	PIPING MATERIAL SPECIFICATION	JOB 032243													
		Piping Class:	15CB1S01												
		Sh. 2 of 2	Rev. <table><tr><td>A</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					A	0	1	2	3			
A	0	1	2	3											

BRANCH TABLES

RunSize		90 Degrees									
1/2	A										
3/4	A	A									
1	A	A	A								
1 1/2	A	A	A	A							
2	S	S	T	T	T						
3	S	S	S	S	W	T					
4	S	S	S	S	W	T	T				
6	S	S	S	S	W	W	T	T			
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6			
Legenda											
A	TEE - SW ENDS - ASME-B16.11										
S	SOCKOLET - SW END - TB RAC 5380										
T	TEE - ASME-B16.9										
W	WELDOLET - MSS-SP97										

GENERAL NOTES

- 1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013.
2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
3) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION														JOB 032243									
																Piping Class:				15SA0S01					
																Sh. 1 of 3		Rev.							
		A		0		1		2		3															

Base Material : STAINLESS STEEL 304/304L DUAL GRADE														Design code : ASME B 31.3 2016													
Nom. Rating : CL1500														PWHT : NO													
Facing/Finishing : RJ (F)														Valve Trim : 12 - SS316/HF													
Corrosion Allow. : 0 mm														Welding Spec : MZ-000-CCX-MC-SPC-00009/00013													
Temp. Limit : -101 °C to 230 °C																											
Service: CI - Chemical Injection NG - Natural Gas																											

Pipe Thickness																											
NPS	1/2	3/4	1	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24	30	36	52							
Thk.mm	2.77	2.87	3.38	5.08	8.74	5.16	5.49	8.56	10.97	14.27	18.26	20.62	22.23	25.4	28.58	31.75	36.53	46	55	70							
SCH.	40S	40S	40S	80S		STD	40S	80S	80S																		

Nipple Thickness																												
NPS	1/2	3/4	1	1 1/2	2																							
Thk.mm	3.73	3.91	4.55	5.08	8.74																							
SCH.	80S	80S	80S	80S	160																							

PRESSURE - TEMPERATURE Ratings																											
NPS	Press. bar	248.2	248.2	ASME B16.5																							
1/2 - 2	Temp. °C	-28.9	37.78	Material Group 2.1																							
NPS	Press. bar	140																									
2 1/2- 12	Temp. °C	230																									
NPS	Press. bar	140																									
14 - 52	Temp. °C	210																									

opt.	Size		Item Description	Ends	Rating/Facing	Material
	from	to				

PIPE						
	1/2	6	PIPE	BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	8	52	PIPE	BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW

FLANGES						
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	2	24	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	30	36	SPECIAL WN FLANGE - <MFR Std> GA-E-060018	BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	52	52	SPECIAL WN FLANGE - <MFR Std> GA-E-060018	BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	1/2	24	BLIND FLANGE - ASME-B16.5		CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
14	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE

SPECTACLE BLIND						
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48		CL1500 RJ (F)	ASTM A240 TP304
	2	12	BLIND & SPACER - ASME-B16.48		CL1500 RJ (F)	ASTM A240 TP304

FITTINGS						
	2	2	DRIP-RING - TB DRI 5011		CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	36	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	52	52	LONG RADIUS ELBOW - TB RAC 5060	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	REDUCER - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	36	REDUCER - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	52	52	REDUCER, LARGE BORE - TB RAC 5062	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	36	CAP - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	52	52	CAP - TB RAC 5064	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A182 F304/304L DUAL GRADE
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A312 TP304/TP304L DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F304/304L DUAL GRADE
	2	6	TEE - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS
	8	36	TEE - ASME-B16.9	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	52	52	TEE - TB RAC 5061	BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD
	2	8	WeldoLET - MSS-SP97	BW		ASTM A182 F304/304L DUAL GRADE
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW/BW	3000	ASTM A182 F304/304L DUAL GRADE

GASKETS						
	1/2	24	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 304
	30	36	OCTAGONAL RJ GASKET - <MFR Std> GA-E-060018			AISI 304
	52	52	OCTAGONAL RJ GASKET - <MFR Std> GA-E-060018			AISI 304

BOLTS						
	1/4	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A320 B8 CL.2 + ASTM A194 GR.8
	1 5/8	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A453 GR. 660

VALVES							
pos.	Size		Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60157	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF
1	2	16	GA-E-60158	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body:ASTM A351 CF8M Trim :316 / HF
4	1/2	1 1/2	GA-E-60250	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body:ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF
4	2	8	GA-E-60251	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body:ASTM A351 CF8M Trim :316 / HF
6	1/2	1 1/2	GA-E-60363	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body:ASTM A182 F316/F316L DUAL GRADE Trim :316 / HF



PIPING MATERIAL
SPECIFICATION

JOB
032243


Piping Class: 15SA0S01

Sh. 2 of 3			Rev.				
			A	0	1	2	3

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	2	12	GA-E-60364	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
7	3	16	GA-E-67121	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
7	52	52	GA-E-67291	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60465	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
8	2	24	GA-E-67180	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60184	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	2	2	GA-E-60181	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF
62	2	2	GA-E-60724	Check-BB-Red.B-Piston-Thdd seat - API602	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
82	1/2	1 1/2	GA-E-60773	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60774	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67019	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	16	GA-E-67032	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
130	1/2	1 1/2	GA-E-67087	Gate-Stem Extension-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
141	2	2	GA-E-67383	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34 - Interlock System	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
401	2	2	GA-E-60230	Globe-Stem Extension-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
801	1/2	1 1/2	GA-E-67144	Ball-Stem Extension-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
801	2	16	GA-E-67181	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
801	20	30	GA-E-67640	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
801	36	36	GA-E-67640	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
801	52	52	GA-E-67640	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
907	2	24	GA-E-69033	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
917	2	24	GA-E-69031	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
971	2	24	GA-E-69067	Ball-Stem Extension-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
972	24	24	GA-E-69066	Ball-Stem Extension-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
974	2	24	GA-E-69072	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
977	2	24	GA-E-69066	Ball-Stem Extension-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

BRANCH TABLES

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243									
												Piping Class:						15SA0S02			
												Sh. 1 of 2						Rev. A 0 1			
Base Material : STAINLESS STEEL 304/304L DUAL GRADE										Design code : ASME B 31.3 2016											
Nom. Rating : CL1500										PWHT : NO											
Facing/Finishing : RJ (F)										Valve Trim : 12 - SS316/HF											
Corrosion Allow. : 0 mm										Welding Spec : MZ-000-CCX-MC-SPC-00009/00013											
Temp. Limit : -29 °C to 180 °C																					
Service: [Amine Service] AL - Amine Lean																					
Pipe Thickness																					
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10											
Thk.mm	2.77	2.87	3.38	5.08	8.74	5.49	6.02	10.97	12.7	14.27											
SCH.	40S	40S	40S	80S		40S	40S	80S	80S												
Nipple Thickness																					
NPS	1/2	3/4	1	1 1/2	2																
Thk.mm	3.73	3.91	4.55	5.08	8.74																
SCH.	80S	80S	80S	80S	160																
PRESSURE - TEMPERATURE Ratings																					
NPS	Press. bar	248.2	248.2	ASME B16.5																	
1/2 - 2	Temp. °C	-28.9	37.78	Material Group 2.1																	
NPS	Press. bar	125																			
3 - 10	Temp. °C	180																			
opt.	Size from to		Item Description								Ends	Rating/Facing	Material								
PIPE																					
	1/2	6	PIPE								BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS								
	8	10	PIPE								BW		ASTM A358 TP304/TP304L CL.1 DUAL GRADE - EFW								
FLANGES																					
14	1/2	1 1/2	SW FLANGE - ASME-B16.5								SW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE								
	2	10	WN FLANGE - ASME-B16.5								BW	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE								
	1/2	10	BLIND FLANGE - ASME-B16.5									CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE								
	2	2	THDD RED. FLANGE - ASME-B16.5								THDF	CL1500 RJ (F)	ASTM A182 F304/304L DUAL GRADE								
SPECTACLE BLIND																					
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48									CL1500 RJ (F)	ASTM A240 TP304								
	2	10	BLIND & SPACER - ASME-B16.48									CL1500 RJ (F)	ASTM A240 TP304								
FITTINGS																					
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11								SW	3000	ASTM A182 F304/304L DUAL GRADE								
	2	6	LONG RADIUS ELBOW - ASME-B16.9								BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS								
	8	10	LONG RADIUS ELBOW - ASME-B16.9								BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD								
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11								SW	3000	ASTM A182 F304/304L DUAL GRADE								
	2	6	REDUCER - ASME-B16.9								BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS								
	8	10	REDUCER - ASME-B16.9								BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD								
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11								SW	3000	ASTM A182 F304/304L DUAL GRADE								
	2	10	CAP - ASME-B16.9								BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS								
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11								SW	3000	ASTM A182 F304/304L DUAL GRADE								
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11								THDM		ASTM A182 F304/304L DUAL GRADE								
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95								PE\THDM		ASTM A403 WP304S/304LS DUAL GRADE - SMLS								
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95								PE		ASTM A403 WP304S/304LS DUAL GRADE - SMLS								
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11								SW	3000	ASTM A182 F304/304L DUAL GRADE								
	2	6	TEE - ASME-B16.9								BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS								
	8	10	TEE - ASME-B16.9								BW		ASTM A403 WP304WX/304LWX DUAL GRADE - WLDD								
	2	6	WELDOLET - MSS-SP97								BW		ASTM A182 F304/304L DUAL GRADE								
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97								SW\BW	3000	ASTM A182 F304/304L DUAL GRADE								
GASKETS																					
	1/2	10	OCTAGONAL RJ GASKET - ASME-B16.20										AISI 304								
BOLTS																					
	3/4	2 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368										ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED								
VALVES																					
pos.	Size from to		Data Sheet	Item Description					Ends	Rating/Facing	Material										
1	1/2	1 1/2	GA-E-60157	Gate-WB-Red.B-Solid wdg-Exp.seat - API602					SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF										
1	2	10	GA-E-60158	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34					BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF										
4	1/2	1 1/2	GA-E-60250	Globe-WB-Red.B-Thdd seat - API602					SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF										
4	2	10	GA-E-60251	Globe-PS-Disk-Integral seat - ASME-B16.34					BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF										
6	1/2	1 1/2	GA-E-60363	Check-WB-Red.B-Piston-Int seat - API602					SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF										
6	2	10	GA-E-60364	Check-PS-FB-Swing-Integral seat - ASME-B16.34					BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF										
7	6	10	GA-E-67107	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D					BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats										
8	1/2	1 1/2	GA-E-60467	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34					PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats										
10	1/2	1 1/2	GA-E-60184	Gate-WB-Red.B-Solid wdg-Exp.seat - API602					SW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF										
11	1/2	1 1/2	GA-E-67005	Gate-WB-Red.B-Solid wdg-Exp.seat - API602					FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF										
11	2	2	GA-E-60181	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34					FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF										
62	2	2	GA-E-60724	Check-BB-Red.B-Piston-Thdd seat - API602					FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF										



PIPING MATERIAL
SPECIFICATION

JOB
032243

Piping Class: 15SA0S02

Sh. 2 of 2

Rev.

A	0	1		

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
82	1/2	1 1/2	GA-E-60773	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
89	1/2	1 1/2	GA-E-60774	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67019	Gate-Stem Extension-WB-Red.B-Solid wdg- Exp.seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	2	GA-E-67032	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
401	2	2	GA-E-60230	Globe-Stem Extension-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
801	1/2	1 1/2	GA-E-67145	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats

BRANCH TABLES

90 Degrees

RunSize


1/2	A									
3/4	A	A								
1	A	A	A							
1 1/2	A	A	A	A						
2	S	S	T	T	T					
3	S	S	S	S	T	T				
4	S	S	S	S	W	T	T			
6	S	S	S	S	W	W	T	T		
8	S	S	S	S	W	W	W	T	T	
10	S	S	S	S	W	W	W	W	T	T
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10

Legenda

A	TEE - SW ENDS - ASME-B16.11
P	PIPE TOPIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E
S	SOCKOLET - SW END - MSS-SP97
T	TEE - ASME-B16.9
T1	TEE - TB RAC 5061
W	WELDOLET - MSS-SP97

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

		PIPING MATERIAL SPECIFICATION				JOB 032243					
						Piping Class:		15SD0S01			
						Sh. 1 of 2		Rev.			
		A		0							

Base Material : STAINLESS STEEL 316/316L DUAL GRADE				Design code : ASME B 31.3 2016							
Nom. Rating : CL1500				PWHT : NO							
Facing/Finishing : RJ (F)				Valve Trim : 12 - SS316/HF							
Corrosion Allow. : 0 mm				Welding Spec : MZ-000-CCX-MC-SPC-00009/00013							
Temp. Limit : -29 °C to 60 °C											
Service: CO2 - Carbon Dioxide											
Pipe Thickness											
NPS	1/2	3/4	1	1 1/2	2	2 1/2	3				
Thk.mm	2.77	2.87	3.38	5.08	8.74	7.01	11.13				
SCH.	40S	40S	40S	80S		80S					
Nipple Thickness											
NPS	1/2	3/4	1	1 1/2	2	2 1/2					
Thk.mm	3.73	3.91	4.55	5.08	8.74	7.01					
SCH.	80S	80S	80S	80S		80S					

PRESSURE - TEMPERATURE Ratings							
NPS	Press. bar	248.2	248.2	ASME B16.5			
1/2 - 3	Temp. °C	-28.9	37.78	Material Group 2.2			

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE						
	1/2	3	PIPE	BW		ASTM A312 TP316/TP316L DUAL GRADE - SMLS

FLANGES						
13	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RJ (F)	ASTM A182 F316/F316L DUAL GRADE
	2	3	WN FLANGE - ASME-B16.5	BW	CL1500 RJ (F)	ASTM A182 F316/F316L DUAL GRADE
	1/2	1 1/2	SW FLANGE - ASME-B16.5	SW	CL1500 RF	ASTM A182 F316/F316L DUAL GRADE
	2	3	WN FLANGE - ASME-B16.5	BW	CL1500 RF	ASTM A182 F316/F316L DUAL GRADE
14	1/2	3	BLIND FLANGE - ASME-B16.5		CL1500 RJ (F)	ASTM A182 F316/F316L DUAL GRADE
	2	2	THDD RED. FLANGE - ASME-B16.5	THDF	CL1500 RJ (F)	ASTM A182 F316/F316L DUAL GRADE

SPECTACLE BLIND						
	1/2	1 1/2	SPECTACLE BLIND - ASME-B16.48		CL1500 RJ (F)	ASTM A240 TP316
	2	3	BLIND & SPACER - ASME-B16.48		CL1500 RJ (F)	ASTM A240 TP316

FITTINGS						
	2	2	DRIP-RING - TB DRI 5011		CL1500 RJ (F)	ASTM A182 F316/F316L DUAL GRADE
	1/2	1 1/2	ELBOW - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F316/F316L DUAL GRADE
	2	3	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	3/4	1 1/2	RED. COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F316/F316L DUAL GRADE
	2	3	REDUCER - ASME-B16.9	BW		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	1/2	1 1/2	FEMALE CAP - SW END - ASME-B16.11	SW	3000	ASTM A182 F316/F316L DUAL GRADE
	2	3	CAP - ASME-B16.9	BW		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	1/2	1 1/2	COUPLING - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F316/F316L DUAL GRADE
	1/2	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A182 F316/F316L DUAL GRADE
	1/2	2	NIPPLE - THDD/PE - ASME-B36.10	THDM/PE		ASTM A312 TP316/TP316L DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/THDD - MSS-SP95	PE/THDM		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	1/2	1 1/2	TEE - SW ENDS - ASME-B16.11	SW	3000	ASTM A182 F316/F316L DUAL GRADE
	2	3	TEE - ASME-B16.9	BW		ASTM A403 WP316S/WP316LS DUAL GRADE - SMLS
	1/2	1 1/2	SOCKOLET - SW END - MSS-SP97	SW\BW	3000	ASTM A182 F316/F316L DUAL GRADE

GASKETS						
13	1/2	3	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			316 SS+GRAPH 98% - C.S. OUT.RING
	1/2	3	OCTAGONAL RJ GASKET - ASME-B16.20			AISI 316

BOLTS						
	3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED

VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1/2	1 1/2	GA-E-60157	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
1	2	3	GA-E-60158	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
4	1/2	1 1/2	GA-E-60250	Globe-WB-Red.B-Thdd seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
4	2	3	GA-E-60251	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
6	1/2	1 1/2	GA-E-60363	Check-WB-Red.B-Piston-Int seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
6	2	3	GA-E-60364	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
7	3	3	GA-E-67121	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
8	1/2	1 1/2	GA-E-60465	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
8	2	3	GA-E-67180	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats
10	1/2	1 1/2	GA-E-60184	Gate-WB-Red.B-Solid wdg-Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
11	2	2	GA-E-60181	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL1500 RJ (F)	Body: ASTM A351 CF8M Trim : 316 / HF
62	2	2	GA-E-60724	Check-BB-Red.B-Piston-Thdd seat - API602	FLGD	CL1500 RJ (F)	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
82	1/2	1 1/2	GA-E-60773	Ball-End entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARR. trim-(XM19 stem)-GRAPH



PIPING MATERIAL SPECIFICATION

JOB
032243

Piping Class: 15SD0S01

Sh. 2 of 2

Rev.

A	0			

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
89	1/2	1 1/2	GA-E-60774	Ball-End entry -FB-Float.ball -Frgd body+ Nipple - ASME-B16.34	PE/THD F	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1/2	1 1/2	GA-E-67019	Gate-Stem Extension-WB-Red.B-Solid wdg- Exp.seat - API602	SW	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
101	2	3	GA-E-67032	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
130	1/2	1 1/2	GA-E-67087	Gate-Stem Extension-WB-Red.B-Solid wdg- Exp.seat - API602	SW/TH DF	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : 316 / HF
141	2	2	GA-E-67383	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34 - Interlock System	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
401	2	3	GA-E-60230	Globe-Stem Extension-PS-Disk-Integral seat - ASME-B16.34	BW	CL1500	Body: ASTM A351 CF8M Trim : 316 / HF
801	1/2	1 1/2	GA-E-67144	Ball-Stem Extension-End entry -FB-Float.ball - Frgd body+nipples - ASME-B16.34	PE	CL1500	Body: ASTM A182 F316/F316L DUAL GRADE Trim : Soft seat-316 trim - PEEK seats
801	2	3	GA-E-67181	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL1500	Body: ASTM A351 CF8M Trim : Soft seat-316 trim - PEEK seats

BRANCH TABLES

90 Degrees

RunSize

1/2	A							
3/4	A	A						
1	A	A	A					
1 1/2	A	A	A	A				
2	S	S	T	T	T			
2 1/2	S	S	S	S	T	T		
3	S	S	S	S	T	T	T	


BranchSize 1/2 3/4 1 1 1/2 2 2 1/2 3

Legenda

A	TEE - SW ENDS - ASME-B16.11
P	PIPE TOPIPE WITH REINFORCING PAD-TS-COR-ENG-PIPMT-012-E
S	SOCKOLET - SW END - MSS-SP97
T	TEE - ASME-B16.9
T1	TEE - TB RAC 5061
W	WELDOLET - MSS-SP97

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div></div>		PIPING MATERIAL SPECIFICATION				JOB 032243	
						Piping Class: 25CB1D01	
						Sh. 1 of 2	
				Rev.			
		A		0		1	

Base Material : CARBON STEEL		Design code : ASME B 31.3 2016	
Nom. Rating : CL2500		PWHT : AS PER CODE (NOTE 1)	
Facing/Finishing : RJ (F)		Valve Trim : 12 - SS316/HF	
Corrosion Allow. : 1.5 mm		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013	
Temp. Limit : -29 °C to 70 °C			
Service: DP - Drain - Process MEG - Monoethylene Glycol (AG) NG - Natural Gas			

Pipe Thickness									
NPS	1	1 1/2	2	3	4	6	8	10	
Thk.mm	9.09	10.15	11.07	15.24	19	26	34	41	
SCH.	XXS	XXS	XXS	XXS					

Nipple Thickness				
NPS	1	1 1/2	2	
Thk.mm	9.09	10.15	11.07	
SCH.	XXS	XXS	XXS	

PRESSURE - TEMPERATURE Ratings			
NPS	Press. bar	385	
1 - 10	Temp. °C	70	

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE						
	1	2	PIPE	BW		ASTM A106 GR.B - SMLS
	2 1/2	10	PIPE	BW		ASTM A333 GR.6 - SMLS

FLANGES						
13	1	10	WN FLANGE - ASME-B16.5	BW	CL2500 RJ (F)	ASTM A105 Normalized
	3	3	WN FLANGE - ASME-B16.5	BW	CL2500 RF	ASTM A105 Normalized
	1	10	BLIND FLANGE - ASME-B16.5		CL2500 RJ (F)	ASTM A105 Normalized

SPECTACLE BLIND						
	1	1 1/2	SPECTACLE BLIND - ASME-B16.48		CL2500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)
	2	10	BLIND & SPACER - ASME-B16.48		CL2500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
	1	2	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	3	10	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1	2	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	3	10	REDUCER - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1	2	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	3	10	CAP - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized
	1 1/2	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A234 WPB - SMLS
	1	2	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS
	3	10	TEE - ASME-B16.9	BW		ASTM A420 WPL6 - SMLS
	1	6	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized

MISCELLANEOUS						
	1	10	KIT FOR INSULATING FLANGE - ASME-B16.5		CL2500 RJ (F)	GRE LAMINATED + TFE (MAX T 180 C)

GASKETS						
13	3	3	SP.WOUND GSKT-with OUT.& INN.RINGS - ASME-B16.20			304 SS+GRAPH 98% - C.S. OUT.RING
	1	10	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON

BOLTS						
	3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	1	1 1/2	GA-E-60196	Gate-WB-FB-Solid wdg-Exp.seat - ASME-B16.34	BW	CL2500	Body: ASTM A105 Normalized Trim : 316 / HF
1	2	10	GA-E-67010	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF
4	2	10	GA-E-60242	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF
6	2	10	GA-E-60304	Check-PS-FB-Swing-Integral seat - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF
8	1	1 1/2	GA-E-60493	Ball-Side entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	BW	CL2500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
8	2	10	GA-E-67182	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL2500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
10	1	1 1/2	GA-E-67331	Gate-WB-FB-Solid wdg-Exp.seat - ASME-B16.34	BW/TH DF	CL2500	Body: ASTM A105 Normalized Trim : 316 / HF
11	2	2	GA-E-67352	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL2500 RJ (F)	Body: ASTM A216 WCB Trim : 316 / HF
62	2	2	GA-E-60746	Check-Lug wafer-Dual plate-Wlidd seat - API594	WAFER LUG	CL2500 RJ (F)	Body: ASTM A216 WCB Trim : 316 / HF
82	1	1 1/2	GA-E-67691	Ball-Side entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	BW	CL2500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
101	1	1	GA-E-67710	Gate-Stem Extension-WB-FB-Solid wdg-Exp.seat - ASME-B16.34	BW	CL2500	Body: ASTM A105 Normalized Trim : 316 / HF
101	2	2	GA-E-67709	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF
140	2	2	GA-E-67384	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34 - Interlock System	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF
801	1	1	GA-E-67698	Ball-Stem Extension-Side entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	BW	CL2500	Body: ASTM A105 Normalized Trim : Soft seat-316 trim - PEEK seats
801	2	2	GA-E-67699	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL2500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats

	PIPING MATERIAL SPECIFICATION	JOB 032243													
		Piping Class:	25CB1D01												
		Sh. 2 of 2	Rev. <table><tr><td>A</td><td>0</td><td>1</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					A	0	1					
A	0	1													

VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
840	2	2	GA-E-67641	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D - Interlock System	BW	CL2500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
907	2	10	GA-E-69068	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL2500	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
917	2	10	GA-E-69069	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL2500 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats

STRAINERS

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	2	2	GA-E-60643	Y Strainer - Bolted cover - ASME-B16.34	FLGD	CL2500 RJ (F)	Body : ASTM A105 Normalized Screen: 316 - PERF.PLATE - 18 Holes/Cm2


BRANCH TABLES

90 Degrees									
RunSize									
1									
1 1/2	T								
2	T	T							
3	W	W	W	T					
4	W	W	W	T	T				
6	W	W	W	W	T	T			
8	W	W	W	W	W	T	T		
10	W	W	W	W	W	W	T	T	
BranchSize	1	1 1/2	2	3	4	6	8	10	
Legenda									
T	TEE - ASME-B16.9								
W	WELDOLET - MSS-SP97								

GENERAL NOTES

1) PWHT requirements shall be in accordance with specification MZ-000-CCX-MC-SPC-00013. 2) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment. 3) The use of Soft-seated Ball Valves shall be limited up to Op. Temp. 148°C (Des. Temp. shall not exceed 200°C). 4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.

<div><div><div>CCS JV</div><div>MOZAMBIQUE LNG</div></div></div>	PIPING MATERIAL SPECIFICATION		JOB 032243							
			Piping Class:		25CB1D05					
			Sh. 1 of 1		Rev. <div><div>A0</div></div>					
Base Material : CARBON STEEL			Design code : ASME B 31.3 2016							
Nom. Rating : CL2500			PWHT : AS PER CODE (NOTE 1)							
Facing/Finishing : RJ (F)			Valve Trim : 12 - SS316/HF							
Corrosion Allow. : 1.5 mm			Welding Spec : MZ-000-CCX-MC-SPC-00009/00013							
Temp. Limit : -29 °C to 70 °C										
Service: MEG - Monoethylene Glycol (UG)										
Pipe Thickness										
NPS	1	1 1/2	2							
Thk.mm	9.09	10.15	11.07							
SCH.	XXS	XXS	XXS							
Nipple Thickness										
NPS	1	1 1/2	2							
Thk.mm	9.09	10.15	11.07							
SCH.	XXS	XXS	XXS							
PRESSURE - TEMPERATURE Ratings										
NPS	Press. bar	385								
1 - 2	Temp. °C	70								
opt.	from	Size to	Item Description	Ends	Rating/Facing	Material				
PIPE										
	1	2	PIPE	BW		ASTM A106 GR.B - SMLS - EXTERNAL FBE COATED				
FLANGES										
	1	2	WN FLANGE - ASME-B16.5	BW	CL2500 RJ (F)	ASTM A105 Normalized - EXTERNAL FBE COATED				
	1	2	BLIND FLANGE - ASME-B16.5		CL2500 RJ (F)	ASTM A105 Normalized - EXTERNAL FBE COATED				
FITTINGS										
	1	2	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A234 WPB - SMLS - EXTERNAL FBE COATED				
	1	2	REDUCER - ASME-B16.9	BW		ASTM A234 WPB - SMLS - EXTERNAL FBE COATED				
	1	2	CAP - ASME-B16.9	BW		ASTM A234 WPB - SMLS - EXTERNAL FBE COATED				
	1	1 1/2	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A105 Normalized - EXTERNAL FBE COATED				
	1	2	TEE - ASME-B16.9	BW		ASTM A234 WPB - SMLS - EXTERNAL FBE COATED				
	1	2	WELDOLET - MSS-SP97	BW		ASTM A105 Normalized - EXTERNAL FBE COATED				
MISCELLANEOUS										
	1	2	KIT FOR INSULATING FLANGE - ASME-B16.5		CL2500 RJ (F)	GRE LAMINATED + TFE (MAX T 180 C)				
GASKETS										
	1	2	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON				
BOLTS										
	3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)				
VALVES										
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material			

<div></div>		PIPING MATERIAL SPECIFICATION				JOB 032243					
						Piping Class:		25CB1D40			
						Sh. 1 of 2		Rev. A 0 1			
Base Material : CARBON STEEL		Design code : ASME B 31.8-2018									
Nom. Rating : CL2500		PWHT : AS PER CODE									
Facing/Finishing : RJ (F)		Valve Trim : 12 - SS316/HF									
Corrosion Allow. : 1.5 mm		Welding Spec : MZ-010-CCX-MC-SPC-00001									
Temp. Limit : -29 °C to 70 °C											
Service: [ASME B31.8] Service line 8" NG - Natural Gas - (Aboveground)											
Pipe Thickness											
NPS	1	1 1/2	2	3	4	6	8				
Thk.mm	6.35	7.14	8.74	11.13	11.13	14.27	18.26				
SCH.	160	160	160	160	120	120	120				
Nipple Thickness											
NPS	1	1 1/2	2								
Thk.mm	6.35	7.14	8.74								
SCH.	160	160	160								
PRESSURE - TEMPERATURE Ratings											
NPS	Press. bar	385									
1 - 8	Temp. °C	70									
opt.	from	Size to	Item Description	Ends	Rating/Facing	Material					
PIPE											
	1	6	PIPE	BW		API 5L GR.X65 PSL2 - SMLS					
	8	8	PIPE	BW		API 5L GR.X65 PSL2 - SMLS					
FLANGES											
	1	8	WN FLANGE - ASME-B16.5	BW	CL2500 RJ (F)	ASTM A694 F65					
	1	8	BLIND FLANGE - ASME-B16.5		CL2500 RJ (F)	ASTM A694 F65					
SPECTACLE BLIND											
	1	1 1/2	SPECTACLE BLIND - ASME-B16.48 GA-E-060011		CL2500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)					
	2	8	BLIND & SPACER - ASME-B16.48 GA-E-060011		CL2500 RJ (F)	ASTM A515 GR.70					
FITTINGS											
2	1	8	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A860 WPHY65 - SMLS					
	8	8	HOT INDUCTION BENDS - ASME B16.49	BW		API 5L GR.X65 PSL2 - SMLS					
	1 1/2	8	REDUCER - ASME-B16.9	BW		ASTM A860 WPHY65 - SMLS					
	1	8	CAP - ASME-B16.9	BW		ASTM A860 WPHY65 - SMLS					
	1	1	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A694 F65					
	1 1/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A860 WPHY65 - SMLS					
	1	6	TEE - ASME-B16.9	BW		ASTM A860 WPHY65 - SMLS					
	8	8	TEE - BW BARRED TYPE - <MFR Std>	BW		ASTM A860 WPHY65 - SMLS					
	8	8	TEE - ASME-B16.9	BW		ASTM A860 WPHY65 - SMLS					
	1	4	WELDOLET - MSS-SP97	BW		ASTM A694 F65					
GASKETS											
	1	8	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON					
BOLTS											
	3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)					
VALVES											
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material				
1	2	8	GA-E-67339	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF				
4	2	4	GA-E-67402	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF				
8	1	1 1/2	GA-E-67280	Ball-Side entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	BW	CL2500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.				
8	2	2	GA-E-67194	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL2500	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM-19 stem)-GRAPH.				
8	8	8	GA-E-67193	Ball-Top entry-FB-Trunnion ball + Pup Pieces - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM-19 stem)-GRAPH.				
10	1	1 1/2	GA-E-67331	Gate-WB-FB-Solid wdg-Exp.seat - ASME-B16.34	BW/TH DF	CL2500	Body: ASTM A105 Normalized Trim : 316 / HF				
11	2	2	GA-E-67329	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	FLGD	CL2500 RJ (F)	Body: ASTM A216 WCB Trim : 316 / HF				
101	2	4	GA-E-67071	Gate-Stem Extension-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF				
140	2	4	GA-E-67706	Gate-PS-FB-Flex wdg-Wlidd seat - ASME-B16.34 - Interlock System	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF				
801	2	2	GA-E-67234	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL2500	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM-19 stem)-GRAPH.				
972	2	8	GA-E-69037	Ball-Top entry-Red.B-Trunnion ball+Pup Pieces - API6D	BW	CL2500	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM-19 stem)-GRAPH.				
974	2	8	GA-E-69038	Ball-Split body-Red.B-Trunnion ball - API6D	FLGD	CL2500 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				
981	8	8	GA-E-69070	Ball-Stem Extension-Split body-FB-Trunnion ball - API6D	FLGD	CL2500 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats				

	PIPING MATERIAL SPECIFICATION	JOB 032243				
		Piping Class:	25CB1D40			
		Sh. 2 of 2	Rev.			
			A	0	1	


BRANCH TABLES


RunSize		90 Degrees					
1	T						
1 1/2	T	T					
2	T	T	T				
3	W	W	W	T			
4	W	W	W	T	T		
6	W	W	W	W	T	T	
8	W	W	W	W	W	TP	TP
BranchSize	1	1 1/2	2	3	4	6	8
Legenda							
T	TEE - ASME-B16.9						
TP	TEE - ASME-B16.9						
W	WELDOLET - MSS-SP97						

GENERAL NOTES

1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
2) Pipes wall Thickness have been calculated in accordance with ASME B31.8 considering Design Factor=0.6
3) Linepipe shall be in accordance with Specification MZ-010-CCX-PL-SPC-00005 Onshore Linepipe Specification
4) Hot induction Bends shall be in accordance with Specification MZ-010-CCX-PL-SPC-00006 Onshore Pipelines Hot Induction Bend
5) Barred Tee shall be in accordance with Specification MZ-010-CCX-PL-SPC-00007 Onshore Pipelines Barred Tee
6) Pipeline Fittings and Flanges shall be in accordance with Specification MZ-010-CCX-PL-SPC-00009 Onshore Pipelines Fittings
7) Monolithic Insulation Joints shall be in accordance with Specification MZ-010-CCX-PL-SPC-0008 Onshore Pipelines Monolithic Insulation Joint

- Report Name: SpcLinB
Revision: 01.06.02 - 09/12/2021
Printed : 28/11/2024 15:18:43

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:		25CB4D01			
		Sh. 2 of 2		Rev.			
		A	0				
4) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.							

<div></div>		PIPING MATERIAL SPECIFICATION										JOB 032243																	
												Piping Class:					25CB4D41												
												Sh. 1 of 2					Rev.												
					A					0					1														

Base Material : CARBON STEEL										Design code : ASME B 31.8-2018									
Nom. Rating : CL2500										PWHT : AS PER CODE									
Facing/Finishing : RJ (F)										Valve Trim : 12 - SS316/HF									
Corrosion Allow. : 6 mm										Welding Spec : MZ-010-CCX-MC-SPC-00001									
Temp. Limit : -29 °C to 70 °C																			
Service: [ASME B31.8] NG - Natural Gas - (Aboveground)																			

Pipe Thickness													
NPS	1	1 1/2	2	3	4	6	8	10	12	16	22	24	
Thk.mm	9.09	10.15	11.07	15.24	17.12	18.26	22.23	28.58	31.75	36.53	47.63	52.37	
SCH.	XXS	XXS	XXS	XXS	XXS	160	XXS	160		140	140	140	

Nipple Thickness													
NPS	1	1 1/2	2										
Thk.mm	9.09	10.15	11.07										
SCH.	XXS	XXS	XXS										

PRESSURE - TEMPERATURE Ratings													
NPS	Press. bar	425.4	425.4	ASME B16.5									
1 - 4	Temp. °C	-28.9	37.78	Material Group 1.1									
NPS	Press. bar	385											
6 - 24	Temp. °C	70											

opt.	Size		Item Description	Ends	Rating/Facing	Material
	from	to				

PIPE						
	1	16	PIPE	BW		API 5L GR.X65 PSL2 - SMLS
	18	20	PIPE	BW		API 5L GR.X65 PSL2 - SAW
	22	24	PIPE	BW		API 5L GR.X65 PSL2 - SAW

FLANGES						
	1	12	WN FLANGE - ASME-B16.5	BW	CL2500 RJ (F)	ASTM A694 F65
	24	24	SPECIAL WN FLANGE - <MFR Std>	BW	CL2500 RJ (F)	ASTM A694 F65
	1	12	BLIND FLANGE - ASME-B16.5		CL2500 RJ (F)	ASTM A694 F65


SPECTACLE BLIND						
	1	1 1/2	SPECTACLE BLIND - ASME-B16.48 GA-E-060011		CL2500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)
	2	12	BLIND & SPACER - ASME-B16.48 GA-E-060011		CL2500 RJ (F)	ASTM A516 GR.70 + S5 (-46°C)

FITTINGS						
2	2	2	DRIP-RING - TB DRI 5011		CL2500 RJ (F)	ASTM A694 F65
	1	12	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A860 WPHY65 - SMLS
	24	24	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A860 WPHY65 - WLDD
	24	24	HOT INDUCTION BENDS - ASME B16.49	BW		API 5L GR.X65 PSL2 - SAW
	1 1/2	16	REDUCER - ASME-B16.9	BW		ASTM A860 WPHY65 - SMLS
	22	24	REDUCER - ASME-B16.9	BW		ASTM A860 WPHY65 - WLDD
	1	12	CAP - ASME-B16.9	BW		ASTM A860 WPHY65 - SMLS
	1	1	THD MALE PLUG - RND HEAD - ASME-B16.11	THDM		ASTM A694 F65
	1	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE		ASTM A860 WPHY65 - SMLS
	1	16	TEE - ASME-B16.9	BW		ASTM A860 WPHY65 - SMLS
	22	24	TEE - ASME-B16.9	BW		ASTM A860 WPHY65 - WLDD
	24	24	TEE - BW BARRED TYPE - <MFR Std>	BW		ASTM A860 WPHY65 - WLDD
	1	8	WELDOLET - MSS-SP97	BW		ASTM A694 F65

GASKETS						
	1	12	OCTAGONAL RJ GASKET - ASME-B16.20			SOFT IRON
	14	24	OCTAGONAL RJ GASKET - <MFR Std>			SOFT IRON

BOLTS						
	3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)

VALVES							
pos.	from	Size	Data Sheet	Item Description	Ends	Rating/Facing	Material
1	2	8	GA-E-67020	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF
4	2	2	GA-E-60286	Globe-PS-Disk-Integral seat - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF
8	1	1 1/2	GA-E-67285	Ball-Side entry -FB-Float.ball -Frgd body+nipples - ASME-B16.34	BW	CL2500	Body: ASTM A105 Normalized Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.
8	2	2	GA-E-67150	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL2500	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM-19 stem)-GRAPH.
8	24	24	GA-E-67151	Ball-Top entry-FB-Trunnion ball + Pup Pieces - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM-19 stem)-GRAPH.
10	1	1 1/2	GA-E-67332	Gate-WB-FB-Solid wdg-Exp.seat - ASME-B16.34	BW/TH DF	CL2500	Body: ASTM A105 Normalized Trim : 316 / HF
11	2	2	GA-E-67330	Gate-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	FLGD	CL2500 RJ (F)	Body: ASTM A216 WCB Trim : 316 / HF
101	2	8	GA-E-67072	Gate-Stem Extension-PS-FB-Flex wdg-Wldd seat - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF
401	2	2	GA-E-60293	Globe-Stem Extension-PS-Disk-Integral seat - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : 316 / HF
801	2	2	GA-E-67235	Ball-Stem Extension-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL2500	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM-19 stem)-GRAPH.
908	2	12	GA-E-69039	Ball-Top entry-FB-Trunnion ball + Pup Pieces - API6D	BW	CL2500	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM-19 stem)-GRAPH.
908	14	24	GA-E-69041	Ball-Top entry-FB-Trunnion ball + Pup Pieces - ASME-B16.34	BW	CL2500	Body: ASTM A216 WCB Trim : Metal seat-316+W CARB. trim-(XM-19 stem)-GRAPH.
918	2	12	GA-E-69040	Ball-Split body-FB-Trunnion ball - ASME-B16.34	FLGD	CL2500 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats
918	14	24	GA-E-69042	Ball-Top entry-FB-Trunnion ball - ASME-B16.34	FLGD	CL2500 RJ (F)	Body: ASTM A216 WCB Trim : Soft seat-316 trim - PEEK seats

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:	25CB4D41				
		Sh. 2 of 2	Rev.				
			A	0	1		


BRANCH TABLES

RunSize		90 Degrees														
1	T															
1 1/2	T	T														
2	T	T	T													
3	W	W	W	T												
4	W	W	W	T	T											
6	W	W	W	W	T	T										
8	W	W	W	W	W	T	T									
10	W	W	W	W	W	W	T	T								
12	W	W	W	W	W	W	W	T	T							
16	W	W	W	W	W	W	W	T	T	T						
22	W	W	W	W	W	W	W	T	T	T	T					
24	W	W	W	W	W	W	W	T	T	T	T	T				
BranchSize	1	1 1/2	2	3	4	6	8	10	12	16	22	24				
Legenda																
T	TEE - ASME-B16.9															
W	WELDOLET - MSS-SP97															

GENERAL NOTES

- 1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.
- 2) Pipes wall Thickness have been calculated in accordance with ASME B31.8 considering Design Factor=0.6
- 3) Linepipe shall be in accordance with Specification MZ-010-CCX-PL-SPC-00005 Onshore Linepipe Specification
- 4) Hot induction Bends shall be in accordance with Specification MZ-010-CCX-PL-SPC-00006 Onshore Pipelines Hot Induction Bend
- 5) Barred Tee shall be in accordance with Specification MZ-010-CCX-PL-SPC-00007 Onshore Pipelines Barred Tee
- 6) Pipeline Fittings and Flanges shall be in accordance with Specification MZ-010-CCX-PL-SPC-00009 Onshore Pipelines Fittings
- 7) Monolithic Insulation Joints shall be in accordance with Specification MZ-010-CCX-PL-SPC-0008 Onshore Pipelines Monolithic Insulation Joint

<div><div><div>CCS TV</div><div>MOZAMBIQUE LNG</div></div></div>		PIPING MATERIAL SPECIFICATION		JOB 032243							
				Piping Class:		25CB4D49					
				Sh. 1 of 2		Rev.					
						A	0	1			
Base Material : CARBON STEEL						Design code : ASME B 31.8-2018					
Nom. Rating : CL2500						PWHT : AS PER CODE					
Facing/Finishing : RJ (F)						Valve Trim : 12 - SS316/HF					
Corrosion Allow. : 6 mm						Welding Spec : MZ-010-CCX-MC-SPC-00001					
Temp. Limit : -29 °C to 70 °C											
Service: [ASME B31.8] NG - Natural Gas - (Underground)											
Pipe Thickness											
NPS	1	1 1/2	2	22	24						
Thk.mm	9.09	10.15	11.07	47.63	52.37						
SCH.	XXS	XXS	XXS	140	140						
Nipple Thickness											
NPS	1	1 1/2	2								
Thk.mm	9.09	10.15	11.07								
SCH.	XXS	XXS	XXS								
PRESSURE - TEMPERATURE Ratings											
NPS	Press. bar	425.4	425.4	ASME B16.5							
1 - 4	Temp. °C	-28.9	37.78	Material Group 1.1							
NPS	Press. bar	385									
22 - 24	Temp. °C	70									
opt.	Size from to		Item Description		Ends	Rating/Facing	Material				
PIPE											
	1	16	PIPE		BW		API 5L GR.X65 PSL2 - SMLS				
	18	20	PIPE		BW		API 5L GR.X65 PSL2 - SAW				
	22	24	PIPE		BW		API 5L GR.X65 PSL2 - SAW - EXTERNAL FBE COATED				
FLANGES											
	1	2	WN FLANGE - ASME-B16.5		BW	CL2500 RJ (F)	ASTM A694 F65				
	24	24	SPECIAL WN FLANGE - <MFR Std>		BW	CL2500 RJ (F)	ASTM A694 F65				
	1	2	BLIND FLANGE - ASME-B16.5			CL2500 RJ (F)	ASTM A694 F65				
FITTINGS											
2	1	2	LONG RADIUS ELBOW - ASME-B16.9		BW		ASTM A860 WPHY65 - SMLS				
	24	24	LONG RADIUS ELBOW - ASME-B16.9		BW		ASTM A860 WPHY65 - WLDD				
	24	24	HOT INDUCTION BENDS - ASME B16.49		BW		API 5L GR.X65 PSL2 - SAW - EXTERNAL FBE COATED				
	1 1/2	2	REDUCER - ASME-B16.9		BW		ASTM A860 WPHY65 - SMLS				
	22	24	REDUCER - ASME-B16.9		BW		ASTM A860 WPHY65 - WLDD				
	1	2	CAP - ASME-B16.9		BW		ASTM A860 WPHY65 - SMLS				
	1	2	SWAGE NIPPLE - PE/PE - MSS-SP95		PE		ASTM A860 WPHY65 - SMLS				
	1	2	TEE - ASME-B16.9		BW		ASTM A860 WPHY65 - SMLS				
	22	24	TEE - ASME-B16.9		BW		ASTM A860 WPHY65 - WLDD				
	24	24	TEE - BW BARRED TYPE - <MFR Std>		BW		ASTM A860 WPHY65 - WLDD				
	1	2	WELDOLET - MSS-SP97		BW		ASTM A694 F65				
GASKETS											
	1	2	OCTAGONAL RJ GASKET - ASME-B16.20				SOFT IRON				
	24	24	OCTAGONAL RJ GASKET - <MFR Std>				SOFT IRON				
BOLTS											
	3/4	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368				ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED				
VALVES											
pos.	Size from to		Data Sheet	Item Description	Ends	Rating/Facing	Material				

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:	25CB4D49				
		Sh. 2 of 2	Rev.				
			A	0	1		
1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment. 2) Pipes wall Thickness have been calculated in accordance with ASME B31.8 considering Design Factor=0.6 3) Linepipe shall be in accordance with Specification MZ-010-CCX-PL-SPC-00005 Onshore Linepipe Specification 4) Hot induction Bends shall be in accordance with Specification MZ-010-CCX-PL-SPC-00006 Onshore Pipelines Hot Induction Bend 5) Barred Tee shall be in accordance with Specification MZ-010-CCX-PL-SPC-00007 Onshore Pipelines Barred Tee 6) Pipeline Fittings and Flanges shall be in accordance with Specification MZ-010-CCX-PL-SPC-00009 Onshore Pipelines Fittings 7) Monolithic Insulation Joints shall be in accordance with Specification MZ-010-CCX-PL-SPC-0008 Onshore Pipelines Monolithic Insulation Joint 8) Buried Carbon Steel piping shall be FBE external coated in accordance with Specification MZ-000-CCX-MC-SPC-00004 _External Coating for Buried Pipeline and Piping Components-FBE and FJC							

<div><div><div>CCS JV</div><div>MOZAMBIQUE LNG</div></div></div>	PIPING MATERIAL SPECIFICATION				JOB 032243						
					Piping Class: 45SA0E01						
					Sh. 1 of 1				Rev.		
				A		0					

Base Material : STAINLESS STEEL 304/304L DUAL GRADE				Design code : ASME B 31.3 2016							
Nom. Rating : CL5000				PWHT : NO							
Facing/Finishing : RJ (F)				Valve Trim : 12 - SS316/HF							
Corrosion Allow. : 0 mm				Welding Spec : MZ-000-CCX-MC-SPC-00009/00013							
Temp. Limit : -130 °C to 70 °C											
Service: NG - Natural Gas											
Pipe Thickness											
NPS	2	3	4	6							
Thk.mm	8.74	15.24	17.12	25							
SCH.											
Nipple Thickness											
NPS	2										
Thk.mm	8.74										
SCH.											
PRESSURE - TEMPERATURE Ratings											
NPS	Press. bar	385									
2 - 6	Temp. °C	70									
PIPE NOMINAL SIZE											
FLANGE SIZE		2	3	4	6						
		2 1/16	2 9/16	3 1/8	5 1/8						

opt.	Size from to	Item Description	Ends	Rating/Facing	Material	
PIPE						
	2 6	PIPE	BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS	
FLANGES						
	2 1/16 5 1/8	WN FLANGE (API 6B/6BX) - API6A	BW	CL5000 RJ (F)	ASTM A182 F304/304L DUAL GRADE	
	2 1/16 5 1/8	BLIND FLANGE (API 6B/6BX) - API6A		CL5000 RJ (F)	ASTM A182 F304/304L DUAL GRADE	
SPECTACLE BLIND						
	2 1/16 2 1/16	PADDLE BLANK & SPACER - API6A		CL5000 RJ (F)	ASTM A182 F304/304L DUAL GRADE	
FITTINGS						
	2 6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	2 6	REDUCER - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	2 6	CAP - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	2 6	TEE - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	2 2	SWEEPOLET - TB RAC 5003	BW		ASTM A182 F304/304L DUAL GRADE	
GASKETS						
	2 1/16 5 1/8	RJ GASKET - RX TYPE - API6A			AISI 304	
BOLTS						
	1/4 1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368			ASTM A320 B8 CL.2 + ASTM A194 GR.8	
VALVES						
pos.	Size from to	Data Sheet	Item Description	Ends	Rating/Facing	Material
101	2 1/16 2 1/16	GA-E-67707	Gate-Thr conduit-BB-FB-Mfr.seat - API6A	FLGD	CL5000 RJ (F)	Body: ASTM A182 F304/304L DUAL GRADE Trim : 316 / HF
401	2 1/16 2 1/16	GA-E-67515	Globe-Stem Extension-BB-Red.B-Int.seat - API6A	FLGD	CL5000 RJ (F)	Body: ASTM A182 F304/304L DUAL GRADE Trim : 316 / HF
801	2 1/16 2 1/16	GA-E-67642	Ball-Stem Extension-Split body-FB-Trunnion ball - API6A	FLGD	CL5000 RJ (F)	Body: ASTM A182 F304/304L DUAL GRADE Trim : Metal seat-316+W CARB. trim-(XM19 stem)-GRAPH.

BRANCH TABLES									
90 Degrees									
RunSize									
	2	T							
	3	T	T						
	4	T	T	T					
	6	S	T	T	T				
BranchSize	2	3	4	6					
Legenda									
S	SWEEPOLET - TB RAC 5003								
SM	SPECIAL SWEEPOLET - <MFR Std>								
T	TEE - ASME-B16.9								

GENERAL NOTES									
1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.									
2) NDE Examination shall be performed in accordance with specification MZ-000-CCX-MC-SPC-00010.									

<div><div><div>CCS</div><div>JV</div></div><div><div>Mozambique</div><div>LNG</div></div></div>		PIPING MATERIAL SPECIFICATION		JOB 032243							
				Piping Class:		45SA0E40					
				Sh. 1 of 1		Rev.					
				A		0					

Base Material		: STAINLESS STEEL 304/304L DUAL GRADE		Design code		: ASME B 31.8-2018	
Nom. Rating		: CL5000		PWHT		: NO	
Facing/Finishing		: RJ (F)		Valve Trim		: 12 - SS316/HF	
Corrosion Allow.		: 0 mm		Welding Spec		: MZ-010-CCX-MC-SPC-00001	
Temp. Limit		: -130 °C to 70 °C					
Service: [ASME B31.8] NG - Natural Gas - (Aboveground)							
Pipe Thickness							
NPS	2	3	4	6			
Thk.mm	11.07	15.24	18	27			
SCH.	XXS	XXS					
Nipple Thickness							
NPS	2						
Thk.mm	11.07						
SCH.	XXS						
PRESSURE - TEMPERATURE Ratings							
NPS	Press. bar	385					
2 - 6	Temp. °C	70					
PIPE NOMINALSIZE							
		2	3	4	6		
FLANGE SIZE		2 1/16	2 9/16	3 1/8	5 1/8		

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE							
	2	6	PIPE	BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS	
FLANGES							
	2 1/16	5 1/8	WN FLANGE (API 6B/6BX) - API6A	BW	CL5000 RJ (F)	ASTM A182 F304/304L DUAL GRADE	
	2 1/16	5 1/8	BLIND FLANGE (API 6B/6BX) - API6A		CL5000 RJ (F)	ASTM A182 F304/304L DUAL GRADE	
FITTINGS							
	2	6	LONG RADIUS ELBOW - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	3	6	REDUCER - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	2	6	CAP - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	2	6	TEE - ASME-B16.9	BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS	
	2	2	SWEEPOLET - TB RAC 5003	BW		ASTM A182 F304/304L DUAL GRADE	
GASKETS							
	2 1/16	5 1/8	RJ GASKET - RX TYPE - API6A			AISI 304	
BOLTS							
	1/4	1 1/2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368	ASTM A320 B8 CL.2 + ASTM A194 GR.8			
VALVES							
pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
4	2 1/16	2 1/16	GA-E-67411	Globe-BB-Red.B-Int.seat - API6A	FLGD	CL5000 RJ (F)	Body: ASTM A182 F304/304L DUAL GRADE
						Trim : 316 / HF	

BRANCH TABLES									
RunSize					90 Degrees				
	2	T							
	3	T	T						
	4	T	T	T					
	6	L	T	T	T				
BranchSize	2	3	4	6					
Legenda									
L	SWEEPOLET - TB RAC 5003								
LM	SPECIAL SWEEPOLET - <MFR Std>								
T	TEE - ASME-B16.9								


GENERAL NOTES									
1) Threaded joints are permitted only at the outlet of vent and drain valves, hydrostatic connections, instrument connections, and to match equipment.									
2) Pipes wall Thickness have been calculated in accordance with ASME B31.8 considering Design Factor=0.6									
3) Linepipe shall be in accordance with Specification MZ-010-CCX-PL-SPC-00005 Onshore Linepipe Specification									
4) Hot induction Bends shall be in accordance with Specification MZ-010-CCX-PL-SPC-00006 Onshore Pipelines Hot Induction Bend									
5) Barred Tee shall be in accordance with Specification MZ-010-CCX-PL-SPC-00007 Onshore Pipelines Barred Tee									
6) Pipeline Fittings and Flanges shall be in accordance with Specification MZ-010-CCX-PL-SPC-00009 Onshore Pipelines Fittings									
7) Monolithic Insulation Joints shall be in accordance with Specification MZ-010-CCX-PL-SPC-00008 Onshore Pipelines Monolithic Insulation Joint									

<div><div>CCS TV</div><div>MOZAMBIQUE LNG</div></div>		PIPING MATERIAL SPECIFICATION		JOB 032243					
				Piping Class:		80CB1E01			
				Sh. 1 of 1		Rev. <div><div>A</div><div>0</div><div></div><div></div><div></div></div>			
Base Material : CARBON STEEL		Design code : ASME B 31.3 sect.K 2016							
Nom. Rating : CL10000		PWHT : AS PER CODE							
Facing/Finishing : RJ (F)		Valve Trim : 12 - SS316/HF							
Corrosion Allow. : 1.5 mm		Welding Spec : MZ-000-CCX-MC-SPC-00009/00013							
Temp. Limit : -29 °C to 70 °C									
Service: MEG - Monoethylene Glycol									
Pipe Thickness									
NPS	2	3	4	6	8				
Thk.mm	14	20	25	35.2	45.3				
SCH.									
Nipple Thickness									
NPS									
Thk.mm									
SCH.									
PRESSURE - TEMPERATURE Ratings									
NPS	Press. bar	690							
2 - 8	Temp. °C	70							
PIPE NOMINALSIZE			2	3	4	6	8		
FLANGE SIZE			1 13/16	1 13/16	2 9/16	4 1/16	5 1/8		
opt.	Size from to		Item Description			Ends	Rating/Facing	Material	
PIPE									
	2	8	PIPE			BW		API 5L GR.X65 PSL2 - SMLS	
FLANGES									
	1 13/16	5 1/8	WN FLANGE (API 6B/6BX) - API6A			BW	CL10000 RJ (F)	ASTM A694 F65	
FITTINGS									
	2	8	LONG RADIUS ELBOW - ASME-B16.9			BW		ASTM A860 WPHY65 - SMLS	
	3	8	REDUCER - ASME-B16.9			BW		ASTM A860 WPHY65 - SMLS	
	2	8	CAP - ASME-B16.9			BW		ASTM A860 WPHY65 - SMLS	
	2	8	TEE - ASME-B16.9			BW		ASTM A860 WPHY65 - SMLS	
	2	3	SWEEPOLET - TB RAC 5003			BW		ASTM A694 F65	
GASKETS									
	1 13/16	5 1/8	RJ GASKET - BX TYPE - API6A					SOFT IRON	
BOLTS									
	1/2	4	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368				ASTM A193 B7 + ASTM A194 GR.2H (HotDip 153)		
VALVES									
pos.	Size from to		Data Sheet	Item Description		Ends	Rating/Facing	Material	
1	1 13/16	5 1/8	GA-E-67057	Gate-Thr conduit-BB-FB-Mfr.seat - API6A		FLGD	CL10000 RJ (F)	Body: ASTM A694 F65 Trim : 316 / HF	
8	1 13/16	5 1/8	GA-E-67187	Ball-Top entry-FB-Trunnion ball - API6A		FLGD	CL10000 RJ (F)	Body: ASTM A694 F65 Trim : Metal seat-316+W CARB. trim-(XM-19 stem)-GRAPH.	
972	1 13/16	5 1/8	GA-E-69071	Ball-Top entry-RB-Trunnion ball - API6A		FLGD	CL10000 RJ (F)	Body: ASTM A694 F65 Trim : Metal seat-316+W CARB. trim-(XM-19 stem)-GRAPH.	

BRANCH TABLES									
RunSize		90 Degrees							
2	T								
3	T	T							
4	T	T	T						
6	L	T	T	T					
8	L	L	T	T	T				
BranchSize	2	3	4	6	8				
Legenda									
L	SWEEPOLET - TB RAC 5003								
T	TEE - ASME-B16.9								

GENERAL NOTES									

PIPING MATERIAL SPECIFICATION

	PIPING MATERIAL SPECIFICATION	JOB 032243																		
		Piping Class:	80CB1E40																	
		Sh. 2 of 2	<table><tr><td colspan="5">Rev.</td></tr><tr><td>A</td><td>0</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					Rev.					A	0						
Rev.																				
A	0																			


90 Degrees									
RunSize									
2	T								
3	T	T							
4	T	T	T						
6	L	T	T	T					
8	L	L	T	T	T				
BranchSize	2	3	4	6	8				

Legenda	
L	SWEEPOLET - TB RAC 5003
T	TEE - ASME-B16.9

GENERAL NOTES


- 1) Pipes wall Thickness have been calculated in accordance with ASME B31.4 considering Design Factor=0.72
2) Linepipe shall be in accordance with Specification MZ-010-CCX-PL-SPC-00005 Onshore Linepipe Specification
3) Hot induction Bends shall be in accordance with Specification MZ-010-CCX-PL-SPC-00006 Onshore Pipelines Hot Induction Bend
4) Barred Tee shall be in accordance with Specification MZ-010-CCX-PL-SPC-00007 Onshore Pipelines Barred Tee
5) Pipeline Fittings and Flanges shall be in accordance with Specification MZ-010-CCX-PL-SPC-00009 Onshore Pipelines Fittings
6) Monolithic Insulation Joints shall be in accordance with Specification MZ-010-CCX-PL-SPC-0008 Onshore Pipelines Monolithic Insulation Joint


PIPING MATERIAL SPECIFICATION

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:	80CB1E49				
		Sh. 2 of 2	Rev.				
			A	0			
7) Buried Carbon Steel piping shall be FBE external coated in accordance with Specification MZ-000-CCX-MC-SPC-00004 _External Coating for Buried Pipeline and Piping Components-FBE and FJC							

	PIPING MATERIAL SPECIFICATION	JOB 032243					
		Piping Class:	80CB4E40				
		Sh. 2 of 2	Rev.				
			A	0			

- 2) Linepipe shall be in accordance with Specification MZ-010-CCX-PL-SPC-00005 Onshore Linepipe Specification
3) Hot induction Bends shall be in accordance with Specification MZ-010-CCX-PL-SPC-00006 Onshore Pipelines Hot Induction Bend
4) Barred Tee shall be in accordance with Specification MZ-010-CCX-PL-SPC-00007 Onshore Pipelines Barred Tee
5) Pipeline Fittings and Flanges shall be in accordance with Specification MZ-010-CCX-PL-SPC-00009 Onshore Pipelines Fittings
6) Monolithic Insulation Joints shall be in accordance with Specification MZ-010-CCX-PL-SPC-00008 Onshore Pipelines Monolithic Insulation Joint
7) Buried Carbon Steel piping shall be FBE external coated in accordance with Specification MZ-000-CCX-MC-SPC-00004 _External Coating for Buried Pipeline and Piping Components-FBE and FJC

	PIPING MATERIAL SPECIFICATION	JOB 032243						
		Piping Class:		80CB4E49				
		Sh. 2 of 2		Rev.				
				A	0			
2) Linepipe shall be in accordance with Specification MZ-010-CCX-PL-SPC-00005 Onshore Linepipe Specification 3) Hot induction Bends shall be in accordance with Specification MZ-010-CCX-PL-SPC-00006 Onshore Pipelines Hot Induction Bend 4) Barred Tee shall be in accordance with Specification MZ-010-CCX-PL-SPC-00007 Onshore Pipelines Barred Tee 5) Pipeline Fittings and Flanges shall be in accordance with Specification MZ-010-CCX-PL-SPC-00009 Onshore Pipelines Fittings 6) Monolithic Insulation Joints shall be in accordance with Specification MZ-010-CCX-PL-SPC-00008 Onshore Pipelines Monolithic Insulation Joint 7) Buried Carbon Steel piping shall be FBE external coated in accordance with Specification MZ-000-CCX-MC-SPC-00004 _External Coating for Buried Pipeline and Piping Components-FBE and FJC								

<div></div>		PIPING MATERIAL SPECIFICATION		JOB 032243			
				Piping Class: 80PU0C01			
				Sh. 1 of 1			
				Rev.			
		A		0	1	2	3

Base Material : CPVC				Design code : ASME B 31.3 2016						
Nom. Rating : CL150				PWHT : NO						
Facing/Finishing : FF				Valve Trim : SPECIAL Trim CPVC						
Corrosion Allow. : 0 mm				Welding Spec : ---						
Temp. Limit : 0 °C to 65 °C										
Service: DW - Drinking Water (UG)										
Pipe Thickness										
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10
Thk.mm										
SCH.										
Nipple Thickness										
NPS										
Thk.mm										
SCH.										
PRESSURE - TEMPERATURE Ratings										
NPS	1/2 - 10	Press. bar	16							
		Temp. °C	65							

opt.	from	Size to	Item Description	Ends	Rating/Facing	Material
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PIPE

	1/2	10	PIPE - PE ENDS - <MFR Std - Plastic>	PE	PN16	CPVC 4120 - Potable Water Certified
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FLANGES

	1/2	10	SW FLANGE - <MFR Std - Plastic> CPVC-PN16	SW	CL150 FF	CPVC 4120 - Potable Water Certified
	1/2	10	BLIND FLANGE - <MFR Std - Plastic> CPVC-PN16		CL150 FF	CPVC 4120 - Potable Water Certified

FITTINGS

	1/2	10	ELBOW - SW ENDS - <MFR Std - Plastic>	SW	PN16	CPVC 4120 - Potable Water Certified
	3/4	10	REDUCER - SW ENDS - <MFR Std - Plastic>	SW	PN16	CPVC 4120 - Potable Water Certified
	1/2	10	COUPLING - SW ENDS - <MFR Std - Plastic>	SW	PN16	CPVC 4120 - Potable Water Certified
	1/2	2	UNION - SW ENDS - <MFR Std - Plastic>	SW	PN16	CPVC 4120 - Potable Water Certified
	1/2	10	TEE - SW ENDS - <MFR Std - Plastic>	SW	PN16	CPVC 4120 - Potable Water Certified

GASKETS

	1/2	10	FLAT NON MET. GASKET - ASME-B16.21			ARAMIDIC FIBER (13%) - Potable Water Certified
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BOLTS

	1/2	1	ST.BOLT+2 NUTS+2 WASH. - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED
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VALVES

pos.	from	Size to	Data Sheet	Item Description	Ends	Rating/Facing	Material
8	1 1/2	4	GA-E-60469	Plastic Ball-End entry-Full.B-Floating ball - <MFR Std - Plastic>	SW	PN16	Body: CPVC 4120 Trim : SPECIAL Trim CPVC

BRANCH TABLES

<div> <div>RunSize</div> <div> <div>1/2</div> <div>A</div> </div> <div> <div>3/4</div> <div>A</div> <div>A</div> </div> <div> <div>1</div> <div>A</div> <div>A</div> <div>A</div> </div> <div> <div>1 1/2</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> </div> <div> <div>2</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> </div> <div> <div>3</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> </div> <div> <div>4</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> </div> <div> <div>6</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> </div> <div> <div>8</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> </div> <div> <div>10</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> <div>A</div> </div> </div>										
<div> <div>BranchSize</div> <div>1/2</div> <div>3/4</div> <div>1</div> <div>1 1/2</div> <div>2</div> <div>3</div> <div>4</div> <div>6</div> <div>8</div> <div>10</div> </div>										
<div> <div>Legenda</div> <div> <div>A</div> <div>TEE - SW ENDS - <MFR Std - Plastic></div> </div> </div>										

GENERAL NOTES

- 1) The material compound of CPVC shall be in accordance with ASTM D1784 class 23447 for pipes and fittings
2) Design, manufacture and dimensional tolerances of CPVC pipe shall be in accordance with ASTM F441, designation code 4120-06
3) Design and manufacture of CPVC fittings and flanges shall be in accordance with ASTM F439. In addition, flanges and unions shall comply with ASTM F1970.

<div><div><div>CCS</div><div>JV</div></div><div><div>MOZAMBIQUE</div><div>LNG</div></div></div>	PIPING MATERIAL SPECIFICATION										JOB 032243									
											Piping Class:						80PU0C02			
											Sh. 1 of 1						Rev.			
A		0		1																

Base Material : CPVC					Design code : ASME B 31.3 2016								
Nom. Rating : CL150					PWHT : NO								
Facing/Finishing : FF					Valve Trim :								
Corrosion Allow. : 0 mm					Welding Spec : ---								
Temp. Limit : 0 °C to 70 °C													
Service: A - Air CH - Chemical CL - Hypochlorite SW - Service Water SWS - Sea Water Supply													
Pipe Thickness													
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12		
Thk.mm													
SCH.													
Nipple Thickness													
NPS													
Thk.mm													
SCH.													
PRESSURE - TEMPERATURE Ratings													
NPS		Press. bar		16									
1/2 - 12		Temp. °C		70									


opt.	Size		Item Description	Ends	Rating/Facing	Material	
	from	to					
PIPE							
	1/2	12	PIPE - PE ENDS - <MFR Std - Plastic>	PE	PN16	CPVC 4120	
FLANGES							
	1/2	12	SW FLANGE - <MFR Std - Plastic> CPVC-PN16	SW	CL150 FF	CPVC 4120	
	1/2	12	BLIND FLANGE - <MFR Std - Plastic> CPVC-PN16		CL150 FF	CPVC 4120	
FITTINGS							
	1/2	12	ELBOW - SW ENDS - <MFR Std - Plastic>	SW	PN16	CPVC 4120	
	3/4	12	REDUCER - SW ENDS - <MFR Std - Plastic>	SW	PN16	CPVC 4120	
	1/2	12	COUPLING - SW ENDS - <MFR Std - Plastic>	SW	PN16	CPVC 4120	
	1/2	2	UNION - SW ENDS - <MFR Std - Plastic>	SW	PN16	CPVC 4120	
	1/2	12	TEE - SW ENDS - <MFR Std - Plastic>	SW	PN16	CPVC 4120	
GASKETS							
	1/2	12	FLAT NON MET. GASKET - ASME-B16.21			VITON	
BOLTS							
	1/2	1	ST.BOLT+2 NUTS+2 WASH. - ANSI Thdd - TB BUL 5368			ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED	
VALVES							
pos.	from	Size	Data Sheet	Item Description	Ends	Rating/Facing	Material
		to					

BRANCH TABLES

RunSize												90 Degrees									
1/2	A																				
3/4	A A																				
1	A A A																				
1 1/2	A A A A																				
2	A A A A A																				
3	A A A A A A																				
4	A A A A A A A																				
6	A A A A A A A A																				
8	A A A A A A A A A																				
10	A A A A A A A A A A																				
12	A A A A A A A A A A A																				
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12										
Legenda																					
A	TEE - SW ENDS - <MFR Std - Plastic>																				

GENERAL NOTES

- 1) The material compound of CPVC shall be in accordance with ASTM D1784 class 23447 for pipes and fittings
- 2) Design, manufacture and dimensional tolerances of CPVC pipe shall be in accordance with ASTM F441, designation code 4120-06
- 3) Design and manufacture of CPVC fittings and flanges shall be in accordance with ASTM F439. In addition, flanges and unions shall comply with ASTM F1970.

<div></div>												PIPING MATERIAL SPECIFICATION										JOB 032243														
																						Piping Class:										80PV0C01				
																						Sh.		1		of		1		Rev.						
												A		0		1		2		3																

Base Material : PVC										Design code : ASME B 31.3 2016									
Nom. Rating : CL150										PWHT : NO									
Facing/Finishing : FF										Valve Trim : SPECIAL Trim PVC; SPECIAL Trim PVC									
Corrosion Allow. : 0 mm										Welding Spec : ---									
Temp. Limit : 0 °C to 65 °C																			
Service: SS - Sanitary Sewer																			
Pipe Thickness																			
NPS	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12								
Thk.mm																			
SCH.																			
Nipple Thickness																			
NPS																			
Thk.mm																			
SCH.																			
PRESSURE - TEMPERATURE Ratings																			
NPS	Press. bar	10																	
1/2 - 12	Temp. °C	65																	

opt.	Size		Item Description							Ends	Rating/Facing	Material
	from	to										

PIPE

	1/2	12	PIPE - PE ENDS - <MFR Std - Plastic>	PE	PN10	PVC 1120
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FLANGES

	1/2	12	SW FLANGE - <MFR Std - Plastic> PVC-PN10	SW	CL150 FF	PVC 1120
	1/2	12	BLIND FLANGE - <MFR Std - Plastic> PVC-PN10		CL150 FF	PVC 1120

FITTINGS

	1/2	12	ELBOW - SW ENDS - <MFR Std - Plastic>	SW	PN10	PVC 1120
	3/4	12	REDUCER - SW ENDS - <MFR Std - Plastic>	SW	PN10	PVC 1120
	1/2	12	FEMALE CAP - SW END - <MFR Std - Plastic>	SW	PN10	PVC 1120
	1/2	12	COUPLING - SW ENDS - <MFR Std - Plastic>	SW	PN10	PVC 1120
	1/2	12	UNION - SW ENDS - <MFR Std - Plastic>	SW	PN10	PVC 1120
	1/2	12	TEE - SW ENDS - <MFR Std - Plastic>	SW	PN10	PVC 1120

GASKETS

	1/2	12	FLAT NON MET. GASKET - ASME-B16.21			NEOPRENE
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BOLTS

	1/2	1	ST.BOLT+2 NUTS+2 WASH. - ANSI Thdd - TB BUL 5368	ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED		
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VALVES

pos.	from	Size	to	Data Sheet	Item Description	Ends	Rating/Facing	Material
6	3	8		GA-E-60374	Plastic Check-End entry-Red.B-Axial Ball - <MFR Std - Plastic>	SW	PN10	Body: PVC 1120 Trim : SPECIAL Trim PVC
8	2	8		GA-E-60470	Plastic Ball-End entry-Full.B-Floating ball - <MFR Std - Plastic>	SW	PN10	Body: PVC 1120 Trim : SPECIAL Trim PVC

BRANCH TABLES												
90 Degrees												
RunSize												
1/2	A											
3/4	A	A										
1	A	A	A									
1 1/2	A	A	A	A								
2	A	A	A	A	A							
3	A	A	A	A	A	A						
4	A	A	A	A	A	A	A					
6	A	A	A	A	A	A	A	A				
8	A	A	A	A	A	A	A	A	A			
10	A	A	A	A	A	A	A	A	A	A		
12	A	A	A	A	A	A	A	A	A	A	A	
BranchSize	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12	
Legenda												
A	TEE - SW ENDS - <MFR Std - Plastic>											

GENERAL NOTES														
1) The material compound of PVC shall be in accordance with ASTM D1784 class 12454 for pipes and fittings														
2) Design, manufacture and dimensional tolerances of PVC pipe shall be in accordance with ASTM D1785, designation code PVC1120														
3)Design and manufacture of PVC fittings and flanges shall be in accordance with ASTM D2467. In addition, flanges and unions shall comply with ASTM F1970														

<div><div>CCS JV</div><div>MOZAMBIQUE LNG</div></div>		PIPING MATERIAL SPECIFICATION				JOB 032243																											
						Piping Class:		80SA0E01																									
						Sh. 1 of 1		Rev.																									
		A		0																													
Base Material : STAINLESS STEEL 304/304L DUAL GRADE																																	
Design code : ASME B 31.3 2016																																	
Nom. Rating : CL10000																																	
PWHT : AS PER CODE																																	
Facing/Finishing : RJ (F)																																	
Valve Trim :																																	
Corrosion Allow. : 0 mm																																	
Welding Spec : MZ-000-CCX-MC-SPC-00009/00013																																	
Temp. Limit : 0 °C to 70 °C																																	
Service: CI - Chemical Injection IN - Inhibitor																																	
Pipe Thickness																																	
NPS	2	3	4	6																													
Thk.mm	14.5	21.5	27.5	40																													
SCH.																																	
Nipple Thickness																																	
NPS																																	
Thk.mm																																	
SCH.																																	
PRESSURE - TEMPERATURE Ratings																																	
NPS	Press. bar	690																															
2 - 6	Temp. °C	70																															
PIPE NOMINALSIZE																																	
FLANGE SIZE																																	
		2	3	4	6																												
		1 13/16	1 13/16	2 9/16	4 1/16																												
opt.	Size from to		Item Description			Ends	Rating/Facing	Material																									
PIPE																																	
	2	6	PIPE			BW		ASTM A312 TP304/TP304L DUAL GRADE - SMLS																									
FLANGES																																	
	1 13/16	4 1/16	WN FLANGE (API 6B/6BX) - API6A			BW	CL10000 RJ (F)	ASTM A182 F304/304L DUAL GRADE																									
	1 13/16	4 1/16	BLIND FLANGE (API 6B/6BX) - API6A				CL10000 RJ (F)	ASTM A182 F304/304L DUAL GRADE																									
FITTINGS																																	
	2	6	LONG RADIUS ELBOW - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS																									
	3	6	REDUCER - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS																									
	2	6	CAP - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS																									
	2	6	TEE - ASME-B16.9			BW		ASTM A403 WP304S/304LS DUAL GRADE - SMLS																									
	2	3	SWEEPOLET - TB RAC 5003			BW		ASTM A182 F304/304L DUAL GRADE																									
MISCELLANEOUS																																	
	2	6	KIT FOR INSULATING FLANGE - ASME-B16.5				CL10000 RJ (F)	GRE LAMINATED + TFE (MAX T 180 C)																									
GASKETS																																	
	1 13/16	4 1/16	RJ GASKET - BX TYPE - API6A					AISI 304																									
BOLTS																																	
	1/4	2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368					ASTM A320 B8 CL.2 + ASTM A194 GR.8																									
VALVES																																	
pos.	Size from to		Data Sheet	Item Description		Ends	Rating/Facing	Material																									

<div><div><div>CCS</div><div>JV</div></div><div><div>MOZAMBIQUE</div><div>LNG</div></div></div>		PIPING MATERIAL SPECIFICATION		JOB 032243							
				Piping Class:		80SW0E01					
				Sh. 1 of 1		Rev.					
		A		0							

Base Material		: SUPER DUPLEX STAINLESS STEEL UNS S32750		Design code		: ASME B 31.3 2016	
Nom. Rating		: CL10000		PWHT		: AS PER CODE	
Facing/Finishing		: RJ (F)		Valve Trim		:	
Corrosion Allow.		: 0 mm		Welding Spec		: MZ-000-CCX-MC-SPC-00009/00011/00013	
Temp. Limit		: 0 °C to 70 °C					
Service: CI - Chemical Injection IN - Inhibitor ME - Methanol							

Pipe Thickness							
NPS	3/8	3/4	2	3	4	6	
Thk.mm	2.31	3.91	8.74	15.24	17.12	23	
SCH.		80S					

Nipple Thickness							
NPS	3/8	3/4					
Thk.mm	3.2	5.56					
SCH.							

PRESSURE - TEMPERATURE Ratings							
NPS	Press. bar	690					
3/8 - 6	Temp. °C	70					

PIPE NOMINAL SIZE			3/8	3/4	2	3	4	6
FLANGE SIZE			1 13/16	1 13/16	1 13/16	1 13/16	4 1/16	5 1/8

opt.	Size from to	Item Description	Ends	Rating/Facing	Material
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PIPE					
	3/8	6	PIPE	BW	ASTM A790 UNS S32750 - SMLS

FLANGES					
	1 13/16	5 1/8	WN FLANGE (API 6B/6BX) - API6A	BW	CL10000 RJ (F) ASTM A182 GR.F53 (UNS S32750)
	1 13/16	5 1/8	BLIND FLANGE (API 6B/6BX) - API6A	CL10000 RJ (F)	ASTM A182 GR.F53 (UNS S32750)

FITTINGS					
	1/2	6	LONG RADIUS ELBOW - ASME-B16.9	BW	ASTM A815 UNS S32750 - SMLS
	3/4	6	REDUCER - ASME-B16.9	BW	ASTM A815 UNS S32750 - SMLS
	1/2	6	CAP - ASME-B16.9	BW	ASTM A815 UNS S32750 - SMLS
	3/4	2	SWAGE NIPPLE - PE/PE - MSS-SP95	PE	ASTM A182 GR.F53 (UNS S32750)
	2	6	TEE - ASME-B16.9	BW	ASTM A815 UNS S32750 - SMLS
	2	3	SWEEPOLET - TB RAC 5003	BW	ASTM A182 GR.F53 (UNS S32750)

MISCELLANEOUS					
	2	6	KIT FOR INSULATING FLANGE - ASME-B16.5	CL10000 RJ (F)	GRE LAMINATED + TFE (MAX T 180 C)

GASKETS					
	1 13/16	5 1/8	RJ GASKET - BX TYPE - API6A		S-32750

BOLTS					
	1/4	2	ST.BOLT+2 NUTS - ANSI Thdd - TB BUL 5368	ASTM A193 B7 + ASTM A194 GR.2H - PTFE COATED	

VALVES						
pos.	Size from to	Data Sheet	Item Description	Ends	Rating/Facing	Material