



EPC FOR SAHIL PHASE III DEVELOPMENT PROJECT

TARGET

COMMENT RESOLUTION SHEET

Document Title:		Comment Resolution Sheet				Company Response		
Document No. & Rev :		Transmittal Ref : EPC-AON-SDP-TR-OUT-0416				<input type="checkbox"/> CODE 1 - No comments, work to proceed <input type="checkbox"/> CODE 2 - With minor Comments, work can proceed subject to incorporation of comments. <input type="checkbox"/> CODE 3 - Major comments, work cannot proceed. <input type="checkbox"/> CODE 4 - Exception comments, document for information only.		
S.No.	Rev No.	Comment Section / Clause / Drawing Reference / Page No.	Commented Person Name	Discipline	Company Comments	Contractor Resolution	Company Confirmation	Remarks
1	B	Page no. 1 of 64	Sujay Ashok	Piping	<p>1) Actions provided in the minutes of meeting dated 07-Jun-2024 to be resolved prior to the next submission of PMS</p> <p>2) Many streams in the MSD are missing. EPC to supply all the missing PFD to MSC SME to cover all the streams and allocate all the piping classes accordingly. same shall be listed in PMS</p> <p>3) Wall thickness calculation, Reinforcement pad calculation report to be submitted prior to next submission of PMS for thickness validation.</p> <p>4) For sizes above 24" thickness shall comply to clause 6 of this PMS</p>	<p>1) Noted and PMS is updated in line with MSR.</p> <p>2) Noted, lines which are missing in the PFD's and the related piping class's are updated.</p> <p>3) Wall thickness calculation attached in related file. Reinforcement pad calculation is not required based on the project requirements and followed the branch size as per the standard branch size table.</p> <p>4) Noted & compiled.</p>		
2	B	Page no. 1 of 64	Sujay Ashok	Piping	CONTRACTOR to compile and provide all the changes made from FEED PMS to the EPC stage PMS in revision table for necessary review and approval	Noted and will be submitted.		
3	B	Page no. 1 of 64	Sujay Ashok	Piping	<p>MSR was received on 7th June, however updated MSR was received on 19th June. The PMS is reviewed based on MSR rev B. However MSR rev B is under COMPANY review and not yet approved. Any changes in the MSR/MSD shall be updated in the PMS</p>	Noted and PMS is updated inline with MSR in discussion with company.		
4	B	Page no. 1 of 64	Sujay Ashok	Piping	<p>Delete this statement <i>Note: This document is prepared based on TFSB Document P16093-30-99-12-1602</i></p> <p><i>Not to be deleted</i></p>	Comments Incorporated.		
5	B	Page no. 3 of 64	Sujay Ashok	Piping	<p>Add Previous comment not incorporated MSD to be added in hold list PID to be added Wall thickness calculation report including RF pad calculation report</p>	<p>Noted</p> <p>Wall thickness calculation attached in related file. Reinforcement pad calculation is not required based on the project requirements and followed the branch size as per the standard branch size table.</p>		
6	B	Page no. 18 of 64	Sujay Ashok	Piping	<p>These are shell standard drawings shall be part of shell standards . shifly accordingly</p> <p><i>3 36 011 Standard blocks for ASME B31.3 3 36 052 Spools blocks for ASME B31.3 3 36 063 Spavers for ASME B31.3, for replacement of spacers 3 36 064 Standard blocks for ASME B31.3, for replacement of spacers 3 36 065 Block 3 36 066 Spool 3 36 067 Spavers 3 36 068 Spool 3 36 069 Spool 3 36 070 Spool 3 36 071 Spool 3 36 072 Spool 3 36 073 Spool 3 36 074 Spool 3 36 075 Spool 3 36 076 Spool 3 36 077 Spool 3 36 078 Spool 3 36 079 Spool 3 36 080 Spool 3 36 081 Spool 3 36 082 Spool 3 36 083 Spool 3 36 084 Spool 3 36 085 Spool 3 36 086 Spool 3 36 087 Spool 3 36 088 Spool 3 36 089 Spool 3 36 090 Spool 3 36 091 Spool 3 36 092 Spool 3 36 093 Spool 3 36 094 Spool 3 36 095 Spool 3 36 096 Spool 3 36 097 Spool 3 36 098 Spool 3 36 099 Spool 3 36 100 Spool 3 36 101 Spool 3 36 102 Spool 3 36 103 Spool 3 36 104 Spool 3 36 105 Spool 3 36 106 Spool 3 36 107 Spool 3 36 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EPC FOR SAHIL PHASE III DEVELOPMENT PROJECT

TARGET

COMMENT RESOLUTION SHEET

COMMENT RESOLUTION SHEET						Company Response		
Document Title:		PIPING MATERIAL SPECIFICATION				<input type="checkbox"/> CODE 1 - No comments, work to proceed. <input type="checkbox"/> CODE 2 - With minor Comments, work can proceed subject to incorporation of comments. <input type="checkbox"/> CODE 3 - Major comments, work cannot proceed. <input type="checkbox"/> CODE 4 - Exception comments, document for information only.		
Document No. & Rev :		P16093-30-99-12-1602 Rev-A						
Contract No.: 4700021779		Project No.: P16093		Transmittal Ref :EPC-AON-SDP-TR-OUT-0416				
S.No.	Rev No.	COMMENT SECTION / CLAUSE / DRAWING REFERENCE / Page No.	COMMENTED PERSON NAME	DISCIPLINE	COMPANY COMMENTS	CONTRACTOR RESOLUTION	COMPANY CONFIRMATION	REMARKS
43	B	Class 031441-Z, Page 12 of 12	Sujay Ashok	Piping	Temperature instrument assemblies missing.	updated as per the Project requirements & Piping standard assembly drawings		
44	B	Class 031503-W, Page 4 of 12	Sujay Ashok	Piping	insulating gasket required to be mentioned material shall be Mica or approved equal	comments incorporated		
45	B	Class 036620-X, Page 13 of 13	Sujay Ashok	Piping	size repeating typical comment to be rectified wherever applicable	updated as per the Project requirements & Piping standard assembly drawings		
46	B	Class 035303-Y, Page 2 of 13	Sujay Ashok	Piping	Update	comments incorporated		
47	B	Class 063411-Z, Page 2 of 12	Sujay Ashok	Piping	update 5	comments incorporated		
48	B	Class 251441-Z, Page 2 of 12	Sujay Ashok	Piping	recheck shall be 4 1/16" ? as per API 6A	comments incorporated as per the size requirements for the Project.		
49	B	Class 251441-Z, Page 2 of 12	Sujay Ashok	Piping	this size is not covered in flange special fittings table also ON 350 confirm and update	size is not required as per Project spec.		
50	B	Class 251441-Z, Page 4 of 12	Sujay Ashok	Piping	octagonal ring gaskets for missing sizes shall be covered	comments incorporated as per the size requirements for the Project.		
1	A	Page no. 1 of 52	Sujay Ashok	Piping	CONTRACTOR has made major changes in line thickness, PWHT, NDE requirements from the FEED PMS without prior discussion with the COMPANY. CONTRACTOR to follow the FEED PMS as a minimum and resubmit the document Document is rejected in code 3	PWHT, Line Thickness, NDE are updated as per FEED PMS.	Noted	
2	A	Page no. 1 of 52	Sujay Ashok	Piping	CONTRACTOR to properly go through the MSR, MSD carry out the updations in P&ID and update the PMS accordingly	Noted	Noted	
3	A	Page no. 3 of 52	Sujay Ashok	Piping	holds to be cleared major comment in the MSR and MSD to be addressed prior to issue of PMS Approved MSR to be added in Hold list	Holds will be removed once MSR & MSD is updated as per the COMPANY Comments. MSR is added in Hold list	Noted however MSD also to be added as per previous comment	comments incorporated
4	A	Page no. 8 of 52	Sujay Ashok	Piping	Copy all the abbreviations, UNITS OF MEASURE form FEED PMS	Noted and all abbreviations, Units of Measures are copied from FEED PMS	Noted	
5	A	Page no. 10 of 52	Sujay Ashok	Piping	Comment provided in previous documents are not taken care, EPC SOW shall not be mentioned	Noted and EPC Scope of work document is removed from reference.	Noted	
6	A	Page no. 10 of 52	Sujay Ashok	Piping	Specification for GRE document to be mentioned	Noted and Specification for GRE document is added in reference	Noted	
7	A	Page no. 13 of 52	Sujay Ashok	Piping	Copy the clause 6.0 CODES AND STANDARDS list from FEED PMS	Codes and standards of Clause 6.0 from FEED PMS are added in respective sections.	Noted	
8	A	Page no. 13 of 52	Sujay Ashok	Piping	ASCE-GL-12-002 Positive Material Identification of Equipment and Piping ASCE-SP-13-001 Criticality Rating Specification	Noted and comment is incorporated.	Noted	
9	A	Page no. 22 of 52	Sujay Ashok	Piping	This clause is modified from FEED PMS. Not acceptable. PWHT clause of the FEED PMS to be mentioned.	Noted and PWHT section is updated as per the PWHT Clause from FEED	Noted	
10	A	Page no. 22 of 52	Sujay Ashok	Piping	these notes are missing from the FEED PMS. Flame cut weld bevels shall not be permitted. - Pipe class rating 400P shall not be used. CONTRACTOR to follow the FEED PMS notes as it is	Noted and comment is incorporated.	Noted	
11	A	Page no. 22 of 52	Sujay Ashok	Piping	Material of jack screw shall be austenitic stainless steel & shall have XYLAN 1070 or takecoat 1000 coating.	Noted and comment is incorporated.	Noted	
12	A	Page no. 38 of 52	Sujay Ashok	Piping	Update the PWHT and NDE requirement as per the FEED PMS. Typical comment	PWHT, NDE are updated as per FEED PMS.	Noted	
13	A	Page no. 38 of 52	Sujay Ashok	Piping	For sour services PWHT is applicable	Noted and PWHT is updated YES for all Sour service	Noted	
14	A	Page no. 39 of 52	S. Pal	Material	To be checked against limiting pH25	Any change in material based on COMPANY comment in MSD will be incorporated in next submission of PMS.		
15	A	Page no. 39 of 52	Sujay Ashok	Piping	017011-Y with sdss valves missing	Noted and 017011-Y piping class with SDSS valve is added	Noted	
16	A	Page no. 39 of 52	Sujay Ashok	Piping	as per MSR clause 14.12/ MSD potable water system is SS316. Piping class and P&ID to be updated	Potable water pipe class is kept hold. Pipe class will be assigned once it is aligned with P&ID.	Noted refer the comment as per MSR	comments incorporated
17	A	Page no. 40 of 52	S. Pal	Material	To be checked against limiting pH25	Any change in material based on COMPANY comment in MSD will be incorporated in next submission of PMS.		
18	A	Page no. 41 of 52	S. Pal	Material	To be checked against limiting pH25.	Any change in material based on COMPANY comment in MSD will be incorporated in next submission of PMS.		
19	A	Page no. 42 of 52	Sujay Ashok	Piping	not acceptable. PWHT to be updated as per FEED PMS	Noted and PWHT requirement is updated as per FEED PMS	Noted	
20	A	Attachment-3 Pipe class 011412-Z	Sujay Ashok	Piping	Schedule numbers have been modified without prior discussion or agreement with company. CONTRACTOR for follow the thicknesses mentioned in the FEED PMS as a minimum	Schedule numbers are retained as per FEED PMS	Noted	
21	A	Attachment-3 Pipe class 013461-Y	Sujay Ashok	Piping	Wall thickness shall be followed as per the FEED PMS	Wall thickness are retained as per FEED PMS. Thickness is modified only in places where calculated Wall Thickness is more than FEED Value inorder to satisfy full vacuum condition in pipes.	Wall thickness calculation , Reinforcement pad calculation report to be submitted prior to next submission of PMS. thickness validation . For sizes above 24" thickness shall comply to clause 6 of this PMS.	Wall thickness calculation attached in related file. Reinforcement pad calculation is not required but as per project requirements and followed the branch size as per the standard branch size table.
22	A	Attachment-3 Pipe class 013461-Y	Sujay Ashok	Piping	This modification is not required. All 55316 items are dual certified as mentioned in the notes	Noted and retained back as 316.	Noted	



EPC OF SAHIL PHASE 3 DEVELOPMENT PROJECT

ADNOC Onshore Contract No.: 4700021779

ADNOC Onshore Project No.: P16093

PIPING MATERIAL SPECIFICATION

REV.	DATE	ORIGINATOR	REVIEWED	APPROVED	DESCRIPTION
THIS DOCUMENT IS INTENDED FOR USE BY ADNOC AND ITS NOMINATED CONSULTANTS, CONTRACTORS, MANUFACTURERS AND SUPPLIERS.					
C	07-July-2024	MSH	SDH	SHA	Issued for Approval
B	05-June-2024	MSH	SDH	SHA	Re-Issued for Review
A	15-May-2024	MSH	SDH	SHA	Issued for Review
EPC CONTRACTOR: TARGET ENGINEERING CONSTRUCTION COMPANY LLC					
SUB-CONTRACTOR: REJLERS INTERNATIONAL ENGINEERING SOLUTIONS AB					

ADNOC Onshore Document No. : P16093-30-99-12-1602

Document Class : 1

ORGINATOR Project No : 5900702

Revision : C

ADNOC Onshore Project No : P16093

Date : 11-July-2024

Page : 1 of 66

Security Code: 5 – Public

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ص ب 270, Abu Dhabi, UAE
adnoc.ae

أدنوك البرية
ADNOC Onshore

PIPING MATERIAL SPECIFICATION

Document No. : P16093-30-99-12-1602 **Rev** : C
Project No. P16093 **Agreement No. 4700021779** **Page** : 2 of 66

The table below is a brief summary of the most recent revisions to this document. Details of all revisions are held on document by the issuing department.

Notes: All the changes shall be marked with track changes in right hand side with **Blue font**

PIPING MATERIAL SPECIFICATION

Document No. : P16093-30-99-12-1602 Rev : C
Project No. P16093 Agreement No. 4700021779 Page : 3 of 66

HOLDS

Sr. No.	Section	HOLD Description
1	-	Nil
2		
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PIPING MATERIAL SPECIFICATION

Document No.	: P16093-30-99-12-1602	Rev : C
Project No. P16093	Agreement No. 4700021779	Page : 4 of 66

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1. INTRODUCTION

ADNOC Onshore (AON) operates four onshore assets: Bab, North East Bab, Bu Hasa, and South East including 11 oil and gas fields spanning over 12,000 km², connected by a vast pipeline network to two export terminals in Jebel Dhanna and Fujairah. Part of Sout East (SE) asset, Sahil field is located 120 km south Abu Dhabi city and produces 104 MBOPD.

To comply with ADNOC direction of restoring 20% Technical Rate margin by 2025, Sahil Phase 3 development project intends to increase the field sustainable production to 114 MBOPD by debottlenecking the existing facilities and installing new facilities to handle 30 years field profile production forecast.

The project includes brownfield works in Sahil CDS, Sahil RDS-1 and ASAB CDS, and greenfield installation of CDS extension at Sahil comprises of gas export compressor, glycol dehydration package and a vapour recovery unit, in addition to two new underground pipelines: 16" x 47 km export gas pipeline from Sahil CDS to ASAB CDS and 20" x 5.6 km oil transfer line from Sahil RDS-1 to Sahil CDS.

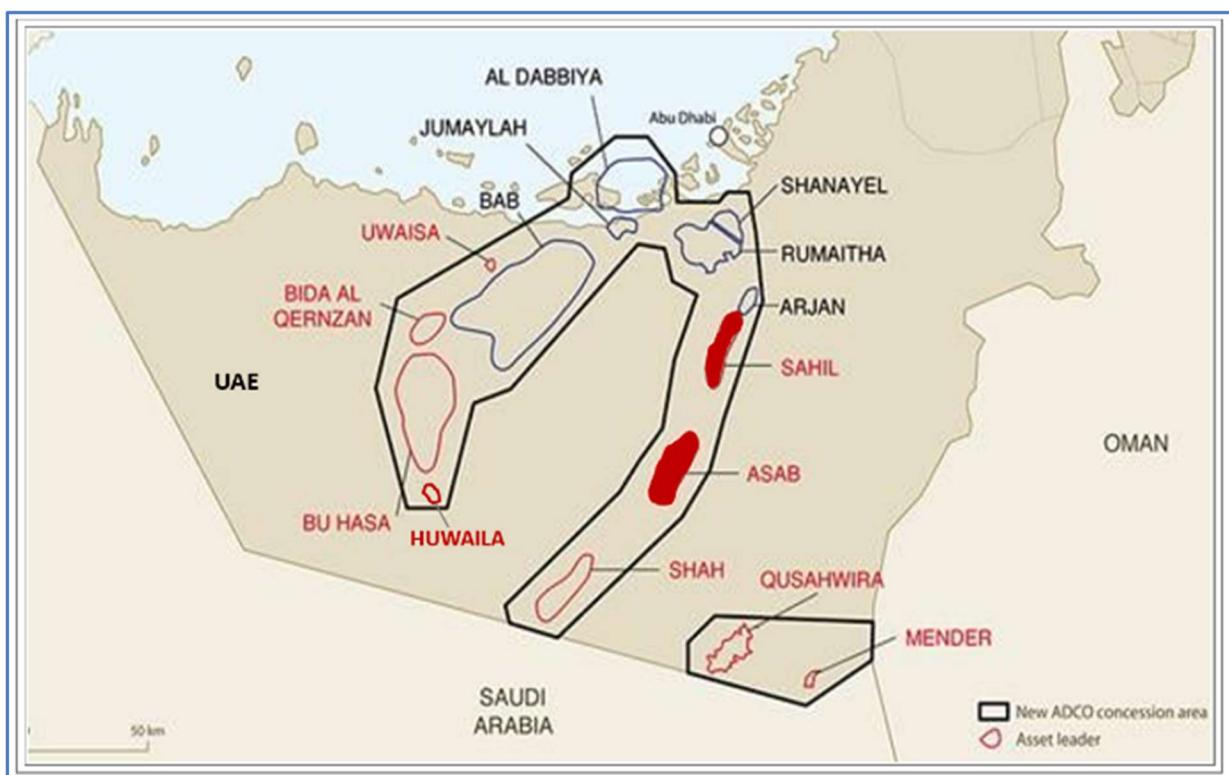


Figure 1-1 Overall Field Lay Out of ADNOC Onshore Fields

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2. PURPOSE AND SCOPE

VENDOR shall provide the Equipment/Material/Package Unit in strict accordance with the conditions stated in this document and any attached documents. Exceptions, deviations and alternatives are valid only if approved in writing by CONTRACTOR / COMPANY. This document shall be read in conjunction with the Datasheets, Specifications & documents listed under reference documents in Section 4. It defines the minimum requirements for the Materials, Manufacture/ Fabrication, Inspection, Testing, Painting/Coating, Documentation, Transportation, Packing and Forwarding of Insulation Material to be procured for the EPC OF SAHIL PHASE 3 DEVELOPMENT project.

3. DEFINITIONS AND ABBREVIATIONS

3.1. Definitions

COMPANY	: Abu Dhabi Company for Onshore Petroleum Operations Ltd. (ADNOC ONSHORE)
CONTRACTOR	: Target Engineering Construction Company-Sole Proprietorship LLC.
ENGINEERING SUB-CONTRACTOR	: Rejlers International Engineering Solution AB – Rejlers Abu Dhabi (Appointed by EPC CONTRACTOR for carrying out Detailed Engineering scope of the project)
CONTRACTOR	: The party which carries out the detailed engineering, procurement, construction, commissioning and management of the “EPC OF SAHIL PHASE 3 DEVELOPMENT PROJECT”.
SUB-CONTRACTOR	: The party which has a subcontract with CONTRACTOR to provide services or carries out all or part of the design, procurement, installation and testing of the systems as specified by CONTRACTOR.
PROJECT	: EPC OF SAHIL PHASE 3 DEVELOPMENT PROJECT
PROJECT NO.	: P16093 - The Project number shall be referred for all drawings and documents, coversheets. Agreement No.: 4700021779
EDMS	: Contractor Electronic Document Management System, which is WRENCH
SHALL	: Indicates a mandatory requirement

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SHOULD	: Indicates a strong recommendation to comply with the requirements of this document
Sustainable Rate	: The rate at which a well, or processing plant, can be operated continuously for 365 days per year with no adverse impact on the reservoir, or plant
Technical Rate	: The higher rate at which a well, or processing plant can be operated for short periods (7 days in any 30 day period) without adverse impact on the reservoir, or plant.
VENDOR /SUPPLIER /MANUFACTURER	: The party (parties) which manufactures and/or supplies materials, equipment, technical documents, or drawings and/or services to perform the duties specified by the CONTRACTOR / COMPANY. This includes all Sub vendors / tradesman & Contractors.

3.2. Abbreviations

ADNOC	: Abu Dhabi National Oil Company (ADNOC Onshore)
AFC	: Approved For Construction
CRS	: Comment Resolution Sheet
CA	: Corrosion Allowance
DC	: Document Controller
DEP	: Design Engineering Practice (Shell)
EDDR	: Engineering Document Deliverable Register
HSE	: Health, Safety and Environment
IDC	: Inter Discipline Check
IFA	: Issued For Approval
IFC	: Issued for Construction
IFD	: Issued For Design

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IFE	: Issued For Enquiry
IFH	: Issued for Hazop
IFP	: Issued For Purchase
IFR	: Issued For Review
IMS	: Integrated Management System
IRC	: Inspection Release Certificate
IRN	: Inspection release Notes
ITP	: Inspection and Test Plan
MBOPD	: Thousand Barrels Oil per Day
MR	: Material Requisition
MESC	: Material & Equipment Standards & Codes
MSS SP	: Manufacturers Standardisation Society-Standard Practice
MTO	: Material Take Off
NCR	: Non-Conformance Report
PDDL	: Project Document Deliverable List
QA	: Quality Assurance
QC	: Quality Control
QMS	: Quality Management System
SDC	: Single Discipline Check
TBE	: Technical Bid Evaluation
TD	: Technical Deviation

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TPI	:	Third Party Inspector
VDDL	:	Vendor Document Deliverable List
AG	:	Above Ground
API	:	American Petroleum Institute
ANSI	:	American National Standards Institute
ASCC	:	Alkaline Stress Corrosion Cracking
ASME	:	American Society of Mechanical Engineers
ASTM	:	American Society for Testing and Materials
BB	:	Bolted Bonnet
BC	:	Bolted Cover
BD	:	Blow Down Drain
BE	:	Bevelled End
BG	:	Bolted Gland
BS	:	British Standard
BW	:	Butt Weld
CA	:	Corrosion Allowance
CDS	:	Central Degassing Terminal
CE	:	Carbon Equivalent
CS	:	Carbon Steel
DEP	:	Design Engineering Practice (Shell)
EB	:	Extended Bonnet

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EFC	:	European Federation of Corrosion
EFW	:	Electric Fusion Welded
ES	:	Engineering Standard Specification
FB	:	Full Bore
FF	:	Flat Face
FV	:	Full Vacuum
GALV	:	Galvanised
GKSW	:	GASKET SPIRAL WOUND
GO	:	Gear operated
GRE	:	Glass Reinforced Epoxy
GTAW	:	Gas Tungsten Arc Welding
HC	:	Hydrocarbon
HF	:	Hard Faced
HIC	:	Hydrogen Induced Cracking
H2S	:	Hydrogen Sulphide
HDR	:	Header
HW	:	Hand wheel
ID	:	Inside diameter
ISO	:	International Organisation for Standardisation
ISNRS	:	Inside Screw Non-Rising Stem
ISRS	:	Inside Screw Rising Stem

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LO	:	Lever Operated
Lb	:	Pound
LTCS	:	Low Temperature Carbon Steel
MBOPD	:	Million Barrels Oil Per Day
MESC	:	Material & Equipment Standards & Codes
MOC	:	Material of Construction
MSS SP	:	Manufacturers Standardisation Society-Standard Practice
MT	:	Magnetic Particle Testing
NACE	:	National Association of Corrosion Engineers
NDE	:	Non-destructive Examination
NPS	:	Nominal Pipe Size
NPT	:	Nominal Pipe Thread
OS&Y	:	Outside Screw and Yoke
OD	:	Outside diameter
PCD	:	Pitch circle diameter
PE	:	Plain Ends
PT	:	Dye-Penetrant Testing
PTFE	:	Poly Tetra Fluoro-Ethylene
PWHT	:	Post Weld Heat Treatment
RB	:	Reduced Bore
RF	:	Raised Face

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RT	: Radiographic Testing
RTJ	: Ring Type Joint
SAW	: Submerged Arc Welding
Sch	: Schedule
Scrd	: Screwed
SDSS	: Super Duplex Stainless Steel
SI	: The International System of Units
SOHIC	: Stress Oriented Hydrogen Induced Cracking
SS	: Stainless Steel
SSC	: Sulphide Stress Cracking
SW	: Socket Weld
TCC	: Tungsten Carbide Coating
UG	: Underground
UNS	: Unified Numbering System

3.3. Units of Measures

All pipe sizes are designated as nominal pipe sizes (NPS) only. The following range of nominal pipe sizes were used in piping classes.

Nominal Pipe Size (NPS)	
INCH	Equivalent to METRIC
½	DN 15
¾	DN 20
1	DN 25
1½	DN 40
2	DN 50
3	DN 80

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4	DN 100
6	DN 150
8	DN 200
10	DN 250
12	DN 300
14	DN 350
16	DN 400
18	DN 450
20	DN 500
24	DN 600
30	DN 750
36	DN 900
42	DN 1050
48	DN 1200

4. REFERENCE DOCUMENTS

4.1. Project Documentation

Document Number	Document Title
P16093-16-11-17-1601	Line list – Sahil RDS-1
P16093-16-01-17-1601	Line list – Sahil CDS
P16093-14-01-17-1601	Line list – ASAB CDS
P16093-30-99-12-1604	Manual Valves Specification
P16093-30-99-12-1627	Specification for GRE Pipes, Fittings & Flanges
P16093-30-99-38-1601	Material Selection Report
P16093-14-01-08-1602	Piping And Instrument Diagram Sahil Gas Export Pig Receiver (ASAB CDS)
P16093-14-01-08-1603	Piping And Instrument Diagram Sahil Export Gas KOD ASAB CDS

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Document Number	Document Title
P16093-14-01-08-1605	Piping And Instrument Diagram Tundish Collection Header Manifold Area ASAB CDS
P16093-14-01-08-1607	Piping And Instrument Diagram Closed Drain Collection Header Manifold Area ASAB CDS
P16093-16-01-08-1677	Piping And Instrument Diagram 1st Stage Suction Drum Pump P-3610-01/02 CDS: SAHIL
P16093-16-01-08-1678	Piping And Instrument Diagram 1st Stage Suction Drum: V-3610-01 Export Gas Compressor CDS: SAHIL
P16093-16-01-08-1679	Piping And Instrument Diagram 1st Stage Suction Filter: ST-3610-01/02 Export Gas Compressor CDS: SAHIL
P16093-16-01-08-1681	Piping And Instrument Diagram 1st Stage Cooler: E-3610-01 Export Gas Compressor CDS: SAHIL
P16093-16-01-08-1682	Piping And Instrument Diagram 2nd Stage Suction Drum: V-3610-02 Export Gas Compressor CDS: SAHIL
P16093-16-01-08-1684	Piping And Instrument Diagram 2nd Stage Cooler: E-3610-02 Export Gas Compressor CDS: SAHIL
P16093-16-01-08-1685	Piping And Instrument Diagram Glycol Contactor Inlet KO Drum: V-3611-01 Export Gas Compressor CDS: SAHIL
P16093-16-01-08-1686	Piping And Instrument Diagram Glycol Contactor: C-3611-01 Export Gas Compressor CDS: SAHIL
P16093-16-01-08-1687	Piping And Instrument Diagram Teg Regeneration Package: U-3611 Export Gas Compressor CDS: SAHIL
P16093-16-01-08-1688	Piping And Instrument Diagram Vapour Recovery Ejectors J-3810-01 CDS: SAHIL
P16093-16-01-08-1689	Piping And Instrument Diagram Export Gas Pig Launcher LP-3904
P16093-16-01-08-1690	Piping And Instrument Diagram Pig Receiver RP-1312 Transfer Line RDS-1 TO CDS-SAHIL
P16093-16-01-08-1691-1	Piping And Instrument Diagram Gathering Manifold Skid: M-0120 CDS: SAHIL
P16093-16-01-08-1691-2	Piping And Instrument Diagram Gathering Manifold Skid: M-0120 CDS: SAHIL
P16093-16-01-08-1691-3	Piping And Instrument Diagram Gathering Manifold Skid: M-0120 CDS: SAHIL
P16093-16-01-08-1691-4	Piping And Instrument Diagram Gathering Manifold Skid: M-0120 CDS: SAHIL
P16093-16-01-08-1692	Piping And Instrument Diagram Production Header: M-0120 (New) CDS: SAHIL

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Document Number	Document Title
P16093-16-01-08-1693-1	Piping And Instrument Diagram Gathering Manifold Skid: M-0121 CDS: SAHIL
P16093-16-01-08-1693-2	Piping And Instrument Diagram Gathering Manifold Skid: M-0121 CDS: SAHIL
P16093-16-01-08-1693-3	Piping And Instrument Diagram Gathering Manifold Skid: M-0121 CDS: SAHIL
P16093-16-01-08-1694	Piping And Instrument Diagram Production Header: M-0122 (New) CDS: SAHIL
P16093-16-01-08-1695	Piping And Instrument Diagram Inlet Manifold CDS: SAHIL
P16093-16-01-08-1702	Piping And Instrument Diagram Production Header: M-0111 (HIPPS) CDS: SAHIL (Construction)
P16093-16-01-08-1712	Piping And Instrument Diagram New Main Oil Line Pump: P-1003 Extended CDS: SAHIL
P16093-16-01-08-1713	Piping And Instrument Diagram Metering Station: U-1601 CDS: SAHIL
P16093-16-01-08-1714	Piping And Instrument Diagram Skimmer Tank: SK-2401 CDS: SAHIL
P16093-16-39-08-1602	Piping And Instrument Diagram Closed Drain Drum: V-6713 CDS: SAHIL
P16093-16-39-08-1606	Piping And Instrument Diagram Flare KO Drum Sump RDS-1 SAHIL
P16093-16-01-08-1782	Piping & Instrument Diagram for Fire Water Ring Main Distribution System (Compressor)
P16093-16-01-08-1783	Piping & Instrument Diagram for Deluge Water Spray System
P16093-16-01-08-1784	Piping & Instrument Diagram for Fire Water Ring Main Distribution System (Manifolds, Test Header, PCV)
P16093-16-01-08-1785	P&ID for Fire Water Ring Main Distribution System (Pig Reciever, Launcher, Corrosion Inhibitor)
P16093-16-01-08-1786	P&ID for Fire Water Ring Main Distribution System (Substation-5, Potable Water System)
P16093-16-01-08-1789	Piping & Instrument Diagram for Deluge Water Spray System
P16093-16-01-08-1791	Piping & Instrument Diagram for Fire Water Pump CDS:SAHIL
P16093-16-01-08-1792	Piping & Instrument Diagram for Fire Water Ring Main Distribution System (SS-1,3,4&CCR Modification)

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Document Number	Document Title
P16093-16-01-08-1793	Construction Piping & Instrument Diagram Fire Water Pumps Sprinkler System CDS: SAHIL
P16093-16-01-08-1796	P&ID for Fire Water Ring Main Distribution System (Separators Upgrade, MOL Pump & Deluge V/V Skid)
P16093-16-01-08-1797	Piping & Instrument Diagram for Deluge Water Spray System

4.1.1 Design basis and Philosophies

Document Number	Document Title
P16093-30-99-23-1601	Piping Design basis
P16093-30-99-91-1603	Process Design basis
P16093-30-99-31-1602	Mechanical Design basis
P16093-30-99-52-1601	Instrumentation and Control Design Basis
P16093-16-99-89-1601	HSE Philosophy

4.2. COMPANY and SHELL Specifications & Standards

4.2.1 COMPANY Specifications

Document Number	Document Title
ES 30-99-90-0136	Meteorological data basis of design
ES 30-99-00-0102	Corrosion control and Materials Selection Philosophy
ES 30-99-00-0106	Submerged Arc Welded Pipe
ES 30-99-00-0105	Seamless Line Pipe
ES 30-99-00-0104	High Frequency Electric Welded Line Pipe
ES 30-99-12-0024	Glass-Fibre Reinforced Plastic Pipelines and Piping Systems

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Document Number	Document Title
ES 30-99-12-3207	Shop & Field Fabrication of Piping
ES 30-99-37-0001	Cathodic Protection Design
ES 30-99-37-0013	Engineering Specification- Painting and Coating of new equipment
ES 30-99-37-0062	Internal lining of new process equipment and tanks
ES 30-99-12-0023	Plant Layout and Piping Basis of Design
ES 30-99-12-3209	Specification for Piping Valves
ES 30-99-12-0030	Inspection and Test Plan for Piping Valves
ES 30-99-12-0031	Inspection and Test Plan for Piping bulk items
ES 30-99-37-2509	Additional requirements for hot tapping and welding
GS EP PVV 112	Piping Material Classes
GS EP PVV 612	Piping and equipment subject to severe sour service
GS EP PVV 622	Piping and equipment subject to mild and intermediate sour service
AGES-GL-13-001	Contractors QA/QC Requirement
AGES-GL-13-002	Positive Material Identification of Equipment and Piping
AGES-SP-13-001	Criticality Rating Specification

4.2.2 Shell DEP Specifications

Document Number	Document Title
DEP 31.38.01.14-Gen	Piping classes
DEP 31.38.01.10-Gen	Piping Classes - Basis of Design

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Document Number	Document Title
DEP 31.38.01.24-Gen	Piping – Engineering and Layout Requirements
DEP 31.38.01.25-Gen	Piping –Process Design Requirements
DEP 31.38.01.26-Gen	Piping – Pipe Stress Analysis Requirements
DEP 30.10.02.11-Gen	Metallic materials - Selected standards
DEP 30.10.02.13-Gen	Non-metallic materials - Selection and application
DEP 31.38.01.84-Gen	Services and materials selection index
DEP 70.10.90.11-Gen	Spare parts
DEP 31.38.01.31-Gen	Shop and filed fabrication for piping
DEP 00.00.06.06-Gen	Standard drawings index
DEP 30.10.02.17-Gen	Wet H2S requirements for downstream process equipment
S 38.011	Spectacle blinds for ASME flanges
S 38.042	Spade blinds for ASME flanges
S 38.043	Spacer for ASME flanges, for replacement of spades
S 38.059	Overall dimensions of plate-type level gauges through-vision and reflex
S 38.090	Branch Fittings
S38.112	High pressure welding thermowell for piping systems DN 50 (NPS 2)
S38.113	Flanged thermowell DN 40 (NPS 1-1/2) ASME classes up to 1500 incl
S38.114	Flanged thermowell DN 50 (NPS 2) ASME classes up to 2500 incl
DEP 31.40.10.19-Gen	Glass-fibre reinforced plastic pipeline and piping systems

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Document Number	Document Title
DEP 31.40.20.39-Gen	HDPE Pipeline and piping systems for oil field applications

4.3. International Code and Standards

It is the CONTRACTOR's responsibility to obtain and be familiar with all codes and standards so referenced in the relevant documentation. Requirements indicated in such codes and standards shall not supersede the requirements of this scope of work but shall be complementary.

Document No.	Document Title
NACE MR0175/ ISO 15156-1/ 2/ 3	Petroleum, Petrochemical and Natural Gas Industries- Material for use in H ₂ S containing Environments in Oil & Gas production

4.3.1 American Society of Mechanical Engineers (ASME)

Document No.	Document Title
ASME B31.3	Process Piping
ASME B36.10M	Welded and Seamless Wrought Steel Pipe
ASME B36.19M	Stainless Steel Pipe
ASME B16.48	Line Blanks
ASME B16.47	Large Diameter Steel Flanges NPS 26 through NPS 60 Metric/Inch Standard
ASME B16.9	Factory-Made Wrought Butt welding Fittings
ASME B16.5	Pipe Flanges and Flanged Fittings NPS 1/2 through NPS 24 Metric/Inch Standard
ASME B16.11	Forged Fittings, Socket-Welding and Threaded

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4.3.2 American Society of Testing Materials (ASTM)

Document No.	Document Title
ASTM A105	Standard Specification for Carbon Steel forgings for Piping Applications
ASTM A106	Specification for Seamless Carbon Steel Pipe for High Temperature Service
ASTM A216	Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service
ASTM A234	Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
ASTM A333	Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service and Other Applications with Required Notch Toughness
ASTM A350	Standard Specification for Carbon and Low-Alloy Steel forgings, Requiring Notch Toughness Testing for Piping Components
ASTM A352	Standard Specification for Steel Castings, Ferritic and Martensitic, for Pressure-Containing Parts, Suitable for Low-Temperature Service
ASTM A358	Electric-fusion-welded austenitic chromium-nickel stainless steel pipe
ASTM A420	Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-Temperature Service
ASTM A516	Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate and Lower-Temperature Service

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Document No.	Document Title
ASTM A671	Standard Specification for Electric-Fusion-Welded Steel Pipe for Atmospheric and Lower Temperatures
ASTM A672	Standard Specification for Electric-Fusion-Welded Steel Pipe for High-Pressure Service at Moderate Temperatures
ASTM A312	Standard Specification for Seamless, Welded Stainless Steel Pipes.
ASTM A182	Standard Specification for Forged Stainless-Steel pipe, Flanges, Forged Fittings
ASTM A216	Standard Specification for Steel Casting, Carbon Steel
ASTM A351	Standard Specification for Casting, Austentic for pressure containing parts.
ASTM D2774	Standard Practice for Underground Installation of Thermoplastic Pressure Piping

4.3.3 American Petroleum Institute (API)

Document No.	Document Title
API 5L	Lined Pipe
API 6A	Specification For Wellhead and Christmas Tree Equipment
API 6D	Specification for Pipeline valves
API 594	Check Valves: Flanged, Lug, Wafer and Butt welding
API 598	Valve Inspection and testing
API 600	Steel Gate Valves - Flanged and Butt-welding Ends, Bolted Bonnets

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Document No.	Document Title
API 602	Gate, Globe, and Check Valves for Sizes DN 100 (NPS 4) and Smaller for the Petroleum and Natural Gas Industries
API 607	Testing of Valves – Fire Type-testing Requirements
API 609	Butterfly Valves: Double-flanged, Lug-and Wafer type

4.3.4 British Standards

Document No.	Document Title
BS EN 10204	Metallic products – Types of Inspection Documents
BS EN 12266-1	Industrial valves, Testing of Metallic Valves, Pressure Tests, Test Procedures and Acceptance Criteria, Mandatory Requirement
BS EN ISO 17292	Metal Ball Valves for Petroleum, Petrochemical and Allied Industries
BS EN ISO 15761	Steel Gate, Globe and Check Valves DN 100 and smaller for Petroleum and Natural Gas Industries
BS 1873	Specification for Steel Globe and Globe Stop and Check Valves (Flanged and Butt-welding Ends) for Petroleum, Petrochemical and Allied Industries
BS 1868	Specification for Steel Check Valves (Flanged and Butt-Welding Ends) for Petroleum, Petrochemical and Allied Industries
BS EN 10497	Testing of Valves – Fire Type Testing Requirements for Petroleum, Petrochemical and Allied Industries

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4.3.5 ISO - International Organization for Standardization

Document No.	Document Title
ISO 14962	Petroleum & Natural Gas Industries – Glass Reinforced Plastic (GRP) Piping: Part-1: Vocabulary, symbols, applications & materials, Part-2: Qualification & manufacture, Part-3: System design, Part-4: Fabrication, Installation & Operation
ISO 75	Plastic-determination of temperature of deflection under load-part1: General test method
ISO 11357-2	Plastic-differential scanning calorimeter (DSC) - Part2: determination of glass transition Temperature
ISO 11359-2	Plastic thermo-mechanical-analysis (TMA) - Part2: determination of coefficient of linear thermal expansion and glass transition temperature
ISO 9000	Quality Management Systems- Fundamentals and vocabulary
ISO 9001	Quality Management Systems - Requirements

4.3.6 MESC Standards

Document No.	Description
MESC Groups 74, 76, 77, 81 & 85	MESC Buying Descriptions and additional specifications for piping components
SPE 74/001	Carbon steel pipe (Amend./Supp. to API Spec. 5L)

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Document No.	Description
SPE 74/002	Carbon Steel Pipe (Amend./Supp. to ASTM A 106)
SPE 74/003	Carbon Steel Pipe (Amend./Supp. to ASTM A 672)
SPE 74/004	Carbon Steel Pipe (Amend./Supp. to ASTM A 333)
SPE 74/005	Carbon Steel Pipe (Amend./Supp. to ASTM A 671)
SPE 74/008	Stainless Steel Pipe (Amend./Supp. to ASTM A312)
SPE 74/009	Stainless Steel Pipe (Amend./Supp. to ASTM A358)
SPE 74/014	Pipe, Duplex/Super Duplex Stainless Steel ASTM A 790
SPE 74/017	Pipe, Nickel – Copper Alloy ASTM B 165
SPE 74/019	Nickel alloy Pipe to ASTM B 423
SPE 74/026	Nickel alloy Pipe to ASTM B 444
SPE 74/125	Hydrogen Induced Cracking Sensitivity Test (Amend./Supp. to NACE)
SPE 76/030	Branch Outlets fittings to MSS SP-97
SPE 76/100	Flanges (Amend./Supp. to ASME B16.5)
SPE 76/101	Flanges (Amend./Supp. to ASME B16.47)
SPE 76/110	Fittings (Amend./Supp. to ASME B16.9)

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Document No.	Description
SPE 76/200	Carbon And Alloy Steel Fittings (Amend./Supp. to ASTM A234)
SPE 76/201	Carbon Steel Fittings (Amend./Supp. to ASTM A420)
SPE 76/202	Stainless Steel Fittings (Amend./Supp. to ASTM A403)
SPE 76/210	Carbon Steel forgings (Amend./Supp. to ASTM A105)
SPE 76/211	Carbon & Alloy Steel forgings (Amend./Supp. to ASTM A350)
SPE 76/212	Alloy & Stainless Steel forgings (Amend./Supp. to ASTM A182)
SPE 76/213	Nickel Alloy Forging to ASTM B 564
SPE 76/220	Carbon Steel Plate (Amend./Supp. to ASTM A 516)
SPE 76/221	Alloy Steel Plate (Amend./Supp. to ASTM A387)
SPE 76/222	Stainless Steel Plate (Amend./Supp. to ASTM A 240)
SPE 76/223	Nickel Copper Plate (Amend./Supp. to ASTM B127)
SPE 81/001	Alloy and Stainless Steel Bolts (Amend./Supp. to ASTM A 193)
SPE 81/002	Carbon and Alloy Steel Nuts (Amend./Supp. to ASTM A 194)
SPE 81/006	Nickel Alloy Bolts & Nuts (Amend./Supp. to EN 10269)

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Document No.	Description
SPE 81/007	Coating Requirements for bolts and nuts
SPE 85/100	Gasket, Metal Grooved to BS EN 12560 -6
SPE 85/101	Non-Metallic Flat Gaskets, With or Without Insert (Amend./Supp. to ASME B16.21)
SPE 85/103	Spiral Wound Gaskets (Amend./Supp. to ASME B16.20)
SPE 85/112	Metal Ring Joint Gasket to ASME B 16.20
SPE 85/201	Flange Insulation Sets
SPE 85/203	Graphite (Amend./Supp. to ASTM F 2168)

4.3.7 MSS-SP Standards

Document No.	Description
MSS SP-25	Standard Marking System for Valves, Fittings, Flanges and Unions
MSS SP-55	Quality Standard for Casing Valves & Fittings.
MSS SP-69	Pipe Hangers and Supports - Selection and Application
MSS SP-95	Swage (d) Nipples and Bull Plugs
MSS SP-97	Integrally Reinforced Forged Branch Outlet Fittings- Socket Welding, Threaded and Butt welding Ends
MSS SP-83	Unions

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4.4. ORDER OF PRECEDENCE

All design and construction shall be performed in accordance with the Specifications, Standards, Codes, Repgulations, latest Shell DEPs, etc. listed in the Contract. In any areas of conflict, the order of precedence of different applicable standards, specifications and project specifications shall follow the order:

- The laws, standards, and Regulations of United Arab Emirates
- ADNOC HSE Standards, HSE manuals and policies.
- Project Specific documents.
- ADNOC Onshore applicable Specifications, Amendments and Codes/Standards
- ADNOC Onshore applicable Specifications, Codes and Standards.
- Shell DEPs Version 41.
- International Oil & Gas Industry Codes, Standards, and Recommended practices.
- Internationally recognized oil and gas industry sound practices.

In the event of any conflict of data or requirements in any of the project applicable specified documents and standards in which some of the requirement could be of more stringent, then the Subcontractor/ Vendor shall carefully scrutiny on the most stringent requirements with regards, to the safety, environmental, economic and legal aspects.

5. SELECTION OF PIPING CLASS/PIPING IDENTIFICATION

5.1. Piping class Numbering

The piping classes are mainly derived from the Shell DEP v41. The numbering of newly developed piping classes are developed based on the Shell DEP 31.38.01.10-Gen as explained hereunder:

A	A	B	C	C	C	-	D
---	---	---	---	---	---	---	---

(AA) Indicates the Flange class in accordance with ASME Flange Rating.

01 = 150 lb

03 = 300 lb

06 = 600 lb

09 = 900 lb

15 = 1500 lb

25 = 2500 lb

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10 = 10000 lb (API-6A)

(B) Identifies the material (Ref Shell DEP 31.38.01.10-Gen)

- 1: Carbon steel
- 2: Low and intermediate alloy steels
- 3: Stainless steel/duplex
- 4: Aluminium and aluminium alloys
- 5: Copper and copper alloys
- 6: Nickel, nickel base alloys
- 7: Non-metallic material
- 8: Carbon steel with lining and for galvanised carbon steel

(CCC) denotes pipe class number selected based on the comparable pipe class in Shell DEP 31.38.01.84-Gen.

(D) identifies modified SHELL piping classes, modified piping classes are suffixed with 'X', 'Y' or 'Z', 'W', or 'G', as applicable. Following are the detail definition of these suffixes:

Process Pipe class

- | | |
|---------------------|--|
| "X" established for | <ul style="list-style-type: none"> • CS/LTCS, 3mm CA, trim Alloy 825 / SS316(L) • CS, 1.5mm CA, SS 316(L) • Cladded/SDSS/GRE, trim Alloy 825 / SDSS |
| "Y" established for | <ul style="list-style-type: none"> • SS, trim SS316(L) • CS/LTCS, 3mm CA, trim SDSS • Solid Alloy 825/625, trim Alloy 825/625 |
| "Z" established for | <ul style="list-style-type: none"> • CS/LTCS, 6mm CA, trim Alloy 825 / SDSS / SS316(L) |
| "W" established for | <ul style="list-style-type: none"> • High temperature |
| "G" established for | <ul style="list-style-type: none"> • Special Gas Service |

Utility Pipe class

- | | |
|---------------------|--|
| "X" established for | <ul style="list-style-type: none"> 1. CS, 1.5mm CA, trim SS 316(L) 2. GRE, trim SS 316(L)/ AlBr |
| "Y" established for | <ul style="list-style-type: none"> 1. CS, 1.5mm CA, trim SDSS/ SS316(L) 2. CS, 3mm CA, trim SDSS/ SS316(L) |

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"Z" established for

1. CS, 1.5mm/3mm CA, trim SS316(L)
2. SS 316, trim SS316(L)

Example:

Pipe class 011412-Z

01 = 150# Rated

1 = Carbon Steel

412 = Derived from Shell DEP

Z = Indicates modification to the original SHELL Class e.g. CA, material upgrade, etc. as stated above.

5.2. MESC

SHELL MESC catalogue shall be utilized, as applicable. Modification made in the piping classes shall be incorporated into the component relevant MESC data sheet. MESC numbers provided in the pipe classes are preliminary; MESC coding shall be modified as per MESC numbering guideline and shall be approved by Company.

6. GENERAL REQUIREMENTS

- The pressure and temperature limits in each piping class are the design limits of the relevant piping class for the specified service design conditions.
- Odd line sizes NPS 1½, 2 ½, 3 ½, 5, 7 etc. shall not be used.
- Butt weld joints requirements shall be applicable for all sizes, as prescribed in the relevant piping class. Socket welded joints are not allowed.
- The use of threaded joints is not allowed for sour, hydrocarbon and process piping services. Threaded connection shall only be applicable as per the relevant piping classes.
- Threaded connections shall be as per NPT in accordance with ASME B1.20.1
- Pipe work shall be fabricated in accordance with the engineering specification amendment/ supplement (ES 30-99-12-3207) to Shell DEP 31-38-01-31- Gen Shop and Field Fabrication for steel piping.
- Cladding/ lining, coating, etc. shall be performed as per respective standard engineering specification and applicable SHELL MESC.
- Flame cut weld bevels are not permitted.
- Pipe class rating 400# shall not be used.
- Raised face and Flat face flanges shall not be matched to form the flange joint. For mating non-Metallic flange, metallic flange face shall be compatible with the mating connecting flange.
- Piping specialty items such as Flame Arrestors, Bird Screen etc. shall be as per respective

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specifications and data sheets.

- Hydrotest pressure shall be 1.5 times of the pipe class specified rated pressure at ambient temperature.
- Carbon / Alloy Steel and LTCS pipes, fittings shall be SMLS up to 24" NPS. Single straight seam welded fabricated pipes shall be used for larger sizes.
- Where the required wall thickness is outside the standard wall thickness/schedules scope of ASME B36.10M, following wall thicknesses should be selected from below table for sizes larger than DN 600 (NPS 24) , in accordance with SHELL DEP 31.38.01.10.

Millimeters					
6.35	12.7	23.83	34	48	62
7.92	14.27	25.4	36	50	64
8.74 (1)	15.88	26.97	38	52	66
9.53	17.48	28.58	40	54	
10.31 (1)	19.05	30.18	42	56	
11.13	20.62	31.75	44	58	
11.91 (1)	22.23	32	46.02	60	
(1)- not acceptable for carbon steel					

6.1. Post Weld Heat Treatment

For carbon steel / LTCS piping in sour service, the requirement of NACE MR0175/ISO 15156 & DEP 39.01.10.12 shall be fulfilled for all the welds. Carbon steel/ LTCS pipe (including cladded pipes) exceeding 20.0mm wall thickness; PWHT shall be applicable in accordance to DEP 31.38.01.31.

- **Mild, intermediate and severe Sour Service:** All equipment and pipework in Carbon steel/LTCS must be subject to a post weld heat treatment, irrespective of their thickness. The post weld heat treatment must be performed in accordance with the requirements of the design code even though the thickness of the material may be below the minimum value.

Exemption of PWHT for carbon steel:

The need for PWHT because of the mild or intermediate sour service on a piping system can be avoided; if the following requirements are met to the satisfaction of the Company:

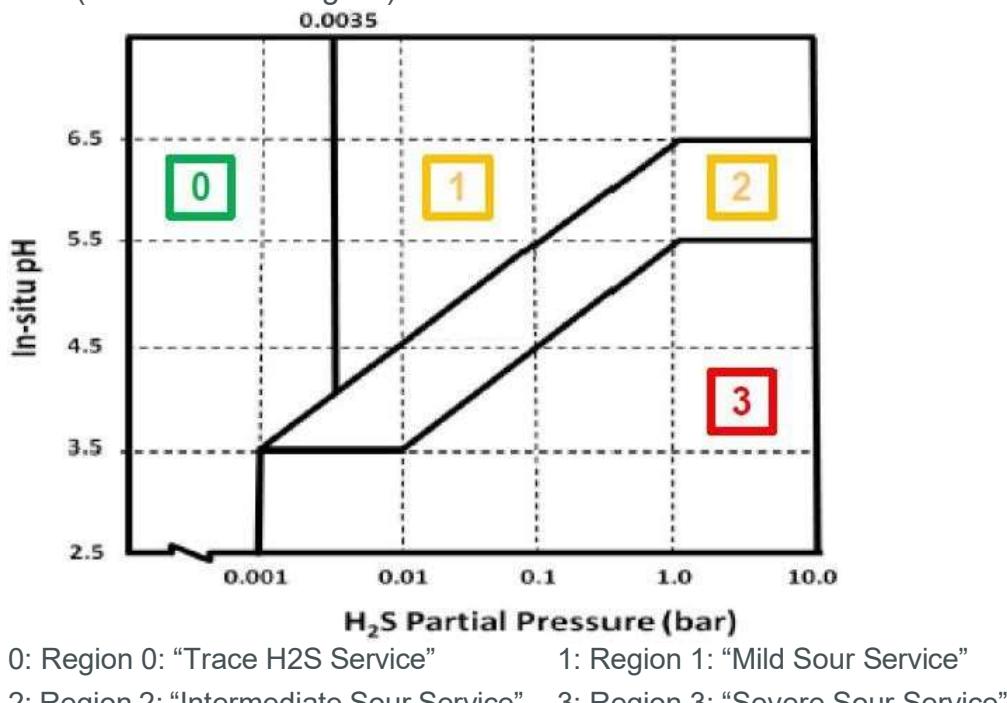
- Hardness values obtained during welding procedure qualification record are below 248 HV5.
- Standard welding procedures for all pipework shall provide for a minimum of two passes.
- The use of double sided welding on larger diameter pipe, internal sealing runs

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to correct bore misalignment, internal root repairs or the use of fittings requiring back welding, etc. which all result in untempered weld beads on the process side are prohibited.

- Pipework wall thickness is below the limit for which PWHT is a mandatory requirements (i.e. 20mm and higher) as addressed above.



- 0: Region 0: "Trace H2S Service" 1: Region 1: "Mild Sour Service"
 2: Region 2: "Intermediate Sour Service" 3: Region 3: "Severe Sour Service"

7. GENERAL MATERIAL REQUIREMENTS

In general all the material requirements shall comply with the requirements of the standard engineering specification ES 30-99-00-0102, SHELL MESC of equivalent / reference SHELL DEP Pipe class as referred in Attachment-1 incorporating the changes specified within this specification. All the SHELL SPEs, DEPs and international codes shall be complied as defined in the individual SHELL MESC description.

However, following additional requirements over and above as specified by SHELL standards shall be followed:

- SDSS material shall have minimum 25% Cr and PREN>40.
- Zinc percent in AlBr material shall be less than 16.
- SS316/SS316L shall be supplied in Dual Certification.

The carbon steel and carbon manganese steel piping shall be fully killed and manufactured by the electric furnace or the basic oxygen process as and to fine grain low hydrogen practice. Austenitic & duplex stainless steel and Inconel material shall be solution annealed condition as per the relevant ASTM standard and MESC SPE and its amendments.

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CS / LTCS forgings shall be supplied in the normalized or normalized & tempered condition and in compliance to the additional requirement of applicable MESC SPE.

Material of jack screw shall be austenitic stainless steel & shall have Xylan 1070 or takecoat 1000 coating.

Compressed Asbestos Fibre (CAF) and Man Made Mineral Fibres shall not be used. The use of compressed asbestos fibre gaskets as a jointing material in any valve packing of components is strictly prohibited. If graphite-based materials cannot be used, e.g. for product contamination reasons, PTFE-based materials shall be applied up to a maximum temperature of 150°C.

Machined surfaces shall be subject to 100 % MPI / DPT as applicable.

Cast/Ductile iron shall not be used.

Carbon / Alloy Steel material shall comply with the requirements of SHELL DEP 31-38-01-10 and ASME B31.3 table 323.2.2A.

Impact testing requirements shall be in accordance with applicable ASTM material specifications & SHELL MESC SPE specifications / SHELL DEP 30-10-02-31-Gen for piping materials.

7.1. Materials For Sour Service

All piping materials shall be in full compliance with the "Corrosion Control and Materials Selection Philosophy" ES 30-99-00-0102".

Piping classes specified for sour service shall satisfy the NACE MR0175/ ISO 15156 requirements with additional requirement of DEP & MESC Specifications.

All chemical restrictions, carbon content, sulphur content, carbon equivalent shall be in accordance with the ES 30-99-00-0102 and the additional requirements for MESC Specification.

All castings and forgings shall be in the normalized or normalized and tempered condition.

7.2. Hardness Testing

The maximum hardness limit of 248 HV10 in the parent Carbon Steel material is acceptable provided the pipe manufacturer demonstrate through the weld ability tests that the hardness in the weld, the heat affected zone and the values within 0.5mm from the fusion line shall not exceed 248 HV10 (Carbon Steel Only). Hardness requirement shall be in compliance with the ES 30-99-00-0102.

8. CLADDING

For pipe cladding refer to Shell DEP 31-40-20-32 (v42).

For piping valves, CRA weld overlay cladding shall comply with the requirements of MESC SPE 77/313, in addition to the company standards. Cladding procedure shall be followed as per company standard ES 30-99-00-0102.

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9. REQUIREMENTS FOR PIPE

API-5L Gr.B PSL2 seamless pipes and ASTM A106 Gr.B Pipes are acceptable substitutes for each other. The pipe dimensions (such as OD, Schedule etc.) shall be in accordance with ASME B 36.10M for carbon steel, ASME B 36.19M for Stainless Steel material and with the additional requirements of MESC Specification.

Welding branches on Alloy 625 / 825 cladded pipes shall be prefabricated by the cladding vendor. Piping wall thicknesses shall be validated over and above the specified wall thicknesses, in case cladding / weld overlay is found to be not practical.

Wherever, A671 CC65 Cl 22 is specified for low temperature pipe material, shall comply with the requirements of MESC SPE 74/005.

9.1. GRE/ GRP Piping

Adhesive-bonded joints shall be used for NPS8 and larger piping sizes in accordance with SHELL DEP 31-40-10-19.

Screwed and glued joint connection shall be used for NPS6 and smaller piping sizes in accordance with SHELL DEP 31-40-10-19.

In addition to specified above, all GRE piping shall follow requirements of Shell DEP 31-40-10-19 and Standard engineering specification ES 30-99-12-0024.

GRE/GRP Piping shall only be used for underground piping installations. Underground GRE/GRP piping shall terminate aboveground with break flanges between metallic and non-metallic piping system, the aboveground exposed section of GRE/GRP piping shall have mechanical protection as per SKETCH-002 & SKETCH-003. UV protection for GRE/GRP piping shall be provided as per referred SHELL DEP 31-40-10-19 for storage, handling and installation for the desert environment.

10. REQUIREMENTS FOR FITTINGS

Butt weld elbows shall be long radius type as per ASME B16.9. Short radius elbows Pipe bends and Mitred bends shall not be allowed.

Eccentric butt weld reducers shall not be used for vertical lines.

Eccentric swaged nipple shall not be allowed.

Unions shall only be used for threaded piping system installations.

The dimensions of steel butt welded fittings shall be in accordance With ASME B16.9 and with the additional requirements of applicable MESC.

Fittings shall not be made from bar stock.

Weld repair of parents fitting material is NOT permitted.

Elbowlets shall not be used for branch connections, instrument taps or vent/drain connections.

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Drain and vent connections shall not be installed on elbows.

Thermowell installation shall be at 90 degrees to the pipe header only, deviation is not allowed.

Fitting for branch take-off shall be in accordance with the respective piping classes' branch table.

Branch connections other than 90 degree tee, especially for relief systems, shall be provided with reinforcement pads in compliance the requirements of ASME B 31.3 code shall be applicable.

11. REQUIREMENTS FOR FLANGES

Flange sizes 24" and smaller shall be as per ASME B16.5. Flanges larger than 24" shall be manufactured as per ASME B16.47 Series A.

Slip on flanges shall not be allowed except for GRE/GRP adhesive-bonded piping.

API 6A flanges shall be used for line sizes above 12" NPS for the 2500# rated classes. Material for API flanges shall be 60K as minimum in line API 6A requirements.

Flange sizes above 12" NPS for 2500# rated classes required to mate equipment nozzles shall be as per ASME Section VIII as applicable. Christmas tree mating flanges shall comply with API 6A weld neck type flanges. API 6B flanges shall be specified for the Christmas tree mating flange up to API 5000# rating whereas API 6BX shall be applicable for higher rated Christmas tree flanges.

Raised face flanges shall have a smooth facing finish giving roughness value of Ra 3.2 to 6.3µm. Flat face flanges shall have a stock finish giving roughness of Ra 6.3 to 12.5µm in accordance to ASME B16.5.

Flat face flange shall not be used mating metallic flanges.

Flange bores shall match with the corresponding pipe inside diameters.

Flange formed/ manufactured by machining forged bar or billet drilled in flanges shall not be allowed.

Orifice Flanges (Raised Faces with Flange Tapping's) for ASME class 300 to 2500 including nominal size DN50 to DN600 shall be in accordance with ASME B16.36 and SHELL DEP standard drawing no. S38.130.

Orifice Flanges shall be supplied as complete assembly set including welded nipple, gaskets, jackscrews and the associated fasteners etc.

Clad on flange shall extend to include the flange facing in addition to the flange bore as minimum.

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12. SPECTACLE BLINDS, SPADES AND SPACERS

Spectacle blinds, spades and spacers shall be in accordance with Standard Drawings S38.011, S38.042 and S38.043.

Jackscrews shall be provided for line sizes 24" & larger for installation of spectacle blinds.

If the required force to turn a spectacle blind exceeds 25kg, spades with spacers should be used instead.

The use of Spades and Spacers shall follow applicable as per the following:

ASME Rating class	Size
150	DN 450 (NPS18) and larger
300	DN 400 (NPS16) and larger
600	DN 350 (NPS14) and larger
900	DN 300 (NPS12) and larger
1500	DN 300 (NPS12) and larger
2500	DN 300 (NPS12) and larger

13. GASKETS

Spiral wound gaskets with flexible graphite filler shall be used, for all general process services except Hydrogen service. "Flexible Graphite" compounds shall contain min. 95% pure carbon grade, except where specific service requirement is determined otherwise.

Spiral wound gaskets for use with raised face flanges shall, unless otherwise specified, be provided with both inner and outer guide rings. Inner ring material shall be suitable for the specific service fluid.

Spiral wound gaskets with inner rings shall be used to provide additional strength. Spiral wound gaskets shall be in accordance with B16.20 & ASME B16.5 with thickness minimum 4.5 in uncompressed state & 3.2 after compression.

Ring joint metallic gaskets shall be used for API 6A flanges. Design of these gaskets shall comply with the requirements of API 6A & ASME B16.20. The type of gaskets shall be RX or R in line with API 6A requirements.

The maximum hardness of ring type gasket shall be as per ASME B16.20, except Stainless steel shall be 140HB maximum and Duplex SS / 6Mo to ASTM A182 F44 shall have 170HB maximum hardness.

Full-face gasket shall be used for all flat face flanges. Flat gasket shall comply with the requirements of ASME B16.21 with additional requirements of MESC SPEs.

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All Non-metallic gaskets or gasket filler materials shall be asbestos free. Gaskets for drinking water service shall be suitable for human consumption.

High performance nitrile rubber based reinforced sheet, containing irrespirable glass fibres may be used for Category-D Utility services.

Insulation Kit shall be used where required for dissimilar material joints between (CS/ CRA) in Process Liquid service, Wet Gas Service & Water Utility service. Insulation Kit shall include Gasket, Bolt, Sleeves and Washers.

No Insulation Kit required between CRA/CRA (i.e. SS/SDSS/Alloy 825/Alloy625). Insulation Kit is not required for connections with a small cathode to anode surface area ratio, such as Instrument connection on piping. Insulating gasket sets shall have acceptable operational performance history.

The Insulating Gasket shall be fire safe design to API 6FB 3rd Edition. It shall contain as minimum High Integrity SS316 Dual certified Metal Core, Spring Energized PTFE or equivalent Seal and Reinforced Laminate (G10/ G11) to suit the service condition and process fluid, refer below table for temperature limitations/boundaries. The dimension shall be in accordance with the mating flange. The insulating gasket shall have the following features as a minimum:

- Easy installation, make up and removal
- Sealing system to be not sensitive to low bolt loads and provide sealing through a range of bolt stress
- Gasket shall be self-aligning and centring
- Easily and quickly installation without special tools
- Designed to maintenance free, corrosion resistant to the process fluid, and resistant to deforming under the load
- Designed to be reusable by simply replacing the sealing ring only.

Insulating Gasket temperature limitations/ boundaries

Temperature °C	ANSI Class 150 and 300	ANSI Class 600 to 2500
Up to 150 °C	NEMA Standard LI-1, Grade G10	NEMA Standard LI-1, Grade G10
Up to 177 °C	NEMA Standard LI-1, Grade G11	NEMA Standard LI-1, Grade G11
178°C to 400°C	Mica or approved equal	

For conductive liquid piping provided with cathodic protection, the piping shall have internal FBE coating up to a length required as per the engineering specification ES 30.99.37.0001.

To avoid galvanic corrosion, graphite-containing gasket should not be used with:

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- Austenitic stainless steel piping systems on corrosive aqueous duties.
- Oxidising duty SS where temperatures may rise above 500°C.

14. REQUIREMENTS FOR BOLTING

Unless specified otherwise, the bolts diameter shall be in accordance with ASME B16.5 (for flanges 24" & smaller) and ASME B16.47 Series A or MSS SP 44 (for flanges 26" & larger).

Bolting & screw threads shall be UNC for 1" & smaller diameters and 8 UN for large diameters, Class 2 fit, in accordance with ASME B1.1.

Stud bolts shall be threaded full length. The length shall be the effective thread length, excluding end points.

Bolts and nuts shall be coated with Xylan 1070 or Takecoat 1000.

Bolt lengths for metallic to non-metallic or between non-metallic flanges shall be individually calculated based on non-metallic flanges thicknesses or any other additional requirements such as washer or backing ring.

Bolt tensioning using propriety equipment shall be used as per the requirements of Shell DEP 70.08.10.11.Gen Attachment 4 and 31-38-01-31 Gen Clause 3.12.

N.B. Bolt tensioning requires additional bolt length. One diameter shall be added to the required bolt length to facilitate attachment of bolt tensioning equipment.

Additional bolt length for bolt-tensioning shall be established for the following bolt sizes:

Bolt Diameter	ASME Rating Class
≥ 1-1/2 inch	1500 & 2500
≥ 2 inch	All

15. REQUIREMENTS FOR VALVES

All valves specifications shall be in accordance with ES 30-99-12-3209; following addition requirements shall be applicable for all valves:

Lifting lug shall be provided for valves weighing ≥ 250 kg.

Piston Lift Type Check Valve shall be used for line sizes 1/2" to 1-1/2".

Globe valves closure member (disk/plug) / wetted parts shall have hard facing.

For 2" & larger sizes Dual Plate Check Valve (Lug Type/Double Flanged Type) shall be used.

Full flange (solid lug) dual plate check / butterfly valves shall be used for line size up to 6" NPS, 8" NPS and above shall be provided with double flanged only.

Double Block and Bleed (DBB) valves shall be of integral design (Ball-Needle-Ball) with one end flanged and other end 1/2" threaded (NPT) instrument forge connector. Both ends flange

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are acceptable for instruments bridle connections however; the same arrangement shall not be used for piping draining assemblies. In either case, use of MONO flange slimline valves are not permitted.

The integral DBB valve shall be of Ball-Needle-Ball valve assembly with following minimum bore ID:

Header Size (DN)	Inlet Flange Size (DN)	Minimum Valve Body Size (DN)	Minimum Bore ID (mm)	Remarks
DN 15	DN 15	DN 15	10	Applicable for Piping System
DN 20	DN 20	DN 20	10	Applicable for Piping System
DN 25/DN 40	DN 25/DN 40	DN 25	14	Applicable for Piping System
DN 50 and Larger	DN 50	DN 25	14	Applicable for Piping System
All sizes For Pipeline	DN50	DN 25	20	Applicable for Pipeline System

All Valves bolts/nuts material shall be as per the bolts/nuts material as specified in the SHELL MESC. All valve bolts & nuts shall be coated with XYLAN 1070 OR TAKECOAT 1000.

SHELL MESC SPE 77/300, shall be applicable for the valves design and qualification.

In case of unavailability of valid TAT certificate, the testing/ Qualification requirements, as per SPE 77/300, shall be performed by the Vendor and be witnessed by the Company representative. The certification/ witnessing by SHELL inspector is waived.

Inspection and test plan for piping valves shall be as per Company ES 30-99-12-0030.

Corrosion allowance shall be taken into account for all valves design and manufacturing. Valve data sheet must include corrosion allowance for all type of valves.

Wherever, trim material alloy 825/ 625/ SS 316 is specified for ball valves; ball material shall be of solid Alloy of same specified trim material for valve sizes DN≤100. Larger valve sizes DN ≥ 150, CS/ LTCS + Alloy 825/ 625/ SS 316 clad can be accepted for the valve ball material, as applicable from techno economic point of view.

Surface safety valves (SSVs) and choke valves shall meet the ASME rating 900/1500/2500 requirement as per corresponding piping class for mating flange design, ensuring dimension matches with companion flange PCD and OD. All other design, testing etc. shall comply with API 6A requirements.

All API 6A valves in sour service shall comply with PSL-3G requirements.

Lip seal design shall be ensured for all the valves in sour service; however, in cases where through conduit valves are used they shall have lip seal arrangement regardless of fluid service.

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Through conduit gate valve shall be bidirectional with double block and bleed design in compliance with SPE 77/131, non-rising stem with position indicator. The valve seat sealing system shall be dual type with primary metal-to-metal and secondary mechanical energized soft seal. The valve slab shall be floating type self-cleaning design.

All through conduit gate valves shall be provided with a sealant injection system for stem. Sealant connection shall incorporate an internal non-return valve, giant button head; cover with vent holes which seals off the connection by plugging the sealant port. The sealant and grease injection system shall be suitable for injecting sealant/ grease with the valve in operating condition.

16. PIPING ASSEMBLY DETAILS

Piping assembly details for general instruments, vents and drain connections on piping shall be as per Shell DEP 31.38.01.10. Applicable assembly configuration shall be the same as those listed in referenced Shell DEP piping classes.

Wherever double block arrangement is required for instrumentation isolation, Ball-Needle-Ball assembly shall be used see (17). For instrumentation hook where single block and bleed arrange is required it shall be provided with Ball-Needle assembly.

Drain connections; including the drain isolating valves; branching from process piping shall be of size 2inch or same size of the process pipe size; whichever less; as a minimum.

Vent connections; including the vent isolating valves, branching from process piping shall be of size 1inch or same size of the process pipe size; whichever less; as a minimum.

17. MISCELLANEOUS REQUIREMENTS

Sealing tape of any kind shall not be used on any threaded joint regardless of service.

18. PAINTING AND COLOUR CODING

Painting shall be in accordance with the ES-30-99-37-0013 Specification for External Painting & Coating of Vessels, Tanks & Equipment.

Painting code shall be based on the maximum operating temperature of the fluid and shall not be based on maximum design temperature.

19. Y-TYPE STRAINERS

All Y-Type strainers shall be as per Shell standard drawing numbers 38.002 and 38.005. Y-Type strainers not covered in Shell standard drawing numbers 38.002 and 38.005 shall be supplied in forged or cast construction with integral flanges. Weld-on/ drilled-in flanges are not permitted. All Y-Type strainers shall be provided with drain valve assembly. The strainer material shall follow the applicable class valve material.

20. Flanged Thermo-wells

Flanged thermos-well shall be supplied as per standard drawing no. S 38.113 & S 38.114

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Minimum run pipe size for thermo-well installation shall be DN80, enlarger (reducer) shall be included for smaller sizes. Flanged thermo-wells for run pipe DN 80 and larger shall be used as follows:

Pipe Class Rating	Thermo-well Size	DEP Standard Drawing
150, 300, 600, 900	DN 40	S 38.113 (Up to Sch. 80s/XS)
1500	DN 50 (unless, specified otherwise)	S 38.114 (Up to Sch. 160/ XXS)
2500	DN 50	S 38.114 (Up to Sch. 160/ XXS)

The length of flanged thermo-well is standardized as follows:

Thermo-well length (mm)	Size
230	pipe DN 80 and DN 100
255	pipe DN 150 and larger
305, 355, 405 and 455	equipment (vessels etc)

If longer thermo-well is required due to service conditions then the mechanical strength of the thermo-well should be upgraded to accommodate the flow dynamic effects and avoid fatigue; if necessary.

21. SPECIAL FITTINGS

Unless specified otherwise, special access fitting (including provision connection) shall be used for the sampling, injection and intrusive monitoring as per below requirement and as specified by the respective applicable piping class. Access fitting COSASCO type or approved equal shall be used taking the following into account:

- Contour radius of Access fitting shall be exactly same as Run Pipe OD (to be installed) i.e. access fitting designed for certain size shall not be used for the consolidated size range. Detailed data sheet / material requisition shall specify the Run Pipe (NPS) x Access Fitting (NPS) for each access fittings size requirement
- Special attention during fabrication shall be given to ensure that the opening on the run pipe is aligned with the Access fitting inlet dimensions. Also, the Installation of Access fitting shall be ensured to be in the true vertical plan with the run pipe and not allowing the coupon holder to come in contact with the run pipe and the access fitting internal wall to avoid galvanic corrosion.
- Access Fitting for Corrosion Coupon (AFCC)

Non-Tee type Access fitting, Flarweld, COSASCO or approved equal, shall be used for all type of corrosion coupon. The arrangement of the Corrosion Coupon shall include on line retrievable design. Coupon Holder shall allow mounting of 2 discs, one flush with the bottom pipe wall, the second one at mid diameter. The access

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fitting and Coupon material shall be same as pipe material whereas coupon trim/holder shall be same as trim of the respective/relevant pipe class valve material. Wake frequency study shall be performed as part of the coupon holder design.

➤ Access Fitting for Corrosion Probe (AFCP)

Non-Tee type Access fitting, Flarweld, COSASCO or approved equal, shall be used for all type of corrosion probe. The arrangement of the Corrosion Probe shall include on line retrievable design. Wake frequency shall be carried out for all type and material of corrosion probe. Probe material shall be same as respective/relevant pipe class Valve trim material of the process fluid whereas Access fitting material shall be same as pipe (forged).

➤ Access Fitting for Corrosion Inhibition (AFCI)

Tee type Access fitting (side connection ranging from $\frac{1}{2}''\sim 1''$ NPS, Flanged), COSASCO or equivalent shall be used for Corrosion Inhibition. Material of access fitting and injection quill shall be selected to suit Injection fluid and process fluid simultaneously. Typical arrangement (Sketch-001) including notes shall be followed.

Design of Injection quill assembly shall ensure on line retrieval & installation of quill. Injection quill shall be supplied with integral check valve.

Flange-olet/ Flanged End Outlet are applicable up to 2500# rating and shall be selected from SHELL standard drawing S 38.090. To ensure correct selection of Flange-olet wall thicknesses, Injection quill dimensions shall be validated.

Injection quill length shall reach exactly to the middle of the run pipe to ensure proper chemical distribution.

Verticality of whole assembly (Sketch-001) shall be ensured, so that the quill shall not come in contact with the run pipe and flange-olet material to avoid galvanic corrosion.

➤ Access Fitting for Sampling Connection (AFSC)

Tee type Access fitting (side connection ranging from $\frac{1}{2}''\sim 1''$ NPS, Flanged), Flarweld, COSASCO or equivalent shall be used for sampling connection assembly. Material of Access fitting shall be same as pipe material (forge) and sampling quill shall be same as trim of valve material of process fluid. Injection quill shall be supplied with integral check valve.

➤ Hose Coupling (HSCL)

Unless specified otherwise, Hose coupling material shall be either of SS316 or Aluminium Bronze. End connection of Hose coupling shall be selected as per P&ID arrangement requirements.

➤ Flange Adaptor (ADFL)

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Adaptor Flange in a piping system should be minimized. Adaptor flange may be used to match API/ ASME flanges.

Material of flange adaptor shall comply with API6A material requirements in case selected to suit with API flanges.

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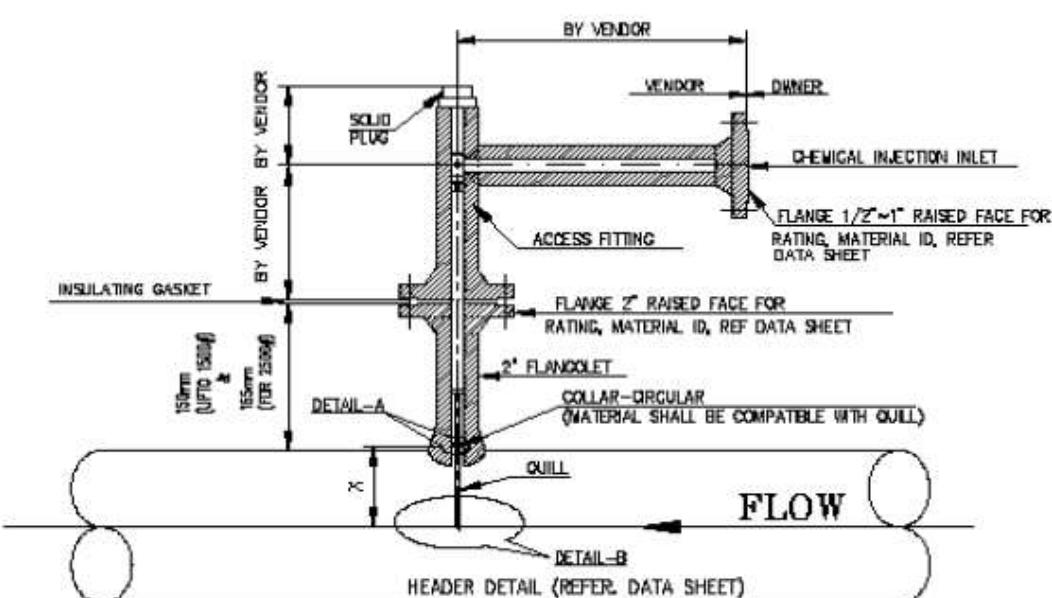
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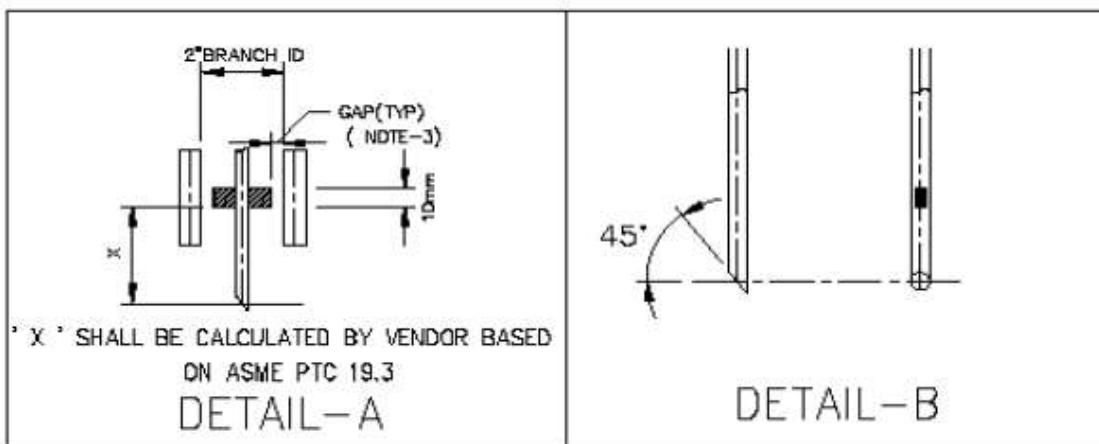
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SKETCH-001



NOTES

1. VENDOR SHALL PROVIDE COMPLETE ASSEMBLY OF INJECTION QUILL INCLUDING COLLAR AS SHOWN IN THIS DRAWING. OWNER SCOPE IS LIMITED TO THE SUPPLY OF FLANGEOLET, ASSOCIATED INSULATING GASKET AND BOLTS.
2. BODY AND TRIM MATERIAL SHALL BE AS PER RESPECTIVE DATA SHEET.
3. GAP BETWEEN COLLAR AND PIPE SHALL BE FINALIZED BY VENDOR.
4. WAKE FREQUENCY CALCULATION SHALL BE CARRIED OUT BY VENDOR BASED ON FLOW DESIGN CONDITION.

SKETCH-001

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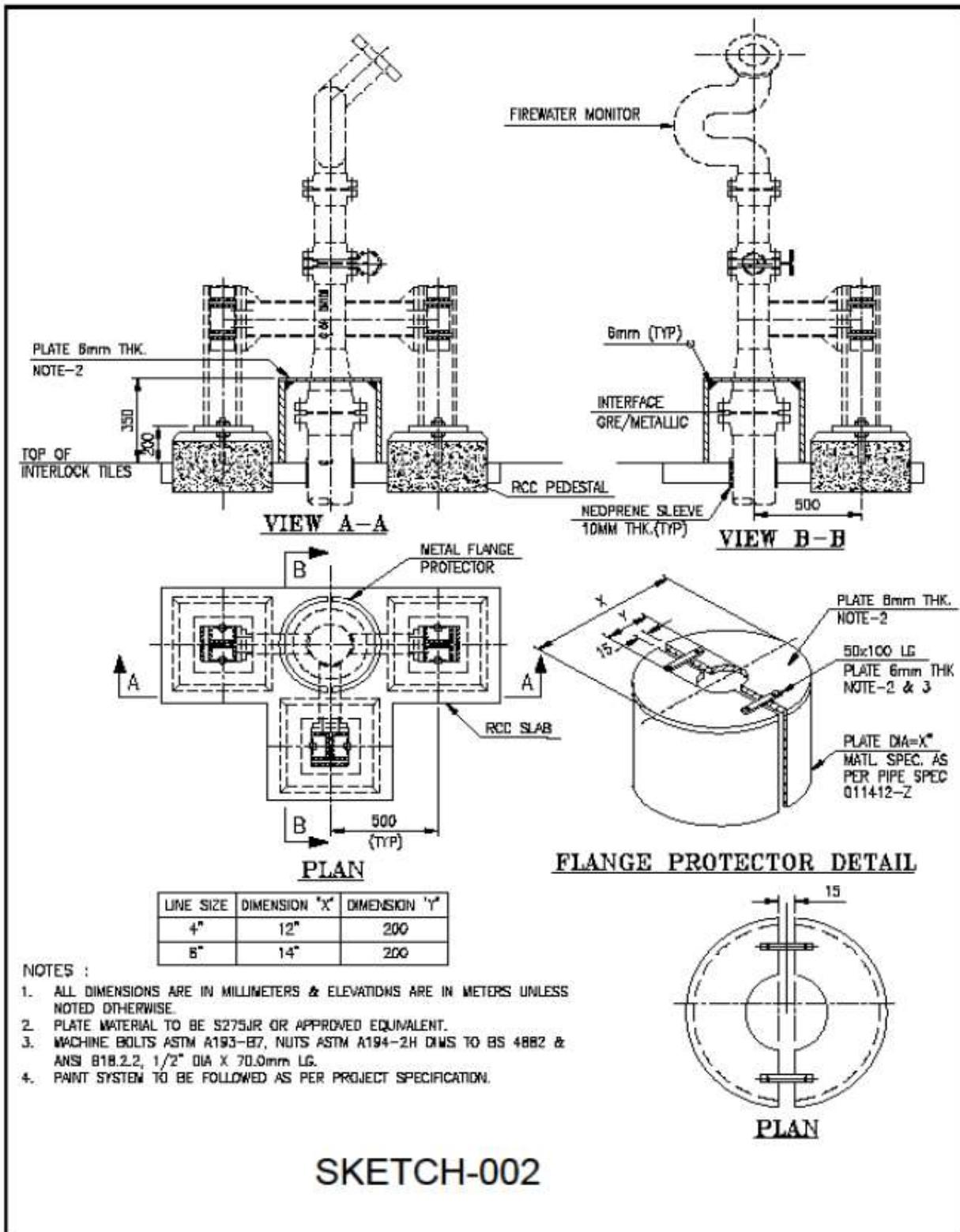
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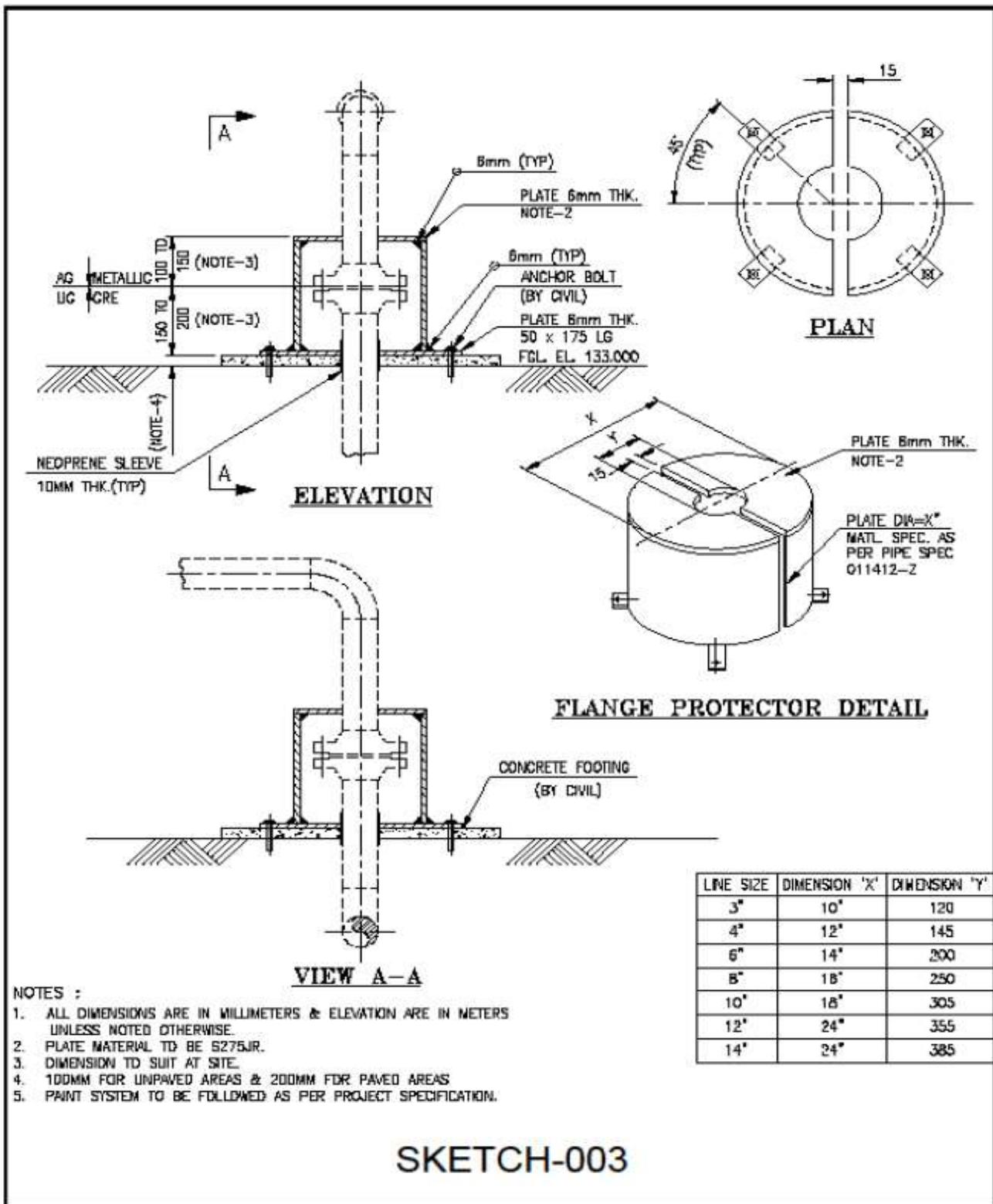
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22. Attachments

[Attachment – 1: PIPE CLASS SUMMARY](#)

[Attachment – 2: VALVE MATERIAL DETAILS](#)

[Attachment – 3: PIPE CLASSES](#)

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22.1.Attachment – 1: PIPE CLASS SUMMARY

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PIPE CLASS SUMMARY

S.N.	Pipe Class	Ref. SHELL Class	Service Description	Basic Material	ASME Class	C.A. (mm)	Design Conditions		Materials			Mat. Gr.	PWHT (Refer Clause 6.1)	NDE	Valve Body	Valve Trim	Notes	Remarks
							DP (barg)	DT °C	Pipe	Fittings	Flanges							
1	011412-Z	11412	Nitrogen, Utility Drain, Utility Water/ Raw Water, Plant Air Vent Gas	CS	150RF	1.5	19.6 - 15.8	(-)29-150	A106 Gr B A672-C65 CL22	A234 WPB	A105N	1.1	NO	10%	CS	SS 316L	15	Utility- Non Sour
2	011440-X	11440	Process Oil Process Gas (Dehydrated), Drain Vent Gas Fuel Gas (Dry/Dehydrated)	CS	150RF	3	19.6 - 15.8 /FV	(-)29-150	A106 Gr B A672-C65 CL22 A671-C65 CL22	A234 WPB/ WPBW	A105N	1.1	YES	100%	CS	SS 316L	1,2,15	Sour HC
3	011440-Z	11440	Process Gas Vent Gas Process Oil Nitrogen	CS	150RF	3	19.6 - 15.8	(-)29-150	A106 Gr B	ASTM A234-WPB	A105N	1.1	YES	100%	CS	SS 316L	1,2,15	Sour HC
4	011441-X	11441	Process Oil Process Gas Blowdown Drain Wash water Vent gas	CS	150RF	3	19.6 - 15.8	(-)29-150	A106 Gr B	A234 WPB	A105N	1.1	YES	100%	CS	Alloy 825	1,2,9	Sour HC
5	011441-Y	11441	Blow down Vent Gas Process Oil	CS	150RF	6	19.6 - 15.8	(-)29-150	A106 Gr B	A234 WPB	A105N	1.1	YES	100%	CS	Alloy 825	1,2,9	Sour HC
6	011441-Z	11441	Process Oil Process Gas (Wet) Fuel Gas (Wet)	CS	150RF	6	19.6 - 15.8 /FV	(-)29-150	A106 Gr B	A234 WPB	A105N	1.1	YES	100%	CS	Alloy 825	1,2,9	Sour HC For manifold M-120 and M-121
7	011502-X	11502	Vent Gas (Dry) Process Gas (Dry) Lift Gas Fuel Gas (Dry/Dehydrated)	LTCS	150RF	3	19.6 - 15.8 /FV	(-)50-150	A333 Gr 6 A671-C65 CL22	A420 Gr. WPL6/WPL6W	A350 Gr. LF2 Cl.1	1.1	YES	100%	LTCS	SS 316L	1,2,15	Sour HC-LT

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S.N.	Pipe Class	Ref. SHELL Class	Service Description	Basic Material	ASME Class	C.A. (mm)	Design Conditions		Materials			Mat. Gr.	PWHT (Refer Clause 6.1)	NDE	Valve Body	Valve Trim	Notes	Remarks
							DP (barg)	DT °C	Pipe	Fittings	Flanges							
8	011503-X	11503	Vent Gas MP Fare (Wet)	LTCS	150RF	3	19.6 - 15.8 /FV	(-)50-150	A333 Gr 6 A671-CC65 CL22	A420 Gr. WPL6/ WPL6W	A350 Gr. LF2 Cl.1	1.1	YES	100%	LTCS	Alloy 825	1,2,9	Sour HC-LT
9	011503-W	11503	Vent Gas (Wet)	LTCS	150RF	3	19.6 - 12.6 /FV	(-)50-235	A333 Gr 6	A420 Gr. WPL6	A350 Gr. LF2 Cl.1	1.1	YES	100%	LTCS	Alloy 825	1,2,9	Sour HC-LT For manifold M-120 and M-121
10	013461-Y	13461	Vent Gas-LT Glycol	SS	150RF	0	19.0-14.8 /FV	(-)101-150	SA 312 TP 316L	SA 403 WP 316L	SA 182 F316L	2.2	NO	100%	SS 316L	SS 316L	1,5,10	Sour HC
11	013600-Z	13600	Potable Water	SDSS	150RF	C	20.0-17.7	(-)29-100	ASTM A790 Gr. UNS 31803-S	ASTM A815-Gr. UNS 31803 WP-S	ASTM A182-F51	2.8	NO	100%	SDSS	SDSS	1,6	
12	013842-X	13842	HC-Condensate Closed Drain Produced Water Process Gas Vent Gas	SDSS	150RF	0	20.0-15.8 /FV	(-)29-150	S32760	S32760	S32760	2.8	NO	100%	SDSS	SDSS	1,6	Sour HC For manifold M-120 and M-121
13	015028-X	Firewater	Cu-Ni	150RF	0	16	0-85	ASTM B466 UNS C71500	Cu Ni UNS C71500	Cu Ni UNS C71500	3.4	NO	NA	Cu-Ni	Cu-Ni	-	For Sprinkler	Firewater
14	016620-X	16620	Process Oil Stagnant Drain Closed Drain Process Gas Disposal Water Produced Water	Solid Alloy 825/ Alloy 825 Cladded, LTCS	150RF	0	20.0-15.8 ½" to 4" 19.6-15.8 6" & above	(-)50-150	Alloy 825/ Alloy 825 Cladded LTCS	Alloy 825/ Alloy 825 Cladded LTCS	Alloy 825/ Alloy 825 Cladded LTCS	3.8, 1.1	YES	100%	Alloy 825/ Alloy 825 Cladded, LTCS	Alloy 825	1,9	Sour HC-LT
15	017011-X	17011	Closed Drain, Produced Water, Disposal Water	GRE	150FF	0	19.6-17.5	(-)29-100	GRE	GRE	GRE	N/A	N/A	NA	Alloy 825/ Alloy 825 Cladded, LTCS	Alloy 825	1,3,4,7	Sour HC For UG services only For manifold M-120 and M-121
16	017011-Y	17011	Closed Drain (Hydro carbon)	GRE	150FF	0	19.6-17.5	(-)29-100	GRE	GRE	GRE	N/A	N/A	NA	SDSS	SDSS	1,3,4,7	Sour HC For UG services only
17	017015-X	17015	Utility Water, Potable Water, Drinking Water	GRE + Aluminum foil	150FF	0	10	0-85	GRE + Aluminum foil	GRE + Aluminum foil	GRE + Aluminum foil	N/A	N/A	NA	SS 316L	SS 316L	3,4,7	For UG services only

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							DP (barg)	DT °C	Pipe	Fittings	Flanges							
18	017015-Y	17015	Process Oil Produced Water	GRE	150FF	0	10	85	GRE	GRE	GRE	N/A	N/A	NA	NA	NA		
19	017020-X	17020	Fire Water (AG)	GRE	150FF	0	16	0-85	GRE	GRE	GRE	N/A	N/A	NA	AlBr	AlBr	3,4,7,8	For UG services only
20	018011-X	18011	Firewater (AG) Foam (dilute)	CS Internal FBE Coated	150RF	0	16	0-90	CS Galv. CS FBE Coated	CS Galv. CS FBE Coated	CS Galv. CS FBE Coated	1.1	N/A	NA	AlBr	AlBr	8	A/G Service
21	018011-Z	18011	Instrument Air, Plant Air, Fire deluge (Dry system)	Carbon Steel Galv.	150RF	0	16	0-90	API 5L Gr B Galv. A106 Galv.	A234 WPB Galv. A105N Galv.	A105N Galv.	1.1	N/A	NA	CS	SS 316L	11,12, 15	A/G Service
22	031440-X	31440	Process Oil Process Gas (Dehydrated) Drain Vent Gas	CS	300RF	3	51.1-45.1 /FV	(-29-150	A106 Gr B A333 Gr 6 ASTM A671-CC65 cl 22	A234 WPB A420 WPL6/WPL6W	A105N	1.1	YES	100%	CS	SS 316L	1,2,15	Sour HC
23	031440-Z	31440	Drain	CS	300RF	6	51.1-45.1	(-29-150	A106 Gr B	A234 WPB	A105N	1.1	YES	100%	CS	SS 316L	1,2,15	Sour HC
24	031441-X	31441	Process Oil Process Gas Blowdown Drain Wash water	CS	300RF	3	51.1-45.1	(-29-150	A106 Gr B A333 Gr 6	A234 WPB A420 WPL6/WPL6W	A105N	1.1	YES	100%	CS	Alloy 825	1,2,9	Sour HC
25	031441-Y	31441	Process Gas Process Oil	CS	300RF	6	51.1-45.1	0-150	A106 Gr B	A234 WPB	A105N	1.1	YES	100%	CS	INCONEL 625	1,2,9	Sour HC
26	031441-Z	31441	Process Oil Process Gas (Wet) Fuel Gas (Wet) Vent Gas	CS	300RF	6	51.1-45.1	(-29-150	A106 Gr B A333 Gr 6	A234 WPB A420 WPL6/WPL6W	A105N	1.1	YES	100%	CS	Alloy 825	1,2,9	Sour HC
27	031502-X	31502	Vent Gas (Dry) Process Gas (Dry) Lift Gas Fuel Gas (Dry/Dehydrated)	LTCS	300RF	3	51.1-45.1	(-50-150	A333 Gr 6	A420 Gr. WPL6	A350 Gr. LF2 Cl.1	1.1	YES	100%	LTCS	SS 316L	1,2,15	Sour HC-LT
28	031503-X	31503	Vent Gas (Wet)	LTCS	300RF	3	51.1-45.1	(-50-150	A333 Gr 6	A420 Gr. WPL6	A350 Gr. LF2 Cl.1	1.1	YES	100%	LTCS	Alloy 825	1,2,9	Sour HC-LT

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							DP (barg)	DT °C	Pipe	Fittings	Flanges							
29	031503-W	31503	Vent Gas (Wet)	LTCS	300RF	3	51.1-43	(-)50-200	A333 Gr 6	A420 Gr. WPL6	A350 Gr. LF2 Cl.1	1.1	YES	100%	LTCS	Alloy 825	1,2,9	Sour HC-LT
30	033411-Z	33411	Chemical Injection Systems	SS	300RF	0	49.6-38.5	(-)29-150	A312 TP316 A358-316L	A403 WP316	A182 F316/316	2.2	NO	10%	SS 316	SS 316	10,15	Utility- Non Sour
31	033461-Y	33461	Vent Gas-LT Glycol	SS	300RF	0	49.6-38.5	(-)101-150	SA 312 TP 316L	SA 403 WP 316L	SA 182 F316L	2.2	NO	100%	SS 316L	SS 316L	1,10,15	Sour HC
32	033842-X	33842	HC-Condensate Closed Drain Produced Water Process Gas Vent Gas	SDSS	300RF	0	51.7-45.9 /FV	(-)29-150	A790 UNS32760/A928 cl1 UNS32760	A815 WP-S UNS S32760/A815 WX UNS S32760	A182-F55	2.8	NO	100%	SDSS	SDSS	1,6	Sour HC
33	036620-X	36620	Process Oil Stagnant Drain Closed Drain Process Gas Disposal Water Produced Water	Solid Alloy 825/ Alloy 825 Cladded, LTCS	300RF	0	51.7-50.3 Up to 4" 51.1-45.1 6" & above	(-)50-150	Alloy 825/ Alloy 825 Cladded LTCS	Alloy 825 / Alloy 825 Cladded LTCS	Alloy 825 / Alloy 825 Cladded LTCS	3.8, 1.1	YES	100%	Alloy 825 / Alloy 825 Cladded, LTCS	Alloy 825	1,9	Sour HC-LT
34	061440-X	61440	Process Oil Process Gas (Dehydrated) Drain Vent Gas	CS	600RF	3	102.1-90.2 /FV	0-150	A106 Gr B	A234 WPB	A105N	1.1	YES	100%	CS	SS 316L	1,2	Sour HC
35	061441-Y	61441	Process Oil	CS	600RF	6	102.1-90.2	(-)29-150	A106 Gr B	A234 WPB	A105N	1.1	YES	100%	NA	NA	1,2	Sour HC
36	061441-Z	61441	Process Oil	Carbon Steel (CS)	600RF	6	102.1 - 90.2	(-)29-150	Up to 8" A106 Gr B 10" & above A333 Gr 6	Up to 8" A234 WPB 10" & above A420 Gr WPL6	A 105N	1.1	YES	100%	CS	Alloy 825	1,2,9	Sour HC
37	063411-Z	63411	Chemical Injection Systems	SS	600RF	0	99.3-77.0	(-)29-150	A312-TP316L A358-316L	A403-WP316L	A182-F316L	2.2	NO	100%	SS 316L	SS 316L	10,15	Utility-Non Sour
38	063461-Y	63461	Vent Gas	SS	600RF	0	99.3-77.0	(-)101-150	SA 312 TP 316L	SA 403 WP 316L	SA 182 F316L	2.2	NO	100%	SS 316L	SS 316L	1,10,15	Sour HC
39	251441-Z	251441	Process Oil Process Gas (Wet)	CS	2500RF	6	315.5 Up to 4" 287.7 6" & above	(-)29-120	1" & 1 1/2" A106 Gr B 2" & above A333 Gr 6	1" & 1 1/2" A234 WPB 2" & above A420 WPL6	A105N	1.1	YES	100%	CS	Alloy 825	1,2,5,9	Sour HC, For manifold M-120 and M-121

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S.N.	Pipe Class	Ref. SHELL Class	Service Description	Basic Material	ASME Class	C.A. (mm)	Design Conditions		Materials			Mat. Gr.	PWHT (Refer Clause 6.1)	NDE	Valve Body	Valve Trim	Notes	Remarks
							DP (barg)	DT °C	Pipe	Fittings	Flanges							
40	253842-X	253842	HC-Condensate Produced Water Process Gas Vent Gas Water Disposal	SDSS	2500RF	0	352.3-363.5	(-)29-120	A790 UNS32760/A928 c1 UNS32760	A815 WP-S UNS S32760/A815 WX UNS S32760	A182-F55	2.8	NO	100%	SDSS	SDSS	1,5,6	Sour HC For manifold M-120 and M-121
41	256620-X	-	Process Oil Blow down	Solid Alloy 825/ Alloy 825 Cladded, LTCS	2500RF	0	275.8	(-)50-120	Alloy 825/ Alloy 825 Cladded LTCS	Alloy 825/ Alloy 825 Cladded LTCS	Alloy 825 / Alloy 825 Cladded LTCS	3.8, 1.1	YES	100%	Alloy 825/ Alloy 825 Cladded LTCS	Alloy 825	1,5,9	Sour HC-LT

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NOTES:

General Notes

- Material descriptions given above are generic only. For detailed MOC, refer Attachment 2,3 & applicable SHELL MESC description/data sheets for procurement purposes.
- Design Code for Piping Classes to be in accordance with ASME B31.3.
- For Instrument Hydraulic/Pneumatic Lines, refer to the Instrumentation Specification.
- Material groups indicated are from ASME B16.5/B16.34.
- For PWHT requirements section 8.1 to be followed.
- NDE requirements will be in accordance with Shell DEP 31.38.01.31 unless otherwise stated here.
 - RT = Radiographic Testing, applicable to butt-welds only.
 - MT = Magnetic Particle Testing, applicable to fillet & branch welds.
 - PT = Dye Penetrant Testing, applicable to fillet & branch welds.
- Piping class range including DN 600[NPS 24] & above design meets full vacuum at ambient condition.

Specific Notes

1. All materials for Sour Service shall conform to NACE MR0175/ISO 15156 requirements.
2. For Carbon and Low Alloy Steel piping in Sour Service, the requirement of NACE MR0175 / ISO 15156-2 Clause 7.3.3 shall be fulfilled for all welds.
3. For GRE Piping Company Doc. No. 30.99.12.0024 and ISO 14692 shall be applicable and Project Doc. No. P16093-30-99-12-1627 Specification for GRE Pipe, Fittings and Flanges.
4. Screwed and glued connection shall be applicable for GRE piping sizes 6" and smaller, adhesive-bonded joints shall be applicable for larger piping sizes in accordance to SHELL DEP 31.40.10.19.
5. Mating flanges for X-Tree shall be RTJ in accordance with the requirements of API6A.
6. Specified SDSS materials shall have minimum 25% Cr & PREN>40
7. GRE Pipes shall be applicable for U/G piping services only.
8. Zinc shall be less than 16% for Al Br material.
9. This class is also applicable to Category-M fluids as defined in SHELL DEP 31.38.01.31.
10. Restrict to 60°C if Chlorides are present. Refer note in piping class for further limitations.
11. All instrument air Galvanized piping shall be of aboveground installation only.
12. Fire deluge terminology established for piping downstream deluge valve (normally no flow/empty).
13. For material group refer notes in the piping classes.
14. Deleted.
15. SS316/316L shall be dual certified

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22.2 Attachment – 2: VALVE MATERIAL DETAILS

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VALVE MATERIAL DETAILS

PIPE CLASS DESIGNATION	VALVE TYPE	VALVE BODY	PLUG/ DISC/SLAB/ WEDGE OR BALL	STEM / TRIM	HARD FACING (Note-2.9)	SOFT SEATS	SEALS	PACKING	GASKETS	BOLTING	SPECIFIC NOTES	REMARKS
011412-Z	GATE, GLOBE & CHECK VALVES	ASTM A105N /A216 GR WCB/WCC	ASTM A105N /A216 GR WCB/WCC + 13CR	F6A / AISI 410	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7/ A194 2H		SOUR SERVICE
	BALL VALVE	ASTM A105N /A216 GR WCB/WCC	SS 316	SS 316	NO	FILLED PTFE	VITON 'B' AED OR APPROVED EQUIVALENT	GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7/ A194 2H		
	DOUBLE BLOCK & BLEED VALVES	ASTM A105N	SS 316	SS 316	NO	FILLED PTFE	VITON 'B' AED OR APPROVED EQUIVALENT	GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7/ A194 2H		
	BUTTERFLY VALVE	ASTM A105N /A216 GR WCB/WCC	ASTM A105N / A216 GR WCB/WCC	F6A / DUPLEX	STELLITE 6 / STELLITE 21	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A193 B7/ A194 2H		
011440-X 031440-X 061440-X	GATE, GLOBE & CHECK VALVES	ASTM A105N /A216 GR WCB/WCC	ASTM A105N / A216 GR WCB/WCC + STELLITE 6	SS 316L	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	GKSW AISI 316L, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7M/A194 2HM	2.1	SOUR SERVICE
	BALL VALVE	ASTM A105N /A216 GR WCB/WCC	SS 316L	SS 316L	NO	FILLED PTFE UP TO 300#, DEVLOV V 600#	PTFE LIP SEAL	GRAPHITE	GKSW AISI 316L, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7M/A194 2HM	2.1,2.5	
	DOUBLE BLOCK & BLEED VALVES	ASTM A105N	SS 316L	SS 316L	NO	FILLED PTFE UP TO 300#, DEVLOV V 600#	PTFE LIP SEAL	GRAPHITE	GKSW AISI 316L, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7M/A194 2HM	2.1,2.5	
	BUTTERFLY VALVE	ASTM A105N /A216 GR WCB/WCC		F6A / DUPLEX	STELLITE 6 / STELLITE 21	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A193 B7M/A194 2HM	2.1,2.4	
011441-X 031441-X 011441-Z 031441-Z 061441-Z	GATE, GLOBE & CHECK VALVES	ASTM A105N /A216 GR WCB/WCC	ASTM A105N / A216 GR WCB/WCC + STELLITE 6	ALLOY 825	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	GKSW ALLOY 825, GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A193 B7M/A194 2HM	2.1	SOUR SERVICE

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PIPE CLASS DESIGNATION	VALVE TYPE	VALVE BODY	PLUG/DISC/SLAB/WEDGE OR BALL	STEM / TRIM	HARD FACING (Note-2.9)	SOFT SEATS	SEALS	PACKING	GASKETS	BOLTING	SPECIFIC NOTES	REMARKS
251441-Z	BALL VALVE	ASTM A105N/A216 GR WCB/WCC	ALLOY 825	ALLOY 825	NO	PTFE UP TO 300#, DEVLOV V 600#, PEEK 900# AND ABOVE	PTFE LIP SEAL	GRAPHITE	GKSW ALLOY 825, GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A193 B7M/A194 2HM	2.1,2,3,2,6	
	DOUBLE BLOCK & BLEED VALVES	ASTM A105N	ALLOY 825	ALLOY 825	NO	PTFE UP TO 300#, DEVLOV V 600#, PEEK 900# AND ABOVE	PTFE LIP SEAL	GRAPHITE	GKSW ALLOY 825, GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A193 B7M/A194 2HM	2.1,2,3,2,6	
	BUTTERFLY VALVE	ASTM A105N/A216 GR WCB/WCC	ASTM A105N/A216 GR WCB/WCC	ALLOY 625 / ALLOY 825	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A193 B7M/A194 2HM	2.1,2,4	
011502-X 031502-X	GATE, GLOBE & CHECK VALVES	ASTM A350 LF2 CL 1 / A352 LCC	ASTM A350 LF2 CL 1 / A352 LCC + STELLITE 6	SS 316L	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	GKSW AISI 316L, GRAPHITE FILLED CS CENTRE/SS INNER	ASTM A320 L7M/A194 7M	2.1	SOUR SERVICE
	BALL VALVE	ASTM A350 LF2 CL 1 / A352 LCC	SS 316L	SS 316L	NO	PTFE UP TO 300#, DEVLOV V 600#	PTFE LIP SEAL	GRAPHITE	GKSW AISI 316L, GRAPHITE FILLED CS CENTRE/SS INNER	ASTM A320 L7M/A194 7M	2.1,2,5	
	DOUBLE BLOCK & BLEED VALVES	ASTM A350 LF2 CL 1	SS 316L	SS 316L	NO	PTFE UP TO 300#, DEVLOV V 600#	PTFE LIP SEAL	GRAPHITE	GKSW AISI 316L, GRAPHITE FILLED CS CENTRE/SS INNER	ASTM A320 L7M/A194 7M	2.1,2,5	
	BUTTERFLY VALVE	ASTM A350 LF2 CL 1 / A352 LCC	ASTM A350 LF2 CL 1 / A352 LCC	ALLOY 625 / DUPLEX	STELLITE 6 / STELLITE 21	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A320 L7M/A194 7M	2.1,2,4	
011503-X 031503-X	GATE, GLOBE & CHECK VALVES	ASTM A350 LF2 CL 1 / A352 LCC	ASTM A350 LF2 CL 1 / A352 LCC + STELLITE 6	ALLOY 825	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	GKSW ALLOY 825, GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A320 L7M/A194 7M	2.1	SOUR SERVICE
	BALL VALVE	ASTM A350 LF2 CL 1 / A352 LCC	ALLOY 825	ALLOY 825	NO	PTFE	PTFE LIP SEAL	GRAPHITE	GKSW ALLOY 825, GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A320 L7M/A194 7M	2.1,2,6	
	DOUBLE BLOCK & BLEED VALVES	ASTM A350 LF2 CL 1	ALLOY 825	ALLOY 825	NO	PTFE	PTFE LIP SEAL	GRAPHITE	GKSW ALLOY 825, GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A320 L7M/A194 7M	2.1,2,6	

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	BUTTERFLY VALVE	ASTM A350 LF2 CL 1 / A352 LCC	ASTM A350 LF2 CL 1 / A352 LCC	ALLOY 625 / ALLOY 825	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A320 L7M/A194 7M	2.1,2.4	
011503-W 031503-W	GATE, GLOBE & CHECK VALVES	ASTM A350 LF2 CL 1 / A352 LCC	ASTM A350 LF2 CL 1 / A352 LCC + STELLITE 6	ALLOY 825	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	GKSW ALLOY 825,GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A320 L7M/A194 7M	2.1	SOUR SERVICE
	DOUBLE BLOCK & BLEED VALVES	ASTM A350 LF2 CL 1	ASTM A350 LF2 CL 1 / A352 LCC + STELLITE 6	ALLOY 825	STELLITE 6	NO	GRAPHITE	GRAPHITE	GKSW ALLOY 825,GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A320 L7M/A194 7M	2.1,2.2,2.6	
	BUTTERFLY VALVE	ASTM A350 LF2 CL 1 / A352 LCC	ASTM A350 LF2 CL 1 / A352 LCC	ALLOY 625 / ALLOY 825	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A320 L7M/A194 7M	2.1	
	BALL VALVE	ASTM A350 LF2 CL 1 / A352 LCC	ALLOY 825	ALLOY 825	STELLITE 6	NO	PTFE LIP SEAL	GRAPHITE	GKSW ALLOY 825,GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A320 L7M/A194 7M	2.1	
033411-Z 063411-Z	GATE, GLOBE & CHECK VALVES	ASTM A182 F316/A351-GR CF8M	SS 316	SS 316	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, SS CENTRE/SS INNER	ASTM A193 GRADE B8M- CLASS 2 ASTM A194 GRADE 8M		
	BALL VALVE	ASTM A182 F316L/A351 CF3M AISI 316L	SS 316	SS 316	NO	PTFE UP TO 300#, DEVLOV V 600#	VITON 'B' AED OR APPROVED EQUIVALENT	GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, SS CENTRE/SS INNER	ASTM A193 GRADE B8M- CLASS 2 ASTM A194 GRADE 8M		
	DOUBLE BLOCK & BLEED VALVES	ASTM A182 F316L	SS 316	SS 316	NO	PTFE UP TO 300#, DEVLOV V 600#	VITON 'B' AED OR APPROVED EQUIVALENT	GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, SS CENTRE/SS INNER	ASTM A193 GRADE B8M- CLASS 2 ASTM A194 GRADE 8M		
	BUTTERFLY VALVE	A351 CF3M AISI 316L	SS 316	ALLOY 625 / SS,DUPLEX	STELLITE 6 / STELLITE 21	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A193 GRADE B8M- CLASS 2 ASTM A194 GRADE 8M		

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013461-Y 033461-Y 063461-Y	GATE, GLOBE & CHECK VALVES	ASTM A182 F316L/A351 CF3M AISI 316L	SS 316L	SS 316L	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, SS CENTRE/SS INNER	ASTM A193 GRADE B8M- CLASS 2 ASTM A194 GRADE 8M/8M	2.1	SOUR SERVICE
	BALL VALVE	ASTM A182 F316L/A351 CF3M AISI 316L	SS 316L	SS 316L	NO	PTFE	PTFE LIP SEAL	GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, SS CENTRE/SS INNER	ASTM A193 GRADE B8M- CLASS 2 ASTM A194 GRADE 8M/8M	2.1	
	DOUBLE BLOCK & BLEED VALVES	ASTM A182 F316L/A351 CF3M AISI 316L	SS 316L	SS 316L	NO	PTFE	PTFE LIP SEAL	GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, SS CENTRE/SS INNER	ASTM A193 GRADE B8M- CLASS 2 ASTM A194 GRADE 8M/8M	2.1	
	BUTTERFLY VALVE	A351 CF3M AISI 316L	SS 316L	ALLOY 625 / SS,NITRONIC	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN / PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A193 GRADE B8M- CLASS 2 ASTM A194 GRADE 8M/8M	2.1,2.4	
013842-X 033842-X 253842-X	GATE, GLOBE & CHECK VALVES	ASTM A182-F55 / A995 6A	SUPER DUPLEX UNS S32760	SUPER DUPLEX UNS S32760	STELLITE 21	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	GKSW 6MO, GRAPHITE FILLED, 6MO CENTRE/6MO INNER	ASTM A193 B8MLCUN- CLASS 1BASTM A194 GRADE 8MLCUNA	2.1	SOUR SERVICE
	BALL VALVE	ASTM A182-F55 / A995 6A	SUPER DUPLEX UNS S32760	SUPER DUPLEX UNS S32760	NO	PTFE UP TO 300#, DEVILON V 600#, PEEK 900# AND ABOVE	PTFE LIP SEAL	GRAPHITE	GKSW 6MO, GRAPHITE FILLED, 6MO CENTRE/6MO INNER	ASTM A193 B8MLCUN- CLASS 1BASTM A194 GRADE 8MLCUNA	2.1	
	DOUBLE BLOCK & BLEED VALVES	ASTM A182-F55 / A995 6A	SUPER DUPLEX UNS S32760	SUPER DUPLEX UNS S32760	NO	PTFE UP TO 300#, DEVILON V 600#, PEEK 900# AND ABOVE	PTFE LIP SEAL	GRAPHITE	GKSW 6MO, GRAPHITE FILLED, 6MO CENTRE/6MO INNER	ASTM A193 B8MLCUN- CLASS 1BASTM A194 GRADE 8MLCUNA	2.1	
	BUTTERFLY VALVE	ASTM A182-F55 / A995 6A	SUPER DUPLEX UNS S32760	SUPER DUPLEX UNS S32760	STELLITE 21	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A193 B8MLCUN- CLASS 1BASTM A194 GRADE 8MLCUNA	2.1,2.4	
016620-X 017011-X	GATE, GLOBE & CHECK VALVES	ASTM B564 UNS N08825(UP TO 4")	ALLOY 825	ALLOY 825	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE	GKSW ALLOY 825,GRAPHITE	ASTM A193 GRADE B8M-	2.1,	SOUR SERVICE

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036620-X 256620-X								YARN/PREFORMED COMPRESSED GRAPHITE	FILLED CS CENTRE/ALLOY 825 INNER	CLASS 2 ASTM A194 GRADE 8M		2.1,
		ASTM A350 LF2/A352 LCC + CLAD UNS N08825 (ABOVE 4")	ALLOY 825	ALLOY 825	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	GKSW ALLOY 825,GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A 320 L7M / ASTM A194 7M		
	BALL VALVE	ASTM B564 UNS N08825 (UP TO 4")	ALLOY 825	ALLOY 825	NO	PTFE UP TO 300#, DEVILON V 600#, PEEK 90# AND ABOVE	PTFE LIP SEAL	GRAPHITE	GKSW ALLOY 825,GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A193 GRADE B8M- CLASS 2 ASTM A194 GRADE 8M		
		ASTM A350 LF2/A352 LCC + CLAD UNS N08825 (ABOVE 4")	ALLOY 825	ALLOY 825	NO	PTFE UP TO 300#, DEVILON V 600#, PEEK 90# AND ABOVE	PTFE LIP SEAL	GRAPHITE	GKSW ALLOY 825,GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A 320 L7M / ASTM A194 7M		
	DOUBLE BLOCK & BLEED VALVES	ASTM B564 UNS N08825	ALLOY 825	ALLOY 825	NO	PTFE UP TO 300#, DEVILON V 600#, PEEK 90# AND ABOVE	PTFE LIP SEAL	GRAPHITE	GKSW ALLOY 825,GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A193 GRADE B8M- CLASS 2 ASTM A194 GRADE 8M		
	BUTTERFLY VALVE	ASTM B564 UNS N08825 (UP TO 4")	ALLOY 825	ALLOY 825	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A193 GRADE B8M- CLASS 2 ASTM A194 GRADE 8M		
		ASTM A350 LF2/A352 LCC + CLAD UNS N08825 (ABOVE 4")	ALLOY 825	ALLOY 825	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A 320 L7M / ASTM A194 7M		
017020-X 018011-X	CHECK VALVES	ASTM B148 UNS C95800	ASTM B148 UNS C95800	ASTM B124 UNS C63200	NO	NO	N/A	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7 /A194 2H	2.7	
	BALL VALVE	ASTM B148 UNS C95800	ASTM B148 UNS C95800	ASTM B124 UNS C63200	NO	PTFE	VITON 'B' AED OR APPROVED EQUIVALENT	GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7 /A194 2H	2.7	
	GATE& GLOBE VALVE	ASTM B148 UNS C95800	ASTM B148 UNS C95800	ASTM B124 UNS C63200	NO	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7 /A194 2H	2.7	

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PIPE CLASS DESIGNATION	VALVE TYPE	VALVE BODY	PLUG/DISC/SLAB/WEDGE OR BALL	STEM / TRIM	HARD FACING (Note-2.9)	SOFT SEATS	SEALS	PACKING	GASKETS	BOLTING	SPECIFIC NOTES	REMARKS
	BUTTERFLY VALVE (CONCENTRIC)	ASTM A105N/A216 WCB/WCC LINED WITH CHLOROPRENE RUBBER OR EPDM	ASTM B148 UNS C95800	ASTM B124 UNS C63200	NO	CHLOROPRENE RUBBER/ EPDM	GRAPHITE	GRAPHITE	N/A	ASTM A193 B7 /A194 2H	2.7	
017015-X	CHECK VALVES	ASTM A182 F316L/A351 -GR CF8M	SS 316	SS 316 / SS 316,EPDM	NO	NO	N/A	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 GRADE B8M- CLASS 1 ASTM A194 GRADE 8MA		
	BALL VALVE	ASTM A182 F316L/A351 -GR CF8M	SS 316	SS 316	NO	FILLED PTFE	VITON 'B' AED OR APPROVED EQUIVALENT	GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 GRADE B8M- CLASS 1 ASTM A194 GRADE 8MA		
	BUTTERFLY VALVE (CONCENTRIC)	ASTM A105N/A216 WCB/WCC LINED WITH CHLOROPRENE RUBBER OR EPDM	ASTM B148 UNS C95800	ASTM B148 UNS C95800	NO	CHLOROPRENE RUBBER/ EPDM	GRAPHITE	GRAPHITE	N/A	ASTM A193 B7/A194 2H		
018011-Z	GATE, GLOBE & CHECK VALVES	ASTM A105N /A216 GR WCB/WCC	ASTM A105N /A216 GR WCB/WCC + STELLITE 6	SS 316L	STELLITE 6	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7 /A194 2H		
	BALL VALVE	ASTM A105N /A216 GR WCB/WCC	SS 316L	SS 316L	NO	FILLED PTFE	VITON 'B' AED OR APPROVED EQUIVALENT	GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7 /A194 2H		
	BUTTERFLY VALVE (CONCENTRIC)	ASTM A105N/A216 WCB/WCC/ ASTM A536 60-40-18 LINED WITH CHLOROPRENE RUBBER OR EPDM	F6A / DUPLEX/ ALUMINUM BRONZE	F6A / DUPLEX/ ALUMINUM BRONZE	STELLITE 6 / STELLITE 21	CHLOROPRENE RUBBER/EPDM	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A193 B7 /A194 2H		

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PIPING MATERIAL SPECIFICATION

Document No.

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PIPE CLASS DESIGNATION	VALVE TYPE	VALVE BODY	PLUG/DISC/SLAB/WEDGE OR BALL	STEM / TRIM	HARD FACING (Note-2.9)	SOFT SEATS	SEALS	PACKING	GASKETS	BOLTING	SPECIFIC NOTES	REMARKS
017011-Y	GATE, GLOBE & CHECK VALVES	ASTM A182-F55 / A995 6A	SUPER DUPLEX UNS S32760	SUPER DUPLEX UNS S32760	STELLITE 21	NO	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	GKSW 6MO, GRAPHITE FILLED, 6MO CENTRE/6MO INNER	ASTM A193 B8MLCUN-CLASS 1BASTM A194 GRADE 8MLCUNA	2.1	
	BALL VALVE	ASTM A182-F55 / A995 6A	SUPER DUPLEX UNS S32760	SUPER DUPLEX UNS S32760	NO	PTFE	PTFE LIP SEAL	GRAPHITE	GKSW 6MO, GRAPHITE FILLED, CS,CENTRE/6MO INNER	ASTM A193 B8MLCUN-CLASS 1B ASTM A194 GRADE 8MLCUNA	2.1	
	DOUBLE BLOCK & BLEED VALVES	ASTM A182-F55 / A995 6A	SUPER DUPLEX UNS S32760	SUPER DUPLEX UNS S32760	NO	PTFE	PTFE LIP SEAL	GRAPHITE	GKSW 6MO, GRAPHITE FILLED, CS CENTRE/6MO INNER	ASTM A193 B8MLCUN-CLASS 1B ASTM A194 GRADE 8MLCUNA	2.1	
	BUTTERFLY VALVE	ASTM A182-F55 / A995 6A	SUPER DUPLEX UNS S32760	SUPER DUPLEX UNS S32760	STELLITE 21	PTFE	GRAPHITE	DIAGONAL BRAIDED GRAPHITE YARN/PREFORMED COMPRESSED GRAPHITE	N/A	ASTM A193 B8MLCUN-CLASS 1B ASTM A194 GRADE 8MLCUNA	2.1,2.4	
031440-Z	BALL VALVE	ASTM A105N /A216 GR WCB/WCC	SS 316L	SS 316L	NO	FILLED PTFE	VITON 'B' AED OR APPROVED EQUIVALENT	GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7 /A194 2H		
031441-Y	BALL VALVE	A216 GR WCB/WCC	Inconel 625	Inconel 625	NO	FILLED PTFE	VITON 'B' AED OR APPROVED EQUIVALENT	GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7 /A194 2H		
011441-Y	BALL VALVE	ASTM A105N /A216 GR WCB/WCC	ALLOY 825	ALLOY 825	NO	PTFE	PTFE LIP SEAL	GRAPHITE	GKSW ALLOY 825, GRAPHITE FILLED CS CENTRE/ALLOY 825 INNER	ASTM A193 B7M/A194 2HM		

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PIPE CLASS DESIGNATION	VALVE TYPE	VALVE BODY	PLUG/DISC/SLAB/WEDGE OR BALL	STEM / TRIM	HARD FACING (Note-2.9)	SOFT SEATS	SEALS	PACKING	GASKETS	BOLTING	SPECIFIC NOTES	REMARKS
011440-Z	BALL VALVE	ASTM A105N /A216 GR WCB/WCC	SS 316L	SS 316L	NO	FILLED PTFE	VITON 'B' AED OR APPROVED EQUIVALENT	GRAPHITE	GKSW AISI 316, GRAPHITE FILLED, CS CENTRE/SS INNER	ASTM A193 B7 /A194 2H		

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NOTES:

1. General Notes

- In addition to the above, all valves shall comply with the Engineering Standard ES-30.99.12.0030 and the applicable Specification requirements material, design, testing, inspection and certification.
- Pressure testing in accordance with the valve applicable design code, engineering standard and respective SPE's.
- Fire safe test as per API 6FA.
- Ball valves larger than 4" sizes shall be provided with grease injection for the valve stem and seats according to applicable MESC additional requirements and the engineering standard specification ES 30.99.12.3209.
- Valves Bolt & Nut materials shall be as specified in the respective piping class or the referenced Shell MESC Data sheet whichever is more stringent. PEEK shall only be used up to 2500# rating.
- SS316/316L shall be dual certified.
- Valves sizes up to 4" NPS shall be made from forged material.
- All Gate & Globe valves shall be OS & Y with rising stem design.
- Unless required to comply with process for dissimilar check valve requirements, Swing Check Valve will not be used.
- Fugitive emission tightness Class shall be "B", except for Category "D" fluids.
- All Dual Plate Check valves and Butterfly valves are Solid lug type up to DN 150 sizes and flanged type both ends for sizes larger than DN 150.
- Viton (AED type) material shall not be applicable for Sour service.
- Butterfly valves shall not be used above 300# rating.
- Corrosion allowance for valve body shall be as per applicable piping class.
- All Ball valves in wet sour service shall have the following extra requirements:
 - The MOC for the upper and lower bearings shall be an equivalent trim material as minimum with PTFE coating.
 - Additional trunnion bearing protection shall be provided to prevent the accumulation of ingress in valve trunnion.
 - Valves shall be provided with sealant injection featuring grease injection as per the applicable MESC catalogue SPEs.
- Globe valves closure member (disk/plug) / wetted parts shall have hard facing.
- Metal-seated valves shall be hard faced on seat rings/ball/wedge.

2. Specific Notes

- 2.1 All materials shall conform to NACE MR0175/ISO 15156 latest edition.
- 2.2 Valves shall be metal seated.
- 2.3 Ball material shall be solid Alloy 825/ 625/ SS 316 for DN 100 and smaller sizes and CS + Alloy 825/ 625/ SS 316 cladded for DN 150 and larger sizes as per the respective pipe class trim material; as applicable.
- 2.4 Butterfly valves shall be triple eccentric tight shut off (TSO) design only for the hydrocarbon services use, and shall be concentric for water service in Class 150# only.
- 2.5 Seat pocket and sealing areas shall have min. 3mm SS316L weld overlay.
- 2.6 Seat pocket and sealing areas shall have alloy 825/625 3mm weld overlay as a minimum.

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- 2.7 Valves in firewater system shall be UL Listed & FM approved with position indicator and extended stem (extended stem should be applicable for underground installations).
- 2.8 Metal seat valves are applicable for Sour Service & if Design temperature is above 150°C.

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22.3. Attachment – 3: PIPE CLASSES

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CLASS 011412-Z

Design limits

Temperature (°C)	-29	0	50	75	100	125	150
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Pressure (Barg)	DN 15-600	19.6	19.6	19.2	18.4	17.7	16.7	15.8
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class range DN 15 [NPS 1/2] up to / incl DN 600[NPS 24] design meets full vacuum at ambient condition
- For hydrotest vent & drains reference is made to standard drawing S.38.154
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.

Table of schedules

DN	Schedule
15	80
20	80
25	80
40	80
50	40
80	40
100	40
150	40
200	20
250	20
300	20
350	20
400	20
450	20
500	20
600	20

Branch connections 90 degrees

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
500	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
450	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
400	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
350	N	N	N	N	P	E	E	E	E	B	B	B	B	A		
300	N	N	N	N	P	E	E	E	B	B	B	B	B	A		
250	N	N	N	N	P	E	B	B	B	A						
200	N	N	N	N	P	E	B	B	A							
150	N	N	N	N	P	B	B	A								
100	N	N	N	N	U	B	A									
80	N	N	N	N	U	A										
50	N	N	M	M	J											
40	N	M	M	J												
25	M	M	J													
20	M	J														
15	J															

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel		Plant
Class no.	011412-Z	Consignee
ASME rating	CLASS 150	Engineered by
Corrosion allowance	<u>1.5 mm</u>	Principal
Revision letter		Contr. job no.
Revision date		Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-600	ASTM A106-B
PIPE	Pipe	DN 400-600	ASTM A672-C65 cl22
PISM	Pipe (API 5L-B sml)	DN 100-100	API 5L-B (sml)
PIWE	Pipe (API 5L-B erw)	DN 150-500	API 5L-B (erw)
PIWS	Pipe (API 5L-B saw)	DN 600-600	API 5L-B (saw)

Flanges

BLFL	Blind flange	DN 15-600	ASTM A105N
LJFL	Lap joint flange	--	ASTM A105N
SBNF	Spectacle blind	DN 15-400	ASTM A516-60/65/70
SPNF	Spade	DN 15-600	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15-600	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-600	ASTM A105N

Fittings

CAPB	Cap bw	DN 15-600	ASTM A234-WPB
E45B	Elbow 45 deg LR bw	DN 15-600	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 15-600	ASTM A234-WPB
TEEB	Tee equal bw	DN 15-600	ASTM A234-WPB

Reducing fittings

BN3F	Branch fitting flgd	DN 40-600	ASTM A105N
BN3P	Branch fitting plain	DN 40-600	ASTM A105N
BROB	Branch outlet bw	DN 400-600	ASTM A105N
BRSB	Branch outlet bw	DN 150-600	ASTM A105N
RECB	Reducer concentric bw	DN 20-600	ASTM A234-WPB
REEB	Reducer eccentric bw	DN 20-600	ASTM A234-WPB
TERB	Tee reducing bw	DN 20-600	ASTM A234-WPB

Valves

BAFF	Ball valve float FB flgd	DN 15-150	Body: ASTM A105N Trim: AISI 316 (L), PTFE
BARF	Ball valve float RB flgd	DN 15-250	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), PTFE
BTFF	Ball valve trunn FB flgd	DN 200-600	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), filled PTFE
BTRF	Ball valve trunn RB flgd	DN 300-600	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A216-WCB/WCC
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-600	Trim: CS, Duplex, Stellite Body: ASTM A105N/ ASTM A216-WCB/WCC
CHVF	Check valve flgd	DN 15-50	Trim: AISI 410, Stellite Body: ASTM A105N
CHVF	Check valve flgd	DN 80-600	Trim: AISI 410, Stellite Body: ASTM A105N/A216-WCB/WCC
GAVF	Gate valve flgd	DN 15-50	Trim: AISI 410 , Stellite Body: ASTM A105N (Normalised) Trim: AISI 410/ Stellite 6
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC
GLVF	Globe valve flgd	DN 15-50	Trim: AISI 410 , Stellite Body: ASTM A105N (Normalised) Trim: AISI 410/ Stellite 6
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A105N/A216-WCB/WCC

Instruments

TWND	Thermowell flgd DN 40	DN 40-40	ASTM B564 UNS N04400
TWNS	Thermowell flgd DN 40 L=230 mm	--	ASTM B564 UNS N04400
TWNL	Thermowell flgd DN 40 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	AISI 316 (L), Graphite CS centring-/SS inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A105N
PLUG	Plug NPT	DN 15-50	ASTM A105N
ST1B	Strainer Y-type (1.5 mm ca)	DN 50-400	Sieve: AISI 316 (L)
STBT	Studbolt with nuts	--	ASTM A193-B7/A194-2H Coated with Xylan 1070 or Takecoat 1000

Special Fittings

HSCL	Hose Coupling Flgd / Female Conn.	DN 15-50	AISI 316 (L) / Aluminium Bronze
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PIPING COMPONENTS

Item description	Nominal pipe size																
	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	
MESC																	
Pipe																	
Pipe	743005 0	181	281	381	581	691											
Pipe	743005 1				031	491											
Pipe	743005 2						111	391	791								
Pipe	743005 3									191	731						
Pipe	743005 4											211	691				
Pipe	743005 5												211	691			
Pipe	743023 0																
Pipe	743023 1																
Pipe	743023 2																
Pipe	743023 5											471	781				
Pipe	743023 6												081	381			
Pipe (API 5L-B erw)	741314 2						111	391	791								
Pipe (API 5L-B erw)	741314 3										191	731					
Pipe (API 5L-B erw)	741314 4											211	691				
Pipe (API 5L-B erw)	741314 5												211				
Pipe (API 5L-B saw)	741317 5												691				
Pipe (API 5L-B sml)	741312 1																
							491										
Flanges																	
Blind flange	766211	0581	0621	0661	0681	0701	0721	0741	0761	0781	0801	0821	0841	0861	0881	0901	0921
Spacer ring	768902	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321
Spade	768930	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321
Spectacle blind	768960	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261			
Welding neck flange	766278	3521	3541	3561	3581	3101	3121	3141	3161	2081	2101	2121	2141	2161	2181	2201	2241

PIPING COMPONENTS

Item description	Nominal pipe size																		
	15 MESC	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600			
Fittings																			
Cap bw	763019	0181	0241	0301	0381	0551	0751	0951	1151	1321	1521	1721	1921	2121	2321	2551	2751		
Elbow 45 deg LR bw	763038	5681	5741	5801	5881	6051	6251	6451	6651	6821	7021	7221	7421	7621	7821	8051	8251		
Elbow 90 deg LR bw	763040	5681	5741	5801	5881	6051	6251	6451	6651	6821	7021	7221	7421	7621	7821	8051	8251		
Tee equal bw	763084	5681	5741	5801	5881	6051	6251	6451	6651	6821	7021	7221	7421	7621	7821	8051	8251		
Valves																			
Ball valve float FB flgd	770025	5039	5049	5059	5079	5089	5109	5129	5139										
Ball valve float RB flgd	770025	0039	0049	0059	0079	0089	0109	0129	0449	0459	0469								
Ball valve trunn FB flgd	770228									5159	5169	5179	5189	5199	5209	5219	5239		
Ball valve trunn RB flgd	770228											0179	0189	0199	0209	0219	0239		
Butterfly valve triple of flgd	774130									0159	0169	0179	0189	0199	0209	0219	0239		
Check valve dual plate flgd	776711									0159	0169	0179	0189	0199	0209	0219	0239		
Check Valve Wafer Lug (Solid)	776795					0099	0109	0129	0149										
Check valve flgd	771013	0039	0049	0059	0079	0099													
Check valve flgd	771020						0109	0129	0149	0159	0169	0179	0189	0199	0209	0219	0239		
Gate valve flgd	772020	3039	3049	3059	3079	3099	0109	0129	0149	0159	0169	0179	0189	0199	0209	0219	0239		
Globe valve flgd	773014	0039	0049	0059	0079	0099													
Globe valve flgd	773020						0109	0129	0149	0159									
Miscellaneous																			
Gasket spiral wound	854136	3041	3061	3081	3121	3141	3181	3201	3241	3261	3281	3301	3321	3341	3361	3381	3421		
Meterrun	766496	0521	0541	0561	0581														
Orifice flange set	766295					0811	0821	0231	0241	0031	0041	0051	0061	0071	0081	0091	0101		
Plug NPT	760518	0081	0121	0161	0181	0201													
Strainer Y-type (1.5 mm ca)	768319					4021	4041	4061	4081	3171	3181	4221	4001	4241					

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7630721371	7630731371	7630890351
25	x	15	7630721471	7630731471	7630890451
25	x	20	7630721571	7630731571	7630890551
40	x	15	7630721671	7630731671	
40	x	20	7630721771	7630731771	7630890751
40	x	25	7630721871	7630731871	7630890851
50	x	20	7629461921	7629611921	
50	x	25	7630721961	7630731961	7630891091
50	x	40	7630722061	7630732061	7630891181
80	x	40	7630722261	7630732261	
80	x	50	7630722351	7630732351	7630891321
100	x	40	7630722501	7630732501	
100	x	50	7630722651	7630732651	7630891531
100	x	80	7630722751	7630732751	7630891651
150	x	80	7630722951	7630732951	7630891771
150	x	100	7630723051	7630733051	7630891891
200	x	100	7630723221	7630733221	7630892101
200	x	150	7630723331	7630733331	7630892301
250	x	100	7629463401	7629613401	7630892581
250	x	150	7630723531	7630733531	7630892761
250	x	200	7630723611	7630733611	7630892891
300	x	150	7630723861	7630733861	7630893151
300	x	200	7630723921	7630733921	7630893261
300	x	250	7630724021	7630734021	7630893481
350	x	150	7629466001	7629616001	
350	x	200	7630724231	7630734231	7630893881
350	x	250	7630724301	7630734301	7630894131
350	x	300	7630724421	7630734421	7630894391

Thermowell flgd DN 40	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683375111
255	7683375121
305	7683375131
355	7683375141
405	7683375151
455	7683375161

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200		7630724541	7630734541	
400	x 250		7630724631	7630734631	7630895031
400	x 300		7630724701	7630734701	7630895291
400	x 350		7630724821	7630734821	7630895541
450	x 250		7630725201	7630735201	7630896021
450	x 300		7630725501	7630735501	7630896261
450	x 350		7630725811	7630735811	7630896501
450	x 400		7630726111	7630736111	7630896741
500	x 300		7630726401	7630736401	7630897461
500	x 350		7630726711	7630736711	7630897701
500	x 400		7630727011	7630737011	7630897941
500	x 450		7630727311	7630737311	7630898181
600	x 300				7630898661
600	x 350				7630898901
600	x 400		7630728811	7630738811	7630899141
600	x 450		7630729111	7630739111	7630899381
600	x 500		7630729411	7630739411	7630899621

<u>Comp.name</u>	<u>Description</u>
BN3F	Branch fitting flgd
BN3P	Branch fitting plain
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>	<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
750	x	400			7630956491	1050	x	600			7630967811
750	x	450			7630957091	1050	x	750			7630968091
750	x	500			7630957601	1050	x	900	7629526301	7629726301	7630968391
750	x	600	7629510881	7630787021	7630958091	1200	x	600			7629896421
900	x	450			7630963431	1200	x	750			7629897021
900	x	500			7630963491	1200	x	900			7629897621
900	x	600			7630963691	1200	x	1050	7630618461	7630798461	7630969801
900	x	750	7630613041	7630793041	7630964281						

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN3P	BROB	BRSB
15	40	-	40	7680370611	7680310361	
15	50	-	50	7680370631	7680310371	
15	80	-	200	7680370641	7680310381	
15	250	-	900	7672292531	7672692041	
15	1050	-	1200	7672292541	7672692051	
20	50	-	50	7680370661	7680310401	
20	80	-	100	7680370671	7680310411	
20	150	-	300	7680370691	7680310431	
20	350	-	900	7672292571	7672692091	
20	1050	-	1200	7672292581	7672692101	
25	80	-	80	7680370731	7680310451	
25	100	-	100	7680370751	7680310461	
25	150	-	250	7680370761	7680310471	
25	300	-	900	7672292611	7672692141	
25	1050	-	1200	7672292621	7672692151	
40	80	-	80	7680370791	7680310511	
40	100	-	100	7680370801	7680310521	
40	150	-	150	7680370821	7680310531	
40	200	-	300	7680370831	7680310551	
40	350	-	600	7680370851	7680310571	
40	750	-	900	7672292651	7672692191	
40	1050	-	1200	7672292661	7672692201	
50	150	-	150		7678312171	
50	200	-	250		7678312181	
50	300	-	450		7678312201	
50	500	-	900		7678312241	
50	1050	-	1200		7678902131	
80	200	-	200		7678312281	
80	250	-	250		7678312291	
80	300	-	350		7678312301	
80	400	-	500		7678312321	
80	600	-	600		7678312351	
80	750	-	900		7678902201	
80	1050	-	1200		7678902261	

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN3P	BROB	BRSB
100	300	-	350			7678312391
100	400	-	500			7678312411
100	600	-	900			7678312441
100	1050	-	1200			7678902391
150	350	-	350			7678312471
150	400	-	400			7678312481
150	450	-	450			7678312491
150	500	-	500			7678312501
150	600	-	600			7678312511
150	750	-	750			7678902461
150	900	-	900			7678902491
150	1050	-	1200			7678902521
200	400	-	400			7679001901
200	450	-	450			7679001911
200	500	-	500			7679001921
200	600	-	600			7679001941
200	750	-	750			7678035591
200	900	-	900			7678035621
200	1050	-	1050			7678030411
200	1200	-	1200			7678030421
250	500	-	500			7679001991
250	600	-	600			7679002001
250	750	-	750			7678035721
250	900	-	900			7678035751
250	1050	-	1050			7678030461
250	1200	-	1200			7678030471
300	750	-	750			7678035841
300	900	-	900			7678035861
300	1050	-	1050			7678030511
300	1200	-	1200			7678030521
350	750	-	750			7678035881
350	900	-	900			7678035901
350	1050	-	1050			7678030561
350	1200	-	1200			7678030571
400	900	-	900			7678035921
400	1050	-	1050			7678030601
400	1200	-	1200			7678030611
450	1050	-	1050			7678030631
450	1200	-	1200			7678030641
500	1050	-	1050			7678030661
500	1200	-	1200			7678030671

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	1/2	x	60	8138150239
20	4	1/2	x	70	8138150259
25	4	1/2	x	70	8138150259
40	4	1/2	x	80	8138150279
50	4	5/8	x	90	8138150759
80	4	5/8	x	100	8138150779
100	8	5/8	x	100	8138150779
150	8	3/4	x	110	8138151439
200	8	3/4	x	110	8138151439
250	12	7/8	x	120	8138152169
300	12	7/8	x	120	8138152169
350	12	1	x	140	8138152999
400	16	1	x	140	8138152999
450	16	1 1/8	x	150	8138153849
500	20	1 1/8	x	160	8138153869
600	20	1 1/4	x	180	8138154709
750	28	1 1/4	x	240	8138154829
900	32	1 1/2	x	290	8138156419
1050	36	1 1/2	x	300	8138156439
1200	44	1 1/2	x	320	8138156479

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	5/8	x	130	8138150839
20	4	5/8	x	130	8138150839
25	4	5/8	x	130	8138150839
40	4	3/4	x	140	8138151499

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	8	5/8	x	130	8138150839
80	8	3/4	x	140	8138151499
100	8	3/4	x	150	8138151519
150	12	3/4	x	150	8138151519
200	12	7/8	x	170	8138152269
250	16	1	x	190	8138153099
300	16	1 1/8	x	210	8138153969
350	20	1 1/8	x	220	8138153989
400	20	1 1/4	x	230	8138154809
450	24	1 1/4	x	250	8138154849
500	24	1 1/4	x	260	8138154869
600	24	1 1/2	x	290	8138156419

Coated boltset for Dual Plate Solid Lug

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	4	5/8	x	150	8138150879
80	4	5/8	x	180	8138150939
100	8	5/8	x	180	8138150939
150	8	3/4	x	210	8138151639
200	8	3/4	x	250	8138151719
250	12	7/8	x	280	8138152489
300	12	7/8	x	310	8138152549

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	1/2	x	70	8138150259
20	4	1/2	x	80	8138150279
25	4	1/2	x	80	8138150279
40	4	1/2	x	80	8138150279
50	4	5/8	x	100	8138150779
80	4	5/8	x	110	8138150799
100	8	5/8	x	110	8138150799
150	8	3/4	x	120	8138151459
200	8	3/4	x	130	8138151479
250	12	7/8	x	140	8138152209
300	12	7/8	x	150	8138152229
350	12	1	x	170	8138153059
400	16	1	x	170	8138153059
450	16	1 1/8	x	180	8138153909
500	20	1 1/8	x	200	8138153949
600	20	1 1/4	x	220	8138154789
750	28	1 1/4	x	280	8138154909
900	32	1 1/2	x	340	8138156519
1050	36	1 1/2	x	360	8138156559
1200	44	1 1/2	x	390	8138156619

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662110581
Welding neck flange	1	7662783521
Gasket spiral wound	1	8541363041
Studbolt with nuts	4	8138150239

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662110621
Gasket spiral wound	1	8541363061
Studbolt with nuts	4	8138150259

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662110621
Welding neck flange	1	7662783541
Gasket spiral wound	1	8541363061
Studbolt with nuts	4	8138150259

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662110661
Gasket spiral wound	1	8541363081
Studbolt with nuts	4	8138150259

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Blind flange	1	7662110681
Gasket spiral wound	1	8541363121
Studbolt with nuts	4	8138150279

Temp instr conn DN 40 Fig.NS DN80 - 100

Branch: branch nipple flanged

Lap joint flange	1	7662202181
Gasket spiral wound	1	8541363121
Thermowell flgd DN 40 L=230 mm	1	7683375111
Studbolt with nuts	4	8138150299

Temp instr conn DN 40 Fig.NL DN150 - 600

Branch: branch nipple flanged

Lap joint flange	1	7662202181
Gasket spiral wound	1	8541363121
Thermowell flgd DN 40 L=255 mm	1	7683375121
Studbolt with nuts	4	8138150299

CLASS 011440-X

Design limits**Temperature (°C)**

-29	0	50	75	100	125	150
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Pressure (Barg)	/FV
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DN 15-1200	19.6	19.6	19.2	18.4	17.7	16.7	15.8
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class range DN 15 [NPS 1/2] up to incl DN 600 [NPS 24] design meets full vacuum at ambient condition, except DN450 [NPS 18].
DN450 [NPS 18] with 2.9 mm [0.114 inch]corrosion allowance meets full vacuum at ambient condition.
For DN 750 [NPS 30] to 1200 [NPS 48], if vacuum condition can occur, piping to be designed accordingly
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- **Socket welding connection is not permitted. Threaded connection only allowed for instrumentation/piping hook up connection.**
- For vent gas (flare) branches, pipe to pipe with reinforcing pad connection shall be developed during detailed design. For equal size connection lateral tee shall be used.

Table of schedules

DN	Schedule
15	160
20	160
25	160
40	160
50	80
80	80
100	40
150	40
200	30
250	30
300	30
350	20
400	20
450	20
500	20
600	20
750	XS
900	HOLD-7
1050	HOLD-7
1200	HOLD-7

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1050	1200
1200	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
1050	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
900	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
750	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
600	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
500	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
450	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
400	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
350	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
300	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
250	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
200	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
150	N	N	N	N	P	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A
100	N	N	N	N	U	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A
80	N	N	N	N	U	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
50	N	N	M	M	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
40	N	M	M	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
25	M	M	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
20	M	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
15	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel Sour		Plant
Class no.	011440-X	Consignee
ASME rating	CLASS 150	Engineered by
Corrosion allowance	3 mm	Principal
Revision letter		Contr. job no.
Revision date		Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-600	ASTM A106-B
PIPE	Pipe	DN 750-1200	ASTM A672-C65 cl22

Flanges

BLFL	Blind flange	DN 15-1200	ASTM A105N
LJFL	Lap joint flange	---	ASTM A105N
SBNF	Spectacle blind	DN 15-400	ASTM A516-60/65/70
SPFL	Spade	DN 750-1200	ASTM A516-70
SPNF	Spade	DN 15-600	ASTM A516-60/65/70
SPRT	Spacer ring	DN 750-1200	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15-600	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-1200	ASTM A105N
WNFL1	Welding neck flange 300#	DN 80	ASTM A105N

Fittings

CAPB	Cap bw	DN 15-1200	ASTM A234-WPB
E45B	Elbow 45 deg LR bw	DN 15-600	ASTM A234-WPB
E45B	Elbow 45 deg LR bw	DN 750-1200	ASTM A234-WPBW
E90B	Elbow 90 deg LR bw	DN 15-600	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 750-1200	ASTM A234-WPBW
TEEB	Tee equal bw	DN 15-600	ASTM A234-WPB
TEEB	Tee equal bw	DN 750-1200	ASTM A234-WPBW

Reducing fittings

BN6F	Branch fitting flgd	DN 40-1200	ASTM A105N
BN6B	Branch fitting bw	DN 40-1200	ASTM A105N
BR3B	Branch outlet bw	DN 150-1200	ASTM A105N
BROB	Branch outlet bw	DN 400-1200	ASTM A105N
BRSB	Branch outlet bw	DN 300-900	ASTM A105N
RECB	Reducer concentric bw	DN 20-600	ASTM A234-WPB
RECB	Reducer concentric bw	DN 750-1200	ASTM A234-WPBW
REEB	Reducer eccentric bw	DN 20-600	ASTM A234-WPB
REEB	Reducer eccentric bw	DN 750-1200	ASTM A234-WPBW
TERB	Tee reducing bw	DN 20-600	ASTM A234-WPB
TERB	Tee reducing bw	DN 750-1200	ASTM A234-WPBW

Valves

BAFF	Ball valve float FB flgd	DN 15-150	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), PTFE
BARF	Ball valve float RB flgd	DN 15-250	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), PTFE
BTFF	Ball valve trunn FB flgd	DN 200-600	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), filled PTFE
BTRF	Ball valve trunn RB flgd	DN 300-1200	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-1200	Body: ASTM A216-WCB/WCC Trim: CS, Duplex, Stellite
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-1200	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), Stellite
CHVF	Check valve flgd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), Stellite
CHVF	Check valve flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), Stellite
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), Stellite
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), Stellite
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), Stellite
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), Stellite
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), filled PTFE
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), filled PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A105N Trim: AISI 316 (L), Stellite

Instruments

TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKMA	Gasket camprofile or approved equal	DN 750-1200	AISI 316 (L), Graphite SS centring ring
GKSW	Gasket spiral wound	DN 15-600	AISI 316 (L), Graphite CS centring-/SS inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A105N
PLUG	Plug NPT	DN 15-50	ASTM A105N
ST3B	Strainer Y-type (3 mm ca)	DN 50-400	Sieve: AISI 316 (L)
STBT	Studbolt with nuts	--	ASTM A193-B7M/A194-2HM Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A105N HOLDER / ACCESS FITTING: AISI 316 (L) COUPON: ASTM A106-B
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A105N INTERNALS: AISI 316 (L)
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: AISI 316 (L) VALVE & INTERNALS: AISI 316 (L)
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A105N VALVE & INTERNALS: AISI 316 (L)
HSCL	Hose Coupling Flgd / Female Conn.	DN 15-50	AISI 316 (L) / Aluminium Bronze

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	Nominal pipe size		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1050	1200		
	MESC																							
Pipe																								
Pipe	743003 0	201	301	401	601	711																		
Pipe	743003 1						091	491																
Pipe	743003 2								111	411	831													
Pipe	743003 3									251	731													
Pipe	743003 4											211	691											
Pipe	743003 5												211	691										
Pipe	743023 3																		391					
Pipe	743023 4																		021	601				
Pipe	743023 5																						161	
Flanges																								
Blind flange	766211	0581	0621	0661	0681	0701	0721	0741	0761	0781	0801	0821	0841	0861	0881	0901	0921							
Blind flange	767012																		0561	0621	0681	0741		
Spacer ring	768875																		1231	1261	1291	1321		
Spacer ring	768908	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321							
Spade	768895																		1231	1261	1291	1321		
Spade	768937	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321							
Spectacle blind	768962	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321							
Welding neck flange	766278	4021	4041	4061	4081	3601	3621	3141	3161	2581	2601	2621	2141	2161	2181	2201	2241							
Welding neck flange	767082																		0171	0411	0611	0751		
Welding neck flange 300#	766278							6121																
Fittings																								
Cap bw	763017	5721	5781	5821	5921	6081	6281	6451	6651	6831	7031	7231	7421	7621	7821	8051	8251	0391	1021	1601	2161			
Elbow 45 deg LR bw	763034	5721	5781	5821	5921	6081	6281	6451	6651	6831	7031	7231	7421	7621	7821	8051	8251	1191	2691	3401	4031			
Elbow 90 deg LR bw	763039																	5191	6691	7411	8031			
Elbow 90 deg LR bw	763042	5721	5781	5821	5921	6081	6281	6451	6651	6831	7031	7231	7421	7621	7821	8051	8251	1191	2701	3411	4051			
Tee equal bw	763081	5721	5781	5821	5921	6081	6281	6451	6651	6831	7031	7231	7421	7621	7821	8051	8251							

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																			
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1050	1200
Valves																					
Ball valve float FB flgd	770025	5039	5049	5059	5079	5089	5109	5129	5139												
Ball valve float RB flgd	770025	0039	0049	0059	0079	0089	0109	0129	0449	0459	0469										
Ball valve trunn FB flgd	770067									5159	5169	5179	5189	5199	5209	5219	5239				
Ball valve trunn RB flgd	770067											0179	0189	0199	0209	0219	0239	0269	0299	0329	0349
Butterfly valve triple of flgd	774131									0159	0169	0179	0189	0199	0209	0219	0239	0269	0299	0329	0349
Check valve dual plate flgd	776716									0159	0169	0179	0189	0199	0209	0219	0239	0269	0299	0329	0349
Check Valve Wafer Lug (Solid)	776751						0099	0109	0129	0149											
Check valve flgd	771005	0039	0049	0059	0079	0099	0109	0129	0149	0159	0169	0179	0189	0199	0209	0219	0239				
Gate valve flgd	772004	0039	0049	0059	0079	0099	0109	0129	0149	0159	0169	0179	0189	0199	0209	0219	0239				
Globe valve flgd	773005	0039	0049	0059	0079	0099	0109	0129	0149	0159											
Valve DBBT	778545	5039	5049	5059	5079	5089															
Valve DBBF	778546	5039	5049	5059	5079	5089															
Gasket camprofile	854190															0481	0541	0601	0661		
Gasket spiral wound	854136	3041	3061	3081	3121	3141	3181	3201	3241	3261	3281	3301	3321	3341	3361	3381	3421				
Meterrun	766496	0521	0541	0561	0581																
Orifice flange set	766295									1051	1061	0231	0241	0131	0141	0151	0061	0071	0081	0091	0101
Plug NPT	760518	0081	0121	0161	0181					0201											
Strainer Y-type (3 mm ca)	768322									0261	0281	0061	0081	0451	0461	0471	0481	0491			

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7630661411	7630671411	7630880391
25	x	15	7630661511	7630671511	7630880491
25	x	20	7630661611	7630671611	7630880591
40	x	15	7630661711	7630671711	
40	x	20	7630661811	7630671811	7630880791
40	x	25	7630661911	7630671911	7630880891
50	x	20	7629471971	7630671931	
50	x	25	7630661991	7630671991	7630881111
50	x	40	7630662081	7630672081	7630881201
80	x	40	7630662291	7630672291	
80	x	50	7630662371	7630672371	7630881331
100	x	40	7630662521	7630672491	
100	x	50	7630662661	7630672661	7630881571
100	x	80	7629472751	7629622701	7630881691
150	x	80	7630662961	7630672961	7630881811
150	x	100	7630663051	7630673051	7630881891
200	x	100	7630663241	7630673241	7630882111
200	x	150	7630663341	7630673341	7630882311
250	x	100	7629473421	7629623421	7630882591
250	x	150	7630663521	7630673521	7630882771
250	x	200	7630663631	7630673631	7630882901
300	x	150	7630663811	7630673811	7630883161
300	x	200	7630663941	7630673941	7630883271
300	x	250	7630664031	7630674031	7630883491
350	x	150	7629476001	7629626001	
350	x	200	7629476391	7629626401	7630883961
350	x	250	7629476731	7629626731	7630884211
350	x	300	7630664451	7630674451	7630884471

Thermowell flgd DN 50	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200	7629478201	7629628131		
400	x 250	7629478691	7629628641	7630885111	
400	x 300	7630664711	7630674711	7630885371	
400	x 350	7630664821	7630674821	7630885541	
450	x 250	7630665321	7630675321	7630886101	
450	x 300	7630665621	7630675621	7630886341	
450	x 350	7630665811	7630675811	7630886501	
450	x 400	7630666111	7630676111	7630886741	
500	x 300	7630666521	7630676521	7630887541	
500	x 350	7630666711	7630676711	7630887701	
500	x 400	7630667011	7630677011	7630887941	
500	x 450	7630667311	7630677311	7630888181	
600	x 300			7630888741	
600	x 350			7630888901	
600	x 400	7630668811	7630678811	7630889141	
600	x 450	7630669111	7630679111	7630889381	
600	x 500	7630669411	7630679411	7630889621	

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting flgd
BN6B	Branch fitting bw
BR3B	Branch outlet bw
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
750	x	400			7629940691
750	x	450			7629940891
750	x	500			7629941091
750	x	600	7629561291	7629761291	7629941291
900	x	450			7629942451
900	x	500			7629942651
900	x	600			7629942851
900	x	750	7629563451	7629763451	7629943451

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
1050	x	600			7629944901
1050	x	750			7629945501
1050	x	900	7629566101	7629766101	7629946101
1200	x	600			7629947571
1200	x	750			7629948171
1200	x	900			7629948771
1200	x	1050	7629569371	7629769371	7629949371

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BROB	BRSB
15	40	-	50	7672293201	7672693519		
15	80	-	150	7672293211	7672693529		
15	200	-	900	7672293221	7672693549		
15	1050	-	1200	7672293231	7672693559		
20	50	-	50	7672293241	7672693569		
20	80	-	250	7672293251	7672693579		
20	300	-	900	7672293261	7672693589		
20	1050	-	1200	7672293271	7672693599		
25	80	-	250	7672291681	7672693619		
25	300	-	900	7672293301	7672693629		
25	1050	-	1200	7672293311	7672693639		
40	80	-	80	7672293321	7672693659		
40	100	-	100	7672293331	7672693669		
40	150	-	200	7672293341	7672693679		
40	250	-	450	7672293351	7672693689		
40	500	-	900	7672293361	7672693699		
40	1050	-	1200	7672293371	7672693709		
50	150	-	150		7678311471		
50	200	-	250		7678311481		
50	300	-	450		7678311501		
50	500	-	900		7678311541		
50	1050	-	1200		7678901131		
80	200	-	200		7678311581		
80	250	-	250		7678311591		
80	300	-	350		7678311601		
80	400	-	500		7678311621		
80	600	-	600		7678311651		
80	750	-	900		7678901201		
80	1050	-	1200		7678901261		

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6P	BR3B	BROB	BRSB
100	300	-	350				7678312391
100	400	-	500				7678312411
100	600	-	900				7678312441
100	1050	-	1200				
150	350	-	350				7678312471
150	400	-	400				7678312481
150	450	-	450				7678312491
150	500	-	500				7678312501
150	600	-	600				7678312511
150	750	-	750				7678902461
150	900	-	900				7678902491
150	1050	-	1200				
200	400	-	400				7679001081
200	450	-	450				7679001091
200	500	-	500				7678310481
200	600	-	600				7678310491
200	750	-	750				7678037591
200	900	-	900				7678037621
200	1050	-	1050				7678001651
200	1200	-	1200				7678005681
250	500	-	500				7678310541
250	600	-	600				7678310551
250	750	-	750				7678037721
250	900	-	900				7678037751
250	1050	-	1050				7678001781
250	1200	-	1200				7678005811
300	750	-	750				7678037801
300	900	-	900				7678037851
300	1050	-	1050				7678001821
300	1200	-	1200				7678005831
350	750	-	750				7678030541
350	900	-	900				7678030551
350	1050	-	1050				7678000861
350	1200	-	1200				7678004851
400	900	-	900				7678030591
400	1050	-	1050				7678000901
400	1200	-	1200				7678004871
450	1050	-	1050				7678000941
450	1200	-	1200				7678004891
500	1050	-	1050				7678000971
500	1200	-	1200				7678004971

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 60	8138170239
20	4	1/2	x 70	8138170259
25	4	1/2	x 70	8138170259
40	4	1/2	x 80	8138170279
50	4	5/8	x 90	8138170759
80	4	5/8	x 100	8138170779
100	8	5/8	x 100	8138170779
150	8	3/4	x 110	8138171439
200	8	3/4	x 110	8138171439
250	12	7/8	x 120	8138172169
300	12	7/8	x 120	8138172169
350	12	1	x 140	8138172999
400	16	1	x 140	8138172999
450	16	1 1/8	x 150	8138173849
500	20	1 1/8	x 160	8138173869
600	20	1 1/4	x 180	8138174709
750	28	1 1/4	x 240	8138174829
900	32	1 1/2	x 290	8138176419
1050	36	1 1/2	x 300	8138176439
1200	44	1 1/2	x 320	8138176479

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138170259
20	4	1/2	x 80	8138170279
25	4	1/2	x 80	8138170279
40	4	1/2	x 80	8138170279
50	4	5/8	x 100	8138170779
80	4	5/8	x 110	8138170799
100	8	5/8	x 110	8138170799
150	8	3/4	x 120	8138171459
200	8	3/4	x 130	8138171479
250	12	7/8	x 140	8138172209
300	12	7/8	x 150	8138172229
350	12	1	x 170	8138173059
400	16	1	x 170	8138173059
450	16	1 1/8	x 180	8138173909
500	20	1 1/8	x 200	8138173949
600	20	1 1/4	x 220	8138174789
750	28	1 1/4	x 280	8138174909
900	32	1 1/2	x 340	8138176519
1050	36	1 1/2	x 360	8138176559
1200	44	1 1/2	x 390	8138176619

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	5/8	x 130	8138170839
20	4	5/8	x 130	8138170839
25	4	5/8	x 130	8138170839
40	4	3/4	x 140	8138171499

Coated boltset for Dual Plate Solid Lug

<u>Wafer Check Valve</u>	<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
	50	4	5/8	x 150	8138170879
	80	4	5/8	x 180	8138170939
	100	8	5/8	x 180	8138170939
	150	8	3/4	x 210	8138171639

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138170839
80	8	3/4	x 140	8138171499
100	8	3/4	x 150	8138171519
150	12	3/4	x 150	8138171519
200	12	7/8	x 170	8138172269
250	16	1	x 190	8138173099
300	16	1 1/8	x 210	8138173969
350	20	1 1/8	x 220	8138173989
400	20	1 1/4	x 230	8138174809
450	24	1 1/4	x 250	8138174849
500	24	1 1/4	x 260	8138174869
600	24	1 1/2	x 290	8138176419

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662110581
Welding neck flange	1	7662784021
Gasket spiral wound	1	8541363041
Studbolt with nuts	4	8138170239

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662110621
Gasket spiral wound	1	8541363061
Studbolt with nuts	4	8138170259

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662110621
Welding neck flange	1	7662784041
Gasket spiral wound	1	8541363061
Studbolt with nuts	4	8138170259

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662110661
Gasket spiral wound	1	8541363081
Studbolt with nuts	4	8138170259

Drain or vent point DN 40 Fig.H DN350 - 1200

Branch: branch nipple flanged

Blind flange	1	7662110681
Gasket spiral wound	1	8541363121
Studbolt with nuts	4	8138170279

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Lap joint flange	1	7662202201
Pipe	1	7430030711
Welding neck flange	1	7662783601
Gasket spiral wound	1	8541363141
Thermowell fild DN 50 L=230 mm	1	7683385611
Studbolt with nuts	4	8138170799

CLASS 011441-X

Design limits**Temperature (°C)**

-29	0	50	75	100	125	150
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DN 15- 600	19.6	19.6	19.2	18.4	17.7	16.7	15.8
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class range DN 15 [NPS 1/2] up to/incl DN 600 [NPS 24] design meets full vacuum at ambient condition, except DN450 [NPS 18]. DN450 [NPS 18] with 2.9 mm [0.114 inch] corrosion allowance meets full vacuum at ambient condition.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.

Table of schedules**DN | Schedule**

15	160
20	160
25	160
40	160
50	80
80	80
100	40
150	40
200	30
250	30
300	30
350	20
400	20
450	20
500	20
600	20

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
500	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
450	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
400	N	N	N	N	P	E	E	E	E	B	B	B	B	A		
350	N	N	N	N	P	E	E	E	E	B	B	B	B	A		
300	N	N	N	N	P	E	E	E	E	B	B	B	B	A		
250	N	N	N	N	P	E	E	B	B	B	B	A				
200	N	N	N	N	P	E	B	B	B	A						
150	N	N	N	N	P	B	B	B	A							
100	N	N	N	N	U	B	A									
80	N	N	N	N	U	A										
50	N	N	M	M	J											
40	N	M	M	J												
25	M	M	J													
20	M	J														
15	J															

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel Sour		Plant
Class no.	011441-X	Consignee
ASME rating	CLASS 150	Engineered by
Corrosion allowance	3 mm	Principal
Revision letter		Contr. job no.
Revision date		Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-600	ASTM A106-B
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Flanges

BLFL	Blind flange	DN 15-600	ASTM A105N
LJFL	Lap joint flange	--	ASTM A105N
SBNF	Spectacle blind	DN 15-400	ASTM A516-60/65/70
SPNF	Spade	DN 15-600	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15-600	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-600	ASTM A105N

Fittings

CAPB	Cap bw	DN 15-600	ASTM A234-WPB
E45B	Elbow 45 deg LR bw	DN 15-600	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 15-600	ASTM A234-WPB
TEEB	Tee equal bw	DN 15-600	ASTM A234-WPB

Reducing fittings

BN6F	Branch fitting flgd	DN 40-600	ASTM A105N
BN6P	Branch fitting plain	DN 40-600	ASTM A105N
BR3B	Branch outlet bw	DN 150-600	ASTM A105N
BROB	Branch outlet bw	DN 400-600	ASTM A105N
BRSB	Branch outlet bw	DN 300-600	ASTM A105N
RECB	Reducer concentric bw	DN 20-600	ASTM A234-WPB
REEB	Reducer eccentric bw	DN 20-600	ASTM A234-WPB
TERB	Tee reducing bw	DN 20-600	ASTM A234-WPB

Valves

BAFF	Ball valve float FB flgd	DN 15-150	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, PTFE
BARF	Ball valve float RB flgd	DN 15-250	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, PTFE
BTFF	Ball valve trunn FB flgd	DN 200-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, filled PTFE
BTRF	Ball valve trunn RB flgd	DN 300-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A216-WCB/WCC Trim: Alloy 825, filled PTFE
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
CHVF	Check valve flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825
CHVF	Check valve flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, PTFE
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A105N Trim: Alloy 825, Stellite

Instruments

TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	Alloy 825, Graphite CS centring-/Alloy 825 inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A105N
PLUG	Plug NPT	DN 15-50	ASTM A105N
ST3B	Strainer Y-type (3 mm ca)	DN 50-400	Sieve: Alloy 825
STBT	Studbolt with nuts	--	ASTM A193-B7M/A194-2HM Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A105N HOLDER / ACCESS FITTING: ALLOY 825 COUPON: ASTM A106-B
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A105N INTERNAL: ALLOY 825
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: ALLOY 825 VALVE & INTERNALS: ALLOY 825
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A105N VALVE & INTERNALS: ALLOY 825
HSCL	Hose Coupling Flgd / Female Conn.	DN 15-50	AISI 316 (L) / Aluminium Bronze

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	Nominal pipe size																
	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	
MESC																	
Pipe																	
Pipe	743003 0	201	301	401	601	711											
Pipe	743003 1						091	491									
Pipe	743003 2								111	411	831						
Pipe	743003 3									251	731						
Pipe	743003 4											211	691				
Pipe	743003 5												211	691			
Flanges																	
Blind flange	766211	0581	0621	0661	0681	0701	0721	0741	0761	0781	0801	0821	0841	0861	0881	0901	0921
Spacer ring	768908	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321
Spade	768937	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321
Spectacle blind	768962	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261			
Welding neck flange	766278	4021	4041	4061	4081	3601	3621	3141	3161	2581	2601	2621	2141	2161	2181	2201	2241
Fittings																	
Cap bw	763017	5721	5781	5821	5921	6081	6281	6451	6651	6831	7031	7231	7421	7621	7821	8051	8251
Elbow 45 deg LR bw	763034	5721	5781	5821	5921	6081	6281	6451	6651	6831	7031	7231	7421	7621	7821	8051	8251
Elbow 90 deg LR bw	763042	5721	5781	5821	5921	6081	6281	6451	6651	6831	7031	7231	7421	7621	7821	8051	8251
Tee equal bw	763081	5721	5781	5821	5921	6081	6281	6451	6651	6831	7031	7231	7421	7621	7821	8051	8251

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																	
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600		
Valves																			
Ball valve float FB flgd	770054	5039	5049	5059	5079	5089	5109	5129	5139										
Ball valve float RB flgd	770054	0039	0049	0059	0079	0089	0109	0129	0449	0459	0469								
Ball valve trunn FB flgd	770091									5159	5169	5179	5189	5199	5209	5219	5239		
Ball valve trunn RB flgd	770091									0179	0189	0199	0209	0219	0239				
Butterfly valve triple of flgd	774142									3159	3169	3179	3189	3199	3209	3219	3239		
Check valve dual plate flgd	776714									0159	0169	0179	0189	0199	0209	0219	0239		
Check Valve Wafer Lug (Solid)	776757					0099	0109	0129	0149										
Check valve flgd	771043	0039	0049	0059	0079	0099	0109	0129	0149	0159	0169	0179	0189	0199	0209	0219	0239		
Gate valve flgd	772053	0039	0049	0059	0079	0099	0109	0129	0149	0159	0169	0179	0189	0199	0209	0219	0239		
Globe valve flgd	773053	0039	0049	0059	0079	0099	0109	0129	0149	0159									
Valve DBBT	778551	5039	5049	5059	5079	5089													
Valve DBBF	778549	5039	5049	5059	5079	5089													
Miscellaneous																			
Gasket spiral wound	854360	3041	3061	3081	3121	3141	3181	3201	3241	3261	3281	3301	3321	3341	3361	3381	3421		
Meterrun	766496	0521	0541	0561	0581														
Orifice flange set	766295					1051	1061	0231	0241	0131	0141	0151	0061	0071	0081	0091	0101		
Plug NPT	760518	0081	0121	0161	0181	0201	0269	0289	0069	0089	0459	0469	0479	0489	0499				
Strainer Y-type (3 mm ca)	768322																		

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7630661411	7630671411	7630880391
25	x	15	7630661511	7630671511	7630880491
25	x	20	7630661611	7630671611	7630880591
40	x	15	7630661711	7630671711	
40	x	20	7630661811	7630671811	7630880791
40	x	25	7630661911	7630671911	7630880891
50	x	20	7629471971	7630671931	
50	x	25	7630661991	7630671991	7630881111
50	x	40	7630662081	7630672081	7630881201
80	x	40	7630662291	7630672291	
80	x	50	7630662371	7630672371	7630881331
100	x	40	7630662521	7630672491	
100	x	50	7630662661	7630672661	7630881571
100	x	80	7629472751	7629622701	7630881691
150	x	80	7630662961	7630672961	7630881811
150	x	100	7630663051	7630673051	7630881891
200	x	100	7630663241	7630673241	7630882111
200	x	150	7630663341	7630673341	7630882311
250	x	100	7629473421	7629623421	7630882591
250	x	150	7630663521	7630673521	7630882771
250	x	200	7630663631	7630673631	7630882901
300	x	150	7630663811	7630673811	7630883161
300	x	200	7630663941	7630673941	7630883271
300	x	250	7630664031	7630674031	7630883491
350	x	150	7629476001	7629626001	
350	x	200	7629476391	7629626401	7630883961
350	x	250	7629476731	7629626731	7630884211
350	x	300	7630664451	7630674451	7630884471

Thermowell figd DN 50	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200	7629478201	7629628131		
400	x 250	7629478691	7629628641	7630885111	
400	x 300	7630664711	7630674711	7630885371	
400	x 350	7630664821	7630674821	7630885541	
450	x 250	7630665321	7630675321	7630886101	
450	x 300	7630665621	7630675621	7630886341	
450	x 350	7630665811	7630675811	7630886501	
450	x 400	7630666111	7630676111	7630886741	
500	x 300	7630666521	7630676521	7630887541	
500	x 350	7630666711	7630676711	7630887701	
500	x 400	7630667011	7630677011	7630887941	
500	x 450	7630667311	7630677311	7630888181	
600	x 300			7630888741	
600	x 350			7630888901	
600	x 400	7630668811	7630678811	7630889141	
600	x 450	7630669111	7630679111	7630889381	
600	x 500	7630669411	7630679411	7630889621	

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting flgd
BN6P	Branch fitting plain
BR3B	Branch outlet bw
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6P	BR3B	BROB	BRSB
15	40	-	50	7672293201	7672693511		
15	80	-	150	7672293211	7672693521		
15	200	-	600	7672293221	7672693541		
20	50	-	50	7672293241	7672693561		
20	80	-	250	7672293251	7672693571		
20	300	-	600	7672293261	7672693581		
25	80	-	250	7672291681	7672693611		
25	300	-	600	7672293301	7672693621		
40	80	-	80	7672293321	7672693651		
40	100	-	100	7672293331	7672693661		
40	150	-	200	7672293341	7672693671		
40	250	-	450	7672293351	7672693681		
40	500	-	600	7672293361	7672693691		
50	150	-	150		7678311471		
50	200	-	250		7678311481		
50	300	-	450		7678311501		
50	500	-	600		7678311541		
80	200	-	200		7678311581		
80	250	-	250		7678311591		
80	300	-	350		7678311601		
80	400	-	500		7678311621		
80	600	-	600		7678311651		

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6P	BR3B	BROB	BRSB
100	300	-	350			7678312391	
100	400	-	500			7678312411	
100	600	-	600			7678312441	
150	350	-	350			7678312471	
150	400	-	400			7678312481	
150	450	-	450			7678312491	
150	500	-	500			7678312501	
150	600	-	600			7678312511	
200	400	-	400			7679001081	
200	450	-	450			7679001091	
200	500	-	500			7678310481	
200	600	-	600			7678310491	
250	500	-	500			7678310541	
250	600	-	600			7678310551	

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 60	8138170239
20	4	1/2	x 70	8138170259
25	4	1/2	x 70	8138170259
40	4	1/2	x 80	8138170279
50	4	5/8	x 90	8138170759
80	4	5/8	x 100	8138170779
100	8	5/8	x 100	8138170779
150	8	3/4	x 110	8138171439
200	8	3/4	x 110	8138171439
250	12	7/8	x 120	8138172169
300	12	7/8	x 120	8138172169
350	12	1	x 140	8138172999
400	16	1	x 140	8138172999
450	16	1 1/8	x 150	8138173849
500	20	1 1/8	x 160	8138173869
600	20	1 1/4	x 180	8138174709

Coated boltset orificefig

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138170839
80	8	3/4	x 140	8138171499
100	8	3/4	x 150	8138171519
150	12	3/4	x 150	8138171519
200	12	7/8	x 170	8138172269
250	16	1	x 190	8138173099
300	16	1 1/8	x 210	8138173969
350	20	1 1/8	x 220	8138173989
400	20	1 1/4	x 230	8138174809
450	24	1 1/4	x 250	8138174849
500	24	1 1/4	x 260	8138174869
600	24	1 1/2	x 290	8138176419

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve****Coated boltset mrun flg**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	5/8	x 130	8138170839
20	4	5/8	x 130	8138170839
25	4	5/8	x 130	8138170839
40	4	3/4	x 140	8138171499

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138170259
20	4	1/2	x 80	8138170279
25	4	1/2	x 80	8138170279
40	4	1/2	x 80	8138170279
50	4	5/8	x 100	8138170779
80	4	5/8	x 110	8138170799
100	8	5/8	x 110	8138170799
150	8	3/4	x 120	8138171459
200	8	3/4	x 130	8138171479
250	12	7/8	x 140	8138172209
300	12	7/8	x 150	8138172229
350	12	1	x 170	8138173059
400	16	1	x 170	8138173059
450	16	1 1/8	x 180	8138173909
500	20	1 1/8	x 200	8138173949
600	20	1 1/4	x 220	8138174789

DN nr inch x mm MESC number

50	4	5/8	x 150	8138170879
80	4	5/8	x 180	8138170939
100	8	5/8	x 180	8138170939
150	8	3/4	x 210	8138171639
200	8	3/4	x 250	8138171719
250	12	7/8	x 280	8138172489
300	12	7/8	x 310	8138172549

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662110581
Welding neck flange	1	7662784021
Gasket spiral wound	1	8543603041
Studbolt with nuts	4	8138170239

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662110621
Gasket spiral wound	1	8543603061
Studbolt with nuts	4	8138170259

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662110621
Welding neck flange	1	7662784041
Gasket spiral wound	1	8543603061
Studbolt with nuts	4	8138170259

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662110661
Gasket spiral wound	1	8543603081
Studbolt with nuts	4	8138170259

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Blind flange	1	7662110681
Gasket spiral wound	1	8543603121
Studbolt with nuts	4	8138170279

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Lap joint flange	1	7662202201
Pipe	1	7430030711
Welding neck flange	1	7662783601
Gasket spiral wound	1	8543603141
Thermowell flgd DN 50 L=230 mm	1	7683385611
Studbolt with nuts	4	8138170799

Temp instr conn DN 50 Fig.HL DN150 - 600

Branch: according to branch table

Lap joint flange	1	7662202201
Pipe	1	7430030711
Welding neck flange	1	7662783601
Gasket spiral wound	1	8543603141
Thermowell flgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	4	8138170799

CLASS 011441-Z

Design limits**Temperature (°C)****Pressure (Barg) /FV**

DN 15-600	19.6	19.6	19.2	18.4	17.7	16.7	15.8
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class is not design for full vacuum, if vacuum condition can occur, piping to be designed accordingly.**
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Installation of thermowell shall be validated considering branch pipe (nipo flange) internal diameter during detailed design.**
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP, as applicable.

Table of schedules

DN	Schedule
15	XXS
20	XXS
25	XXS
40	XXS
50	160
80	80
100	XS
150	XS
200	60
250	40
300	STD
350	40
400	40
450	40
500	XS
600	XS30
750	12.7mm
900	30HOLD-7
1100	HOLD-7
1400	HOLD-7

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	900
900	N	N	N	N	P	E	E	E	E	E	E	E	E	E	B	B	A
600	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	A
500	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	A
450	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	A
400	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	A
350	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	A
300	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	A
250	N	N	N	N	P	E	B	B	B	B	B	B	B	B	B	B	A
200	N	N	N	N	P	E	B	B	B	B	B	B	B	B	B	B	A
150	N	N	N	N	P	B	B	B	B	B	B	B	B	B	B	B	A
100	N	N	N	N	U	B	B	B	B	B	B	B	B	B	B	B	A
80	N	N	N	N	U	A											
50	N	N	M	M	J												
40	N	M	M	J													
25	M	M	J														
20	M	J															
15	J																

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel Sour Class no. ASME rating Corrosion allowance Revision letter Revision date	011441-Z CLASS 150 6 mm	Plant Consignee Engineered by Principal Contr. job no. Project no.
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COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-600	ASTM A106-B
PIPE	Pipe	DN 750-1400	ASTM A672-C65 cl22

Flanges

BLFL	Blind flange	DN 15-1400	ASTM A105N
LJFL	Lap joint flange	--	ASTM A105N
SBNF	Spectacle blind	DN 15-400	ASTM A516-60/65/70
SPNF	Spade	DN 15-1400	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15-1400	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-1400	ASTM A105N

Fittings

CAPB	Cap bw	DN 15-600	ASTM A234-WPB
CAPB	Cap bw	DN 900	ASTM A234-WPBW
E45B	Elbow 45 deg LR bw	DN 15-600	ASTM A234-WPB
E45B	Elbow 45 deg LR bw	DN 900	ASTM A234-WPBW
E90B	Elbow 90 deg LR bw	DN 15-600	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 750-1400	ASTM A234-WPBW
TEEB	Tee equal bw	DN 15-600	ASTM A234-WPB
TEEB	Tee equal bw	DN 900	ASTM A234-WPBW

Reducing fittings

BN6F	Branch fitting flgd	DN 40-900	ASTM A105N
BN6B	Branch fitting bw	DN 40-900	ASTM A105N
BR6B	Branch outlet bw	DN 150-900	ASTM A105N
BR3B	Branch outlet bw	DN 200-900	ASTM A105N
BROB	Branch outlet bw	DN 350-900	ASTM A105N
BRSB	Branch outlet bw	DN 500-900	ASTM A105N
RECB	Reducer concentric bw	DN 20-600	ASTM A234-WPB
RECB	Reducer concentric bw	DN 750-1400	ASTM A234-WPBW
REEB	Reducer eccentric bw	DN 20-600	ASTM A234-WPB
REEB	Reducer eccentric bw	DN 900	ASTM A234-WPBW
TERB	Tee reducing bw	DN 20-600	ASTM A234-WPB
TERB	Tee reducing bw	DN 900	ASTM A234-WPBW

Valves

BAFF	Ball valve float FB flgd	DN 15-150	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, PTFE
BARF	Ball valve float RB flgd	DN 15-250	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, PTFE
BTFF	Ball valve trunn FB flgd	DN 200-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, filled PTFE
BTRF	Ball valve trunn RB flgd	DN 300-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A216-WCB/WCC Trim: CS, Alloy 825, Stellite
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, Stellite
CHVF	Check valve flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, Stellite
CHVF	Check valve flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, Stellite
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, Stellite
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, Stellite
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, Stellite
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, Stellite
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, PTFE
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A105N Trim: Alloy 825, Stellite

Instruments

TWHD	Thermowell flgd DN 50	DN 50-500	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKMA	Gasket camprofile or approved equal	DN 750-1400	Alloy 825 Graphite SS centring ring
GKSW	Gasket spiral wound	DN 15-600	Alloy 825, Graphite CS centring-/Alloy 825 inner ring
GKIK	Insulating Gasket kit	DN 15-1400	(G-10/11) with 316 SS CORE, PTFE SS Pres Enrg Spirl Spring
ORFS	Orifice flange set	DN 50-1400	ASTM A105N
PLUG	Plug NPT	DN 15-50	ASTM A105N
ST3B	Strainer Y-type (6 mm ca)	DN 50-400	Sieve: Alloy 825
STBT	Studbolt with nuts	--	ASTM A193-B7M/A194-2HM Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A105N HOLDER / ACCESS FITTING: ALLOY 825 COUPON: ASTM A106-B
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A105N INTERNAL: ALLOY 825
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: ALLOY 825 VALVE & INTERNALS: ALLOY 825
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A105N VALVE & INTERNALS: ALLOY 825
HSCL	Hose Coupling Flgd / Female Conn.	DN 15-50	AISI 316 (L) / Aluminium Bronze

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	Nominal pipe size																
	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	900
MESC																	
Pipe																	
Pipe	743003 0	221	321	421	621	731											
Pipe	743003 1						091		649								
Pipe	743003 2							319		511	871						
Pipe	743003 3								501	791							
Pipe	743003 4									311	771						
Pipe	743003 5										539						
Pipe	743003 6											001					
Flanges																	
Blind flange	766211	0581	0621	0661	0681	0701	0721	0741	0761	0781	0801	0821	0841	0861	0881	0901	0921
Spacer ring	768908	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321
Spade	768937	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321
Spectacle blind	768962	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321
Welding neck flange	766278	4341	4361	4381	4401	4101	3621	1149	1169	3421	3201	0621	3241	3261	2681	1209	1241
Fittings																	
Cap bw	763017	5731	5791	5831	5931	6121	6281	6519	6719	6871	7051	7381	7471	7681	7861	8209	8401
Elbow 45 deg LR bw	763034	5731	5791	5831	5931	6121	6281	6519	6719	6871	7051	7381	7471	7681	7861	8209	7391
Elbow 90 deg LR bw	763042	5731	5791	5831	5931	6121	6281	6519	6719	6871	7051	7381	7471	7681	7861	8209	8391
Tee equal bw	763081	5731	5791	5831	5931	6121	6281	6519	6719	6871	7051	7381	7471	7681	7861	8209	8401

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																	
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900

Valves																				
Ball valve float FB fgd	770054	5209	5219	5229	5239	5249	5259	5269	5279											
Ball valve float RB fgd	770054	1109	1119	1129	1139	1149	1159	1169	1179	1189	1199									
Ball valve trunn FB fgd	770091									5309	5319	5329	5339	5349	5359	5369	5379			
Ball valve trunn RB fgd	770091										0329	0339	0349	0359	0369	0379	0579	0479		
Butterfly valve triple of fgd	774142									5309	5319	5329	5339	5349	5359	5369	5379			
Check valve dual plate fgd	776714									6309	6319	6329	6339	6349	6359	6369	6379			
Check Valve Wafer Lug (Solid)	776757					3099	3109	3129	3149											
Check valve fgd	771043	0309	0319	0329	0339	0349	0359	0369	0379	0389	0399	0409	0419	0429	0439	0449	0459			
Gate valve fgd	772053	0309	0319	0329	0339	0349	0359	0369	0379	0389	0399	0409	0419	0429	0439	0449	0459			
Globe valve fgd	773053	0309	0319	0329	0339	0349	0359	0369	0379	0389										
Valve DBBT	778551	5209	5219	5229	5239	5249														
Valve DBBF	778549	5209	5219	5229	5239	5249														

Miscellaneous																				
Gasket spiral wound	854360	3041	3061	3081	3121	3141	3181	3201	3241	3261	3281	3301	3321	3341	3361	3381	3421			
Insulating Gasket Kit	854609					0641												0691		
Orifice flange set	766295					1421	1061	0509	0519	6461	0271	0591	0291	0301	0191	0559	0571			
Plug NPT	760518	0081	0121	0161	0181	0201														
Strainer Y-type (6 mm ca)	768322					1319	0281	1309	1349	1359	1369	1379	1389	1399						

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7630661421	7630671421	7630880401
25	x	15	7630661521	7630671521	7630880501
25	x	20	7630661621	7630671621	7630880601
40	x	15	7630661721	7630671721	
40	x	20	7630661821	7630671821	7630880801
40	x	25	7630661921	7630671921	7630880901
50	x	20	7630661901	7630671901	
50	x	25	7630662031	7630672031	7630881121
50	x	40	7630662131	7630672131	7630881211
80	x	40	7629472151	7629622151	
80	x	50	7630662381	7630672381	7630881381
100	x	40	7630662559	7630672559	
100	x	50	7630662649	7630672649	7630881589
100	x	80	7630662789	7630672789	7630881709
150	x	80	7630663049	7630673049	7630881869
150	x	100	7630663069	7630673069	7630881949
200	x	100	7630662769	7630672769	7630882099
200	x	150	7630663159	7630673159	7630882299
250	x	100	7630663169	7630673169	7630882679
250	x	150	7630663729	7630673729	7630882759
250	x	200	7629473941	7629623941	7630882979
300	x	150	7630663789	7630673789	7630883149
300	x	200	7629475051	7629625051	7630883421
300	x	250	7629475411	7629625411	7630883651
350	x	150	7630664189	7630674189	
350	x	200	7629476411	7629626411	7630884011
350	x	250	7630664381	7630674381	7630884151
350	x	300	7629477051	7629627051	7630884521

Thermowell fgd DN 50	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200		7629478251	7629628251	
400	x 250		7630664621	7630674621	7630885051
400	x 300		7629478831	7629628831	7630885421
400	x 350		7630664871	7630674871	7630885561
450	x 250		7630665341	7630675341	7630886131
450	x 300		7629479131	7629629131	7630886461
450	x 350		7630665961	7630675961	7630886611
450	x 400		7630666261	7630676261	7630886851
500	x 300		7630666569	7630676569	7630887569
500	x 350		7630666889	7630676889	7630887809
500	x 400		7630667069	7630677069	7630888049
500	x 450		7630667429	7630677429	7630888269
600	x 300				7630888891
600	x 350				7630889081
600	x 400		7629479801	7629629801	7630889321
600	x 450		7629479881	7629629881	7630889571
600	x 500		7630669529	7630679529	7630889709
900	x 450		xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
900	x 500		xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
900	x 600		xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
900	x 1000		7630664399		

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting fgd
BN6B	Branch fitting bw
BR6B	Branch outlet bw
BR3B	Branch outlet bw
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR6B	BR3B	BROB	BRSB
15	40	-	50	7672293201	7672693519			
15	80	-	150	7672293211	7672693529			
15	200	-	600	7672293221	7672693549			
15	200	-	900	xxxxxxxxxx	xxxxxxxxxx			
20	50	-	50	7672293241	7672693569			
20	80	-	250	7672293251	7672693579			
20	300	-	600	7672293261	7672693589			
25	80	-	250	7672291681	7672693619			
25	300	-	600	7672293301	7672693629			
25	300	-	900	xxxxxxxxxx	xxxxxxxxxx			
40	80	-	80	7672293321	7672693659			
40	100	-	100	7672293331	7672693669			
40	150	-	200	7672293341	7672693679			
40	250	-	450	7672293351	7672693689			
40	500	-	600	7672293361	7672693699			
40	500	-	900	xxxxxxxxxx	xxxxxxxxxx			
50	150	-	200		7679031001			
50	250	-	450		7679031011			
50	500	-	600		7679031029			
50	500	-	900		xxxxxxxxxx			
80	200	-	200			7678311581		
80	250	-	250			7678311591		
80	300	-	350			7678311601		
80	400	-	500			7678311621		
80	600	-	600			7678311651		
80	600	-	900			xxxxxxxxxx		

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR6B	BR3B	BROB	BRSB
100	300	-	350			7678311691		
100	400	-	500			7678311711		
100	600	-	600			7678311741		
100	900	-	900			xxxxxxxxxx		
150	350	-	350			7679014381		
150	400	-	400			7679014401		
150	450	-	450			7679014421		
150	500	-	500			7679014441		
150	600	-	600			7679014481		
150	900	-	900			xxxxxxxxxx		
200	400	-	400			7678913261		
200	450	-	450			7678911171		
200	500	-	500			7678911181		
200	600	-	600			7678918191		
200	900	-	900			xxxxxxxxxx		
250	500	-	500			7679004231		
250	600	-	600			7679038801		
250	900	-	900			xxxxxxxxxx		
300	900	-	900			xxxxxxxxxx		
350	900	-	900			xxxxxxxxxx		
400	900	-	900			xxxxxxxxxx		

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 60	8138170239
20	4	1/2	x 70	8138170259
25	4	1/2	x 70	8138170259
40	4	1/2	x 80	8138170279
50	4	5/8	x 90	8138170759
80	4	5/8	x 100	8138170779
100	8	5/8	x 100	8138170779
150	8	3/4	x 110	8138171439
200	8	3/4	x 110	8138171439
250	12	7/8	x 120	8138172169
300	12	7/8	x 120	8138172169
350	12	1	x 140	8138172999
400	16	1	x 140	8138172999
450	16	1 1/8	x 150	8138173849
500	20	1 1/8	x 160	8138173869
600	20	1 1/4	x 180	8138174709
750	28	1 1/4	x 240	xxxxxxxxxxxx
900	32	1 1/2	x 280	xxxxxxxxxxxx
1100	40	1 1/2	x 310	xxxxxxxxxxxx
1400	48	1 3/4	x 370	xxxxxxxxxxxx

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138170259
20	4	1/2	x 80	8138170279
25	4	1/2	x 80	8138170279
40	4	1/2	x 80	8138170279
50	4	5/8	x 100	8138170779
80	4	5/8	x 110	8138170799
100	8	5/8	x 110	8138170799
150	8	3/4	x 120	8138171459
200	8	3/4	x 130	8138171479
250	12	7/8	x 140	8138172209
300	12	7/8	x 150	8138172229
350	12	1	x 170	8138173059
400	16	1	x 170	8138173059
450	16	1 1/8	x 180	8138173909
500	20	1 1/8	x 200	8138173949
600	20	1 1/4	x 220	8138174789
900	32	1 1/2	x 340	xxxxxxxxxxxx

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	4	5/8	x 150	8138170879
80	4	5/8	x 180	8138170939
100	8	5/8	x 180	8138170939
150	8	3/4	x 210	8138171639

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138170839
80	8	3/4	x 140	8138171499
100	8	3/4	x 150	8138171519
150	12	3/4	x 150	8138171519
200	12	7/8	x 170	8138172269
250	16	1	x 190	8138173099
300	16	1 1/8	x 210	8138173969
350	20	1 1/8	x 220	8138173989
400	20	1 1/4	x 230	8138174809
450	24	1 1/4	x 250	8138174849
500	24	1 1/4	x 260	8138174869
600	24	1 1/2	x 290	8138176419

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662110581
Welding neck flange	1	7662784341
Gasket spiral wound	1	8543603041
Studbolt with nuts	4	8138170239

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662110621
Gasket spiral wound	1	8543603061
Studbolt with nuts	4	8138170259

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662110621
Welding neck flange	1	7662784361
Gasket spiral wound	1	8543603061
Studbolt with nuts	4	8138170259

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662110661
Gasket spiral wound	1	8543603081
Studbolt with nuts	4	8138170259

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Blind flange	1	7662110681
Gasket spiral wound	1	8543603121
Studbolt with nuts	4	8138170279

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Lap joint flange	1	7662202201
Pipe	1	7430030731
Welding neck flange	1	7662784101
Gasket spiral wound	1	8543603141
Thermowell fgd DN 50 L=230 mm	1	7683385611
Studbolt with nuts	4	8138170799

Temp instr conn DN 50 Fig.HL DN150 - 600

Branch: according to branch table

Lap joint flange	1	7662202201
Pipe	1	7430030731
Welding neck flange	1	7662784101
Gasket spiral wound	1	8543603141
Thermowell fgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	4	8138170799

CLASS 011502-X

Design limits**Temperature (°C)**

-50	0	50	75	100	125	150
-----	---	----	----	-----	-----	-----

Pressure (Barg) /FV

DN 15-1200	19.6	19.6	19.2	18.4	17.7	16.7	15.8
------------	------	------	------	------	------	------	------

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class range DN 15 [NPS 1/2] up to incl **DN 1200 [NPS 48]** design meets full vacuum at ambient condition, except DN450 [NPS 18]. DN450 [NPS 18] with 2.9 mm [0.114 inch] corrosion allowance meets full vacuum at ambient condition.
- Non-extended bonnet valves in this piping class are intended for short term low temperature excursion (e.g non-operable during depressurization) (or) non-insulated piping only.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- DN 750 to DN 1200 shall be limited to flare header (vent gas) only.
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**
- For lateral and pipe to pipe connection, refer Branch Table-B.

Table of schedules

DN	Schedule
15	160
20	160
25	160
40	160
50	80
80	80
100	40
150	40
200	30
250	30
300	30
350	20
400	20
450	20
500	20
600	20
750	XS
900	HOLD-7
1000	HOLD-7
1050	HOLD-7
1200	HOLD-7

Branch connections 90 degrees Table-A**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1050	1200
----------	----	----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------

1200	N	N	N	N	W																
1050	N	N	N	N	W																
1000	N	N	N	N	W																REFER TABLE-B
900	N	N	N	N	W																
750	N	N	N	N	W																
600	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	B	A		
500	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	B	A		
450	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	B	A		
400	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	B	A		
350	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	B	A		
300	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	B	A		
250	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	B	A		
200	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	B	A		
150	N	N	N	N	W	B	B	B	B	B	A										
100	N	N	N	N	U	B	B	B	B	B	A										
80	N	N	N	N	U	A															
50	N	N	M	M	J																
40	N	M	M	J																	
25	M	M	J																		
20	M	J																			
15	J																				

Carbon steel LT F-Gr Sour

Class no.	011502-X
ASME rating	CLASS 150
Corrosion allowance	3 mm
Revision letter	
Revision date	

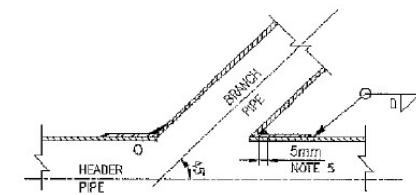
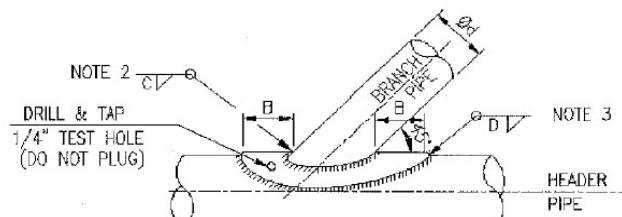
Plant	
Consignee	
Engineered by	
Principal	
Contr. job no.	
Project no.	

Branch connections Table-B

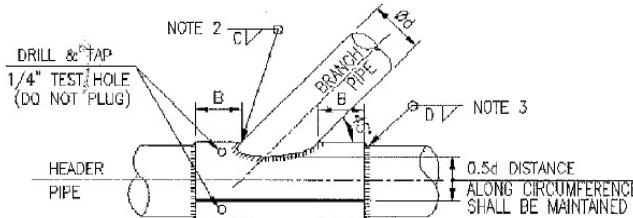
Branch Size	Run	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1050	1200
size	Run	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1050	1200
1200	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
1050	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
1000	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
900	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
750	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
600	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
500	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
450	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
400	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
350	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
300	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
250	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
200	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
150	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
100	P	P	P	L														

Code	Explanation of characters
A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
W	Branch outlet BW
U	Reducing tee BW
P	Branch Weld with reinforcement PAD
L	Lateral Tee

A) CIRCULAR TYPE REINFORCING PAD (TYPE "P" IN BRANCH TABLE)



B) FULL ENCIRCLEMENT TYPE REINFORCING PAD (TYPE "F" IN THE BRANCH TABLE) NOTE 7



NOTES:

1. ALL 45° BRANCH CONNECTION SHALL BE REINFORCED WITH WIDTH "B" OF THE REINFORCING PAD SHALL BE GREATER THAN OR EQUAL TO 0.75 TIMES THE BRANCH OUTSIDE DIAMETER (\varnothing).
2. FILLET WELD "C" SHALL BE THE GREATER OF 6.35mm OR 3/8 TIMES BRANCH PIPE THICKNESS.
3. FILLET WELD "D" SHALL BE GREATER OF 6.00mm OR 0.707 TIMES PAD THICKNESS.
4. IF REINFORCEMENT IS ADDED IN TWO HALVES THEN THE HALVES SHALL BE WELDED TOGETHER USING A FULL PENETRATION BUTT WELD AND EACH HALF SHALL HAVE A TEST HOLE.
5. 5.00mm CLEARANCE IS TAKEN INTO CONSIDERATION FOR WELDING BETWEEN BRANCH PIPE AND PAD.
6. PAD WELDING SHALL BE AIR TESTED AT 1 BARG PRESSURE. NO LEAKAGE SHALL BE OBSERVED THROUGH THE WELD ZONE.
7. WHERE TYPE "F" PAD IS SPECIFIED IN BRANCH TABLE, THE REINFORCEMENT SHALL BE MADE IN TWO HALVES AND BE OF THE FULL ENCIRCLEMENT TYPE AS SHOWN ABOVE. THE HALVES SHALL BE WELDED TOGETHER USING A FULL PENETRATION BUTT WELD AND EACH HALF SHALL HAVE A TEST HOLE.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-600 DN 750-1200	ASTM A333-6 ASTM A671-CC65 CL 22
------	------	---------------------------------	--

Flanges

BLFL	Blind flange	DN 15- 1200	ASTM A350-LF2 cl 1
LJFL	Lap joint flange	---	ASTM A350-LF2 cl 1
SBNF	Spectacle blind	DN 15-400	ASTM A516-60/65/70
SPNF	Spade	DN 15- 1200	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15- 1200	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15- 1200	ASTM A350-LF2 cl 1
WNFL1	Welding neck flange 600#	DN 25-200	ASTM A350-LF2 cl 1
WNFL2	Welding neck flange 1500#	DN 200	ASTM A350-LF2 cl 1

Fittings

CAPB	Cap bw	DN 15-600 DN 750-1200	ASTM A420-WPL6 ASTM A420-WPL6W
E45B	Elbow 45 deg LR bw	DN 15-600 DN 750-1200	ASTM A420-WPL6 ASTM A420-WPL6W
E90B	Elbow 90 deg LR bw	DN 15-600 DN 750-1200	ASTM A420-WPL6 ASTM A420-WPL6W
TEEB	Tee equal bw	DN 15-600 DN 750-1200	ASTM A420-WPL6 ASTM A420-WPL6W

Reducing fittings

BN6F	Branch fitting flgd	DN 40-600	ASTM A350-LF2 cl 1
BN6B	Branch fitting bw	DN 40-600	ASTM A350-LF2 cl 1
BR3B	Branch outlet bw	DN 150-600	ASTM A350-LF2 cl 1
BROB	Branch outlet bw	DN 400-600	ASTM A350-LF2 cl 1
BRSB	Branch outlet bw	DN 300-600	ASTM A350-LF2 cl 1
RECB	Reducer concentric bw	DN 20-600	ASTM A420-WPL6
		DN 750-1200	ASTM A420-WPL6W
REEB	Reducer eccentric bw	DN 20-600	ASTM A420-WPL6
		DN 750-1200	ASTM A420-WPL6W
TERB	Tee reducing bw	DN 20-600	ASTM A420-WPL6
		DN 750-1200	ASTM A420-WPL6W

Valves

BAFF	Ball valve float FB flgd	DN 15-150	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316, PTFE
BARF	Ball valve float RB flgd	DN 15-250	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316, PTFE
BVFF	Ball valve float FB n-ext flgd	DN 15-150	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), filled PTFE
BVRF	Ball valve float RB n-ext flgd	DN 15-250	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), filled PTFE
BNFF	Ball valve trunn FB n-ext flgd	DN 200-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316 (L), filled PTFE
BNRF	Ball valve trunn RB n-ext flgd	DN 300- 1200	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316 (L), filled PTFE
BTFF	Ball valve trunn FB flgd	DN 200-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316, filled PTFE
BTRF	Ball valve trunn RB flgd	DN 300-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316, filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A352-LCC Trim: LTCS, Duplex, Stellite
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50- 1200	Body: ASTM A350-LF2 cl 1/ASTM A352-LCC Trim: AISI 316 (L), Stellite
CHVF	Check valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), Stellite
CHVF	Check valve flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316 (L), Stellite
GANF	Gate valve n-ext flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), Stellite
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), Stellite
GAVF	Gate valve flgd	DN 80- 1200	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316 (L), Stellite
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), Stellite
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316 (L), Stellite
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), PTFE
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), Stellite

Instruments

TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKMA	Gasket camprofile or approved equal	DN 750-1200	AISI 316 (L), Graphite SS centring ring
GKSW	Gasket spiral wound	DN 15-600	AISI 316 (L), Graphite CS centring-/SS inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50- 1200	ASTM A350-LF2 cl 1
PLUG	Plug NPT	DN 15-50	ASTM A350-LF2 cl 1
ST3B	Strainer Y-type (3 mm ca)	DN 50-400	Sieve: AISI 316 (L)
STBT	Studbolt with nuts	---	ASTM A320-L7M/A194-7M Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A350-LF2 cl 1 HOLDER / ACCESS FITTING: AISI 316 (L) COUPON: ASTM A333-6
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A350-LF2 cl 1 INTERNAL: AISI 316 (L)
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: AISI 316 (L) VALVE & INTERNALS: AISI 316 (L)
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A350-LF2 cl 1 VALVE & INTERNALS: AISI 316 (L)
HSCL	Hose Coupling Flgd / Female Conn.	DN 15-50	AISI 316 (L) / Aluminium Bronze

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	Nominal pipe size		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1050	1200	
	MESC																							
Pipe																								
Pipe	743016 0	231	301	381	541	611	691	751	841	931	051	171	291	391	641	041	341	421	011	219	621	171		
Pipe	743016 1																							
Pipe	743016 2																							
Pipe	743021 0																							
Pipe	743021 1																							
Pipe	743021 2																							
Flanges																								
Blind flange	766212	4581	4621	4661	4681	4701	4721	4741	4761	4781	4801	4821	4841	4861	4881	4901	4921	0561	0621	0661	0681	0741		
Blind flange	767013																							
Spacer ring	768906	0081	0121	0161	0181	0201	0221	0241	0261	0281	0301	0321	0341	0361	0381	0401	0441	1231	1261	1289	1291	1321		
Spacer ring	768875																							
Spade	768935	0011	0021	0031	0041	0051	0061	0071	0081	0091	0101	0111	0121	0131	0141	0151	0161	1231	1261	1289	1291	1321		
Spade	768895																							
Spectacle blind	768966	1081	1121	1161	1181	1201	1221	1241	1261	1281	1301	1321	1341	1361	0181	0201	0241	0151	0421	0551	0601	0761		
Welding neck flange	766282	1821	1841	1861	1881	1601	1621	1141	1161	0581	0601	0621	0141	0161	0181	0201	0241	9381						
Welding neck flange	767083																							
Welding neck flange 600#	766286		2661		1601													5619						
Welding neck flange 600#	766282																							
Welding neck flange 1500#	766286																							
Fittings																								
Cap bw	763117	1721	1781	1821	1921	2101	2301	2461	2661	2831	3041	3261	3451	3651	3841	3941	4041	5411	6061	6599	6621	7171		
Elbow 45 deg LR bw	763134	1721	1781	1821	1921	2101	2301	2461	2661	2831	3041	3261	3451	3651	3841	3941	4041	5221	6681	7299	7431	8041		
Elbow 90 deg LR bw	763143	1721	1781	1821	1921	2101	2301	2461	2661	2831	3041	3261	3451	3651	3841	3941	4041	5221	6651	7329	7391	8041		
Tee equal bw	763180	1721	1781	1821	1921	2101	2301	2461	2661	2831	3041	3261	3451	3651	3841	3941	4041	5221	6641	7299	7431	8041		

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																				
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1050	1200
Valves																						
Ball valve float FB fffd	770031	5039	5049	5059	5079	5089	5109	5129	5139													
Ball valve float FB n-ext fffd	770035	5039	5049	5059	5079	5089	5109	5129	5149													
Ball valve float RB fffd	770031	0039	0049	0059	0079	0089	0109	0129	0449	0459	0469											
Ball valve float RB n-ext fffd	770035	0039	0049	0059	0079	0089	0109	0129	0449	0459	0469											
Ball valve trunn FB fffd	770077									5159	5169	5179	5189	5199	5209	5219	5239					
Ball valve trunn FB n-ext fffd	770051									5159	5169	5179	5189	5199	5209	5219	5239					
Ball valve trunn RB fffd	770077											0179	0189	0199	0209	0219	0239					
Ball valve trunn RB n-ext fffd	770051											0179	0189	0199	0209	0219	0239					
Ball valve trunn RB n-ext fffd	770083																	0269	0299	0319	0329	0349
Butterfly valve triple of fffd	774133									0159	0169	0179	0189	0199	0209	0219	0239					
Check valve dual plate fffd	776720									0159	0169	0179	0189	0199	0209	0219	0239	3269	3299	3319	3329	3349
Check Valve Wafer Lug (Solid)	776752																					
Check valve fffd	771033	0039	0049	0059	0079	0099	0109	0129	0149	0159	0169	0179	0189	0199	0209	0219	0239					
Gate valve fffd	772033	9039	9049	9059	9079	9089	9109	9129	9149	9159	9169	9179	9189	9199	9209	9219	9239	0269	0299	0319	0329	0349
Gate valve n-ext fffd	772041	9039	9049	9059	9079					9159	9169	9179	9189	9199	9209	9219	9239					
Globe valve fffd	773033	0039	0049	0059	0079	0099	6109	6129	6149	6159												
Valve DBBT	778586	5039	5049	5059	5079	5089																
Valve DBBF	778535	5039	5049	5059	5079	5089																
Miscellaneous																						
Gasket camprofile	854190																0481	0541	0581	0601	0661	
Gasket spiral wound	854136	3041	3061	3081	3121	3141	3181	3201	3241	3261	3281	3301	3321	3341	3361	3381	3421					
Meterrun	766496	0521	0541	0561	0581																	
Orifice flange set	766297					1121	1131	0241	0261	0141	0151	0161	0061	0071	0081	0091	0101					
Plug NPT	760563	0081	0121	0161	0181	0201				5261	5281	5061	5081	5451	5461	5471	5481	5491				
Strainer Y-type (3 mm ca)	768322																					

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7631661411	7631751411	7631880391
25	x	15	7631661511	7631751511	7631880491
25	x	20	7631661611	7631751611	7631880591
40	x	15	7631661711	7631751711	
40	x	20	7631661811	7631751811	7631880791
40	x	25	7631661911	7631751911	7631880891
50	x	20	7631661931	7631751931	
50	x	25	7631661991	7631751991	7631881111
50	x	40	7631662081	7631752081	7631881201
80	x	40	7631662291	7631752291	
80	x	50	7631662371	7631752371	7631881331
100	x	40	7631662491	7631752491	
100	x	50	7631662661	7631752661	7631881581
100	x	80	7631662761	7631752761	7631881701
150	x	80	7629452941	7629602881	7631881811
150	x	100	7631663051	7631753051	7631881891
200	x	100	7631663241	7631753241	7631882111
200	x	150	7631663341	7631753341	7631882311
250	x	100	7629453421	7629603421	7631882591
250	x	150	7631663521	7631753521	7631882771
250	x	200	7631663631	7631753631	7631882901
300	x	150	7631663811	7631753811	7631883161
300	x	200	7631663941	7631753941	7631883271
300	x	250	7631664031	7631754031	7631883491
350	x	150	7629456001	7629606001	
350	x	200	7629456351	7629606351	7631883971
350	x	250	7631664311	7631754311	7631884211
350	x	300	7631664441	7631754441	7631884471

Thermowell flgd DN 50	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x	200	7629458131	7629608131	
400	x	250	7631664711	7629608251	7631885111
400	x	300	7629458321	7629608321	7631885371
400	x	350	7631664821	7631754821	7631885541
450	x	250	7631665321	7631755321	7631886101
450	x	300	7631665621	7631755621	7631886341
450	x	350	7631665811	7631755811	7631886501
450	x	400	7631666111	7631756111	7631886741
500	x	300	7631666521	7631756521	7631887541
500	x	350	7631666711	7631756711	7631887701
500	x	400	7631667011	7631757011	7631887941
500	x	450	7631667311	7631757311	7631888181
600	x	300			7631888741
600	x	350			7631888901
600	x	400	7631668811	7631758811	7631889141
600	x	450	7631669111	7631759111	7631889381
600	x	500	7631669531	7631759411	7631889621
750	x	600	7631607079	7631787079	
900	x	750	7631613139	7631793139	
1000	x	750	7631614689	7631794689	
1050	x	900	7631616071	7631796071	
1200	x	1050	7631618501	7631798501	

REDUCING/PIPING COMPONENTS

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting fgd
BN6B	Branch fitting bw
BR3B	Branch outlet bw
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

Branch	Run	pipe	BN6F	BN6B	BR3B	BROB	BRSB
15	40	-	50	7672306801	7672579309		
15	80	-	150	7672306811	7672579319		
15	200	-	900	7672306821	7672579329		
15	1000	-	1200	7672306831	7672579339		
20	50	-	50	7672306841	7672579349		
20	80	-	250	7672306851	7672579359		
20	300	-	900	7672306861	7672579369		
20	1000	-	1200	7672306871	7672579379		
25	80	-	250	7672306881	7672708149		
25	300	-	900	7672306891	7672579419		
25	1000	-	1200	7672306901	7672579429		
40	80	-	80	7672306911	7672579439		
40	100	-	100	7672306921	7672579449		
40	150	-	200	7672306931	7672579459		
40	250	-	450	7672306941	7672579469		
40	500	-	900	7672306951	7672579479		
40	1000	-	1200	7672306961	7672579489		
50	150	-	150			7679503571	
50	200	-	250			7679503581	
50	300	-	450			7679503601	
50	500	-	900			7679503641	
80	200	-	200			7679503681	
80	250	-	250			7679503691	
80	300	-	350			7679503701	
80	400	-	500			7679503721	
80	600	-	600			7679503751	

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BROB	BRSB
100	300	-	350			7679504491	
100	400	-	500			7679504511	
100	600	-	600			7679504541	
150	350	-	350			7679504571	
150	400	-	400			7679504591	
150	450	-	450			7679504601	
150	500	-	500			7679504611	
150	600	-	600			7679504621	
200	400	-	400		7679041071		
200	450	-	450		7679041091		
200	500	-	500		7679041101		
200	600	-	600		7679041111		
250	500	-	500		7679041171		
250	600	-	600		7679041181		

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 60	8138270239
20	4	1/2	x 70	8138270259
25	4	1/2	x 70	8138270259
40	4	1/2	x 80	8138270279
50	4	5/8	x 90	8138270759
80	4	5/8	x 100	8138270779
100	8	5/8	x 100	8138270779
150	8	3/4	x 110	8138271439
200	8	3/4	x 110	8138271439
250	12	7/8	x 120	8138272169
300	12	7/8	x 120	8138272169
350	12	1	x 140	8138272999
400	16	1	x 140	8138272999
450	16	1 1/8	x 150	8138273849
500	20	1 1/8	x 160	8138273869
600	20	1 1/4	x 180	813827409
750	28	1 1/4	x 240	8138274829
900	32	1 1/2	x 290	8138276419
1000	36	1 1/2	x 290	8138276419
1050	36	1 1/2	x 300	8138276439
1200	44	1 1/2	x 320	8138276479

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138270839
80	8	3/4	x 140	8138271499
100	8	3/4	x 150	8138271519
150	12	3/4	x 150	8138271519
200	12	7/8	x 170	8138272269
250	16	1	x 190	8138273099
300	16	1 1/8	x 210	8138273969
350	20	1 1/8	x 220	8138273989
400	20	1 1/4	x 230	8138274809
450	24	1 1/4	x 250	8138274849
500	24	1 1/4	x 260	8138274869
600	24	1 1/2	x 290	8138276419

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	4	5/8	x 150	8138270879
80	4	5/8	x 180	8138270939
100	8	5/8	x 180	8138270939
150	8	3/4	x 210	8138271639

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	5/8	x 130	8138270839
20	4	5/8	x 130	8138270839
25	4	5/8	x 130	8138270839
40	4	3/4	x 140	8138271499

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138270259
20	4	1/2	x 80	8138270279
25	4	1/2	x 80	8138270279
40	4	1/2	x 80	8138270279
50	4	5/8	x 100	8138270779
80	4	5/8	x 110	8138270799
100	8	5/8	x 110	8138270799
150	8	3/4	x 120	8138271459
200	8	3/4	x 130	8138271479
250	12	7/8	x 140	8138272209
300	12	7/8	x 150	8138272229
350	12	1	x 170	8138273059
400	16	1	x 170	8138273059
450	16	1 1/8	x 180	8138273909
500	20	1 1/8	x 200	8138273949
600	20	1 1/4	x 220	8138274789
750	28	1 1/4	x 280	8138274909
900	32	1 1/2	x 340	8138276519
1000	36	1 1/2	x 350	8138276539
1050	36	1 1/2	x 360	8138276559
1200	44	1 1/2	x 390	8138276619

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662124581
Welding neck flange	1	7662821821
Gasket spiral wound	1	8541363041
Studbolt with nuts	4	8138270239

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662124621
Gasket spiral wound	1	8541363061
Studbolt with nuts	4	8138270259

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662124621
Welding neck flange	1	7662821841
Gasket spiral wound	1	8541363061
Studbolt with nuts	4	8138270259

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662124661
Gasket spiral wound	1	8541363081
Studbolt with nuts	4	8138270259

Drain or vent point DN 40 Fig.H DN350 - 1200

Branch: branch nipple flanged

Blind flange	1	7662124681
Gasket spiral wound	1	8541363121
Studbolt with nuts	4	8138270279

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Lap joint flange	1	7662208481
Pipe	1	7430160611
Welding neck flange	1	7662821601
Gasket spiral wound	1	8541363141
Thermowell fldg DN 50 L=230 mm	1	7683385611
Studbolt with nuts	4	8138270799

Temp instr conn DN 50 Fig.HL DN150 - 1200

Branch: according to branch table

Lap joint flange	1	7662208481
Pipe	1	7430160611
Welding neck flange	1	7662821601
Gasket spiral wound	1	8541363141
Thermowell fldg DN 50 L=255 mm	1	7683385621
Studbolt with nuts	4	8138270799

CLASS 011503-W

Design limits

Temperature (°C)	-50	0	50	75	100	125	150	160	200	235
Pressure (Barg) /FV										
DN 15- 1400	19.6	19.6	19.2	18.4	17.7	16.7	15.8	15.4	13.8	12.6

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class range DN 15 [NPS 1/2] up to/incl **DN 1400 [NPS 56]** design meets full vacuum at ambient condition, except DN450 [NPS 18]. DN450 [NPS 18] with 2.9 mm [0.114 inch] corrosion allowance meets full vacuum at ambient condition.
- Non-extended bonnet valves in this piping class are intended for short term low temperature excursion (e.g. non-operable during depressurization) (or) non-insulated piping only.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- **DN 750 to DN 1200 shall be limited to flare header (vent gas) only. Accordingly, maximum design condition 12.6 barg @ 150°C is taken for wall thickness calculation for these sizes. Whereas, DN1400 design condition validated for 12.6 barg @ 235 °c**
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.
- For lateral and pipe to pipe connection, refer Branch Table-B shall be developed during detailed design.
- Non-commercial sizes (such as DN 1400) are project specific and shall not be used as standard unless proven suitable economically

Table of schedules

DN	Schedule
15	160
20	160
25	160
40	160
50	80
80	80
100	40
150	40
200	30
250	30
300	30
350	20
400	20
450	20
500	20
600	20
750	XS
900	HOLD-7
1000	HOLD-7
1050	HOLD-7
1200	HOLD-7
1400	HOLD-7

Branch connections 90 degrees Table-A**Branch Size**

Run size 15 20 25 40 50 80 100 150 200 250 300 350 400 450 500 600 **750 900 1000 1050 1200 1400**

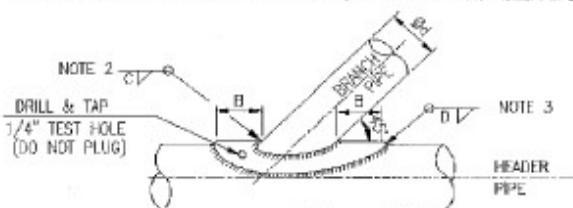
1400	N	N	N	N	W												
1200	N	N	N	N	W												
1050	N	N	N	N	W												
1000	N	N	N	N	W												
900	N	N	N	N	W												
750	N	N	N	N	W												
						REFER TABLE-B											
600	N	N	N	N	W	E	E	E	E	B	B	B	B	B	A		
500	N	N	N	N	W	E	E	E	E	B	B	B	B	B	A		
450	N	N	N	N	W	E	E	E	E	B	B	B	B	B	A		
400	N	N	N	N	W	E	E	E	E	B	B	B	B	B	A		
350	N	N	N	N	W	E	E	E	E	B	B	B	B	B	A		
300	N	N	N	N	W	E	E	B	B	B	B	B	B	B	A		
250	N	N	N	N	W	E	B	B	B	B	B	B	B	B	A		
200	N	N	N	N	W	E	B	B	B	B	B	B	B	B	A		
150	N	N	N	N	W	B	B	B	B	A							
100	N	N	N	N	U	B	B	A									
80	N	N	N	N	U	A											
50	N	N	M	M	J												
40	N	M	M	J													
25	M	M	J														
20	M	J															
15	J																

Carbon steel LT F-Gr Sour		Plant
Class no.	011503-W	Consignee
ASME rating	CLASS 150	Engineered by
Corrosion allowance	3 mm	Principal
Revision letter		Contr. job no.
Revision date		Project no.

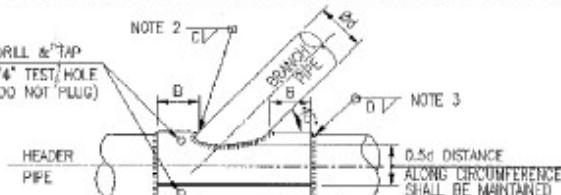
Branch connections Table-B

Branch Size	Run	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1050	1200	1400
size		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L
1400	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L
1200	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
1050	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
1000	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
900	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
750	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
600	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
500	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
450	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
400	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
350	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
300	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
250	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
200	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
150	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
100	P	P	P	L															

A) CIRCULAR TYPE REINFORCING PAD (TYPE 'P' IN BRANCH TABLE)



B) FULL ENCIRCLEMENT TYPE REINFORCING PAD (TYPE 'F' IN THE BRANCH TABLE) NOTE 7



NOTES:

1. ALL 45° BRANCH CONNECTION SHALL BE REINFORCED WITH WIDTH 'B' OF THE REINFORCING PAD SHALL BE GREATER THAN OR EQUAL TO 0.75 TIMES THE BRANCH OUTSIDE DIAMETER (D_B).
2. FILLET WELD 'C' SHALL BE THE GREATER OF 6.35mm OR 3/8 TIMES BRANCH PIPE THICKNESS.
3. FILLET WELD 'D' SHALL BE GREATER OF 6.00mm OR 0.707 TIMES PAD THICKNESS.
4. IF REINFORCEMENT IS ADDED IN TWO HALVES THEN THE HALVES SHALL BE WELDED TOGETHER USING A FULL PENETRATION BUTT WELD AND EACH HALF SHALL HAVE A TEST HOLE.
5. 5.00mm CLEARANCE IS TAKEN INTO CONSIDERATION FOR WELDING BETWEEN BRANCH PIPE AND PAD.
6. PAD WELDING SHALL BE AIR TESTED AT 1 BARG PRESSURE. NO LEAKAGE SHALL BE OBSERVED THROUGH THE WELD ZONE.
7. WHERE TYPE 'F' PAD IS SPECIFIED IN BRANCH TABLE, THE REINFORCEMENT SHALL BE MADE IN TWO HALVES AND BE OF THE FULL ENCIRCLEMENT TYPE AS SHOWN ABOVE. THE HALVES SHALL BE WELDED TOGETHER USING A FULL PENETRATION BUTT WELD AND EACH HALF SHALL HAVE A TEST HOLE.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-600 DN 750-1400	ASTM A333-6 ASTM A671-CC65 CL 22
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Flanges

BLFL	Blind flange	DN 15- 1400	ASTM A350-LF2 cl 1
LJFL	Lap joint flange	--	ASTM A350-LF2 cl 1
SBNF	Spectacle blind	DN 15-400	ASTM A516-60/65/70
SPNF	Spade	DN 15- 1400	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15- 1400	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15- 1400	ASTM A350-LF2 cl 1

Fittings

CAPB	Cap bw	DN 15-600	ASTM A420-WPL6
CAPB	Cap bw	DN 750-1400	ASTM A420-WPL6W
E45B	Elbow 45 deg LR bw	DN 15-600	ASTM A420-WPL6
E45B	Elbow 45 deg LR bw	DN 750-1400	ASTM A420-WPL6W
E90B	Elbow 90 deg LR bw	DN 15-600	ASTM A420-WPL6
E90B	Elbow 90 deg LR bw	DN 750-1400	ASTM A420-WPL6W
TEEB	Tee equal bw	DN 15-600	ASTM A420-WPL6
TEEB	Tee equal bw	DN 750-1400	ASTM A420-WPL6W

Reducing fittings

BN6F	Branch fitting flgd	DN 40- 1400	ASTM A350-LF2 cl 1
BN6B	Branch fitting bw	DN 40- 1400	ASTM A350-LF2 cl 1
BR3B	Branch outlet bw	DN 150-600	ASTM A350-LF2 cl 1
BROB	Branch outlet bw	DN 400-600	ASTM A350-LF2 cl 1
BRSB	Branch outlet bw	DN 300-600	ASTM A350-LF2 cl 1
RECB	Reducer concentric bw	DN 20-600	ASTM A420-WPL6
RECB	Reducer concentric bw	DN 750-1400	ASTM A420-WPL6W
REEB	Reducer eccentric bw	DN 20-600	ASTM A420-WPL6
REEB	Reducer eccentric bw	DN 750-1400	ASTM A420-WPL6W
TERB	Tee reducing bw	DN 20-600	ASTM A420-WPL6
TERB	Tee reducing bw	DN 750-1400	ASTM A420-WPL6W

Valves

BAFF	Ball valve float FB flgd	DN 15-150	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, Stellite
BARF	Ball valve float RB flgd	DN 15-250	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, Stellite
BNFF	Ball valve trunn FB n-ext flgd	DN 200-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, Stellite
BNRF	Ball valve trunn RB n-ext flgd	DN 300-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, Stellite
BTFF	Ball valve trunn FB flgd	DN 200-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, Stellite
BTRF	Ball valve trunn RB flgd	DN 300-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, Stellite
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A352-LCC Trim: LTCS, Alloy 825, Stellite
BVFF	Ball valve float FB n-ext flgd	DN 15-150	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, Stellite
BVRF	Ball valve float RB n-ext flgd	DN 15-250	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, Stellite
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-600	Body: ASTM A350-LF2 cl 1/ASTM A352-LCC Trim: Alloy 825, Stellite
CHVF	Check valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, Stellite
CHVF	Check valve flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, Stellite
GANF	Gate valve n-ext flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, Stellite
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, Stellite
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, Stellite
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, Stellite
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, Stellite
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, Stellite
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, Stellite
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, Stellite

Instruments

TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKMA	Gasket camprofile or approved equal	DN 750-1400	Alloy 825, Graphite SS centring ring
GKSW	Gasket spiral wound	DN 15-1400	Alloy 825, Graphite CS centring-/Alloy 825 inner ring
GKIK	Insulating Gasket kit	DN 15-1400	(G-10/11) with 316 SS CORE, PTFE SS Pres Engg Spirl Spring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A350-LF2 cl 1
PLUG	Plug NPT	DN 15-50	ASTM A350-LF2 cl 1
ST3B	Strainer Y-type (3 mm ca)	DN 50-400	Sieve: Alloy 825
STBT	Studbolt with nuts	--	ASTM A320-L7M/A194-7M Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A350-LF2 cl 1 HOLDER / ACCESS FITTING: ALLOY 825 COUPON: ASTM A333-6
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A350-LF2 cl 1 INTERNAL: ALLOY 825
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: ALLOY 825 VALVE & INTERNALS: ALLOY 825
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A350-LF2 cl 1 VALVE & INTERNALS: ALLOY 825
HSCL	Hose Coupling Flgd / Female Conn.	DN 15-50	AISI 316 (L) / Aluminium Bronze

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS	Item description	Nominal pipe size																				
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1050	1200
Pipe																						
Pipe	743016 0	231	301	381	541	611	691	751	841	931	051	171	291	391	641	041	341	421	011	219	621	171
Pipe	743016 1																					
Pipe	743016 2																					
Pipe	743021 0																					
Pipe	743021 1																					
Pipe	743021 2																					
Flanges																						
Blind flange	766212	4581	4621	4661	4681	4701	4721	4741	4761	4781	4801	4821	4841	4861	4881	4901	4921	0561	0621	0661	0681	0741
Blind flange	767013																					
Spacer ring	768906	0081	0121	0161	0181	0201	0221	0241	0261	0281	0301	0321	0341	0361	0381	0401	0441	1231	1261	1289	1291	1321
Spacer ring	768875																					
Spade	768935	0011	0021	0031	0041	0051	0061	0071	0081	0091	0101	0111	0121	0131	0141	0151	0161	1231	1261	1289	1291	1321
Spade	768895																					
Spectacle blind	768966	1081	1121	1161	1181	1201	1221	1241	1261	1281	1301	1321	1341	1361	1381	1401	1441	1231	1261	1289	1291	1321
Welding neck flange	766282	1821	1841	1861	1881	1901	1921	1941	1961	1981	2001	2021	2041	2061	2081	2101	2141	0151	0421	0551	0601	0761
Welding neck flange	767083																					
Fittings																						
Cap bw	763117	1721	1781	1821	1921	2101	2301	2461	2661	2831	3041	3261	3451	3651	3841	3941	4041	5411	6061	6599	6621	7171
Elbow 45 deg LR bw	763134	1721	1781	1821	1921	2101	2301	2461	2661	2831	3041	3261	3451	3651	3841	3941	4041	5221	6681	7299	7431	8041
Elbow 90 deg LR bw	763143	1721	1781	1821	1921	2101	2301	2461	2661	2831	3041	3261	3451	3651	3841	3941	4041	5221	6651	7329	7391	8041
Tee equal bw	763180	1721	1781	1821	1921	2101	2301	2461	2661	2831	3041	3261	3451	3651	3841	3941	4041	5221	6641	7299	7431	8041

PIPING COMPONENTS Item description	MESC	Nominal pipe size															
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
Valves																	
Ball valve float FB ffld	770056	4819	4829	4839	4849	4859	4869	4879	4889								
Ball valve float FB n-ext ffld	770047	4019	4029	4039	4049	4059	4069	4079	4089								
Ball valve float RB ffld	770056	4519	4529	4539	4549	4559	4569	4579	4589	4599	4609						
Ball valve float RB n-ext ffld	770047	4519	4529	4539	4549	4559	4569	4579	4589	4599	4609						
Ball valve trunn FB ffld	770094									4209	4219	4229	4239	4249	4259	4269	4279
Ball valve trunn FB n-ext ffld	770049									4209	4219	4229	4239	4249	4259	4269	4279
Ball valve trunn RB ffld	770094											4709	4719	4729	4739	4749	4759
Ball valve trunn RB n-ext ffld	770049											4709	4719	4729	4739	4749	4759
Butterfly valve triple of fffd	774143									0159	0169	0179	0189	0199	0209	0219	0239
Check valve dual plate fffd	776719									0159	0169	0179	0189	0199	0209	0219	0239
Check Valve Wafer Lug (Solid)	776759						0099	0109	0129	0149							
Check valve fffd	771044	0039	0049	0059	0079	0099	0109	0129	0149	0159	0169	0179	0189	0199	0209	0219	0239
Gate valve fffd	772054	9039	9049	9059	9079	9089	6109	6129	6149	6159	6169	6179	6189	6199	6209	6219	6239
Gate valve n-ext fffd	772052	0039	0049	0059	0079												
Globe valve fffd	773054	3039	3049	3059	3079	3099	6109	6129	6149	6159							
Valve DBBT	778591	4819	4829	4839	4849	4859											
Valve DBBF	778590	4819	4829	4839	4849	4859											
Miscellaneous																	
Gasket spiral wound	854360	3041	3061	3081	3121	3141	3181	3201	3241	3261	3281	3301	3321	3341	3361	3381	3421
Insulating Gasket Kit	854609											1221					
Meterrun	766496	0521	0541	0561	0581												
Orifice flange set	766297																
Plug NPT	760563	0081	0121	0161	0181	1121	1131	0241	0261	0141	0151	0161	0061	0071	0081	0091	0101
Strainer Y-type (3 mm ca)	768322					0201	5269	5289	5069	5089	5459	5469	5479	5489	5499		

Metric units

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
20	x	15	7631661411	7631751411	7631880391
25	x	15	7631661511	7631751511	7631880491
25	x	20	7631661611	7631751611	7631880591
40	x	15	7631661711	7631751711	
40	x	20	7631661811	7631751811	7631880791
40	x	25	7631661911	7631751911	7631880891
50	x	20	7631661931	7631751931	
50	x	25	7631661991	7631751991	7631881111
50	x	40	7631662081	7631752081	7631881201
80	x	40	7631662291	7631752291	
80	x	50	7631662371	7631752371	7631881331
100	x	40	7631662491	7631752491	
100	x	50	7631662661	7631752661	7631881581
100	x	80	7631662761	7631752761	7631881701
150	x	80	7629452941	7629602881	7631881811
150	x	100	7631663051	7631753051	7631881891
200	x	100	7631663241	7631753241	7631882111
200	x	150	7631663341	7631753341	7631882311
250	x	100	7629453421	7629603421	7631882591
250	x	150	7631663521	7631753521	7631882771
250	x	200	7631663631	7631753631	7631882901
300	x	150	7631663811	7631753811	7631883161
300	x	200	7631663941	7631753941	7631883271
300	x	250	7631664031	7631754031	7631883491
350	x	150	7629456001	7629606001	
350	x	200	7629456351	7629606351	7631883971
350	x	250	7631664311	7631754311	7631884211
350	x	300	7631664441	7631754441	7631884471

Thermowell flgd DN 50	
Length (mm)	MESC number
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
400	x 200	7629458131	7629608131		
400	x 250	7631664711	7629608251	7631885111	
400	x 300	7629458321	7629608321	7631885371	
400	x 350	7631664821	7631754821	7631885541	
450	x 250	7631665321	7631755321	7631886101	
450	x 300	7631665621	7631755621	7631886341	
450	x 350	7631665811	7631755811	7631886501	
450	x 400	7631666111	7631756111	7631886741	
500	x 300	7631666521	7631756521	7631887541	
500	x 350	7631666711	7631756711	7631887701	
500	x 400	7631667011	7631757011	7631887941	
500	x 450	7631667311	7631757311	7631888181	
600	x 300			7631888741	
600	x 350			7631888901	
600	x 400	7631668811	7631758811	7631889141	
600	x 450	7631669111	7631759111	7631889381	
600	x 500	7631669531	7631759411	7631889621	

Comp.name	Description
BN6F	Branch fitting flgd
BN6B	Branch fitting bw
BR3B	Branch outlet bw
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BROB	BRSB
15	40	-	50	7672306801	7672579309		
15	80	-	150	7672306811	7672579319		
15	200	-	600	7672306821	7672579329		
20	50	-	50	7672306841	7672579349		
20	80	-	250	7672306851	7672579359		
20	300	-	600	7672306861	7672579369		
25	80	-	250	7672306881	7672708149		
25	300	-	600	7672306891	7672579419		
40	80	-	80	7672306911	7672579439		
40	100	-	100	7672306921	7672579449		
40	150	-	200	7672306931	7672579459		
40	250	-	450	7672306941	7672579469		
40	500	-	600	7672306951	7672579479		
50	150	-	150		7679503571		
50	200	-	250		7679503581		
50	300	-	450		7679503601		
50	500	-	600		7679503641		
80	200	-	200		7679503681		
80	250	-	250		7679503691		
80	300	-	350		7679503701		
80	400	-	500		7679503721		
80	600	-	600		7679503751		

Metric units

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BROB	BRSB
100	300	-	350			7679504491	
100	400	-	500			7679504511	
100	600	-	600			7679504541	
150	350	-	350			7679504571	
150	400	-	400			7679504591	
150	450	-	450			7679504601	
150	500	-	500			7679504611	
150	600	-	600			7679504621	
200	400	-	400		7679041071		
200	450	-	450		7679041091		
200	500	-	500		7679041101		
200	600	-	600		7679041111		
250	500	-	500			7679041171	
250	600	-	600			7679041181	

Metric units

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 60	8138270239
20	4	1/2	x 70	8138270259
25	4	1/2	x 70	8138270259
40	4	1/2	x 80	8138270279
50	4	5/8	x 90	8138270759
80	4	5/8	x 100	8138270779
100	8	5/8	x 100	8138270779
150	8	3/4	x 110	8138271439
200	8	3/4	x 110	8138271439
250	12	7/8	x 120	8138272169
300	12	7/8	x 120	8138272169
350	12	1	x 140	8138272999
400	16	1	x 140	8138272999
450	16	1 1/8	x 150	8138273849
500	20	1 1/8	x 160	8138273869
600	20	1 1/4	x 180	8138274709
750	28	1 1/4	x 240	8138274829
900	32	1 1/2	x 290	8138276419
1000	36	1 1/2	x 290	8138276419
1050	36	1 1/2	x 300	8138276439
1200	44	1 1/2	x 320	8138276479
1400	48	1 3/4	X 370	xxxxxxxxxx

Coated boltset orifice fig

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138270839
80	8	3/4	x 140	8138271499
100	8	3/4	x 150	8138271519
150	12	3/4	x 150	8138271519
200	12	7/8	x 170	8138272269
250	16	1	x 190	8138273099
300	16	1 1/8	x 210	8138273969
350	20	1 1/8	x 220	8138273989
400	20	1 1/4	x 230	8138274809
450	24	1 1/4	x 250	8138274849
500	24	1 1/4	x 260	8138274869
600	24	1 1/2	x 290	8138276419

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138270259
20	4	1/2	x 80	8138270279
25	4	1/2	x 80	8138270279
40	4	1/2	x 80	8138270279
50	4	5/8	x 100	8138270779
80	4	5/8	x 110	8138270799
100	8	5/8	x 110	8138270799
150	8	3/4	x 120	8138271459
200	8	3/4	x 130	8138271479
250	12	7/8	x 140	8138272209
300	12	7/8	x 150	8138272229
350	12	1	x 170	8138273059
400	16	1	x 170	8138273059
450	16	1 1/8	x 180	8138273909
500	20	1 1/8	x 200	8138273949
600	20	1 1/4	x 220	8138274789
750	28	1 1/4	x 280	8138274909
900	32	1 1/2	x 340	8138276519
1000	36	1 1/2	x 350	8138276539
1050	36	1 1/2	x 360	8138276559
1200	44	1 1/2	x 390	8138276619
1400	48	1 3/4	X 430	XXXXXXXXXX

Coated boltset mrn fig

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	5/8	x 130	8138270839
20	4	5/8	x 130	8138270839
25	4	5/8	x 130	8138270839
40	4	3/4	x 140	8138271499

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662124581
Welding neck flange	1	7662821821
Gasket spiral wound	1	8543603041
Studbolt with nuts	4	8138270239

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662124621
Gasket spiral wound	1	8543603061
Studbolt with nuts	4	8138270259

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662124621
Welding neck flange	1	7662821841
Gasket spiral wound	1	8543603061
Studbolt with nuts	4	8138270259

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662124661
Gasket spiral wound	1	8543603081
Studbolt with nuts	4	8138270259

Drain or vent point DN 40 Fig.H DN350 - 600

mmBranch: branch nipple flanged

Blind flange	1	7662124681
Gasket spiral wound	1	8543603121
Studbolt with nuts	4	8138270279

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Lap joint flange	1	7662208481
Pipe	1	7430160611
Welding neck flange	1	7662821601
Gasket spiral wound	1	8543603141
Thermowell fgd DN 50 L=230 mm	1	7683385611
Studbolt with nuts	4	8138270799

Temp instr conn DN 50 Fig.HL DN150 - 600

Branch: according to branch table

Lap joint flange	1	7662208481
Pipe	1	7430160611
Welding neck flange	1	7662821601
Gasket spiral wound	1	8543603141
Thermowell fgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	4	8138270799

CLASS 011503-X

Design limits**Temperature (°C)**

-50	0	50	75	100	125	150
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Pressure (Barg) /FV

DN 15-1200	19.6	19.6	19.2	18.4	17.7	16.7	15.8
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class range DN 15 [NPS 1/2] up to/incl **DN 1200 [NPS 48]** design meets full vacuum at ambient condition, except DN450 [NPS 18]. DN450 [NPS 18] with 2.9 mm [0.114 inch] corrosion allowance meets full vacuum at ambient condition.
- Non-extended bonnet valves in this piping class are intended for short term low temperature excursion (e.g. non-operable during depressurization) (or) non-insulated piping only.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- DN 750 to DN 1200 shall be limited to flare header (vent gas) only. Accordingly, maximum design condition 12 barg @ 150°C is taken for wall thickness calculation for these sizes.
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**
- For lateral and pipe to pipe connection, refer Branch Table-B. shall be developed during detailed design.

Table of schedules

DN	Schedule
15	160
20	160
25	160
40	160
50	80
80	80
100	40
150	40
200	30
250	30
300	30
350	20
400	20
450	20
500	20
600	20
750 XS	
900 HOLD-7	
1000 HOLD-7	
1050 HOLD-7	
1200 HOLD-7	

Branch connections 90 degrees Table-A**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1050	1200
1200	N	N	N	N	W																
1050	N	N	N	N	W																
1000	N	N	N	N	W																REFER TABLE-B
900	N	N	N	N	W																
750	N	N	N	N	W																
600	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	A			
500	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	A			
450	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	A			
400	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	A			
350	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	A			
300	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	A			
250	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	A			
200	N	N	N	N	W	E	E	E	E	E	B	B	B	B	B	B	B	A			
150	N	N	N	N	W	B	B	B	B	B	A										
100	N	N	N	N	U	B	B	B	B	B	A										
80	N	N	N	N	U	A															
50	N	N	M	M	J																
40	N	M	M	J																	
25	M	M	J																		
20	M	J																			
15	J																				

Carbon steel LT F-Gr Sour

Class no.	011503-X
ASME rating	CLASS 150
Corrosion allowance	3 mm
Revision letter	
Revision date	

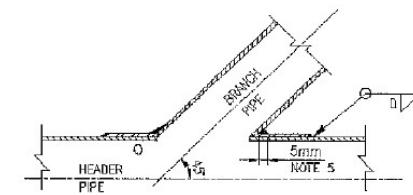
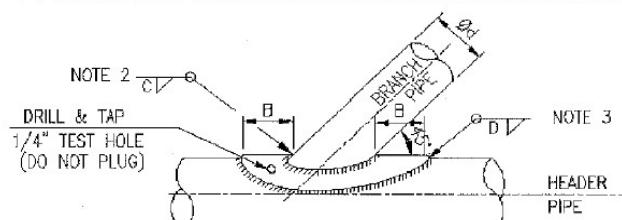
Plant	
Consignee	
Engineered by	
Principal	
Contr. job no.	
Project no.	

Branch connections Table-B

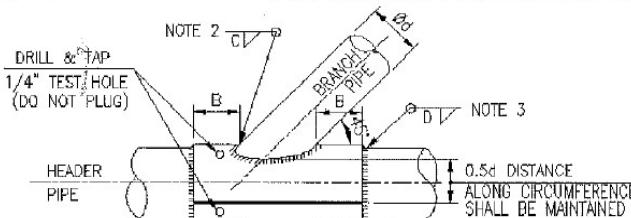
Branch Size	Run	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1050	1200
size	Run	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1050	1200
1200	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
1050	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
1000	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
900	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
750	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
600	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
500	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
450	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
400	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
350	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
300	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
250	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
200	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
150	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	L	
100	P	P	P	L														

Code	Explanation of characters
A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
W	Branch outlet BW
U	Reducing tee BW
P	Branch Weld with reinforcement PAD
L	Lateral Tee

A) CIRCULAR TYPE REINFORCING PAD (TYPE "P" IN BRANCH TABLE)



B) FULL ENCIRCLEMENT TYPE REINFORCING PAD (TYPE "F" IN THE BRANCH TABLE) NOTE 7



NOTES:

- ALL 45° BRANCH CONNECTION SHALL BE REINFORCED WITH WIDTH "B" OF THE REINFORCING PAD SHALL BE GREATER THAN OR EQUAL TO 0.75 TIMES THE BRANCH OUTSIDE DIAMETER (ϕ).
- FILLET WELD "C" SHALL BE THE GREATER OF 6.35mm OR 3/8 TIMES BRANCH PIPE THICKNESS.
- FILLET WELD "D" SHALL BE GREATER OF 6.0mm OR 0.707 TIMES PAD THICKNESS.
- IF REINFORCEMENT IS ADDED IN TWO HALVES THEN THE HALVES SHALL BE WELDED TOGETHER USING A FULL PENETRATION BUTT WELD AND EACH HALF SHALL HAVE A TEST HOLE.
- 5.00mm CLEARANCE IS TAKEN INTO CONSIDERATION FOR WELDING BETWEEN BRANCH PIPE AND PAD.
- PAD WELDING SHALL BE AIR TESTED AT 1 BARG PRESSURE. NO LEAKAGE SHALL BE OBSERVED THROUGH THE WELD ZONE.
- WHERE TYPE "F" PAD IS SPECIFIED IN BRANCH TABLE, THE REINFORCEMENT SHALL BE MADE IN TWO HALVES AND BE OF THE FULL ENCIRCLEMENT TYPE AS SHOWN ABOVE. THE HALVES SHALL BE WELDED TOGETHER USING A FULL PENETRATION BUTT WELD AND EACH HALF SHALL HAVE A TEST HOLE.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-600 DN 750-1200	ASTM A333-6 ASTM A671-CC65 CL 22
------	------	---------------------------------	--

Flanges

BLFL	Blind flange	DN 15-1200	ASTM A350-LF2 cl 1
LJFL	Lap joint flange	--	ASTM A350-LF2 cl 1
SBNF	Spectacle blind	DN 15-400	ASTM A516-60/65/70
SPNF	Spade	DN 15-1200	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15-1200	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-1200	ASTM A350-LF2 cl 1

Fittings

CAPB	Cap bw	DN 15-600 DN 750-1200	ASTM A420-WPL6 ASTM A420-WPL6W
E45B	Elbow 45 deg LR bw	DN 15-600 DN 750-1200	ASTM A420-WPL6 ASTM A420-WPL6W
E90B	Elbow 90 deg LR bw	DN 15-600 DN 750-1200	ASTM A420-WPL6 ASTM A420-WPL6W
TEEB	Tee equal bw	DN 15-600 DN 750-1200	ASTM A420-WPL6 ASTM A420-WPL6W

Reducing fittings

BN6F	Branch fitting flgd	DN 40-600	ASTM A350-LF2 cl 1
BN6B	Branch fitting bw	DN 40-600	ASTM A350-LF2 cl 1
BR3B	Branch outlet bw	DN 150-600	ASTM A350-LF2 cl 1
BR0B	Branch outlet bw	DN 400-600	ASTM A350-LF2 cl 1
BRSB	Branch outlet bw	DN 300-600	ASTM A350-LF2 cl 1
RECB	Reducer concentric bw	DN 20-600	ASTM A420-WPL6
		DN 750-1200	ASTM A420-WPL6W
REEB	Reducer eccentric bw	DN 20-600	ASTM A420-WPL6
		DN 750-1200	ASTM A420-WPL6W
TERB	Tee reducing bw	DN 20-600	ASTM A420-WPL6
		DN 750-1200	ASTM A420-WPL6W

Valves

BAFF	Ball valve float FB flgd	DN 15-150	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, PTFE
BARF	Ball valve float RB flgd	DN 15-250	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, PTFE
BNFF	Ball valve trunn FB n-ext flgd	DN 200-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, filled PTFE
BNRF	Ball valve trunn RB n-ext flgd	DN 300- 1200	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, filled PTFE
BTFF	Ball valve trunn FB flgd	DN 200-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, filled PTFE
BTRF	Ball valve trunn RB flgd	DN 300-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A352-LCC Trim: LTCS, Alloy 825, Stellite
BVFF	Ball valve float FB n-ext flgd	DN 15-150	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, PTFE
BVRF	Ball valve float RB n-ext flgd	DN 15-250	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, PTFE
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50- 1200	Body: ASTM A350-LF2 cl 1/ASTM A352-LCC Trim: Alloy 825
CHVF	Check valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
CHVF	Check valve flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
GANF	Gate valve n-ext flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
GAVF	Gate valve flgd	DN 80-1200	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, PTFE
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, Stellite

Instruments

TWHD Thermowell flgd DN 50
 TWHS Thermowell flgd DN 50 L=230 mm
 TWHL Thermowell flgd DN 50 L=255 mm

DN 50-50

ASTM B564 UNS N04400
 ASTM B564 UNS N04400
 ASTM B564 UNS N04400

Miscellaneous

GKMA	Gasket camprofile or approved equal	DN 750-1200	Alloy 825, Graphite SS centring ring
GKSW	Gasket spiral wound	DN 15-600	Alloy 825, Graphite CS centring-/Alloy 825 inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A350-LF2 cl 1
PLUG	Plug NPT	DN 15-50	ASTM A350-LF2 cl 1
ST3B	Strainer Y-type (3 mm ca)	DN 50-400	Sieve: Alloy 825
STBT	Studbolt with nuts	--	ASTM A320-L7M/A194-7M Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A350-LF2 cl 1 HOLDER / ACCESS FITTING: ALLOY 825 COUPON: ASTM A333-6
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A350-LF2 cl 1 INTERNAL: ALLOY 825
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: ALLOY 825 VALVE & INTERNALS: ALLOY 825
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A350-LF2 cl 1 VALVE & INTERNALS: ALLOY 825
HSCL	Hose Coupling Flgd / Female Conn.	DN 15-50	AISI 316 (L) / Aluminium Bronze

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS	Nominal pipe size MESC																					
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1050	1200
Item description																						
Pipe																						
Pipe	743016 0	231	301	381	541	611	691	751	841	931	051	171	291	391	641	041	341	421	011	219	621	171
Pipe	743016 1																					
Pipe	743016 2																					
Pipe	743021 0																					
Pipe	743021 1																					
Pipe	743021 2																					
Flanges																						
Blind flange	766212	4581	4621	4661	4681	4701	4721	4741	4761	4781	4801	4821	4841	4861	4881	4901	4921	0561	0621	0661	0681	0741
Blind flange	767013																					
Spacer ring	768906	0081	0121	0161	0181	0201	0221	0241	0261	0281	0301	0321	0341	0361	0381	0401	0441	1231	1261	1289	1291	1321
Spacer ring	768875																					
Spade	768935	0011	0021	0031	0041	0051	0061	0071	0081	0091	0101	0111	0121	0131	0141	0151	0161	1231	1261	1289	1291	1321
Spade	768895																					
Spectacle blind	768966	1081	1121	1161	1181	1201	1221	1241	1261	1281	1301	1321	1341	1361	1381	1401	1421	0151	0421	0551	0601	0761
Welding neck flange	766282	1821	1841	1861	1881	1601	1621	1141	1161	0581	0601	0621	0141	0161	0181	0201	0241	0151	0421	0551	0601	0761
Welding neck flange	767083																					
Fittings																						
Cap bw	763117	1721	1781	1821	1921	2101	2301	2461	2661	2831	3041	3261	3451	3651	3841	3941	4041	5411	6061	6599	6621	7171
Elbow 45 deg LR bw	763134	1721	1781	1821	1921	2101	2301	2461	2661	2831	3041	3261	3451	3651	3841	3941	4041	5221	6681	7299	7431	8041
Elbow 90 deg LR bw	763143	1721	1781	1821	1921	2101	2301	2461	2661	2831	3041	3261	3451	3651	3841	3941	4041	5221	6651	7329	7391	8041
Tee equal bw	763180	1721	1781	1821	1921	2101	2301	2461	2661	2831	3041	3261	3451	3651	3841	3941	4041	5221	6641	7299	7431	8041

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																				
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1050	1200
Valves																						
Ball valve float FB flgd	770056	5039	5049	5059	5079	5089	5109	5129	5139													
Ball valve float FB n-ext flgd	770047	5039	5049	5059	5079	5089	5109	5129	5149													
Ball valve float RB flgd	770056	0039	0049	0059	0079	0089	0109	0129	0449	0459	0469											
Ball valve float RB n-ext flgd	770047	0039	0049	0059	0079	0089	0109	0129	0149	0159	0169											
Ball valve trunn FB flgd	770094									5159	5169	5179	5189	5199	5209	5219	5239					
Ball valve trunn FB n-ext flgd	770049									5159	5169	5179	5189	5199	5209	5219	5239					
Ball valve trunn RB flgd	770094											0179	0189	0199	0209	0219	0239					
Ball valve trunn RB n-ext flgd	770049											0179	0189	0199	0209	0219	0239	0269	0299	0319	0329	0349
Butterfly valve triple of flgd	774143									0159	0169	0179	0189	0199	0209	0219	0239					
Check valve dual plate flgd	776719									0159	0169	0179	0189	0199	0209	0219	0239	0269	0299	0319	0329	0349
Check Valve Wafer Lug (Solid)	776759									0099	0109	0129	0149									
Check valve flgd	771044	0039	0049	0059	0079	0099	0109	0129	0149	0159	0169	0179	0189	0199	0209	0219	0239					
Gate valve flgd	772054	9039	9049	9059	9079	9089	6109	6129	6149	6159	6169	6179	6189	6199	6209	6219	6239	0269	0299	0319	0329	0349
Gate valve n-ext flgd	772052	0039	0049	0059	0079																	
Globe valve flgd	773054	3039	3049	3059	3079	3099	6109	6129	6149	6159												
Valve DBBT	778591	5039	5049	5059	5079	5089																
Valve DBBF	778590	5039	5049	5059	5079	5089																
Miscellaneous																						
Gasket camprofile	854390																0489	0549	0589	0609	0669	
Gasket spiral wound	854360	3041	3061	3081	3121	3141	3181	3201	3241	3261	3281	3301	3321	3341	3361	3381	3421					
Meterrun	766496	0521	0541	0561	0581																	
Orifice flange set	766297					1121	1131	0241	0261	0141	0151	0161	0061	0071	0081	0091	0101					
Plug NPT	760563	0081	0121	0161	0181	0201																
Strainer Y-type (3 mm ca)	768322					5269	5289	5069	5089	5459	5469	5479	5489	5499								

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7631661411	7631751411	7631880391
25	x	15	7631661511	7631751511	7631880491
25	x	20	7631661611	7631751611	7631880591
40	x	15	7631661711	7631751711	
40	x	20	7631661811	7631751811	7631880791
40	x	25	7631661911	7631751911	7631880891
50	x	20	7631661931	7631751931	
50	x	25	7631661991	7631751991	7631881111
50	x	40	7631662081	7631752081	7631881201
80	x	40	7631662291	7631752291	
80	x	50	7631662371	7631752371	7631881331
100	x	40	7631662491	7631752491	
100	x	50	7631662661	7631752661	7631881581
100	x	80	7631662761	7631752761	7631881701
150	x	80	7629452941	7629602881	7631881811
150	x	100	7631663051	7631753051	7631881891
200	x	100	7631663241	7631753241	7631882111
200	x	150	7631663341	7631753341	7631882311
250	x	100	7629453421	7629603421	7631882591
250	x	150	7631663521	7631753521	7631882771
250	x	200	7631663631	7631753631	7631882901
300	x	150	7631663811	7631753811	7631883161
300	x	200	7631663941	7631753941	7631883271
300	x	250	7631664031	7631754031	7631883491
350	x	150	7629456001	7629606001	
350	x	200	7629456351	7629606351	7631883971
350	x	250	7631664311	7631754311	7631884211
350	x	300	7631664441	7631754441	7631884471

Thermowell flgd DN 50	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x	200	7629458131	7629608131	
400	x	250	7631664711	7629608251	7631885111
400	x	300	7629458321	7629608321	7631885371
400	x	350	7631664821	7631754821	7631885541
450	x	250	7631665321	7631755321	7631886101
450	x	300	7631665621	7631755621	7631886341
450	x	350	7631665811	7631755811	7631886501
450	x	400	7631666111	7631756111	7631886741
500	x	300	7631666521	7631756521	7631887541
500	x	350	7631666711	7631756711	7631887701
500	x	400	7631667011	7631757011	7631887941
500	x	450	7631667311	7631757311	7631888181
600	x	300			7631888741
600	x	350			7631888901
600	x	400	7631668811	7631758811	7631889141
600	x	450	7631669111	7631759111	7631889381
600	x	500	7631669531	7631759411	7631889621
750	x	600	7631607079	7631787079	
900	x	750	7631613139	7631793139	
1000	x	750	7631614689	7631794689	
1050	x	900	7631616071	7631796071	
1200	x	1050	7631618501	7631798501	

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting flgd
BN6B	Branch fitting bw
BR3B	Branch outlet bw
BR0B	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BROB	BRSB
15	40	-	50	7672306801	7672579309		
15	80	-	150	7672306811	7672579319		
15	200	-	900	7672306821	7672579329		
15	1000	-	1200	7672306831	7672579339		
20	50	-	50	7672306841	7672579349		
20	80	-	250	7672306851	7672579359		
20	300	-	900	7672306861	7672579369		
20	1000	-	1200	7672306871	7672579379		
25	80	-	250	7672306881	7672708149		
25	300	-	900	7672306891	7672579419		
25	1000	-	1200	7672306901	7672579429		
40	80	-	80	7672306911	7672579439		
40	100	-	100	7672306921	7672579449		
40	150	-	200	7672306931	7672579459		
40	250	-	450	7672306941	7672579469		
40	500	-	900	7672306951	7672579479		
40	1000	-	1200	7672306961	7672579489		
50	150	-	150		7679503571		
50	200	-	250		7679503581		
50	300	-	450		7679503601		
50	500	-	900		7679503641		
80	200	-	200		7679503681		
80	250	-	250		7679503691		
80	300	-	350		7679503701		
80	400	-	500		7679503721		
80	600	-	600		7679503751		

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BROB	BRSB
100	300	-	350				7679504491
100	400	-	500				7679504511
100	600	-	600				7679504541
150	350	-	350				7679504571
150	400	-	400				7679504591
150	450	-	450				7679504601
150	500	-	500				7679504611
150	600	-	600				7679504621
200	400	-	400			7679041071	
200	450	-	450			7679041091	
200	500	-	500			7679041101	
200	600	-	600			7679041111	
250	500	-	500			7679041171	
250	600	-	600			7679041181	

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	1/2	x	60	8138270239
20	4	1/2	x	70	8138270259
25	4	1/2	x	70	8138270259
40	4	1/2	x	80	8138270279
50	4	5/8	x	90	8138270759
80	4	5/8	x	100	8138270779
100	8	5/8	x	100	8138270779
150	8	3/4	x	110	8138271439
200	8	3/4	x	110	8138271439
250	12	7/8	x	120	8138272169
300	12	7/8	x	120	8138272169
350	12	1	x	140	8138272999
400	16	1	x	140	8138272999
450	16	1 1/8	x	150	8138273849
500	20	1 1/8	x	160	8138273869
600	20	1 1/4	x	180	8138274709
750	28	1 1/4	x	240	8138274829
900	32	1 1/2	x	290	8138276419
1000	36	1 1/2	x	290	8138276419
1050	36	1 1/2	x	300	8138276439
1200	44	1 1/2	x	320	8138276479

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	8	5/8	x	130	8138270839
80	8	3/4	x	140	8138271499
100	8	3/4	x	150	8138271519
150	12	3/4	x	150	8138271519
200	12	7/8	x	170	8138272269
250	16	1	x	190	8138273099
300	16	1 1/8	x	210	8138273969
350	20	1 1/8	x	220	8138273989
400	20	1 1/4	x	230	8138274809
450	24	1 1/4	x	250	8138274849
500	24	1 1/4	x	260	8138274869
600	24	1 1/2	x	290	8138276419

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	4	5/8	x	150	8138270879
80	4	5/8	x	180	8138270939
100	8	5/8	x	180	8138270939
150	8	3/4	x	210	8138271639

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	5/8	x	130	8138270839
20	4	5/8	x	130	8138270839
25	4	5/8	x	130	8138270839
40	4	3/4	x	140	8138271499

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	1/2	x	70	8138270259
20	4	1/2	x	80	8138270279
25	4	1/2	x	80	8138270279
40	4	1/2	x	80	8138270279
50	4	5/8	x	100	8138270779
80	4	5/8	x	110	8138270799
100	8	5/8	x	110	8138270799
150	8	3/4	x	120	8138271459
200	8	3/4	x	130	8138271479
250	12	7/8	x	140	8138272209
300	12	7/8	x	150	8138272229
350	12	1	x	170	8138273059
400	16	1	x	170	8138273059
450	16	1 1/8	x	180	8138273909
500	20	1 1/8	x	200	8138273949
600	20	1 1/4	x	220	8138274789
750	28	1 1/4	x	280	8138274909
900	32	1 1/2	x	340	8138276519
1000	36	1 1/2	x	350	8138276539
1050	36	1 1/2	x	360	8138276559
1200	44	1 1/2	x	390	8138276619

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662124581
Welding neck flange	1	7662821821
Gasket spiral wound	1	8543603041
Studbolt with nuts	4	8138270239

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662124621
Gasket spiral wound	1	8543603061
Studbolt with nuts	4	8138270259

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662124621
Welding neck flange	1	7662821841
Gasket spiral wound	1	8543603061
Studbolt with nuts	4	8138270259

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662124661
Gasket spiral wound	1	8543603081
Studbolt with nuts	4	8138270259

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Blind flange	1	7662124681
Gasket spiral wound	1	8543603121
Studbolt with nuts	4	8138270279

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Lap joint flange	1	7662208481
Pipe	1	7430160611
Welding neck flange	1	7662821601
Gasket spiral wound	1	8543603141
Thermowell flgd DN 50 L=230 mm	1	7683385611
Studbolt with nuts	4	8138270799

Temp instr conn DN 50 Fig.HL DN150 - 600

Branch: according to branch table

Lap joint flange	1	7662208481
Pipe	1	7430160611
Welding neck flange	1	7662821601
Gasket spiral wound	1	8543603141
Thermowell flgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	4	8138270799

CLASS 013461-Y

Design limits**Temperature (°C)**

	-101	0	50	75	100	125	150
Pressure (Barg) /FV							
DN 15-1200	19.0	19.0	18.4	17.3	16.2	15.5	14.8

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 2.2
- For basis of design see DEP 31.38.01.10-Gen.
- External protection is required for design temperatures > 50 degr. C [120 °F] in saliferous atmospheres to prevent chloride stress corrosion crackin
- When chlorides are present in the process fluid in conjunction with free oxygen, the max. temperature is limited to 50 deg C [120 °F], to prevent chloride stress corrosion cracking.
- Piping class range DN 15 [NPS 1/2] up to incl DN 600[NPS 24] design meets full vacuum at ambient condition For DN 750 [NPS 30] to 1200 [NPS 48], if vacuum condition can occur, piping to be designed accordingly
- Non-extended bonnet valves in this piping class are intended for short term low temperature excursion (e.g non-operable during depressurization) (or) non-insulated piping only.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**

Table of schedules

DN	Schedule
15	40S
20	40S
25	10S
40	10S
50	10S
80	10S
100	10S
150	10S
200	10S
250	10S
300	10S
350	10S
400	10S
450	10S
500	10S
600	10S
750	10S

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1050	1200
1200	C	C	C	C	E	E	E	E	E	S	S	S	S	S	B	B	B	B	A	
1050	C	C	C	C	E	E	E	E	E	S	S	S	S	S	B	B	B	B	A	
900	C	C	C	C	E	E	E	E	E	S	S	S	S	S	B	B	B	B	A	
750	C	C	C	C	E	E	E	E	E	B	B	B	B	B	B	B	B	B	A	
600	C	C	C	C	E	E	E	E	E	E	B	B	B	B	B	B	B	B	A	
500	C	C	C	C	E	E	E	E	E	E	B	B	B	B	B	B	B	B	A	
450	C	C	C	C	E	E	E	E	E	B	B	B	B	B	B	B	B	B	A	
400	C	C	C	C	E	E	E	E	E	B	B	B	B	B	B	B	B	B	A	
350	C	C	C	C	E	E	E	E	E	B	B	B	B	B	B	B	B	B	A	
300	C	C	C	C	E	E	E	E	E	B	B	B	B	B	B	B	B	B	A	
250	C	C	C	C	E	E	E	E	E	B	B	B	B	B	B	B	B	B	A	
200	C	C	C	C	E	E	E	E	E	B	B	B	B	B	B	B	B	B	A	
150	C	C	C	C	E	E	E	E	E	B	B	B	B	B	B	B	B	B	A	
100	C	C	C	C	B	B	B	B	B	A										
80	C	C	C	C	B	B	B	B	B	A										
50	C	C	B	B	B	B	B	B	B	A										
40	C	B	B	B	B	B	B	B	B	A										
25	B	B	B	B	B	B	B	B	B	A										
20	B	B	B	B	B	B	B	B	B	A										
15	A																			

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
C	Branch fitting
E	Branch outlet
S	Welded-in contour insert

Stainl steel AISI 316 (L) LT Sour

Class no.	013461-Y
ASME rating	CLASS 150
Corrosion allowance	0 mm
Revision letter	
Revision date	

Plant
Consignee
Engineered by
Principal
Contr. job no.
Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe				Valves			
PIPE	Pipe	DN 15-300	ASTM A312-TP316L	BAFF	Ball valve float FB flgd	DN 15-150	Body: ASTM A182-F316
PIPE	Pipe	DN 350-600	ASTM A358-316L	BARF	Ball valve float RB flgd	DN 15-250	Trim: AISI 316 (L), PTFE
PIPE	Pipe	DN 750-1200	ASTM A358-316	BTFF	Ball valve trunn FB flgd	DN 200-600	Body: ASTM A182-F316
Flanges				BNFF	Ball valve trunn FB n-ext flgd	DN 200-600	Trim: AISI 316 (L), filled PTFE
BLFL	Blind flange	DN 15-1200	ASTM A182-F316	BNRF	Ball valve trunn RB n-ext flgd	DN 300-600	Body: ASTM A182-F316/A351-CF8M
LJFL	Lap joint flange	--	ASTM A182-F316	BTRF	Ball valve trunn RB flgd	DN 300-600	Trim: AISI 316, filled PTFE
SBNF	Spectacle blind	DN 15-400	ASTM A240-TP316	BUTF	Butterfly valve triple of flgd	DN 200-1200	Body: ASTM A182-F316 (L) /A351-CF8M
SPFL	Spade	DN 750-1200	ASTM A240-TP316	CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-1200	Trim: AISI 316 (L), filled PTFE
SPNF	Spade	DN 15-600	ASTM A240-TP316	CHVF	Check valve flgd	DN 15-50	Body: ASTM A182-F316
SPRT	Spacer ring	DN 750-1200	ASTM A240-TP316	BVFF	Ball valve float FB n-ext flgd	DN 15-150	Trim: AISI 316 (L), Stellite
SRNF	Spacer ring	DN 15-600	ASTM A240-TP316	BVRF	Ball valve float RB n-ext flgd	DN 15-250	Body: ASTM A182-F316(L)/A351-CF8M
WNFL	Welding neck flange	DN 15-1200	ASTM A182-F316	CHVF	Check valve flgd	DN 80-600	Trim: AISI 316, PTFE
Fittings				GAVF	Gate valve flgd	DN 15-50	Body: ASTM A182-F316
CAPB	Cap bw	DN 15-600	ASTM A403-WP316L	GAVF	Gate valve flgd	DN 80-600	Trim: AISI 316 (L), Stellite
CAPB	Cap bw	DN 750-1200	ASTM A403-WP316	GANF	Gate valve n-ext flgd	DN 15-50	Body: ASTM A182-F316
E45B	Elbow 45 deg LR bw	DN 15-150	ASTM A403-WP316L	GANF	Gate valve n-ext flgd	DN 80-600	Trim: AISI 316, Stellite
E45B	Elbow 45 deg LR bw	DN 200-600	ASTM A403 Class WP-S/WX-316L	GLVF	Globe valve flgd	DN 15-50	Body: ASTM A182-F316
E45B	Elbow 45 deg LR bw	DN 750-1200	ASTM A403 WP316 cl WX	GLVF	Globe valve flgd	DN 80-200	Trim: AISI 316 (L), Stelite
E90B	Elbow 90 deg LR bw	DN 15-150	ASTM A403-WP316L	DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A182-F316
E90B	Elbow 90 deg LR bw	DN 200-600	ASTM A403 Class WP-S/WX-316L	DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Trim: AISI 316 (L), PTFE
E90B	Elbow 90 deg LR bw	DN 750-1200	ASTM A403 WP316 cl WX	NVFL	Needle valve flgd	DN 15-40	Body: ASTM A182-F316
TEEB	Tee equal bw	DN 15-600	ASTM A403-WP316L				Trim: AISI 316 (L), Stelite
TEEB	Tee equal bw	DN 750-1200	ASTM A403 WP316 cl WX				Body: ASTM A182-F316 (L)/ASTM A351-CF8M
Reducing fittings							Trim: AISI 316 (L), Stelite
BN3B	Branch fitting bw	DN 40-1200	ASTM A182-F316				Body: ASTM A182-F316
BNLF	Branch fitting flgd	DN 40-1200	ASTM A182-F316				Trim: AISI 316 (L), Stelite
BROB	Branch outlet bw	DN 400-1200	ASTM A182-F316				Body: ASTM A182-F316(A351-CF8M)
BRSB	Branch outlet bw	DN 150-1200	ASTM A182-F316				Trim: AISI 316, Stelite
CIWB	Contour insert welded-in bw	DN 900-1200	ASTM A182-F316				Body: ASTM A182-F316
RECB	Reducer concentric bw	DN 20-150	ASTM A403-WP316L				Trim: AISI 316 (L), Stelite
RECB	Reducer concentric bw	DN 200-600	ASTM A403 Class WP-S/WX-316L				Body: ASTM A182-F316/A351-CF8M
RECB	Reducer concentric bw	DN 750-1200	ASTM A403 WP316 cl WX				Trim: AISI 316 (L), Stelite
REEB	Reducer eccentric bw	DN 20-150	ASTM A403-WP316L				Body: ASTM A182-F316
REEB	Reducer eccentric bw	DN 200-600	ASTM A403 Class WP-S/WX-316L				Trim: AISI 316 (L), PTFE
REEB	Reducer eccentric bw	DN 750-1200	ASTM A403 WP316 cl WX				Body: ASTM A182-F316
TERB	Tee reducing bw	DN 20-600	ASTM A403-WP316L				Trim: AISI 316 (L), PTFE
TERB	Tee reducing bw	DN 750-1200	ASTM A403 WP316 cl WX				Body: ASTM A182-F316
Instruments							Trim: AISI 316 (L), Stelite
TWND	Thermowell flgd DN 40					DN 40-40	ASTM B564 UNS N04400
TWNS	Thermowell flgd DN 40 L=230 mm					--	ASTM B564 UNS N04400
TWNL	Thermowell flgd DN 40 L=255 mm					--	ASTM B564 UNS N04400

Metric units

Miscellaneous

GKMA	Gasket camprofile	DN 750-1200	AISI 316 (L), Graphite SS centring ring
GKSW	Gasket spiral wound	DN 15-600	AISI 316 (L), Graphite CS centring-/SS inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/AISI 316 (L) end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A182-F316
STBT	Studbolt with nuts	--	ASTM A193 GRADE B8M-CLASS 2/ASTM A194 GRADE 8M Coated with Xylan 1070 or Takecoat 1000
STYB	Strainer Y-type	DN 50-400	Sieve: AISI 316 (L)

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																				
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1050	1200	
Pipe																						
Pipe		743625 2																431	001	571		
Pipe		743625 3																			111	
Pipe		743625 4																				
Pipe	743633 0	181	261	331	491	571	651	731	821	911												
Pipe											031	151										
Pipe	743633 1																					
Pipe	743634 1																	271	371	471	571	771
Flanges																						
Blind flange	766510	3121	3141	3161	3181	3201	3221	3241	3261	3281	3301	3321	3341	3361	3381	3401	3421					
Blind flange	767114																	4061	4121	4181	4241	
Spacer ring	768877																	0031	0061	0091	0121	
Spacer ring	768915	4081	4121	4161	4181	4201	4221	4241	4261	4281	4301	4321	4341	4361	4381	4401	4441					
Spade	768897																	0031	0061	0091	0121	
Spade	768950	2521	2541	2561	2581	2601	2621	2641	2661	2681	2701	2721	2741	2761	2781	2801	2821					
Spectacle blind	768981	1581	1621	1661	1681	1701	1721	1741	1761	1781	1801	1821	1841	1861								
Welding neck flange	766579	2621	2641	2061	2081	2101	2121	2141	2161	2181	2201	2221	2241	2261	2281	2301	2321					
Welding neck flange	767182																	8101	8201	8301	8401	
Welding neck flange(900/1500)	766580																					
Welding neck flange(2500)	766583																					
Fittings																						
Cap bw	763319	2861	2961	3041	3241	3341	3541	3741	3931	4041	4171	4331	4471	4571	4671	4771	4871					
Cap bw	763326																	0371	1001	1571	2111	
Elbow 45 deg LR bw	763337	2861	2961	3041	3241	3341	3541	3741	3931	4041	4171	4331	4471	4571	4671	4771	4871					
Elbow 45 deg LR bw	763612																	0371	1001	1571	2111	
Elbow 90 deg LR bw	763341	2861	2961	3041	3241	3341	3541	3741	3931	4041	4171	4331	4471	4571	4671	4771	4871					
Elbow 90 deg LR bw	763631																	0371	1001	1571	2111	
Tee equal bw	763384	7861	7961	8041	8241	8341	8541	8741	8931	9041	9171	9331	9481	9571	9681	9791	9991					
Tee equal bw	763883																	0371	1001	1571	2111	

Metric units

PIPING COMPONENTS Item description	MESC	Nominal pipe size																			
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1050	1200
Valves																					
Ball valve float FB flgd	770325	5039	5049	5059	5079	5089	5109	5129	5139												
Ball valve float RB flgd	770325	0039	0049	0059	0079	0089	0109	0129	0449	0459	0469										
Ball valve trunn FB flgd	770373									5159	5169	5179	5189	5199	5209	5219	5239				
Ball valve trunn RB flgd	770373									0179	0189	0199	0209	0219	0239						
Butterfly valve triple of flgd	774426									0159	0169	0179	0189	0199	0209	0219	0239	0269	0299	0329	0349
Check valve dual plate flgd	776813									0159	0169	0179	0189	0199	0209	0219	0239	0269	0299	0329	0349
Check Valve Wafer Lug (Solid)	776856																				
Check valve flgd	771319	0039	0049	0059	0079	0099	0109	0129	0149	0159	0169	0179	0189	0199	0209	0219	0239				
Gate valve flgd	772305	0039	0049	0059	0079	0099	3109	3129	3149	3159	3169	3179	3189	3199	3209	3219	3239				
Gate valve n-ext flgd	772305	6039	6049	6059	6079	6099	6109	6129	6149	6159	6169	6179	6189	6199	6209	6219	6239				
Globe valve flgd	773305	0039	0049	0059	0079	0099	0109	0129	0149	0159											
Ball valve float FB n-ext flgd	770327	5039	5049	5059	5079	5089	5109	5129	5149												
Ball valve float RB n-ext flgd	770327	0039	0049	0059	0079	0089	0109	0129	0149	0159	0169										
Ball valve trunn FB n-ext flgd	770355									5159	5169	5179	5189	5199	5209	5219	5239				
Ball valve trunn RB n-ext flgd	770355									0179	0189	0199	0209	0219	0239						
Valve DBBT	XXXXXX																				
Valve DBBF	XXXXXX																				
Miscellaneous																					
Gasket camprofile	854190															0481	0541	0601	0661		
Gasket spiral wound	854136	3041	3061	3081	3121	3141	3181	3201	3241	3261	3281	3301	3321	3341	3361	3381	3421				
Meterrun	766496	0021	0041	0061	0081																
Orifice flange set	766592					4911	4931	4011	4021	4031	4041	4051	4061	4071	4081	4091	4101				
Strainer Y-type	768321					4021	4041	4061	4091	4131	4121	4201	4161	4191							

Metric units

REDUCING/PIPING COMPONENTS

Run	x	Br	CIWB	RECB	REEB	TERB
20	x	15		7633705661	7633725661	7633856181
25	x	15		7633705791	7633725791	7633856321
25	x	20		7633705891	7633725891	7633856371
40	x	15		7633705991	7633725991	
40	x	20		7633706191	7633726191	7633856491
40	x	25		7633706241	7633726241	7633856561
50	x	20		7636500901	7636630901	
50	x	25		7633706341	7633726341	7633856721
50	x	40		7633706441	7633726441	7633856831
80	x	40		7633706741	7633726741	
80	x	50		7633706841	7633726841	7633893521
100	x	40		7633706931	7633726931	
100	x	50		7633707041	7633727041	7633893681
100	x	80		7633707141	7633727141	7633893761
150	x	80		7633707441	7633727441	7633893841
150	x	100		7633707541	7633727541	7633893921
200	x	100		7633707641	7633727641	7633894001
200	x	150		7633707741	7633727741	7633894081
250	x	100		7636502501	7636632501	7633894161
250	x	150		7633707891	7633727891	7633894211
250	x	200		7633708031	7633728031	7633894261
300	x	150		7633708161	7633728161	7633894311
300	x	200		7633708271	7633728271	7633894361
300	x	250		7633708391	7633728391	7633894411
350	x	150		7636505301	7636635301	
350	x	200		7633708481	7633728481	7633894511
350	x	250		7633708511	7633728511	7633894561
350	x	300		7633708631	7633728631	7633894611

Thermowell flgd DN 40	
Length (mm)	MESC number
230	7683375111
255	7683375121
305	7683375131
355	7683375141
405	7683375151
455	7683375161

Metric units

REDUCING/PIPING COMPONENTS

Run	x	Br	CIWB	RECB	REEB	TERB
400	x	200		7633708691	7633728691	
400	x	250		7633708731	7633728731	7633894761
400	x	300		7633708781	7633728781	7633894811
400	x	350		7633708921	7633728921	7633894861
450	x	250		7636487141	7633728971	7633894961
450	x	300		7636487311	7633729001	7633895011
450	x	350		7636487481	7633729031	7633895061
450	x	400		7636487651	7633729141	7633895111
500	x	300		7636488161	7633729201	7633895261
500	x	350		7636488331	7633729231	7633895311
500	x	400		7636488501	7633729251	7633895361
500	x	450		7636488671	7633729351	7633895411
600	x	300				7633895511
600	x	350				7633895561
600	x	400		7636489411	7633729551	7633895611
600	x	450		7636489611	7633729651	7633895661
600	x	500		7636489751	7633729751	7633895711

Comp.name Description

BN3B	Branch fitting bw
BNLF	Branch fitting fgd
BROB	Branch outlet bw
BRSB	Branch outlet bw
CIWB	Contour insert welded-in bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Run	x	Br	CIWB	RECB	REEB	TERB	Run	x	Br	CIWB	RECB	REEB	TERB	
750	x	300				7638840131	1050	x	300	7680020161				
750	x	350				7638840231	1050	x	350	7680020241				
750	x	400				7638840331	1050	x	400		7638842141			
750	x	450				7638840431	1050	x	450		7638842241			
750	x	500				7638840531	1050	x	500		7638842341			
750	x	600				7638840631	1050	x	600		7638842441			
900	x	300	7680020701				1050	x	750			7638842741		
900	x	350	7680020781				1050	x	900	7636353041	7638473041	7638843041		
900	x	400				7638841111	1200	x	300	7680020171				
900	x	450				7638841211	1200	x	350	7680020251				
900	x	500				7638841311	1200	x	400	7680020321				
900	x	600				7638841411	1200	x	450	7680020381				
900	x	750				7638841711	1200	x	500	7680020431				
							1200	x	600			7638843771		
							1200	x	750			7638844071		
							1200	x	900			7638844371		
							1200	x	1050	7636354671	7638474671	7638844671		

Metric units

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BNLF	BN3B	BROB	BRSB
15	40	-	40	7680550511	7680316039	
15	50	-	50	7680550521	7680316059	
15	80	-	200	7680550531	7680316079	
15	250	-	900	7680550061	7672604349	
15	1050	-	1200	7680550051	7672604359	
20	50	-	50	7680550561	7680316199	
20	80	-	100	7680550571	7680316209	
20	150	-	300	7680550581	7680316219	
20	350	-	900	7680550111	7672604499	
20	1050	-	1200	7680550101	7672604509	
25	80	-	80	7680550611	7680316249	
25	100	-	100	7680550621	7680316259	
25	150	-	250	7680550631	7680316269	
25	300	-	900	7680550141	7672604549	
25	1050	-	1200	7680550151	7672604559	
40	80	-	80	7680550661	7680316299	
40	100	-	100	7680550671	7680316309	
40	150	-	150	7680550681	7680316319	
40	200	-	300	7680550691	7680316339	
40	350	-	600	7680550181	7680316359	
40	750	-	900	7680550191	7672604599	
40	1050	-	1200	7680550201	7672604609	
50	150	-	150			7679696381
50	200	-	250			7679696431
50	300	-	450			7679696451
50	500	-	900			7679696481
50	1050	-	1200			7678155131
80	200	-	200			7679696641
80	250	-	250			7679696661
80	300	-	350			7679696691
80	400	-	500			7679696711
80	600	-	600			7679696741
80	750	-	900			7678154201
80	1050	-	1200			7678155261

Metric units

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BNLF	BN3B	BROB	BRSB
100	300	-	350			7679696911
100	400	-	500			7679696931
100	600	-	900			7679696951
100	1050	-	1200			7678155391
150	350	-	350			7679697111
150	400	-	400			7679697131
150	450	-	450			7679697141
150	500	-	500			7679697151
150	600	-	600			7679697161
150	750	-	750			7678154461
150	900	-	900			7678154491
150	1050	-	1200			7678155521
200	400	-	400	7679684581		
200	450	-	450	7679684601		
200	500	-	500	7679684621		
200	600	-	600	7679684661		
200	750	-	750	7678150591		
200	900	-	900	7678151621		
200	1050	-	1050	7678152651		
200	1200	-	1200	7678153681		
250	500	-	500	7679684781		
250	600	-	600	7679684821		
250	750	-	750	7678150721		
250	900	-	900	7678151751		
250	1050	-	1050	7678152781		
250	1200	-	1200	7678153811		

Metric units

BOLTING**boltset std flange**

DN	nr	inch	x mm	MESC number
15	4	1/2	x 60	8138461549
20	4	1/2	x 70	8138461559
25	4	1/2	x 70	8138461559
40	4	1/2	x 80	8138461579
50	4	5/8	x 90	8138462719
80	4	5/8	x 100	8138462739
100	8	5/8	x 100	8138462739
150	8	3/4	x 110	8138463309
200	8	3/4	x 110	8138463309
250	12	7/8	x 120	8138464019
300	12	7/8	x 120	8138464019
350	12	1	x 140	8138464049
400	16	1	x 140	8138464049
450	16	1 1/8	x 150	8138465299
500	20	1 1/8	x 160	8138465309
600	20	1 1/4	x 180	8138465339
750	28	1 1/4	x 240	8138465439
900	32	1 1/2	x 290	8138460229
1050	36	1 1/2	x 300	8138460239
1200	44	1 1/2	x 320	8138460249

Boltset mrun fig

DN	nr	inch	x mm	MESC number
15	4	5/8	x 130	8138462789
20	4	5/8	x 130	8138462789
25	4	5/8	x 130	8138462789
40	4	3/4	x 140	8138463359

Boltset orificefig

DN	nr	inch	x mm	MESC number
50	8	5/8	x 130	8138462789
80	8	3/4	x 140	8138463359
100	8	3/4	x 150	8138463369
150	12	3/4	x 150	8138463369
200	12	7/8	x 170	8138464909
250	16	1	x 190	8138464799
300	16	1 1/8	x 210	8138464819
350	20	1 1/8	x 220	8138464829
400	20	1 1/4	x 230	8138465989
450	24	1 1/4	x 250	8138466029
500	24	1 1/4	x 260	8138466039
600	24	1 1/2	x 290	8138466089

Boltset blind/spc

DN	nr	inch	x mm	MESC number
15	4	1/2	x 70	8138461559
20	4	1/2	x 80	8138461579
25	4	1/2	x 80	8138461579
40	4	1/2	x 80	8138461579
50	4	5/8	x 100	8138462739
80	4	5/8	x 110	8138462729
100	8	5/8	x 110	8138462729
150	8	3/4	x 120	8138463330
200	8	3/4	x 120	8138463330
250	12	7/8	x 120	8138464019
300	12	7/8	x 120	8138464019
350	12	1	x 130	8138463349
400	16	1	x 130	8138464049
450	16	1 1/8	x 140	8138464049
500	20	1 1/8	x 150	8138464099
600	20	1 1/4	x 170	8138464749
750	28	1 1/4	x 180	8138460129
900	32	1 1/2	x 200	8138460149
1050	36	1 1/2	x 220	8138465979
1200	44	1 1/2	x 280	8138466109
150	8	3/4	x 280	8138466109
200	8	3/4	x 300	8138467029
250	12	7/8	x 300	8138467059
300	12	1	x 320	8138467079

Boltset for Dual Plate Solid Lug Wafer**Check Valve**

DN	nr	inch	x mm	MESC number
50	4	5/8	x 150	8138462819
80	4	5/8	x 180	8138462859
100	8	5/8	x 180	8138462859
150	8	3/4	x 210	8138463459
200	8	3/4	x 250	8138463539
250	12	7/8	x 280	8138464309
300	12	7/8	x 310	8138464369

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7665103121
Welding neck flange	1	7665792621
Gasket spiral wound	1	8541363041
Studbolt with nuts	4	<u>8138461539</u>

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7665103141
Gasket spiral wound	1	8541363061
Studbolt with nuts	4	<u>8138461529</u>

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7665103141
Welding neck flange	1	7665792641
Gasket spiral wound	1	8541363061
Studbolt with nuts	4	<u>8138461529</u>

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7665103161
Gasket spiral wound	1	8541363081
Studbolt with nuts	4	<u>8138461529</u>

Drain or vent point DN 40 Fig.H DN350 - 1200

Branch: branch nipple flanged

Blind flange	1	7665103181
Gasket spiral wound	1	8541363121
Studbolt with nuts	4	<u>8138461569</u>

Temp instr conn DN 40 Fig.NL DN150 - 1200

Branch: branch nipple flanged

Lap joint flange	1	7665204181
Gasket spiral wound	1	8541363121
Thermowell flgd DN 40 L=255 mm	1	7683375121
Studbolt with nuts	4	<u>8138461589</u>

Temp instr conn DN 40 Fig.NS DN80 - 100

Branch: branch nipple flanged

Lap joint flange	1	7665204181
Gasket spiral wound	1	8541363121
Thermowell flgd DN 40 L=230 mm	1	7683375111
Studbolt with nuts	4	<u>8138461589</u>

CLASS 013842-X

Design limits**Temperature (°C)**

-29	0	50	75	100	125	150
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Pressure (Barg) /FV

DN 15-900	20.0	20.0	19.5	18.6	17.7	16.7	15.8
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 2.8
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class range DN 15 [NPS 1/2] up to/incl DN 600[NPS 24] design meets full vacuum at ambient condition For DN 650 [NPS 26] to 900 [NPS 36], if vacuum condition can occur, piping to be designed accordingly
- Min./Max. temperature of piping class and min./max. specified application temperature of plug valve lubricant have been aligned.
- Where two options are given for pipe, welded pipe is normally the most economic choice
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Alternate super duplex material grade UNS S32750 may be used. Design limits have been verified with ASME B31.3.
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Select plug valves where service is loaded with mildly abrasive particles.
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.
- Non-commercial sizes (such as DN 650) are project specific and shall not be used as standard unless proven suitable economically.

Table of schedules**DN| Schedule**

15	40S
20	40S
25	10S
40	10S
50	10S
80	10S
100	10S
150	10S
200	10S
250	10S
300	10S
350	10S
400	10S
450	10S
500	10S
600	10S
650	10S
700	10S
750	10S

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	650	700	750	900
900	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
750	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
700	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
650	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
600	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
500	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
450	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
400	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
350	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
300	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
250	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
200	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
150	C	C	C	C	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
100	C	C	C	C	B	B	B	B	B	B	B	B	B	B	A					
80	C	C	C	C	B	B	B	B	B	B	B	B	B	B	A					
50	C	C	B	B	B	B	B	B	B	B	B	B	B	B	A					
40	C	B	B	B	B	B	B	B	B	B	B	B	B	B	A					
25	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A					
20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A					
15															A					

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
C	Branch fitting
E	Branch outlet

Super Duplex SS steel Sour

Class no.	013842-X
ASME rating	CLASS 150
Corrosion allowance	0 mm
Revision letter	
Revision date	

Plant
Consignee
Engineered by
Principal
Contr. job no.
Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe				Valves			
PIPE	Pipe	DN 15-100	ASTM A790 UNS S32760	BAFF	Ball valve float FB fgd	DN 15-150	Body: ASTM A182-F55
PIPE	Pipe	DN 150-900	ASTM A790/A928 cl 1UNS S32760	BARF	Ball valve float RB fgd	DN 15-250	Trim: Super Duplex, PTFE
Flanges							
BLFL	Blind flange	DN 15-600	ASTM A182-F55	BTFF	Ball valve trunn FB fgd	DN 200-600	Body: ASTM A182-F55/A995-6A
BLFL	Blind flange	DN 650-900	ASTM A182-F55	BTRF	Ball valve trunn RB fgd	DN 300-600	Trim: Super Duplex, filled PTFE
LJFL	Lap joint flange	--	ASTM A182-F55	BUTF	Butterfly valve triple of fgd	DN 200-600	Body: ASTM A182-F55/A995-6A
SBNF	Spectacle blind	DN 15-400	ASTM A240 UNS S32760	CHDF	Check valve dual plate Solid Wafer lug / fgd	DN 50-600	Trim: Super Duplex, filled PTFE
SPNF	Spade	DN 15-600	ASTM A240 UNS S32760	CHVF	Check valve fgd	DN 15-50	Body: ASTM A182-F55/ ASTM A995-6A
SRNF	Spacer ring	DN 15-600	ASTM A240 UNS S32760	CHVF	Check valve fgd	DN 80-600	Trim: Super Duplex, Stellite 21
WNFL	Welding neck flange	DN 15-600	ASTM A182-F55	GAVF	Gate valve fgd	DN 15-50	Body: ASTM A182-F53/55
WNFL	Welding neck flange	DN 650-900	ASTM A182-F55	GAVF	Gate valve fgd	DN 80-600	Trim: Super Duplex, Stellite 21
Fittings							
CAPB	Cap bw	DN 15-600	ASTM A815 WP-S UNS S32760	GLVF	Globe valve fgd	DN 15-50	Body: ASTM A182-F53/55
E45B	Elbow 45 deg LR bw	DN 15-100	ASTM A815 WP-S UNS S32760	GLVF	Globe valve fgd	DN 80-600	Trim: Super Duplex, Stellite 21
E45B	Elbow 45 deg LR bw	DN 150-600	ASTM A815 WP-S/WX UNS S32760	DBBT	Valve ass double block ball & bleed fgd/thrd	DN 15-50	Body: ASTM A182-F55/A995-6A
E90B	Elbow 90 deg LR bw	DN 15-100	ASTM A815 WP-S UNS S32760	DBBF	Valve ass double block ball & bleed fgd	DN 15-50	Trim: Super Duplex, Stellite 21
E90B	Elbow 90 deg LR bw	DN 150-600	ASTM A815 WP-S/WX UNS S32760	NVFL	Needle valve fgd	DN 15-40	Body: ASTM A182 F55
TEEB	Tee equal bw	DN 15-600	ASTM A815 WP-S UNS S32760	PLL	Plug valve fgd lub.inv.regul	DN 150-250	Trim: UNS S32760,Stellite 21
BN3B	Branch fitting bw	DN 40-900	ASTM A182-F55	PLLS	Plug valve fgd lub.inv.short	DN 15-100	Body: ASTM A182-F55/A995-6A
BNLF	Branch fitting fgd	DN 40-900	ASTM A182-F55	PLLV	Plug valve fgd lub.inv.ventur	DN 300-600	Trim: Super Duplex, ENP
BROB	Branch outlet bw	DN 400-900	ASTM A182-F55				Body: ASTM A182-F55/A995-6A
BRSB	Branch outlet bw	DN 150-900	ASTM A182-F55				Trim: Super Duplex, ENP
RECB	Reducer concentric bw	DN 150-900	ASTM A815 WP-S/WX UNS S32760				Body: ASTM A182-F55/A995-6A
RECB	Reducer concentric bw	DN 20-100	ASTM A815 WP-S UNS S32760				Trim: Super Duplex, ENP
REEB	Reducer eccentric bw	DN 150-900	ASTM A815 WP-S/WX UNS S32760				Body: ASTM A182-F55/A995-6A
REEB	Reducer eccentric bw	DN 20-100	ASTM A815 WP-S UNS S32760				Trim: Super Duplex, ENP
TERB	Tee reducing bw	DN 20-600	ASTM A815 WP-S UNS S32760				Body: ASTM A182-F55/A995-6A
TERB	Tee reducing bw	DN 650-900	ASTM A815 WP-S/WX UNS S32760				Trim: Super Duplex, ENP

Instruments

TWND	Thermowell fgd DN 40	DN 40-40	ASTM A182-F55
TWNS	Thermowell fgd DN 40 L=230 mm	--	ASTM A182-F55
TWNL	Thermowell fgd DN 40 L=255 mm	--	ASTM A182-F55

Miscellaneous

GKMA	Gasket camprofile or approved equal	DN 650-900	6Mo, Graphite SS centring ring
GKSW	Gasket spiral wound	DN 15-600	6Mo, Graphite CS centring ring/6Mo inner ring
GKIK	Insulating Gasket kit	DN 15-150	(G-10/11) with 316 SS CORE, PTFE SS Pres Enrg Spirl Spring
MTRR	Meterrun	DN 15-40	ASTM A182-F55/A790 UNS S32760
ORFS	Orifice flange set	DN 50-600	ASTM A182-F55
STBT	Studbolt with nuts	--	ASTM A193-B7M/A194-2HM Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-1)	DN 50	BODY: ASTM A182-F55 VALVE & INTERNALS: Super Duplex
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-1)	DN 50	BODY: ASTM A182-F55 VALVE & INTERNALS: Super Duplex
HSCL	Hose Coupling Flgd / Female Conn.	DN 15-50	AISI 316 (L)

Notes for Special Fittings

1. Retrievable Tee Type With Solid Plug Assembly, Heavy SS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																			
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	650	700	750	900
Pipe																					
Pipe	743662 0	361	461	541	741	841															
Pipe	743662 1				041		241	431	531	661	821	981									
Pipe	743662 2																131	311	461	611	
																		829	859		
Flanges																					
Blind flange	766615	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321		0359	0389	
Spacer ring	768914	7521	7541	7561	7581	7601	7621	7641	7661	7681	7701	7721	7741	7761	7781	7801	7821		7859	7889	
Spade	768952	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321		0359	0389	
Spectacle blind	768985	0021	0041	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261							
Welding neck flange	766632	0341	0361	0061	0081	0101	0121	0141	0161	0181	0201	0221	0241	0261	0281	0301	0321		0359	0389	
Welding neck flange	766632																				
Fittings																					
Cap bw	763608	0361	0461	0541	0741	0841	1041	1241	1431	1531	1661	1821	1981	2131	2311	2461	2611		2819	2919	
Elbow 45 deg LR bw	763617	0361	0461	0541	0741	0841	1041	1241	1431	1531	1661	1821	1981	2131	2311	2461	2611		2819	2919	
Elbow 90 deg LR bw	763627	0361	0461	0541	0741	0841	1041	1241	1431	1531	1661	1821	1981	2131	2311	2461	2611		2819	2919	
Tee equal bw	763675	0361	0461	0541	0741	0841	1041	1241	1431	1531	1661	1821	1981	2131	2311	2461	2611		2819	2919	

Metric units

PIPING COMPONENTS Item description	MESC	Nominal pipe size																	
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900
Valves																			
Ball valve float FB fffd	770545	5039	5049	5059	5079	5089	5109	5129	5149										
Ball valve float RB fffd	770545	0039	0049	0059	0079	0089	0109	0129	0149	0159	0169								
Ball valve trunn FB fffd	770537									5159	5169	5179	5189	5199	5209	5219	5239		
Ball valve trunn RB fffd	770537									0179	0189	0199	0209	0219	0239				
Butterfly valve triple of fffd	774471									3159	3169	3179	3189	3199	3209	3219	3239		
Check valve dual plate fffd	776809									3159	3169	3179	3189	3199	3209	3219	3239		
Check Valve Wafer Lug (Solid)	776839																		
Check valve fffd	771342	3039	3049	3059	3079	0099	3109	3129	3149	3159	3169	3179	3189	3199	3209	3219	3239		
Gate valve fffd	772345	0039	0049	0059	0079	0099	6109	6129	6149	6159	6169	6179	6189	6199	6209	6219	6239		
Globe valve fffd	773343	0039	0049	0059	0079	0099	6109	6129	6149	6159									
Plug valve fffd lub.inv.regul	777108									0149	0159	0169							
Plug valve fffd lub.inv.short	777108	0039	0049	0059	0079	0089	0109	0129											
Plug valve fffd lub.inv.ventur	777108									0179	0189	0199	0209	0219	0239				
Valve DBBT	778553	5039	5049	5059	5079	5089													
Valve DBBF	778548	5039	5049	5059	5079	5089													
Miscellaneous																			
Gasket camprofile	854158															0459	0489		
Gasket spiral wound	854158	0041	0061	0081	0121	0141	0181	0201	0241	0261	0281	0301	0321	0341	0361	0381	0421		
Insulating Gasket Kit	854609	0161				0541			021										
Meterrun	766596	8421	8441	8461	8481														
Orifice flange set	766691					0811	0831	0011	0021	0031	0041	0051	0071	0091	0111	0131	0151		

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
20	x	15	7636440031	7636590031	7636930031
25	x	15	7636440251	7636590251	7636930251
25	x	20	7636440411	7636590411	7636930411
40	x	15	7636440571	7636590571	
40	x	20	7636440751	7636590751	7636930751
40	x	25	7636440861	7636590861	7636930861
50	x	20	7636441071	7636591071	
50	x	25	7636441201	7636591201	7636931201
50	x	40	7636441361	7636591361	7636931361
80	x	40	7636441521	7636591521	
80	x	50	7636441701	7636591701	7636931701
100	x	40	7636441861	7636591861	
100	x	50	7636442051	7636592051	7636932051
100	x	80	7636442241	7636592241	7636932241
150	x	80	7636442431	7636592431	7636932431
150	x	100	7636442601	7636592601	7636932601
200	x	100	7636442801	7636592801	7636932801
200	x	150	7636443041	7636593041	7636933041
250	x	100	7636443241	7636593241	7636933281
250	x	150	7636443511	7636593511	7636933511
250	x	200	7636443741	7636593741	7636933741
300	x	150	7636444091	7636594091	7636934091
300	x	200	7636444361	7636594361	7636934361
300	x	250	7636444701	7636594701	7636934701
350	x	150	7636445041	7636595041	
350	x	200	7636445301	7636595301	7636935301
350	x	250	7636445631	7636595631	7636935631
350	x	300	7636445961	7636595961	7636935961

Thermowell flgd DN 40	
Length (mm)	MESC number
230	7683378211
255	7683378221
305	7683378231
355	7683378241
405	7683378251
455	7683378261

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
400	x	200	7636446311	7636596311	
400	x	250	7636446481	7636596481	7636936481
400	x	300	7636446651	7636596651	7636936651
400	x	350	7636446821	7636596821	7636936821
450	x	250	7636447141	7636597141	7636937141
450	x	300	7636447311	7636597311	7636937311
450	x	350	7636447481	7636597481	7636937481
450	x	400	7636447651	7636597651	7636937651
500	x	300	7636448161	7636598161	7636938161
500	x	350	7636448331	7636598331	7636938331
500	x	400	7636448501	7636598501	7636938501
500	x	450	7636448671	7636598671	7636938671
600	x	300			7636939011
600	x	350			7636939211
600	x	400	7636449411	7636599411	7636939411
600	x	450	7636449611	7636599611	7636939611
600	x	500	7636449811	7636599811	7636939811
750	x	400	7636449769	7636599769	7636939769
750	x	500			7636935979
900	x	600	7636449999	7636599999	7636939999

Comp.name Description

BN3B	Branch fitting bw
BNLF	Branch fitting fgd
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BNLF	BN3B	BROB	BRSB
15	40	-	40	7680557511	7680322629	
15	50	-	50	7680557521	7680322639	
15	80	-	200	7680557531	7680322649	
15	250	-	600	7680557551	7672654349	
20	50	-	50	7680557561	7680322669	
20	80	-	100	7680557571	7680322679	
20	150	-	300	7680557581	7680322689	
20	350	-	600	7680557601	7672654499	
25	80	-	80	7680557611	7680322719	
25	100	-	100	7680557621	7680322729	
25	150	-	250	7680557631	7680322739	
25	300	-	600	7680557651	7672654549	
40	80	-	80	7680557661	7680322769	
40	100	-	100	7680557671	7680322779	
40	150	-	150	7680557681	7680322789	
40	200	-	300	7680557691	7680322799	
40	350	-	600	7680557711	7680322809	
50	150	-	150			7679795091
50	200	-	250			7679795041
50	300	-	450			7679795051
50	500	-	600			7679795111
80	200	-	200			7679795151
80	250	-	250			7679795141
80	300	-	350			7679795161
80	400	-	500			7679795171
80	600	-	600			7679795181

Metric units

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BNLF	BN3B	BROB	BRSB
100	300	-	350			7679795221
100	400	-	500			7679795231
100	600	-	600			7679795241
150	350	-	350			7679795251
150	400	-	400			7679795271
150	450	-	450			7679795281
150	500	-	500			7679795291
150	600	-	600			7679795301
200	400	-	400			7679794581
200	450	-	450			7679794601
200	500	-	500			7679794621
200	600	-	600			7679794661
250	500	-	500			7679794781
250	600	-	600			7679794821
300	750	-	750	7679793099		
400	900	-	900	7679793129		

Metric units

BOLTING**Coated boltset std flange**

DN	nr	inch	x mm	MESC number
15	4	1/2	x 60	8138170239
20	4	1/2	x 70	8138170259
25	4	1/2	x 70	8138170259
40	4	1/2	x 80	8138170279
50	4	5/8	x 90	8138170759
80	4	5/8	x 100	8138170779
100	8	5/8	x 100	8138170779
150	8	3/4	x 110	8138171439
200	8	3/4	x 110	8138171439
250	12	7/8	x 120	8138172169
300	12	7/8	x 120	8138172169
350	12	1	x 140	8138172999
400	16	1	x 140	8138172999
450	16	1 1/8	x 150	8138173849
500	20	1 1/8	x 160	8138173869
600	20	1 1/4	x 180	8138174709
650	24	1 1/4	x 220	xxxxxxxxxx
700	28	1 1/4	x 230	xxxxxxxxxx
750	28	1 1/4	x 240	8138174829
900	32	1 1/2	x 290	8138176419

Coated boltset blind/spc

DN	nr	inch	x mm	MESC number
15	4	1/2	x 70	8138170259
20	4	1/2	x 80	8138170279
25	4	1/2	x 80	8138170279
40	4	1/2	x 80	8138170279
50	4	5/8	x 100	8138170779
80	4	5/8	x 110	8138170799
100	8	5/8	x 110	8138170799
150	8	3/4	x 120	8138171459
200	8	3/4	x 130	8138171479
250	12	7/8	x 140	8138172209
300	12	7/8	x 150	8138172229
350	12	1	x 170	8138173059
400	16	1	x 170	8138173059
450	16	1 1/8	x 180	8138173909
500	20	1 1/8	x 200	8138173949
600	20	1 1/4	x 220	8138174789
650	24	1 1/4	x 260	xxxxxxxxxx
700	28	1 1/4	x 260	xxxxxxxxxx

Coated boltset mrun flg

DN	nr	inch	x mm	MESC number
15	4	5/8	x 130	8138170839
20	4	5/8	x 130	8138170839
25	4	5/8	x 130	8138170839
40	4	3/4	x 140	8138171499

Coated boltset for Dual Plate Solid Lug

DN	nr	inch	x mm	MESC number
750	28	1 1/4	x 280	8138174909
900	32	1 1/2	x 340	8138176519

Wafer Check Valve

DN	nr	inch	x mm	MESC number
50	4	5/8	x 150	8138170879
80	4	5/8	x 180	8138170939
100	8	5/8	x 180	8138170939
150	8	3/4	x 210	8138171639

DN	nr	inch	x mm	MESC number
50	8	5/8	x 130	8138170839
80	8	3/4	x 140	8138171499
100	8	3/4	x 150	8138171519
150	12	3/4	x 150	8138171519
200	12	7/8	x 170	8138172269
250	16	1	x 190	8138173099
300	16	1 1/8	x 210	8138173969
350	20	1 1/8	x 220	8138173989
400	20	1 1/4	x 230	8138174809
450	24	1 1/4	x 250	8138174849
500	24	1 1/4	x 260	8138174869
600	24	1 1/2	x 290	8138176419

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Gasket spiral wound	1	8541580041
Blind flange	1	7666150021
Welding neck flange	1	7666320341
Studbolt with nuts	4	8138170239

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Gasket spiral wound	1	8541580061
Blind flange	1	7666150041
Studbolt with nuts	4	8138170259

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Gasket spiral wound	1	8541580061
Blind flange	1	7666150041
Welding neck flange	1	7666320361
Studbolt with nuts	4	8138170259

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Gasket spiral wound	1	8541580081
Blind flange	1	7666150061
Studbolt with nuts	4	8138170259

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Gasket spiral wound	1	8541580121
Blind flange	1	7666150081
Studbolt with nuts	4	8138170279

Temp instr conn DN 40 Fig.NS DN80 - 100

Branch: branch nipple flanged

Gasket spiral wound	1	8541580121
Lap joint flange	1	7665218731
Thermowell fild DN 40 L=230 mm	1	7683378211
Studbolt with nuts	4	8138170299

Temp instr conn DN 40 Fig.NL DN150 - 600

Branch: branch nipple flanged

Gasket spiral wound	1	8541580121
Lap joint flange	1	7665218731
Thermowell fild DN 40 L=255 mm	1	7683378221
Studbolt with nuts	4	8138170299

CLASS 016620-X

Metric units

Design limits

Temperature (°C)	-50	0	50	75	100	125	150	
Pressure (Barg)	DN 15-100	20.0	20.0	19.5	18.6	17.7	16.7	15.8
	DN 150-1050	19.6	19.6	19.2	18.4	17.7	16.7	15.8

Notes

- DN 15-100 [NPS 1/2 - 4]: Design limits acc. to ASME B16.5 flange rating mat. grp 3.8
- DN 150-750 [NPS 8 - 30]: Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class contains a combination of solid and carbon steel with clad material
- Piping class range DN 15 [NPS 1/2] up to incl DN 600 [NPS 24] design meets full vacuum at ambient condition
For DN 700 [NPS 28] & Above, if vacuum condition can occur, piping to be designed accordingly.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Piping wall thicknesses shall be validated over and above specified wall thicknesses, in case cladding / weld overlay is not practical by approved cladding / weld overlay vendors.
- Welding branches on Alloy 825 cladded pipes shall be prefabricated by cladding vendor.
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.
- Solid Alloy825 reducing fittings (i.e. TERB, REEB, RECB) shall be used for all possible sizes e.g. 10"x4", 8"x4", 6"x4", 6"x3" wherever transition between solid versus cladded CRA fitting is required. The thickness of large end shall meet the main run pipe and smaller end with solid CRA thickness.
- Non-commercial sizes (such as DN 700) are project specific and shall not be used as standard unless proven suitable economically

Table of schedules

Solid Alloy825 DN	Cladded Base Material LTCS Schedule
15 40S	150 40
20 40S	200 20
25 10S	250 20
40 10S	300 20
50 10S	350 20
80 10S	400 20
100 10S	450 20
	500 20
	600 20
	700 7.92mm
	750 STD
	900 STD
	HOLD-7

Branch connections 90 degrees

Branch size	Run 15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1050
1050	-	-	-	-	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
900	-	-	-	-	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
750	-	-	-	-	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
700	-	-	-	-	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
600	-	-	-	-	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
500	-	-	-	-	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
450	-	-	-	-	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
400	-	-	-	-	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
350	-	-	-	-	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
300	-	-	-	-	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
250	-	-	-	-	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
200	-	-	-	-	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A
150	C	C	C	C	E	E	B	B	A											
100	C	C	C	C	B	B	A													
80	C	C	C	C	B	A														
50	C	C	B	B	A															
40	C	B	B	A																
25	B	B	A																	
20	B	A																		
15	A																			

Code	Explanation of characters
-	Not applicable
A	Equal tee BW
B	Reducing tee BW
C	Branch fitting
E	Branch outlet

Alloy 825 LT Sour	Plant
Class no. 016620-X	Consignee
ASME rating CLASS 150	Engineered by
Corrosion allowance 0 mm	Principal
Revision letter	Contr. job no.
Revision date	Project no.

Metric units

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-100	ASTM B423 UNS N08825
PIPE	Pipe	DN 150-1050	ASTM A333-6/A671-CC65 cl 22 + Clad UNS N08825

Flanges

BLFL	Blind flange	DN 15-100	ASTM B564 UNS N08825
BLFL	Blind flange	DN 150-1050	ASTM A350-LF2 cl 1 + Clad UNS N08825
LJFL	Lap joint flange	--	ASTM B564 UNS N08825
SBNF	Spectacle blind	DN 15-400	ASTM B424 UNS N08825
SPNF	Spade	DN 15-600	ASTM B424 UNS N08825
SRNF	Spacer ring	DN 15-600	ASTM B424 UNS N08825
WNFL	Welding neck flange	DN 15-100	ASTM B564 UNS N08825
WNFL	Welding neck flange	DN 150-1050	ASTM A350-LF2 cl 1 + Clad UNS N08825
WNFL1	Welding neck flange (F/F)	DN 50-300	ASTM B564 UNS N08825 / ASTM A350-LF2 cl 1 + Clad UNS N08825
WNFL2	Welding neck flange 300#	DN 600	ASTM A350-LF2 cl 1 + Clad UNS N08825

Fittings

CAPB	Cap bw	DN 15-100	ASTM B366-WPNICMC
CAPB	Cap bw	DN 150-600	ASTM A420-WPL6 + Clad UNS N08825
CAPB	Cap bw	DN 650-1050	ASTM A420-WPL6W + Clad UNS N08825
E45B	Elbow 45 deg LR bw	DN 15-100	ASTM B366-WPNICMC
E45B	Elbow 45 deg LR bw	DN 150-600	ASTM A420-WPL6 + Clad UNS N08825
E45B	Elbow 45 deg LR bw	DN 650-1050	ASTM A420-WPL6W + Clad UNS N08825
E90B	Elbow 90 deg LR bw	DN 15-100	ASTM B366-WPNICMC
E90B	Elbow 90 deg LR bw	DN 150-600	ASTM A420-WPL6 + Clad UNS N08825
E90B	Elbow 90 deg LR bw	DN 650-1050	ASTM A420-WPL6W + Clad UNS N08825
TEEB	Tee equal bw	DN 15-100	ASTM B366-WPNICMC
TEEB	Tee equal bw	DN 150-600	ASTM A420-WPL6 + Clad UNS N08825
TEEB	Tee equal bw	DN 650-1050	ASTM A420-WPL6W + Clad UNS N08825

Reducing fittings

BN3B	Branch fitting bw	DN 40-100	ASTM B564 UNS N08825
BNLF	Branch fitting fgd	DN 40-100	ASTM B564 UNS N08825
BROB	Branch outlet bw	DN 400-1050	ASTM A350-LF2 cl 1 + Clad UNS N08825
BRSB	Branch outlet bw	DN 150-1050	ASTM B564 UNS N08825
RECB	Reducer concentric bw	DN 20-350	ASTM B366-WPNICMC
RECB	Reducer concentric bw	DN 200-600	ASTM A420-WPL6 + Clad UNS N08825
RECB	Reducer concentric bw	DN 650-1050	ASTM A420-WPL6W + Clad UNS N08825
REEB	Reducer eccentric bw	DN 20-350	ASTM B366-WPNICMC
REEB	Reducer eccentric bw	DN 200-600	ASTM A420-WPL6 + Clad UNS N08825
REEB	Reducer eccentric bw	DN 650-1050	ASTM A420-WPL6W + Clad UNS N08825
TERB	Tee reducing bw	DN 20-250	ASTM B366-WPNICMC
TERB	Tee reducing bw	DN 200-600	ASTM A420-WPL6 + Clad UNS N08825
TERB	Tee reducing bw	DN 650-1050	ASTM A420-WPL6W + Clad UNS N08825

Valves

BAFF	Ball valve float FB fgd	DN 15-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825, PTFE Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, PTFE
BARF	Ball valve float RB fgd	DN 15-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825, PTFE Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, PTFE
BARF	Ball valve float RB fgd	DN 150	Body: ASTM B564 UNS N08825 Trim: Alloy 825, PTFE Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, PTFE
BTFF	Ball valve trunn FB fgd	DN 200-1050	Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, filled PTFE Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, filled PTFE
BTRF	Ball valve trunn RB fgd	DN 200-1050	Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, filled PTFE Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, filled PTFE
BUTF	Butterfly valve triple of fgd	DN 150-600	Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, Stellite 6 Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, Stellite 6
CHVF	Check valve fgd	DN 15-50	Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6 Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6
CHVF	Check valve fgd	DN 80-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6 Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6
CHVF	Check valve fgd	DN 150-1050	Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, Stellite 6 Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, Stellite 6
CHDF	Check valve dual plate Solid Wafer lug / fgd	DN 50-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6 Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, Stellite 6
CHDF	Check valve Dual Plate Solid Wafer lug / fgd	DN 150-1050	Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, Stellite 6 Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, Stellite 6
GAVF	Gate valve fgd	DN 15-50	Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6 Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6
GAVF	Gate valve fgd	DN 80-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6 Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6
GAVF	Gate valve fgd	DN 150-1050	Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, Stellite 6 Body: ASTM A350-LF2/A352-LCC + Clad UNS N08825 Trim: Alloy 825, Stellite 6
GLVF	Globe valve fgd	DN 15-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6 Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6
GLVF	Globe valve fgd	DN 150-200	Body: ASTM A350-LF2/ ASTM A352-LCC + Clad UNS N08825 Trim: Alloy 825, Stellite 6 Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6
DBBT	Valve ass double block ball fgd/thd	DN 15-50	Body: ASTM B564 UNS N08825 Trim: Alloy 825, PTFE Body: ASTM B564 UNS N08825 Trim: Alloy 825, PTFE
DBBF	Valve ass double block ball fgd	DN 15-50	Body: ASTM B564 UNS N08825 Trim: Alloy 825, PTFE Body: ASTM B564 UNS N08825 Trim: Alloy 825, PTFE
NVFL	Needle valve fgd	DN 15-40	Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6 Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6

Metric units

Instruments

TWND	Thermowell flgd DN 40	DN 40-40	ASTM B564 UNS N08825
TWNL	Thermowell flgd DN 40 L=255 mm	--	ASTM B564 UNS N08825
TWNS	Thermowell flgd DN 40 L=230 mm	--	ASTM B564 UNS N08825

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	Alloy 825, Graphite CS centring-/Alloy 825 inner ring
GKMA	Gasket camprofile or approved equal	DN 700-1050	Alloy 825, Graphite SS centring ring
GKIK	Insulating Gasket kit	DN 15-1050	(G-10/11) with 316 SS CORE, PTFE SS Pres Engg Spirl Spring
MTRR	Meter run	DN 15-40	Alloy 825
ORFS	Orifice flange set	DN 50-600	ASTM B564 UNS N08825
STBT	Studbolt with nuts	--	ASTM A320-L7M/A194-7M
STYB	Strainer Y-type	DN 50-400	(Coated with Xylan 1070 or Takecoat 1000) Sieve: Alloy 825. Body: ASTM B564 UNS N08825 / A352-LCC + Clad UNS N08825

Special Fittings

AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-1)	DN 50	BODY: ALLOY 825 VALVE & INTERNALS: ALLOY 825
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-1)	DN 50	BODY: ALLOY 825 VALVE & INTERNALS: ALLOY 825
HSCL	Hose Coupling Flgd / Female Conn.	DN 15-50	AISI 316 (L) / Aluminium Bronze

Notes for Special Fittings

1. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																		
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900
Pipe																				
Pipe	747861 0	181	261	331	491	571	651	751												
Pipe	749100 0								851											
Pipe	749100 1									041	281	531	821							
Pipe	749100 2																			
Pipe	749100 3																	051		
Pipe	749101 1																		079	
Flanges																				
Blind flange	766000	0011	0021	0031	0041	0051	0061	0071												
Blind flange	769127								0089											
Blind flange	769126									0091	0101	0111	0121	0131	0141	0151	0161			0189
Spacer ring	768926	8021	8031	8041	8051	8061	8071	8081	8091	8101	8111	8121	8131	8141	8151	8161	8171			
Spade	768958	0021	0031	0041	0051	0061	0071	0081	0091	0101	0111	0121	0131	0141	0151	0161	0171			
Spectacle blind	768996	0021	0031	0041	0051	0061	0071	0081	0091	0101	0111	0121	0131	0141						
Welding neck flange	766078	0221	0231	0031	0051	0061	0081	0101		0009										
Welding neck flange	769140									0011	0021	0031	0041	0051	0061	0071	0091			0189
Welding neck flange	769139																			
Welding neck flange (300#)	769140																	1909		
Welding neck flange (F/F)	769142									0019	0029	0039	0049	0059	0069	0079				
Fittings																				
Cap bw	762817	0361	0461	0541	0741	0841	1041	1241		0851										
Cap bw	769112									1041	1281	1521	1821	2141	2451	2751	3051			
Cap bw	769113																	3079		
Elbow 45 deg LR bw	762837	0361	0461	0541	0741	0841	1041	1241		0851										
Elbow 45 deg LR bw	769117									1041	1281	1521	1821	2141	2451	2751	3051			
Elbow 45 deg LR bw	769118																	3079		
Elbow 90 deg LR bw	762842	0361	0461	0541	0741	0841	1041	1241		0851										
Elbow 90 deg LR bw	769122									1041	1281	1521	1821	2141	2451	2751	3051			
Elbow 90 deg LR bw	769123																	3079		
Tee equal bw	762887	0361	0461	0541	0741	0841	1041	1241		0851										
Tee equal bw	769183									1041	1281	1521	1821	2141	2451	2751	3051			
Tee equal bw	769184																	3079		

Metric units

PIPING COMPONENTS Item description	Nominal pipe size MESC																			
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	1050
Valves																				
Ball valve float FB fgd	770655	5039	5049	5059	5079	5089	5109	5129												
Ball valve float FB fgd	770062																			
Ball valve float RB fgd	770655	0039	0049	0059	0079	0089	0109	0129												
Ball valve float RB fgd	770062																			
Ball valve trunn FB fgd	770092																			
Ball valve trunn RB fgd	770092																			
Butterfly valve triple of fgd	774155																			
Check valve dual plate fgd	776724																			
Check Valve Wafer Lug (Solid)	776998																			
		0099	3109	3129																
Check valve fgd	771053																			
Check valve fgd	771640	0039	0049	0059	0079	0099	3109	3129												
Gate valve fgd	772056																			
Gate valve fgd	772641	6039	6049	6059	6079	6089	3109	3129												
Globe valve fgd	773055																			
Globe valve fgd	773641	0039	0049	0059	0079	0099	3139	3129												
Valve DBBT	778568	5039	5049	5059	5079	5089														
Valve DBBF	778598	5039	5049	5059	5079	5089														
Miscellaneous																				
Gasket spiral wound	854360	3041	3061	3081	3121	3141	3181	3201	3241	3261	3281	3301	3321	3341	3361	3381	3421			
Gasket camprofile	854390																			
Insulating Gasket Kit	854609	0041	0161	0261	0401	0541	0681	0841	1061	1221	1441	1701	1961	2161	2361	2541	2721	0489	2819	
Meterrun	766496	1521	1541	1561	1581															
Orifice flange set	766096					1011	1021	0011	0021	0111	0121	0131	0141	0151	0161	0171	0181			
Strainer Y-type	768307					0011	0021	0031	0041	0101	0111	0121	0131	0141						

Metric units

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
20	x	15	7628670661	7628750661	7628926181
25	x	15	7628670791	7628750791	7628926321
25	x	20	7628670891	7628750891	7628926371
40	x	15	7628670991	7628750991	
40	x	20	7628671191	7628751191	7628926471
40	x	25	7628671241	7628751241	7628926721
50	x	20	7628671311	7628751311	
50	x	25	7628671341	7628751341	7628926771
50	x	40	7628671441	7628751441	7628926831
80	x	40	7628671741	7628751741	
80	x	50	7628671841	7628751841	7628926891
100	x	40	7628671941	7628751941	
100	x	50	7628672041	7628752041	7628926921
100	x	80	7628672141	7628752141	7628926961
150	x	80	7628672499	7628752499	7628927169
150	x	100	7628672539	7628752539	7628927179
200	x	100	7628672591	7628752591	7628927051
200	x	150	7691513569	7691623569	7691883589
250	x	100	7628672621	7628752621	7628927081
250	x	150	7691514149	7691624149	7691884149
250	x	200	7691514221	7691624221	7691884221
300	x	150	7691514649	7691624649	7691884649
300	x	200	7691514691	7691624691	7691884691
300	x	250	7691514901	7691624901	7691884901
350	x	150	7691515279	7691625279	
350	x	200	7691515381	7691625381	7691885381
350	x	250	7691515591	7691625591	7691885591
350	x	300	7691515801	7691625801	7691885801

Thermowell figd DN 50	
Length (mm)	MESC number
230	7683386411
255	7683386421
305	7683386431
355	7683386441
405	7683386451
455	7683386461

Thermowell figd DN 40	
Length (mm)	MESC number
230	7683371811
255	7683371821
305	7683371831
355	7683371841
405	7683371851
455	7683371861

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
400	x 200	7691516061	7691626061		
400	x 250	7691516271	7691626271	7691886271	
400	x 300	7691516481	7691626481	7691886481	
400	x 350	7691516691	7691626691	7691886691	
450	x 250	7691516951	7691626951	7691886951	
450	x 300	7691517161	7691627161	7691887161	
450	x 350	7691517371	7691627371	7691887371	
450	x 400	7691517581	7691627581	7691887581	
500	x 300	7691518051	7691628051	7691888051	
500	x 350	7691518261	7691628261	7691888261	
500	x 400	7691518471	7691628471	7691888471	
500	x 450	7691518681	7691628681	7691888681	
600	x 300			7691888931	
600	x 350			7691889151	
600	x 400	7691519361	7691629361	7691889361	
600	x 450	7691519571	7691629571	7691889571	
600	x 500	7691519781	7691629781	7691889781	

Comp.name	Description
BN3B	Branch fitting bw
BNLF	Branch fitting fgd
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

Run	x	Br	RECB	REEB	TERB
700	x 350			xxxxxxxxxx	
700	x 400			xxxxxxxxxx	
700	x 450			xxxxxxxxxx	
700	x 500	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	
700	x 600	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	
750	x 350				<u>7691909609</u>
750	x 400				<u>7691909619</u>
750	x 450				<u>7691909629</u>
750	x 500	<u>7691539369</u>	<u>7691649639</u>	<u>7691909639</u>	
750	x 600	<u>7691539649</u>	<u>7691649649</u>	<u>7691909649</u>	
900	x 350			xxxxxxxxxx	
900	x 400			xxxxxxxxxx	
900	x 450			xxxxxxxxxx	
900	x 500	xxxxxxxxxx	xxxxxxxxxx	7691885999xxxxxxxx	
900	x 600	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	
1050	x 350			xxxxxxxxxx	
1050	x 400			xxxxxxxxxx	
1050	x 450			xxxxxxxxxx	
1050	x 600	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	
1050	x 900	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BNLF	BN3B	BROB	BRSB
15	40	-	40	7680543511	7680306029	
15	50	-	50	7680543521	7680306039	
15	80	-	150	7680543531	7680306049	
20	50	-	50	7680543561	7680306069	
20	80	-	100	7680543571	7680306079	
20	150	-	150	7680543581	7680306089	
25	80	-	80	7680543611	7680306119	
25	100	-	100	7680543621	7680306129	
25	150	-	150	7680543631	7680306139	
25	600	-	600	7680543649	7680306149	
25	700	-	700	xxxxxxxxxx	xxxxxxxxxx	
25	900	-	900	xxxxxxxxxx	xxxxxxxxxx	
25	1050	-	1050	xxxxxxxxxx	xxxxxxxxxx	
40	80	-	80	7680543661	7680306169	
40	100	-	100	7680543671	7680306179	
40	150	-	150	7680543681	7680306189	
50	150	-	150		7677355671	
50	200	-	250		7677355691	
50	300	-	450		7677355701	
50	500	-	600		7677355741	
80	200	-	200		7677355781	
80	250	-	250		7677355791	
80	300	-	350		7677355801	
80	400	-	500		7677355821	
80	600	-	600		7677355851	
80	700	-	700		XXXXXXXX	
80	750	-	750		7677341309	
80	900	-	900		xxxxxxxxxx	
80	1050	-	1050		xxxxxxxxxx	
50	900	-	900		xxxxxxxxxx	
50	1050	-	1050		xxxxxxxxxx	

Metric units

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BNLF	BN3B	BROB	BRSB
100	300	-	350			7677355891
100	400	-	500			7677355911
100	600	-	600			7677355941
100	700	-	700			XXXXXXXX
100	750	-	750			<u>7677341319</u>
100	900	-	900			xxxxxxxxxx
100	1050	-	1050			xxxxxxxxxx
150	350	-	350			<u>7691001509</u>
150	400	-	400			<u>7691001519</u>
150	450	-	450			<u>7691001529</u>
150	500	-	500			<u>7691001539</u>
150	600	-	600			<u>7691001549</u>
150	700	-	700			XXXXXXXX
150	750	-	750			<u>7691021409</u>
150	900	-	900			xxxxxxxxxx
150	1050	-	1050			xxxxxxxxxx
200	400	-	400			7691000461
200	450	-	450			7691000471
200	500	-	500			7691000481
200	600	-	600			7691000491
200	700	-	700			XXXXXXXX
200	750	-	750			<u>7691021419</u>
200	900	-	900			xxxxxxxxxx
200	1050	-	1050			xxxxxxxxxx
250	500	-	500			7691000541
250	600	-	600			7691000551
250	700	-	700			XXXXXXXX
250	750	-	750			<u>7691021429</u>
250	900	-	900			xxxxxxxxxx
250	1050	-	1050			xxxxxxxxxx
300	700	-	700			xxxxxxxxxx
300	750	-	750			<u>7691021439</u>
300	900	-	900			xxxxxxxxxx
300	1050	-	1050			xxxxxxxxxx

Metric units

BOLTING**Coated boltset std flange**

DN	nr	inch	x	mm	MESC number
15	4	1/2	x	60	8138270239
20	4	1/2	x	70	8138270259
25	4	1/2	x	70	8138270259
40	4	1/2	x	80	8138270279
50	4	5/8	x	90	8138270759
80	4	5/8	x	100	8138270779
100	8	5/8	x	100	8138270779
150	8	3/4	x	110	8138271439
200	8	3/4	x	110	8138271439
250	12	7/8	x	120	8138272169
300	12	7/8	x	120	8138272169
350	12	1	x	140	8138272999
400	16	1	x	140	8138272999
450	16	1 1/8	x	150	8138273849
500	20	1 1/8	x	160	8138273869
600	20	1 1/4	x	180	8138274709
700	28	1 1/4	x	230	xxxxxxxxxx
750	28	1 1/4	x	240	8138274829
900	32	1 1/2	x	280	xxxxxxxxxx
1050	36	1 1/2	x	300	xxxxxxxxxx

Coated boltset mrun tig

DN	nr	inch	x	mm	MESC number
15	4	5/8	x	130	8138270839
20	4	5/8	x	130	8138270839
25	4	5/8	x	130	8138270839
40	4	3/4	x	140	8138271499

Coated boltset blind/spc

DN	nr	inch	x	mm	MESC number
15	4	1/2	x	70	8138270259
20	4	1/2	x	80	8138270279
25	4	1/2	x	80	8138270279
40	4	1/2	x	80	8138270279
50	4	5/8	x	100	8138270779
80	4	5/8	x	110	8138270799
100	8	5/8	x	110	8138270799
150	8	3/4	x	120	8138271459
200	8	3/4	x	130	8138271479
250	12	7/8	x	140	8138272209
300	12	7/8	x	150	8138272229
350	12	1	x	170	8138273059
400	16	1	x	170	8138273059
450	16	1 1/8	x	180	8138273909
500	20	1 1/8	x	200	8138273949
600	20	1 1/4	x	220	8138274789
700	28	1 1/4	x	280	xxxxxxxxxx
900	32	1 1/2	x	340	xxxxxxxxxx
1050	36	1 1/2	x	360	xxxxxxxxxx

Coated boltset orificefig

DN	nr	inch	x	mm	MESC number
50	8	5/8	x	130	8138270839
80	8	3/4	x	140	8138271499
100	8	3/4	x	150	8138271519
150	12	3/4	x	150	8138271519
200	12	7/8	x	170	8138272269
250	16	1	x	190	8138273099
300	16	1 1/8	x	210	8138273969
350	20	1 1/8	x	220	8138273989
400	20	1 1/4	x	230	8138274809
450	24	1 1/4	x	250	8138274849
500	24	1 1/4	x	260	8138274869
600	24	1 1/2	x	290	8138276419

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve**

DN	nr	inch	x	mm	MESC number
50	4	5/8	x	150	8138270879
80	4	5/8	x	180	8138270939
100	8	5/8	x	180	8138270939
150	8	3/4	x	210	8138271639

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table	
Blind flange	1 7660000011
Gasket spiral wound	1 8543603041
Welding neck flange	1 7660780221
Studbolt with nuts	4 8138270239

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged	
Blind flange	1 7660000021
Gasket spiral wound	1 8543603061
Studbolt with nuts	4 8138270259

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table	
Blind flange	1 7660000021
Gasket spiral wound	1 8543603061
Welding neck flange	1 7660780231
Studbolt with nuts	4 8138270259

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged	
Blind flange	1 7660000031
Gasket spiral wound	1 8543603081
Studbolt with nuts	4 8138270259

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged	
Blind flange	1 7660000041
Gasket spiral wound	1 8543603121
Studbolt with nuts	4 8138270279

Temp instr conn DN 40 Fig.NS DN80 - 100

Branch: branch nipple flanged	
Thermowell fild DN 40 L=230 mm	1 7683371811
Gasket spiral wound	1 8543603121
Lap joint flange	1 7660240041
Studbolt with nuts	4 8138270299

Temp instr conn DN 50 Fig.HL DN150 -

9600	
Branch: according to branch table	
Pipe	1 7478610571
Gasket spiral wound	1 8543603141
Welding neck flange	1 7660780061
Thermowell fild DN 50 L=255 mm	1 7683386421
Studbolt with nuts	4 8138270799

CLASS 017011-X

Design limits**Temperature (°C)**-29105**Pressure (Bar ga)**

DN 25-600

19.6**17.5****Branch connections 90 degrees**

All branch connections will be made with factory wound fittings. No branch connection will be less than 2/3 of the run pipe NPS. Further reductions will be made within the branch itself.

Notes

- Design limits acc. to the nom. pressure of valves
- Ball valves are in accordance with ISO17292
- For basis of design see DEP 31.38.01.10-Gen.
- For GRP/GRE Piping ADCO doc 30.99.12.0024 and Shell DEP 31.40.10.19-Gen shall be followed
- Bolts for GRP flanges to be provided with washers
- Piping material: glass reinforced epoxy resin (GRE) aromatic amine, hot cured, tg > 140 deg C [285°F]
- Flanges to be drilled acc. to ASME B16.5, class 150
- Bolt sets not shown in piping class; flange thickness differs per manufacturer
- **Pipes, Fittings & Flanges shall be as per manufacturer standard.**
- **Butterfly valve shall be triple eccentric, tight shut off design.**

Table of schedules

DN	Schedule
25	By Vendor
40	By Vendor
50	By Vendor
80	By Vendor
100	By Vendor
150	By Vendor
200	By Vendor
250	By Vendor
300	By Vendor
350	By Vendor
400	By Vendor
450	By Vendor
500	By Vendor
600	By Vendor.

GRE-Aromatic amine (Sour Hydrocarbon)

Class no. 017011-X
ASME rating CLASS 150
Corrosion allowance 0 mm
Revision letter
Revision date

Plant
Consignee
Engineered by
Principal
Contr. job no.
Project no.

COMPONENT MATERIAL DESCRIPTION (For full material description see relevant MESC buying description.)							
Valves							
BAFF	Ball Valve float FB flgd FF	DN 25-100	Body: ASTM B564 N08825 Trim: Alloy 825, PTFE	CHDF	Check valve dual plate Solid Wafer lug / flgd FF	DN150-600	Body: ASTM A105N/ A216 WCB WCC body clad with UNS N08825 Trim: Alloy 825, Stellite
BAFF	Ball Valve float FB flgd FF	DN 150	Body: ASTM A105N/ A216 WCB WCC body clad with UNS N08825 Trim: Alloy 825, PTFE	BUWF	Butterfly valve lug type/ flgd FF	DN 80-100	Body: ASTM A564 UNS N08825 Trim: Alloy 825
BTFF	Ball Valve trunn FB flgd FF	DN 200-600	Body: ASTM A105N/ A216 WCB WCC body clad with UNS N08825 Trim: Alloy 825, PTFE	GLVF	Globe Valve Flgd	DN 25-100	Body: ASTM A105N/ A216 WCB WCC body clad with UNS N08825 Trim: Alloy 825, Stellite
BARF	Ball Valve float RB flgd FF	DN 25-100	Body: ASTM B564 N08825 Trim: Alloy 825, PTFE	DBBT	Valve assy double block & bleed flgd/thrd	DN 25-50	Body: ASTM B564 N08825 Trim: Alloy 825, PTFE
BARF	Ball Valve float RB flgd FF	DN 150	Body: ASTM A105N/ A216 WCB WCC body clad with UNS N08825 Trim: Alloy 825, PTFE	DBBF	Valve assy double block & bleed flgd	DN 25-50	Body: ASTM B564 N08825 Trim: Alloy 825, PTFE
BTRF	Ball Valve trunn RB flgd FF	DN 200-600	Body: ASTM A105N/ A216 WCB WCC body clad with UNS N08825 Trim: Alloy 825, PTFE	NVFL	Needle valve flgd	DN 25-40	Body: ASTM B564 N08825 Trim: Alloy 825, Stellite
CHVF	Check valve flgd FF	DN 25-50	Body: ASTM B564 N08825 Trim: Alloy 825, Stellite	Miscellaneous			
CHVF	Check valve flgd FF	DN 80-100	Body: ASTM B564 N08825 Trim: Alloy 825, Stellite	STBT	Studbolt with nuts & washers	--	ASTM A193-B7M/A194-2HM, (Coated with Xylan 1070 or Takecoat 1000)
CHVF	Check valve flgd FF	DN150-600	Body: ASTM A105N/ A216 WCB WCC body clad with UNS N08825 Trim: Alloy 825, Stellite	GKRP	Gasket flat ring (f/f face)	DN 25-600	Ethylene propylene rubber (EPDM) hardness 70+-5 shore A
CHDF	Check valve dual plate Solid Wafer lug	DN 50-100	Body: ASTM A564 UNS N08825 Trim: Alloy 825, Stellite				

PIPING COMPONENTS

Item description	MESC	Nominal pipe size												
		25	40	50	80	100	150	200	250	300	350	400	450	500
Valves														
Ball valve float FB flgd FF	770655	9059	9079	9089	9109	9129								
Ball valve float RB flgd FF	770655	8159	8179	8189	8109	8129								
Ball valve float RB flgd FF	770062						8149							
Ball Valve float FB flgd FF	770062						9149							
Ball valve trunn FB flgd FF	770092						0309	0319	0329	0339	0349	0359	0369	0379
Ball valve trunn RB flgd FF	770092						0409	0419	0429	0439	0449	0459	0469	0479
Butterfly valve triple of flgd FF	774730				8109	8129								
Butterfly valve triple of flgd FF	774155				8149	0309	0319	0329	0339	0349	0359	0369	0379	
Check Valve Wafer Lug (Solid)/FLGD	776724				8149	8159	8169	8179	8189	8199	8209	8219	8239	
Check Valve Wafer Lug (Solid)	776998			8089	8109	8129								
Check valve flgd FF	771053				8149	8159	8169	8179	8189	8199	8209	8219	8239	
Check valve flgd FF	771640	8059	8079	8089										
Check valve flgd FF	771640				8109	8129								
Globe valve flgd FF	773640	8059	8079	8089	8109	8129								
Globe valve flgd FF	773055						8149	8159						
Valve DBBT FF	778568	8059	8079	8089										
Valve DBBF FF	778598	8059	8079	8089										

CLASS 017011-Y

Metric units

Design limits

Temperature (°C)	-29	105
Pressure (Bar ga)	DN 25- 150	19.6 17.5

Notes

- Design limits acc. to the nom. pressure of valves
- Ball valves are in accordance with ISO17292
- For basis of design see DEP 31.38.01.10-Gen.
- For GRP/GRE Piping ADCO doc 30.99.12.0024 and Shell DEP 31.40.10.19-Gen shall be followed
- Bolts for GRP flanges to be provided with washers
- Piping material: glass reinforced epoxy resin (GRE) aromatic amine, hot cured, tg > 140 deg C [285°F]
- Flanges to be drilled acc. to ASME B16.5, class 150
- Bolt sets not shown in piping class; flange thickness differs per manufacturer
- Details for Pipes, Fittings & Flanges shall be established, as part of detail design.
- In case required by process design and agreed by COMPANY, triple eccentric tight shut off design Butterfly may be utilized.

Table of schedules

DN	Schedule
25	By Vendor
40	By Vendor
50	By Vendor
80	By Vendor
100	By Vendor
150	By Vendor

Branch connections 90 degrees

All branch connections will be made with factory wound fittings. No branch connection will be less than 2/3 of the run pipe NPS. Further reductions will be made within the branch itself.

GRE-Aromatic amine (Sour Hydrocarbon)		Plant
Class no.	017011-Y	Consignee
ASME rating	CLASS 150	Engineered by
Corrosion allowance	0 mm	Principal
Revision letter		Contr. job no.
Revision date		Project no.

Metric units

COMPONENT MATERIAL DESCRIPTION
 (For full material description see relevant MESC buying description.)

Valves

BAFF	Ball Valve float FB flgd FF	DN 25-150	Body: ASTM A182-F55 Trim: Super Duplex, PTFE
BARF	Ball Valve float RB flgd FF	DN 25-150	Body: ASTM A182-F55 Trim: Super Duplex, PTFE
CHVF	Check valve flgd FF	DN 25-150	Body: ASTM A182-F55 Trim: Super Duplex, Stellite 21
CHDF	Check valve dual plate Solid Wafer Lug FF	DN 50-150	Body: ASTM A182-F55 Trim: Super Duplex, Stellite 21
GLVF	Globe Valve Flgd	DN 25-150	Body: ASTM A182-F55 Trim: Super Duplex, Stellite 21
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 25-50	Body: ASTM A182-F55 Trim: Super Duplex, PTFE
DBBF	Valve assy Double block ball & bleed flgd	DN 25-50	Body: ASTM A182-F55 Trim: Super Duplex, PTFE
NVFL	Needle valve flgd	DN 25-40	Body: ASTM A182-F55 Trim: Super Duplex, Stellite 21

Miscellaneous

STBT	Studbolt with nuts & washers	---	ASTM A193-B7M/A194-2HM, (Coated with Xylan 1070 or Takecoat 1000)
GKRP	Gasket flat ring (r/f face)	DN 25-150	Ethylene propylene rubber (EPDM) hardness 70+/-5 shore A

Metric units

PIPING COMPONENTS

Item description	MESC	25	40	50	80	100	150
Ball valve float FB flgd		770545	9059	9079	9089	9109	9129
Ball valve float RB flgd		770545	8059	8079	8089	8109	8129
Check Valve Wafer Lug (Solid)		776839		4099	4109	4129	4149
Check valve flgd		771342	4059	4079	4099	4109	4129
Globe valve flgd		773343	8059	8079	8099	8109	8129
Valve DBBT		778553	9059	9079	9089		
Valve DBBF		778548	9059	9079	9089		

Gasket flat ringd (r/f face) 854810 0081 0121 0141 0181 0201 0241

Metric units

REDUCING/PIPING COMPONENTS

Metric units

Metric units

Metric units

BOLTING

Metric units

Metric units

CLASS 017015-X

Design limits

Temperature (°C)

Pressure (Barg)

DN 25-300 10.0 10.0

0 85

Notes

- Design limits acc. to the nom. pressure of valves
- Ball valves are in accordance with ISO17292
- For basis of design see DEP 31.38.01.10-Gen.
- **For GRP/GRE Piping ADCO doc 30.99.12.0024 and Shell DEP 31.40.10.19-Gen shall be followed.**
- Bolts for GRP flanges to be provided with washers
- Piping material: glass reinforced epoxy resin (GRE) aliphatic amine, hot cured, tg > 115 deg C [240°F], all executed with aluminum foil barrier
- Flanges to be drilled acc. to ASME B16.5, class 150
- Bolt sets not shown in piping class; flange thickness differs per manufacturer
- Piping components for potable water service shall be approved by local health authorities
- Underground carbon steel components (incl. bolting) shall be protected by a coating as per **ADCO ES 30.99.37.0013** (amendment to DEP 30.48.00.31-Gen).
- **Details for Pipes, Fittings & Flanges shall be established as part of detail design.**
- Gasket material shall be suitable for potable water system

Table of schedules

DN	Schedule
25	By Vendor
40	By Vendor
50	By Vendor
80	By Vendor
100	By Vendor
150	By Vendor
200	By Vendor
250	By Vendor
300	By Vendor

Branch connections 90 degrees

All branch connections will be made with factory wound fittings. No branch connection will be less than 2/3 of the run pipe NPS. Further reductions will be made within the branch itself.

GRE-Aliphatic amine+alum foil	
Class no.	017015-X
ASME rating	CLASS 150
Corrosion allowance	0 mm
Revision letter	
Revision date	

Plant
Consignee
Engineered by
Principal
Contr. job no.
Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Valves

BARP	Ball valve float RB flgd FF	DN 25-50	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, PTFE
BUCL	Butterfly valve conc lug type	DN 80-300	Body: ASTM A105N/A216 WCB/WCC lined with Chloroprene Rubber or EPDM Disc: Aluminium Bronze Lining: EPDM
CHDP	Check valve dual plate flgd FF	DN 300-300	Body: ASTM A182-F316/ASTM A351-CF8M Trim: AISI 316, EPDM
CHVP	Check valve flgd FF	DN 25- 40	Body: ASTM A182-F316 Trim: AISI 316, Stellite
CHWP	Check valve dual plate lug FF	DN 50 -250	Body: ASTM A351-CF8M Trim: AISI 316, EPDM

Miscellaneous

GKRP	Gasket flat ringd (r/f face)	DN 25-300	Ethylene propylene rubber (EPDM) hardness 70+/-5 shore A
STBT	Studbolt with nuts	---	ASTM A193-B7/A194-2H Coated with Xylan 1070 or Takecoat 1000

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PIPING COMPONENTS

<u>Item description</u>	<u>MESC</u>	Nominal pipe size								
		25	40	50	80	100	150	200	250	300
Valves										
Ball valve float RB flgd FF	770322	3059	3079	3089						
Butterfly valve conc lug type	776009				6609	6629	6649	6659	6669	6679
Check valve dual plate flgd FF	776865									0179
Check valve dual plate lug FF	776826				0089	0109	0129	0149	0159	0169
Check valve flgd ff	771301	0059	0079							
Miscellaneous										
Gasket flat ringd (r/f face)	854810	0081	0121	0141	0181	0201	0241	0261	0281	0301

REDUCING/PIPING COMPONENTS

REDUCING/PIPING COMPONENTS

REDUCING/PIPING COMPONENTS

REDUCING/PIPING COMPONENTS

BOLTING

ASSEMBLIES

CLASS 017020-X

Design limits**Temperature (°C)**

0 85

Pressure (Barg)

DN 25- 600 16.0 16.0

Branch connections 90 degrees

All branch connections will be made with factory wound fittings. No branch connection will be less than 2/3 of the run pipe NPS. Further reductions will be made within the branch itself.

Notes

- Design limits acc. to the nom. pressure of valves
- For basis of design see DEP 31.38.01.10-Gen.
- For fire protection systems see DEP 80.47.10.31-Gen.
- For GRP/GRE Piping ADCO doc 30.99.12.0024 and Shell DEP 31.40.10.19-Gen shall be followed.
- Bolts for GRP flanges to be provided with washers
- Piping material: glass reinforced epoxy resin (GRE) aromatic amine, hot cured, tg > 140 deg C [285°F]
- Flanges to be drilled acc. to ASME B16.5, class 150
- Bolt sets not shown in piping class; flange thickness differs per manufacturer
- Butterfly valve shall be tight shut off design.
- **Pipes, Fittings & Flanges shall be as per manufacturer standard.**
- **Valves in U/G firewater system shall be UL Listed & FM approved with position indicator and extended stem (extended stem should be applicable for underground installations).**

Table of schedules

DN	Schedule
25	By Vendor
40	By Vendor
50	By Vendor
80	By Vendor
100	By Vendor
150	By Vendor
200	By Vendor
250	By Vendor
300	By Vendor
350	By Vendor
400	By Vendor
450	By Vendor
500	By Vendor
600	By Vendor

GRE-Aromatic amine		Plant
Class no.	017020-X	Consignee
ASME rating	CLASS 150	Engineered by
Corrosion allowance	0 mm	Principal
Revision letter		Contr. job no.
Revision date		Project no.

Metric units

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Valves

BARP	Ball valve float RB flgd ff	DN 25-50	Body: ASTM B148 UNS C95800 Trim: ASTM B148 UNS C95800, PTFE
BUCL	Butterfly valve conc lug type	DN 80-600	Body: ASTM A536 60-40-18 OR ASTM A105N/A216 WCB/WCC lined with Chloroprene Rubber or EPDM Disc: Aluminium Bronze Lining: EPDM
CHDP	Check valve dual plate flgd ff	DN 300-600	Body: ASTM B148 UNS C95800 Trim: ASTM B148 UNS C95800
CHVP	Check valve flgd ff	DN 25-50	Body: ASTM B148 UNS C95800 Trim: ASTM B148 UNS C95800
CHWP	Check valve dual plate lug ff	DN 50-250	Body: ASTM B148 UNS C95800 Trim: ASTM B148 UNS C95800
GAVF	Gate valve ff	DN 15-40	Body: ASTM B148 UNS C95800 Trim: ASTM B148 UNS C95800
GAVF	Gate valve ff	DN 80-600	Body: ASTM B148 UNS C95800 Trim: ASTM B148 UNS C95800

Miscellaneous

GKRP	Gasket flat ringd (r/f face)	DN 25-600	Ethylene propylene rubber (EPDM) hardness 70+-5 shore A
STBT	Studbolt with nuts	DN -	ASTM A193-B7/A194-2H (Coated with Xylan 1070 or Takecoat 1000)

PIPING COMPONENTS

Item description	Nominal pipe size		25	40	50	80	100	150	200	250	300	350	400	450	500	600
	MESC															
Valves																
Ball valve float RB flgd ff	770604	0059	0079	0089												
Butterfly valve conc lug type (DI)	775066					6609	6629	6649	6659	6669	6679	6689	6699	6709	6719	6739
Butterfly valve conc lug type (CS)	775067					6609	6629	6649	6659	6669	6679	6689	6699	6709	6719	6739
Check valve dual plate flgd ff	776918										3179	3189	3199	3209	3219	3239
Check valve dual plate lug ff	776921					3109	3129	3149	3159	3169						
Check valve flgd ff	771601	3059	3079	3089		3109	3129	3149	3159	3169	3179	3189	3199	3209	3219	3239
Gate Valve ff	772601	3059	3079	3089		<u>3109</u>	<u>3129</u>	<u>3149</u>	<u>3159</u>	<u>3169</u>	<u>3179</u>	<u>3189</u>	<u>3199</u>	<u>3209</u>	<u>3219</u>	<u>3239</u>
Miscellaneous																
Gasket flat ringd (r/f face)	854810	0081	0121	0141	0181	0201	0241	0261	0281	0301	0321	0341	0361	0381	0421	

REDUCING/PIPING COMPONENTS

REDUCING/PIPING COMPONENTS

REDUCING/PIPING COMPONENTS

REDUCING/PIPING COMPONENTS

ASSEMBLIES

CLASS 018011-X

Design limits

Temperature (°C)	0	90
Pressure (Barg)		
DN 15 - 50	16.0	16.0
DN 80 - 600	16.0	16.0

Notes

- Design limits acc .to API609 butterfly valve rating
- For basis of design see DEP 31.38.01.10-Gen.
- Pre-fab carbon steel pipe spools for line sizes DN80 & above shall be internally FBE (fusion bonded epoxy) lined in accordance with SHELL DEP and applicable project specification with Company approval.
- Pre-fab carbon steel pipe spools shall have flanged ends and shall be limited to L- or Z-shapes
- Piping class range DN 15 [NPS 1/2] up to/incl DN 250 [NPS 10] design meets full vacuum at ambient condition For DN 300 [NPS 12] to 600 [NPS 24], if vacuum condition can occur, piping to be designed accordingly
- For fire protection systems see DEP 80.47.10.31-Gen.
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Pipe sizes DN 15-50 (API 5L-B) shall be provided with threaded ends C/W full coupling on one end. Coupling rating 3000 lbs
- Mating flange facing with GRE/GRP/FRP/RTR shall be flat face only.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- The use of Dual Plate Check valves is preferred.
- All loose piping components like spectacle blinds & spacer and spades shall be FBE coated (line size 3" & above).
- For internal FBE lined piping, The use of Victaulic coupling with manufacturer sealing/gasket joints (or approved equal) over flange joints shall be preferred. All elbows, tees, weld neck flanges etc. shall be provided with appropriate extended length and groove to suit these couplings (in line with Vendor requirements/recommendations) as prefabricated spools prior to Internal FBE lining with square cut pipe to ensure installation of these couplings. All non-standard / non-listed piping components (fittings etc.) shall be UL listed & FM approved.
- Calculated wall thicknesses/schedule are based on design conditions, additional thickness shall be added during detailed design based on vendor recommendation for the groove joints (Victaulic or approved equal) to fit with the couplings.
- Flat face flange shall be used to match with GRE flange
- All valves shall be UL Listed & FM approved and shall be provided with position indicator.

Table of schedules

DN	Schedule (note)
15	80
20	80
25	80
40	80
50	80
80	40
100	40
150	40
200	20
250	20
300	20
350	20
400	20
450	20
500	20
600	20

Branch connections 90 degrees (Galvanized)

Branch Size	Run	15	20	25	40	50
size	Run	B	B	B	B	A
50	B	B	B	B	A	
40	B	B	B	A		
25	B	B	A			
20	B	A				
15	A					

Code	Explanation of characters
A	Equal tee (threaded)
B	Reducing tee (threaded)

Branch connections 90 degrees (Internal FBE Coated)

Branch Size	Run	50	80	100	150	200	250	300	350	400	450	500	600
size	Run	E	E	E	E	E	E	B	B	B	B	B	A
600	E	E	E	E	E	E	B	B	B	B	B	B	A
500	E	E	E	E	E	E	B	B	B	B	B	B	A
450	E	E	E	E	E	B	B	B	B	B	B	A	
400	E	E	E	E	E	B	B	B	B	B	B	A	
350	E	E	E	E	B	B	B	B	B	B	B	A	
300	E	E	E	E	B	B	B	B	B	B	B	A	
250	E	E	E	B	B	B	B	B	B	B	B	A	
200	E	E	B	B	B	B	B	B	B	B	B	A	
150	E	B	B	B	A								
100	B	B	A										
80	B	A											

Code	Explanation of characters
A	Equal tee BW
B	Reducing tee (BW)
C	Branch Fitting
E	Branch Outlet

Carbon steel Galvanized (DN15-50) / Internal FBE Coated (DN80 & above)	Plant
Class no.	018011-X
ASME rating	CLASS 150
Corrosion allowance	0 mm
Revision letter	Constr. job no.
Revision date	Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe				Valves			
PIPE Pipe thrd		DN 15-50	API 5L-B (galvanised)	BART	Ball valve float RB thrd	DN 15-50	Body: ASTM B148-UNS C95800 Trim: Aluminium Bronze, PTFE
PIPE Pipe		DN 80-80	ASTM A106-B (FBE Internal Coated)	BARF	Ball valve float RB flgd RF	DN 80-150	Body: ASTM B148-UNS C95800 Trim: Aluminium Bronze, PTFE
PISM Pipe (API 5L-B sml)		DN 100-600	API 5L-B (sml) (FBE Internal Coated)	BTRF	Ball Valve trunn RB flgd RF	DN 200-600	Body: ASTM B148-UNS C95800 Trim: Aluminium Bronze, PTFE
PNTT Pipe nipple thrd ends L=50 mm		DN 15-25	API 5L-B (galvanised)	BUCL	Butterfly valve conc lug type	DN 80-300	Body: ASTM A105NA/A216 WCB/WCC Lined With Chloroprene Rubber Or EPDM Disc: Aluminium Bronze Lining: EPDM
PT75 Pipe nipple thrd ends L=75 mm		DN 15-50	API 5L-B (galvanised)	CHVT	Check valve thrd	DN 15-50	Body: ASTM B148 UNS C95800
PT99 Pipe nipple thrd ends L=100 mm		DN 15-50	API 5L-B (galvanised)	CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 80-600	Trim: Aluminium Bronze Body: ASTM B148 UNS C95800 Trim: Aluminium Bronze
Flanges				GLVF	Globe valve flgd	DN 15-50	Body: ASTM B148-UNS C95800
BLFL Blind flange RF		DN 15-50	ASTM A105N (galvanized)	GLVF	Globe valve flgd	DN 80-200	Trim: Aluminium Bronze Body: ASTM B148-UNS C95800 Trim: Aluminium Bronze
BLFL Blind flange RF		DN 80-600	ASTM A105N (FBE Internal Coated)	GAVT	Gate valve thrd	DN 15-50	Body: ASTM B148 UNS C95800 Trim: Aluminium Bronze
FLTR Flange thrd RF		DN 15-50	ASTM A105N (galvanised)	GAVF	Gate Valve flgd RF	DN 80-600	Trim: Aluminium Bronze Body: ASTM B148-UNS C95800 Trim: Aluminium Bronze
WNFL Welding neck flange (FBE Lined)		DN 80-600	ASTM A105N (FBE Internal Coated)	Miscellaneous			
LJFL Lap joint flange		--	ASTM A105 (galvanised)	GKSW	Gasket spiral wound	DN 15-600	AISI 316 (L), Graphite
SBFL Spectacle Blind		DN 15-50	ASTM A516 Gr.60 (galvanized)	GKIK	Insulating Gasket kit with Washer & Sleeve	DN 15-600	CS centring-/SS inner ring (G-10/11) with 316 SS CORE, PTFE SS Pres
SBFL Spectacle Blind		DN 80-600	ASTM A516 Gr.60 (FBE Internal Coated)	GKIK	Insulating Gasket kit with Washer & Sleeve (Type-F)	DN 15-600	(G-10/11) with 316 SS CORE, PTFE SS Pres
WNFL1 Welding neck flange 300#		DN 300	ASTM A105N (FBE Internal Coated)	STYB	Strainer Y-type	DN 50-600	Enrg Spirl Spring Sieve: ASTM B148 UNS C95800
Fittings				STBB	Strainer Bucket type	DN 50-600	ASTM B148 UNS C95800
CAPB Cap bw		DN 80-600	ASTM A234-WPB (FBE Internal Coated)	STBT	Studbolt with nuts	--	ASTM A193-B7/A194-2H (Coated with Xylan 1070 or Takecoat 1000)
CAPT Cap thrd		DN 15-50	ASTM A105 (galvanised)	Special Fittings			
COUT Coupling thrd		DN 15-50	ASTM A105 (galvanised)	HSCL	Hose Coupling Flgd / Female Conn.	DN 15-50	Aluminium Bronze
E45B Elbow 45 deg LR bw		DN 80-600	ASTM A234-WPB (FBE Internal Coated)				
E45T Elbow 45 deg thrd		DN 15-50	ASTM A105 (galvanised)				
E90B Elbow 90 deg LR bw		DN 80-600	ASTM A234-WPB (FBE Internal Coated)				
E90T Elbow 90 deg thrd		DN 15-50	ASTM A105 (galvanised)				
TEEB Tee equal bw		DN 80-600	ASTM A234-WPB (FBE Internal Coated)				
TEET Tee equal thrd		DN 15-50	ASTM A105 (galvanised)				
UNIT Union thrd		DN 15-50	ASTM A105 (galvanised)				
JCPP Joint Coupling (Vicatulic or approved equal)		DN 15-600	ASTM A536, Grade 65-45-12				
Reducing fittings							
BROB Branch outlet bw		DN 400-600	ASTM A105 (FBE Internal Coated)				
BRSB Branch outlet bw		DN 150-600	ASTM A105 (FBE Internal Coated)				
REBU Reducing bushing thrd		DN 20-50	ASTM A234-WPB (galvanised)				
RECB Reducer concentric bw		DN 80-600	ASTM A234-WPB (FBE Internal Coated)				
RECT Reducer concentric thrd		DN 20-50	ASTM A105 (galvanised)				
REEB Reducer eccentric bw		DN 80-600	ASTM A234-WPB (FBE Internal Coated)				
REFT Reducing flange thrd cl 150		DN 20-50	ASTM A105 (galvanised)				
TERB Tee reducing bw		DN 80-600	ASTM A234-WPB (FBE Internal Coated)				
TERT Tee reducing thrd		DN 20-50	ASTM A105 (galvanised)				

PIPING COMPONENTS

Item description	MESC	Nominal pipe size															
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
Pipe																	
Pipe	741308 0	181	231	281	381	431											
Pipe	743106 0						039										
Pipe (API 5L-B sml)	743106 0							499	119	399	799	209	739	219	699		
Pipe (API 5L-B sml)	743106 1															219	699
Pipe nipple thrd ends L=100 mm	760656 0	941															
Pipe nipple thrd ends L=100 mm	760656 1		341	741	941												
Pipe nipple thrd ends L=100 mm	760656 2							141									
Pipe nipple thrd ends L=50 mm	760656 0	921															
Pipe nipple thrd ends L=50 mm	760656 1		321	721													
Pipe nipple thrd ends L=75 mm	760656 0	931															
Pipe nipple thrd ends L=75 mm	760656 1		331	731	931												
Pipe nipple thrd ends L=75 mm	760656 2					131											
Flanges																	
Blind flange	766215	0081	0121	0161	0181	0201											
Blind flange	769394						0229	0249	0269	0289	0309	0829	0849	0869	0889	0909	0929
Flange thrd rf	766250	7581	7621	7661	7681	7701											
Welding neck flange	769396						3129	3149	3169	2089	2109	2129	2149	2169	2189	2209	2249
Spectacle blind	768800	0021	0041	0061	0081	0101											
Spectacle blind	769365						1109	1119	1129	1139	1149	1159	1169	1179	1189	1199	1209
Welding neck flange(300#)	xxxxxx														xxxx		
Fittings																	
Cap bw	769397						6259	6459	6659	6829	7029	7229	7429	7629	7829	8059	8259
Cap thrd	760618	0081	0121	0161	0181	0201											
Coupling thrd	760628	0081	0121	0161	0181	0201	6259	6459	6659	6829	7029	7229	7429	7629	7829	8059	8259
Elbow 45 deg LR bw	769338																
Elbow 45 deg thrd	760638	0081	0121	0161	0181	0201	6259	6459	6659	6829	7029	7229	7429	7629	7829	8059	8259
Elbow 90 deg LR bw	769339						6259	6459	6659	6829	7029	7229	7429	7629	7829	8059	8259
Elbow 90 deg thrd	760639	0081	0121	0161	0181	0201											
Tee equal bw	769382						6259	6459	6659	6829	7029	7229	7429	7629	7829	8059	8259
Tee equal thrd	760684	0081	0121	0161	0181	0201											
Union thrd	760691	0081	0121	0161	0181	0201											

Metric units

PIPING COMPONENTS Item description	MESC	Nominal pipe size																	
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600		
Valves																			
Ball valve float RB thrd	770703	1539	1549	1559	1579	1589													
Ball valve float RB fild RF	770605																		
Ball valve trunn RB fild RF	770606																		
Butterfly valve conc lug type	776009																		
Check valve dual plate fild	776921																		
Check valve dual plate solid wafer lug	776930																		
Check valve thrd	771701	0039	0049	0059	0079	0089													
Gate valve thrd	772701	0039	0049	0059	0079	0089													
Gate valve fild RF	772601																		
Globe valve fild	xxxx																		
Globe valve fild	xxxx																		
Miscellaneous																			
Gasket spiral wound	854136	3041	3061	3081	3121	3141	3181	3201	3241	3261	3281	3301	3321	3341	3361	3381	3421		
Insulating Gasket Kit	854609	0049	0069	0089	0129	0149	0189	0209	0249	0269	0289	0309	0329	0349	0369	0389	0429		
Strainer Y-type	768322																		
Strainer Bucket type	768322																		0169

Metric units

REDUCING/PIPING COMPONENTS

Run	x	Br	REBU	RECB	RECT	REEB	REFT	TERB	TERT
20	x	15	7606141221		7606701221		7662611301		7606850261
25	x	15	7606141621		7606701621		7662611401		7606850341
25	x	20	7606141641		7606701641		7662611421		7606850361
40	x	15	7606141811		7606701811		7662611601		7606850441
40	x	20	7606141831		7606701831		7662611611		7606850461
40	x	25	7606141851		7606701851		7662611631		7606850481
50	x	15	7606142001		7606702001		7662611801		7606850541
50	x	20	7606142011		7606702011		7662611821		7606850561
50	x	25	7606142021		7606702021		7662611841		7606850581
50	x	40	7606142041		7606702041		7662611861		7606850601
80	x	40	7693702249		7693712249				
80	x	50	7693702259		7693712259		7693830729		
100	x	40	7693702269		7693712269				
100	x	50	7693702429		7693712429		7693830789		
100	x	80	7693702449		7693712449		7693830809		
150	x	80	7693702459		7693712459		7693830819		
150	x	100	7693702469		7693712469		7693830829		
200	x	100	7693702479		7693712479		7693830839		
200	x	150	7693702489		7693712489		7693830849		
250	x	100	7693702499		7693712499				
250	x	150	7693702509		7693712509		7693830869		
250	x	200	7693702519		7693712519		7693830879		
300	x	150	7693702529		7693712529				
300	x	200	7693702539		7693712539		7693830899		
300	x	250	7693702549		7693712549		7693830909		
350	x	150	7693702559		7693712559				
350	x	200	7693702569		7693712569		7693830929		
350	x	250	7693702579		7693712579		7693830939		
350	x	300	7693702589		7693712589		7693830949		
Run	x	Br	CIWB	RECB	REEB	TERB			
400	x	200	7693702599	7693712599					
400	x	250	7693702609	7693712609	7693830969				
400	x	300	7693702619	7693712619	7693830979				
400	x	350	7693702629	7693712629	7693830989				
450	x	250	7693702639	7693712639	7693830999				
450	x	300	7693702649	7693712649	7693831009				
450	x	350	7693702659	7693712659	7693831019				
450	x	400	7693702669	7693712669	7693831029				
500	x	300	7693702679	7693712679	7693831039				
500	x	350	7693702689	7693712689	7693831049				
500	x	400	7693702699	7693712699	7693831059				
500	x	450	7693702709	7693712709	7693831069				
600	x	300			7693831079				
600	x	350			7693831089				
600	x	400	7693702739	7693712739	7693831099				
600	x	450	7693702749	7693712749	7693831109				
600	x	500	7693702759	7693712759	7693831119				

Metric units

REDUCING/PIPING COMPONENTS

<u>Comp.name</u>	<u>Description</u>
BROB	Branch outlet bw
BRSB	Branch outlet bw
REBU	Reducing bushing thrd
RECB	Reducer concentric bw
RECT	Reducer concentric thrd
REEB	Reducer eccentric bw
REFT	Reducing flange thrd cl 150
TERB	Tee reducing bw
TERT	Tee reducing thrd

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BROB	BRSB
50	150	-	150	<u>7693871119</u>
50	200	-	250	<u>7693871129</u>
50	300	-	450	<u>7693871139</u>
50	500	-	600	<u>7693871149</u>
80	200	-	200	<u>7693871159</u>
80	250	-	250	<u>7693871169</u>
80	300	-	350	<u>7693871179</u>
80	400	-	500	<u>7693871189</u>
80	600	-	600	<u>7693871199</u>
100	250	-	250	<u>7693871209</u>
100	300	-	350	<u>7693871219</u>
100	400	-	500	<u>7693871229</u>
100	600	-	600	<u>7693871239</u>
150	300	-	350	<u>7693871249</u>
150	400	-	400	<u>7693871259</u>
150	450	-	450	<u>7693871269</u>
150	500	-	500	<u>7693871279</u>
150	600	-	600	<u>7693871289</u>
200	400	-	400	<u>7693882119</u>
200	450	-	450	<u>7693882129</u>
200	500	-	500	<u>7693882139</u>
200	600	-	600	<u>7693882149</u>
250	500	-	500	<u>7693882159</u>
250	600	-	600	<u>7693882169</u>

Metric units

BOLTING**Boltset API 609 wafer lug**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
80	4	5/8	x	140	8138150859
100	8	5/8	x	160	8138150899
150	8	3/4	x	170	8138151559
200	8	3/4	x	180	8138151579
250	12	7/8	x	200	8138152329

Coated boltset std flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	1/2	x	60	8138150239
20	4	1/2	x	70	8138150259
25	4	1/2	x	70	8138150259
40	4	1/2	x	80	8138150279
50	4	5/8	x	90	8138150759
80	4	5/8	x	100	8138150779
100	8	5/8	x	100	8138150779
150	8	3/4	x	110	8138151459
200	8	3/4	x	120	8138151479
250	12	7/8	x	140	8138152209
300	12	7/8	x	150	8138152229
350	12	1	x	170	8138153059
400	16	1	x	170	8138153059
450	16	1 1/8	x	180	8138153909
500	20	1 1/8	x	200	8138153949
600	20	1 1/4	x	220	8138154789

Coated boltset for Dual Plate Solid Lug**Wafer Check Valve**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	4	5/8	x	150	8138150879
80	4	5/8	x	180	8138150939
100	8	5/8	x	180	8138150939
150	8	3/4	x	210	8138151639

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	1/2	x	70	8138150259
20	4	1/2	x	80	8138150279
25	4	1/2	x	80	8138150279
40	4	1/2	x	80	8138150279
50	4	5/8	x	100	8138150779
80	4	5/8	x	110	8138150799
100	8	5/8	x	110	8138150799
150	8	3/4	x	120	8138151459
200	8	3/4	x	130	8138151479
250	12	7/8	x	140	8138152209
300	12	7/8	x	150	8138152229
350	12	1	x	170	8138153059
400	16	1	x	170	8138153059
450	16	1 1/8	x	180	8138153909
500	20	1 1/8	x	200	8138153949
600	20	1 1/4	x	220	8138154789

ASSEMBLIES

Drain or vent point DN 15 Fig.A DN15 - 25

Branch: according to branch table

Cap thrd	1	7606180081
Pipe nipple thrd ends L=50 mm	1	7606560921

Drain or vent point DN 20 Fig.A DN40 - 50

Branch: according to branch table

Cap thrd	1	7606180121
Pipe nipple thrd ends L=50 mm	1	7606561321

Drain or vent point DN 25 Fig.H DN80 - 250

Branch: branch nipple flanged

Blind flange	1	7662150161
Gasket spiral wound	1	8541363081
Studbolt with nuts	4	8138150259

CLASS 018011-Z

Design limits**Temperature (°C)**

0 90

Pressure (Barg)

DN 15- 250 16.0 16.0

Notes

- Design limits acc .to API609 butterfly valve rating
- For basis of design see DEP 31.38.01.10-Gen.
- Pre-fab carbon steel pipe spools shall be galvanised in accordance with ASTM A53
- Pre-fab carbon steel pipe spools shall have flanged ends and shall be limited to L- or Z-shapes and shall be hot dip galvanised before installation.
- Wherever, this pipe class is selected, line sizes DN 80 and above shall be provided as galvanised spool. Galvanising shall be carried out by approved Vendor only. Accordingly, Item/MESC coding for line sizes DN 80 and above are kept as carbon steel for further supplying to approved Vendors for Galvanisation.
- Piping class design meets full vacuum at ambient temperature condition
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Pipe sizes DN 15-50 (API 5L-B) shall be provided with threaded ends C/W full coupling on one end. Coupling rating 3000 lbs
- RF flange shall be used to match with metallic flanges; however mating with GRE/GRP/FRP/RTR flanges shall be flat faced.

Table of schedules

DN	Schedule
15	80
20	80
25	80
40	80
50	80
80	40
100	40
150	40
200	20
250	20

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250
250	G	G	G	G	G	E	B	B	B	A
200	G	G	G	G	G	E	B	B	B	A
150	G	G	G	G	G	B	B	B	A	
100	G	G	G	G	B	B	B	A		
80	G	G	G	G	B	B	A			
50	B	B	B	B	B	A				
40	B	B	B	B	A					
25	B	B	B	A						
20	B	B	A							
15		A								

Code | Explanation of characters

A	Equal tee
B	Reducing tee
E	Branch outlet
G	Branch fitting (threaded)

Carbon steel Galvanised	Plant
Class no. 018011-Z	Consignee
ASME rating CLASS 150	Engineered by
Corrosion allowance 0 mm	Principal
Revision letter	Contr. job no.
Revision date	Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-50	API 5L-B (galvanised)
PIPE	Pipe	DN 80-80	ASTM A106-B (galvanised)
PISM	Pipe (API 5L-B sml)	DN 100-250	API 5L-B (sml) (galvanised)
PNTT	Pipe nipple thrd ends L=50 mm	DN 15-25	API 5L-B (galvanised)
PT75	Pipe nipple thrd ends L=75 mm	DN 15-50	API 5L-B (galvanised)
PT99	Pipe nipple thrd ends L=100 mm	DN 15-50	API 5L-B (galvanised)

Flanges

BLFL	Blind flange RF	DN 15-250	ASTM A105N (galvanised)
FLTR	Flange thrd RF	DN 15-50	ASTM A105N (galvanised)
FLTR1	Flange thrd FF	DN 15-50	ASTM A105N (galvanised)
FLTR2	Flange thrd RF-300#	DN 50-50	ASTM A105N (galvanised)
LJFL	Lap joint flange	--	ASTM A105 (galvanised)
WNFL	Welding neck flange RF	DN 80-250	ASTM A105N (galvanised)
WNFL1	Welding neck flange RF(300#)	DN 80-250	ASTM A105N (galvanised)
SBFL	Spectacle Blind	DN 15-80	ASTM A516 Gr.60

Fittings

CAPB	Cap bw	DN 80-250	ASTM A234-WPB (galvanised)
CAPT	Cap thrd	DN 15-50	ASTM A105 (galvanised)
COUT	Coupling thrd	DN 15-80	ASTM A105 (galvanised)
E45B	Elbow 45 deg LR bw	DN 80-250	ASTM A234-WPB (galvanised)
E45T	Elbow 45 deg thrd	DN 15-50	ASTM A105 (galvanised)
E90B	Elbow 90 deg LR bw	DN 80-250	ASTM A234-WPB (galvanised)
E90T	Elbow 90 deg thrd	DN 15-50	ASTM A105 (galvanised)
TEEB	Tee equal bw	DN 80-250	ASTM A234-WPB (galvanised)
TEET	Tee equal thrd	DN 15-50	ASTM A105 (galvanised)
UNIT	Union thrd	DN 15-80	ASTM A105 (galvanised)

Reducing fittings

BN3F	Branch fitting flgd	DN 80-250	ASTM A105 (galvanised)
BN3T	Branch fitting thrd	DN 80-250	ASTM A105 (galvanised)
REBU	Reducing bushing thrd	DN 20-50	ASTM A234-WPB (galvanised)
RECB	Reducer concentric bw	DN 80-250	ASTM A234-WPB (galvanised)
RECT	Reducer concentric thrd	DN 20-50	ASTM A105 (galvanised)
REEB	Reducer eccentric bw	DN 80-250	ASTM A234-WPB (galvanised)
REFT	Reducing flange thrd cl 150	DN 20-50	ASTM A105 (galvanised)
TERB	Tee reducing bw	DN 80-250	ASTM A234-WPB (galvanised)
TERT	Tee reducing thrd	DN 20-80	ASTM A105 (galvanised)

Valves

BART	Ball valve float RB thrd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), PTFE
BUCL	Butterfly valve conc lug type	DN 80-250	Body: ASTM A536 60-40-18 Disc: Aluminium Bronze Lining: EPDM
CHVT	Check valve thrd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), Stellite 6
CHWL	Check valve dual plate Solid Wafer lug	DN 80-150	Body: ASTM A105N Trim: AISI 316 (L), Stellite 6
CHDF	Check valve dual plate Flgd	DN 200-250	Body: ASTM A105N Trim: AISI 316 (L), Stellite 6
GAVT	Gate valve thrd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), Stellite 6

Miscellaneous

GKSW	Gasket spiral wound	DN 15-250	AISI 316 (L), Graphite CS centring-/SS inner ring
GKSW1	Gasket spiral wound(300#)	DN 15-250	AISI 316 (L), Graphite CS centring-/SS inner ring
STBT	Studbolt with nuts	--	ASTM A193-B7/A194-2H (Coated with Xylan 1070 or Takecoat 1000)
STBT1	Studbolt with nuts (300#)	--	ASTM A193-B7/A194-2H (Coated with Xylan 1070 or Takecoat 1000)

Special Fittings

HSCL	Hose Coupling Flgd / Female Conn.	DN 15-50	AISI 316 (L) / Aluminium Bronze
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PIPING COMPONENTS

Item description	Nominal pipe size										
	15	20	25	40	50	80	100	150	200	250	
MESC											
Pipe											
Pipe	741308 0	181	231	281	381	431					
Pipe	743005 1						031				
Pipe (API 5L-B sml)	741312 1							491			
Pipe (API 5L-B sml)	741312 2							111	391	791	
Pipe nipple thrd ends L=100 mm	760656 0	941									
Pipe nipple thrd ends L=100 mm	760656 1		341	741	941						
Pipe nipple thrd ends L=100 mm	760656 2						141				
Pipe nipple thrd ends L=50 mm	760656 0	921									
Pipe nipple thrd ends L=50 mm	760656 1		321	721							
Pipe nipple thrd ends L=75 mm	760656 0	931									
Pipe nipple thrd ends L=75 mm	760656 1		331	731	931						
Pipe nipple thrd ends L=75 mm	760656 2					131					
Flanges											
Blind flange	766215	0081	0121	0161	0181	0201	0221	0241	0261	0281	0301
Flange thrd rf	766250	7581	7621	7661	7681	7701					
Flange thrd RF 300#	766250						8701				
Flange thrd ff	766250	0281	0321	0361	0381	0401					
Welding neck flange	766278						3121	3141	3161	2081	2101
Welding neck flange (300#)	766278						5621	5641	5661	4681	4701
Spectacle blind	768960	0021	0041	0061	0081	0101	0121				
Fittings											
Cap bw	763019						0751	0951	1151	1321	1521
Cap thrd	760618	0081	0121	0161	0181	0201					
Coupling thrd	760628	0081	0121	0161	0181	0201	0221				
Elbow 45 deg LR bw	763038						6251	6451	6651	6821	7021
Elbow 45 deg thrd	760638	0081	0121	0161	0181	0201					
Elbow 90 deg LR bw	763040						6251	6451	6651	6821	7021
Elbow 90 deg thrd	760639	0081	0121	0161	0181	0201					
Tee equal bw	763084						6251	6451	6651	6821	7021
Tee equal thrd	760684	0081	0121	0161	0181	0201					
Union thrd	760691	0081	0121	0161	0181	0201	0221				

PIPING COMPONENTS

<u>Item description</u>	Nominal pipe size									
	15	20	25	40	50	80	100	150	200	250
<u>MESC</u>										
Valves										
Ball valve float RB thrd	770100	1539	1549	1559	1579	1589				
Butterfly valve conc lug type	775066						6609	6629	6649	6659
Check valve dual plate solid wafer lug	776713						0109	0129	0149	
Check valve dual plate Flgd	776713									6659
Check valve thrd	771101	0039	0049	0059	0079	0089				6669
Gate valve thrd	772101	0039	0049	0059	0079	0089				
Miscellaneous										
Gasket spiral wound	854136	3041	3061	3081	3121	3141	3181	3201	3241	3261
Gasket spiral wound (300#)	854136	4041	4061	4081	4121	4141	4181	3701	3741	3761
										3781

REDUCING/PIPING COMPONENTS

Run	x	Br	REBU	RECB	RECT	REEB	REFT	TERB	TERT
20	x	15	7606141221		7606701221		7662611301		7606850261
25	x	15	7606141621		7606701621		7662611401		7606850341
25	x	20	7606141641		7606701641		7662611421		7606850361
40	x	15	7606141811		7606701811		7662611601		7606850441
40	x	20	7606141831		7606701831		7662611611		7606850461
40	x	25	7606141851		7606701851		7662611631		7606850481
50	x	15	7606142001		7606702001		7662611801		7606850541
50	x	20	7606142011		7606702011		7662611821		7606850561
50	x	25	7606142021		7606702021		7662611841		7606850581
50	x	40	7606142041		7606702041		7662611861		7606850601
80	x	40		7630722261		7630732261			
80	x	50		7630722361		7630732361		7630891361	7606850721
100	x	40		7630722501		7630732501			
100	x	50		7630722661		7630732661		7630891571	
100	x	80		7630722751		7630732751		7630891651	
150	x	80		7630722951		7630732951		7630891771	
150	x	100		7630723051		7630733051		7630891891	
200	x	100		7630723221		7630733221		7630892101	
200	x	150		7630723331		7630733331		7630892301	
250	x	100		7629463401		7629613401		7630892581	
250	x	150		7630723531		7630733531		7630892761	
250	x	200		7630723611		7630733611		7630892891	

REDUCING/PIPING COMPONENTS

<u>Comp.name</u>	<u>Description</u>
BN3F	Branch fitting flgd
BN3P	Branch fitting plain
BN3T	Branch fitting thrd
REBU	Reducing bushing thrd
RECB	Reducer concentric bw
RECT	Reducer concentric thrd
REEB	Reducer eccentric bw
REFT	Reducing flange thrd cl 150
TERB	Tee reducing bw
TERT	Tee reducing thrd

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN3T	BRSB
15	80	-	200	7680370641	7680319841
15	250	-	250	7672292531	7672692341
20	80	-	100	7680370671	7680319871
20	150	-	250	7680370691	7680319881
25	80	-	80	7680370731	7680319901
25	100	-	100	7680370751	7680319911
25	150	-	250	7680370761	7680319921
40	80	-	80	7680370791	7680319941
40	100	-	100	7680370801	7680319951
40	150	-	150	7680370821	7680319961
40	200	-	250	7680370831	7680319971
50	150	-	150		<u>7680310589</u>
50	200	-	250		<u>7680310599</u>
80	200	-	200		7678312281
80	250	-	250		7678312291

BOLTING**Boltset API 609 wafer lug**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
80	8	3/4	x 140	8138151499
100	8	3/4	x 150	8138151519
150	12	3/4	x 150	8138151519
200	12	7/8	x 170	8138152269
250	16	1	x 190	8138153099

Std boltset standard flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 60	8138150239
20	4	1/2	x 70	8138150259
25	4	1/2	x 70	8138150259
40	4	1/2	x 80	8138150279
50	4	5/8	x 90	8138150759
80	4	5/8	x 100	8138150779
100	8	5/8	x 100	8138150779
150	8	3/4	x 110	8138151439
200	8	3/4	x 110	8138151439
250	12	7/8	x 120	8138152169

Coated boltset for Dual Plate Solid Lug**Wafer Check Valve**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	4	5/8	x 150	8138150879
80	4	5/8	x 180	8138150939
100	8	5/8	x 180	8138150939
150	8	3/4	x 210	8138151639
200	8	3/4	x 250	8138151719
250	12	7/8	x 280	8138152489
300	12	7/8	x 310	8138152549

Coated boltset std flange 300#

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138150259
20	4	5/8	x 80	8138150739
25	4	5/8	x 80	8138150739
40	4	3/4	x 100	8138151419
50	8	5/8	x 90	8138150759
80	8	3/4	x 110	8138151439
100	8	3/4	x 120	8138151459
150	12	3/4	x 130	8138151479
200	12	7/8	x 140	8138152209
250	16	1	x 160	8138153039

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138150259
20	4	1/2	x 80	8138150279
25	4	1/2	x 80	8138150279
40	4	1/2	x 80	8138150279
50	4	5/8	x 100	8138150779
80	4	5/8	x 110	8138150799

ASSEMBLIES**Drain or vent point DN 15 Fig.A DN15 - 25**

Branch: according to branch table

Cap thrd	1	7606180081
Pipe nipple thrd ends L=50 mm	1	7606560921

Drain or vent point DN 20 Fig.A DN40 - 50

Branch: according to branch table

Cap thrd	1	7606180121
Pipe nipple thrd ends L=50 mm	1	7606561321

Drain or vent point DN 25 Fig.H DN80 - 250

Branch: branch nipple flanged

Blind flange	1	7662150161
Gasket spiral wound	1	8541363081
Studbolt with nuts	4	8138611559

CLASS 031440-X

Design limits**Temperature (°C)**

	-29	0	50	75	100	125	150
Pressure (Barg) /FV	51.1	51.1	50.1	48.3	46.6	45.8	45.1
DN 15-1200							

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class range DN 15 [NPS 1/2] up to /incl DN 600[NPS 24] design meets full vacuum at ambient condition For DN 1200 [NPS 48] & Above, if vacuum condition can occur, piping to be designed accordingly.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.
- Non-commercial sizes (such as DN 650) are project specific and shall not be used as standard unless proven suitable economically.

Table of schedules

DN	Schedule
15	160
20	160
25	160
40	160
50	80
80	80
100	40
150	40
200	40
250	40
300	40
350	40
400	40
450	40
500	40
600	40
650	16.25mm
750	18.28mm
900	HOLD-7
1050	HOLD-7
1200	HOLD-7

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	650	750	900	1050	1200
1200	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
1050	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
900	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
750	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
650	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
600	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
500	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
450	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
400	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
350	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
300	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
250	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
200	N	N	N	N	P	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
150	N	N	N	N	P	B	B	B	A												
100	N	N	N	N	U	B	A														
80	N	N	N	N	U	A															
50	N	N	M	M	J																
40	N	M	M	J																	
25	M	M	J																		
20	M	J																			
15	J																				

Code Explanation of characters

A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel Sour
 Class no. 031440 - X
 ASME rating CLASS 300
 Corrosion allowance 3 mm
 Revision letter
 Revision date

Plant
 Consignee
 Engineered by
 Principal
 Contr. job no.
 Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe				Valves			
PIPE	Pipe	DN 650-1200	ASTM A671-CC65 cl 22	BAFF	Ball valve float FB fgd	DN 15-40	Body: ASTM A105N
PIPE	Pipe	DN 15-400	ASTM A106-B	BARF	Ball valve float RB fgd	DN 15-50	Trim: AISI 316 (L), filled PTFE
PIPE	Pipe	DN 450-600	ASTM A333-6	BTFF	Ball valve trunn FB fgd	DN 50-600	Body: ASTM A105N
Flanges				BTFR	Ball valve trunn RB fgd	DN 80-1200	Trim: AISI 316 (L), filled PTFE
BLFL	Blind flange	DN 15-1200	ASTM A105N	BUTF	Butterfly valve triple of fgd	DN 200-1200	Body: ASTM A105NA/A216-WCB/WCC
LJFL	Lap joint flange	--	ASTM A105N	CHDF	Check valve dual plate Solid Wafer lug / fgd	DN 50-1200	Trim: AISI 316 (L), filled PTFE
SBNF	Spectacle blind	DN 15-350	ASTM A516-60/65/70	CHVF	Check valve fgd	DN 15-50	Body: ASTM A105NA/A216-WCB/WCC
SPNF	Spade	DN 15-600	ASTM A516-60/65/70	CHVF	Check valve fgd	DN 80-600	Trim: CS, Duplex, Stellite
SRNF	Spacer ring	DN 15-600	ASTM A516-60/65/70	GAVF	Gate valve fgd	DN 15-50	Body: ASTM A105NA/ASTM A216-WCB/WCC
WNFL	Welding neck flange	DN 15-1200	ASTM A105N	GAVF	Gate valve fgd	DN 80-600	Trim: AISI 316 (L), Stellite
Fittings				GLVF	Globe valve fgd	DN 15-50	Body: ASTM A105N
CAPB	Cap bw	DN 650-1200	ASTM A420-WPL6W	GLVF	Globe valve fgd	DN 80-200	Trim: AISI 316 (L), Stellite
CAPB	Cap bw	DN 15-400	ASTM A234-WPB	DBBT	Valve assy Double block ball & bleed fgd/thrd	DN 15-50	Body: ASTM A105N
CAPB	Cap bw	DN 450-600	ASTM A420-WPL6	DBBF	Valve assy Double block ball & bleed fgd	DN 15-50	Trim: AISI 316 (L), filled PTFE
E45B	Elbow 45 deg LR bw	DN 650-1200	ASTM A420-WPL6W	NVFL	Needle valve fgd	DN 15-40	Body: ASTM A105N
E45B	Elbow 45 deg LR bw	DN 15-400	ASTM A234-WPB	NVFL1	Needle valve(SW/THD)	DN 15	Trim: AISI 316 (L), Stellite
E45B	Elbow 45 deg LR bw	DN 450-600	ASTM A420-WPL6				Body: ASTM A105N
E45B	Elbow 45 deg LR bw	DN 650-1200	ASTM A420-WPL6W				Trim: AISI 316 (L), Stellite
E90B	Elbow 90 deg LR bw	DN 15-400	ASTM A234-WPB				Body: ASTM A105NA/A216-WCB/WCC
E90B	Elbow 90 deg LR bw	DN 450-600	ASTM A420-WPL6				Trim: AISI 316 (L), Stelite
E90B	Elbow 90 deg LR bw	DN 650-1200	ASTM A420-WPL6W				Body: ASTM A105NA/ASTM A216-WCB/WCC
TEEB	Tee equal bw	DN 650-1200	ASTM A420-WPL6W				Trim: AISI 316 (L), Stelite
TEEB	Tee equal bw	DN 15-400	ASTM A234-WPB				Body: ASTM A105N
TEEB	Tee equal bw	DN 450-600	ASTM A420-WPL6				Trim: AISI 316 (L), filled PTFE
Reducing fittings							Body: ASTM A105N
BN6F	Branch fitting fgd	DN 40-1200	ASTM A105N				Trim: AISI 316 (L), Stelite
BN6B	Branch fitting bw	DN 40-1200	ASTM A105N				
BR3B	Branch outlet bw	DN 150-400	ASTM A105N				
BR6B	Branch outlet bw	DN 450-1200	ASTM A105N				
BROB	Branch outlet bw	DN 400-1200	ASTM A105N				
RECB	Reducer concentric bw	DN 650-1200	ASTM A420-WPL6W	TWHD	Thermowell fgd DN 50	DN 50-5400	ASTM B564 UNS N04400
RECB	Reducer concentric bw	DN 20-400	ASTM A234-WPB	TWHS	Thermowell fgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
RECB	Reducer concentric bw	DN 450-600	ASTM A420-WPL6	TWHL	Thermowell fgd DN 50 L=255 mm	--	ASTM B564 UNS N04400
REEB	Reducer eccentric bw	DN 650-1200	ASTM A420-WPL6W				
REEB	Reducer eccentric bw	DN 20-400	ASTM A234-WPB				
REEB	Reducer eccentric bw	DN 450-600	ASTM A420-WPL6				
TERB	Tee reducing bw	DN 650-1200	ASTM A420-WPL6W				
TERB	Tee reducing bw	DN 20-400	ASTM A234-WPB				
TERB	Tee reducing bw	DN 450-600	ASTM A420-WPL6				
Instruments							

Miscellaneous

GKMA	Gasket camprofile	DN 650-1200	AISI 316 (L), Graphite SS centring ring
GKSW	Gasket spiral wound	DN 15-600	AISI 316 (L), Graphite CS centring/SS inner ring
GKIK	Insulating Gasket kit	DN 15-100	(G-10/11) with 316 SS CORE, PTFE SS Pres Enrg Spirl Spring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A105N
PLUG	Plug NPT	DN 15-50	ASTM A105N
ST3B	Strainer Y-type (3 mm ca)	DN 50-400	Sieve: AISI 316 (L)
STBT	Studbolt with nuts	--	ASTM A193-B7M/A194-2HM Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A105N HOLDER / ACCESS FITTING: AISI 316 (L) COUPON: ASTM A106-B
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A105N INTERNAL: AISI 316 (L)
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: AISI 316 (L) VALVE & INTERNALS: AISI 316 (L)
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A105N VALVE & INTERNALS: AISI 316 (L)

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	MESC	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	650	750	900	1050	1200			
Pipe	743003 0	201	301	401	601	711																			
Pipe	743003 1						091	491																	
Pipe	743003 2								111	451	871														
Pipe	743003 3											311	791												
Pipe	743003 4												311												
Pipe	743016 1													701											
Pipe	743016 2														101	401									
Pipe	743021 0															461									
Pipe	743021 1																111	691							
Pipe	743021 2																	241							
Blind flange	766211	1081	1121	1161	1181	1201	1221	1241	1261	1281	1301	1321	1341	1361	1381	1401	1421								
Blind flange	767012																	1561	1621	1681	1741				
Spacer ring	768875																	1531	1561	1591	1621				
Spacer ring	768908	0421	0441	0461	0481	0501	0521	0541	0561	0581	0601	0621	0641	0661	0681	0701	0721								
Spade	768895																	1531	1561	1591	1621				
Spade	768937	0421	0441	0461	0481	0501	0521	0541	0561	0581	0601	0621	0641	0661	0681	0701	0721								
Spectacle blind	768962	0421	0441	0461	0481	0501	0521	0541	0561	0581	0601	0621	0641	0661	0681	0701	0721								
Welding neck flange	766278	6521	6541	6561	6581	6101	6121	5641	5661	5681	5701	5721	5741	5761	5781	5801	5841								
Welding neck flange	767082																	1221	1461	1621	1811				
Cap bw	763017	5721	5781	5821	5921	6081	6281	6451	6651	6851	7051	7281	7471	7681											
Cap bw	763117																	3861	3961	4061		5461	6121	6691	7241
Elbow 45 deg LR bw	763034	5721	5781	5821	5921	6081	6281	6451	6651	6851	7051	7281	7471	7681											
Elbow 45 deg LR bw	763134																	3861	3961	4061		5261	6781	7501	8111
Elbow 90 deg LR bw	763042	5721	5781	5821	5921	6081	6281	6451	6651	6851	7051	7281	7471	7681											
Elbow 90 deg LR bw	763143																	3861	3961	4061		5261	6721	7431	8111
Tee equal bw	763081	5721	5781	5821	5921	6081	6281	6451	6651	6851	7051	7281	7471	7681											
Tee equal bw	763180																	3861	3961	4061		5261	6721	7501	8101

Metric units

PIPING COMPONENTS		Nominal pipe size																				
Item description	MESC	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	650	750	900	1050	1200
Valves																						
Ball valve float FB fffd	770025	8539	8549	8559	8579																	
Ball valve float RB fffd	770025	3539	3549	3559	3579	3589																
Ball valve trunn FB fffd	770067					5589	5609	5629	5649	5659	5669	5679	5689	5699	5709	5719	5739					
Ball valve trunn RB fffd	770067						0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739	0769	0799	0829	0849	
Butterfly valve triple of fffd	774131									0659	0669	0679	0689	0699	0709	0719	0739	0769	0799	0829	0849	
Check valve dual plate fffd	776716									0659	0669	0679	0689	0699	0709	0719	0739	0769	0799	0829	0849	
Check Valve Wafer Lug (Solid)	776751																					
Check valve fffd	771005	0539	0549	0559	0579	0599	0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739					
Gate valve fffd	772004	0539	0549	0559	0579	0599	0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739					
Globe valve fffd	773005	0539	0549	0559	0579	0599	0609	0629	0649	0659												
Valve DBBT	778545	8539	8549	8559	8579	5589																
Valve DBBF	778546	8539	8549	8559	8579	5589																
Needle valve (SW/THD)	773254	0539																				
Miscellaneous																						
Gasket camprofile	854190																	1541	1601	1661		
Gasket spiral wound	854136	4041	4061	4081	4121	4141	4181	3701	3741	3761	3781	3801	3821	3841	3861	3881	3921					
Insulating Gasket Kit	854610	0221	0501	0621		0881																
Meterrun	766496	0621	0641	0661	0681																	
Orifice flange set	766295							1051	1061	0231	0241	0261	0271	0281	0291	0301	0321	0331	0341			
Plug NPT	760518	0081	0121	0161	0181	0201																
Strainer Y-type (3 mm ca)	768322						0769	0789	0569	0589	1659	1669	1679	1689	1699							

Metric units

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
20	x	15	7630661411	7630671411	7630880391
25	x	15	7630661511	7630671511	7630880491
25	x	20	7630661611	7630671611	7630880591
40	x	15	7630661711	7630671711	
40	x	20	7630661811	7630671811	7630880791
40	x	25	7630661911	7630671911	7630880891
50	x	20	7629471971	7630671931	
50	x	25	7630661991	7630671991	7630881111
50	x	40	7630662081	7630672081	7630881201
80	x	40	7630662291	7630672291	
80	x	50	7630662371	7630672371	7630881331
100	x	40	7630662521	7630672491	
100	x	50	7630662661	7630672661	7630881571
100	x	80	7629472751	7629622701	7630881691
150	x	80	7630662961	7630672961	7630881811
150	x	100	7630663051	7630673051	7630881891
200	x	100	7630663251	7630673251	7630882051
200	x	150	7630663351	7630673351	7630882251
250	x	100	7630663431	7630673431	7630882531
250	x	150	7630663551	7630673551	7630882711
250	x	200	7630663651	7630673651	7630882911
300	x	150	7630663831	7630673831	7630883101
300	x	200	7630663961	7630673961	7630883281
300	x	250	7630664041	7630674041	7630883501
350	x	150	7630664131	7630674131	
350	x	200	7630664221	7630674221	7630883901
350	x	250	7630664381	7630674381	7630884151
350	x	300	7630664471	7630674471	7630884411

Thermowell flgd DN 50	
Length (mm)	MESC number
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

Metric units

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
400	x	200	7630664531	7630674531	
400	x	250	7630664621	7630674621	7630885051
400	x	300	7630664741	7630674741	7630885311
400	x	350	7630664871	7630674871	7630885561
450	x	250	7631665231	7631755231	7631886041
450	x	300	7631665531	7631755531	7631886281
450	x	350	7631665841	7631755841	7631886521
450	x	400	7631666141	7631756141	7631886761
500	x	300	7631666431	7631756431	7631887481
500	x	350	7631666741	7631756741	7631887721
500	x	400	7631667041	7631757041	7631887961
500	x	450	7631667341	7631757341	7631888201
600	x	300			7631888681
600	x	350			7631888921
600	x	400	7631668841	7631758841	7631889161
600	x	450	7631669141	7631759141	7631889401
600	x	500	7631669551	7631759441	7631889641

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting fgd
BN6B	Branch fitting bw
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BROB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
650	x	400		XXXXXXXX	
650	x	450		XXXXXXXX	
650	x	500		XXXXXXXX	
650	x	600	XXXXXXXX	XXXXXXXX	XXXXXXXX
750	x	450			7629940961
750	x	500			7629941161
750	x	600	7629561361	7629761361	7629941361
900	x	450			7629942541
900	x	500			7629942741
900	x	600			7629942941
900	x	750	7629563541	7629763541	7629943541

Run	x	Br	RECB	REEB	TERB
1050	x	600			7629944991
1050	x	750			7629945591
1050	x	900	7629566191	7629766191	7629946191
1200	x	600			7629957651
1200	x	750			7629958251
1200	x	900			7629958851
1200	x	1050	7629549451	7629749451	7629959451

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BR6B	BROB
15	40	-	50	7672293401	7672693519		
15	80	-	150	7672293411	7672693529		
15	200	-	900	7672293421	7672693549		
15	1050	-	1200	7672293431	7672693559		
20	50	-	50	7672293441	7672693569		
20	80	-	250	7672293451	7672693579		
20	300	-	900	7672293461	7672693589		
20	1050	-	1200	7672293471	7672693599		
25	80	-	250	7672291931	7672693619		
25	300	-	900	7672293501	7672693629		
25	1050	-	1200	7672293511	7672693639		
40	80	-	80	7672293521	7672693659		
40	100	-	100	7672293531	7672693669		
40	150	-	200	7672293541	7672693679		
40	250	-	450	7672293551	7672693689		
40	500	-	900	7672293561	7672693699		
40	1050	-	1200	7672293571	7672693709		
50	150	-	150		7678311471		
50	200	-	250		7678311481		
50	300	-	400		7678311501		
50	450	-	450		7679031011		
50	500	-	900		7678903051		
50	1050	-	1200		7678903131		
80	200	-	200		7678311581		
80	250	-	250		7678311591		
80	300	-	350		7678311601		
80	400	-	400		7678311621		
80	450	-	450		7679031211		
80	500	-	500		7679031221		
80	600	-	600		7679031241		
80	650	-	650		xxxxxxxxxx		
80	750	-	1200		7678903201		

Metric units

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BR6B	BROB
100	300	-	350		7678311691		
100	400	-	400		7678311711		
100	450	-	450			7679031321	
100	500	-	500			7679031331	
100	600	-	600			7679031351	
100	650	-	650			xxxxxxxxxx	
100	750	-	750			7678903331	
100	900	-	900			7678903361	
100	1050	-	1050			7678903391	
100	1200	-	1200			7678903421	
150	350	-	350		7678311771		
150	400	-	400		7678311791		
150	450	-	450			7679008921	
150	500	-	500			7679008961	
150	600	-	600			7679008981	
150	650	-	650			xxxxxxxxxx	
150	750	-	750			7678012461	
150	900	-	900			7678034821	
150	1050	-	1050			7678017521	
150	1200	-	1200			7678038301	
200	400	-	400			7679009081	
200	450	-	450			7679009101	
200	500	-	500			7679009121	
200	600	-	600			7679009161	
200	650	-	650			xxxxxxxxxx	
200	750	-	750			7678012591	
200	900	-	900			7678034881	
200	1050	-	1050			7678017651	
200	1200	-	1200			7678038351	
250	500	-	500			7679009281	
250	600	-	600			7679009321	
250	650	-	650			xxxxxxxxxx	
250	750	-	750			7678012721	
250	900	-	900			7678034911	
250	1050	-	1050			7678017781	
250	1200	-	1200			7678038401	
300	650	-	650			xxxxxxxxxx	
300	750	-	750			7678012841	
300	900	-	900			7678034941	
300	1050	-	1050			7678017841	
300	1200	-	1200			7678038451	
350	650	-	650			xxxxxxxxxx	
350	750	-	750			7678012881	
350	900	-	900			7678034961	
350	1050	-	1050			7678017871	
350	1200	-	1200			7678038501	
400	900	-	900			7678034981	
400	1050	-	1050			7678017901	
400	1200	-	1200			7678038551	
450	1050	-	1050			7678017931	
450	1200	-	1200			7678038601	
500	1050	-	1050			7678017961	
500	1200	-	1200			7678038651	

Metric units

BOLTING**Coated boltset blind flg**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
750	28	1 3/4	x	310	8138177749
900	32	2	x	450	8138179119
1050	32	1 5/8	x	350	8138177209
1200	32	1 7/8	x	390	8138178479

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	5/8	x	130	8138170839
20	4	5/8	x	130	8138170839
25	4	5/8	x	130	8138170839
40	4	3/4	x	140	8138171499

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	8	5/8	x	150	8138170879
80	8	3/4	x	190	8138171599
100	8	3/4	x	200	8138171619
150	12	3/4	x	230	8138171679

Coated boltset std flange

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	1/2	x	70	8138170259
20	4	5/8	x	80	8138170739
25	4	5/8	x	80	8138170739
40	4	3/4	x	100	8138171419
50	8	5/8	x	90	8138170759
80	8	3/4	x	110	8138171439
100	8	3/4	x	120	8138171459
150	12	3/4	x	130	8138171479
200	12	7/8	x	140	8138172209
250	16	1	x	160	8138173039
300	16	1 1/8	x	180	8138173909
350	20	1 1/8	x	180	8138173909
400	20	1 1/4	x	190	8138174729
450	24	1 1/4	x	200	8138174749
500	24	1 1/4	x	210	8138174769
600	24	1 1/2	x	240	8138176319
650	28	1 5/8	x	270	xxxxxxxxxxxx
750	28	1 3/4	x	300	8138177729
900	32	2	x	390	8138178899
1050	32	1 5/8	x	350	8138177209
1200	32	1 7/8	x	390	8138178479

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	8	5/8	x	130	8138170839
80	8	3/4	x	140	8138171499
100	8	3/4	x	150	8138171519
150	12	3/4	x	150	8138171519
200	12	7/8	x	170	8138172269
250	16	1	x	190	8138173099
300	16	1 1/8	x	210	8138173969
350	20	1 1/8	x	220	8138173989
400	20	1 1/4	x	230	8138174809
450	24	1 1/4	x	250	8138174849
500	24	1 1/4	x	260	8138174869
600	24	1 1/2	x	290	8138176419

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	1/2	x	80	8138170279
20	4	5/8	x	90	8138170759
25	4	5/8	x	90	8138170759
40	4	3/4	x	110	8138171439
50	8	5/8	x	110	8138170799
80	8	3/4	x	130	8138171479
100	8	3/4	x	140	8138171499
150	12	3/4	x	150	8138171519
200	12	7/8	x	170	8138172269
250	16	3	x	190	8138173099
300	16	1 1/8	x	210	8138173969
350	20	1 1/8	x	220	8138173989
400	20	1 1/4	x	240	8138174829
450	24	1 1/4	x	250	8138174849
500	24	1 1/4	x	260	8138174869
600	24	1 1/2	x	300	8138176439
650	28	1 5/8	x	340	xxxxxxxxxxxx
750	28	1 3/4	x	370	8138177869
900	32	2	x	480	8138179179
1050	32	1 5/8	x	450	8138177409
1200	32	1 7/8	x	500	8138182989

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table	
Blind flange	9 7662111081
Welding neck flange	9 7662786521
Gasket spiral wound	9 8541364041
Studbolt with nuts	4 8138170259

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged	
Blind flange	9 7662111121
Gasket spiral wound	9 8541364061
Studbolt with nuts	4 8138170739

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table	
Blind flange	9 7662111121
Welding neck flange	9 7662786541
Gasket spiral wound	9 8541364061
Studbolt with nuts	4 8138170739

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged	
Blind flange	9 7662111161
Gasket spiral wound	9 8541364081
Studbolt with nuts	4 8138170739

Drain or vent point DN 40 Fig.H DN350 - 1200

Branch: branch nipple flanged	
Blind flange	9 7662111181
Gasket spiral wound	9 8541364121
Studbolt with nuts	4 8138171419

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table	
Lap joint flange	9 7662203201
Pipe	9 7430030711
Welding neck flange	9 7662786101
Gasket spiral wound	9 8541364141
Thermowell fgd DN 50 L=230 mm	9 7683385611
Studbolt with nuts	8 8138170799

Temp instr conn DN 50 Fig.HL DN150 - 1200

Branch: according to branch table	
Lap joint flange	9 7662203201
Pipe	9 7430030711
Welding neck flange	9 7662786101
Gasket spiral wound	9 8541364141
Thermowell fgd DN 50 L=255 mm	9 7683385621
Studbolt with nuts	8 8138170799

CLASS 031441-X

Design limits**Temperature (°C)**

	-29	0	50	75	100	125	150
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Pressure (Barg)	DN 15-600	51.1	51.1	50.1	48.3	46.6	45.8	45.1
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class design meets full vacuum at ambient temperature condition
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**

Table of schedules

DN	Schedule
15	160
20	160
25	160
40	160
50	80
80	80
100	40
150	40
200	40
250	40
300	40
350	40
400	40
450	40
500	40
600	40

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
500	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
450	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
400	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
350	N	N	N	N	P	E	E	E	E	B	B	B	B	A		
300	N	N	N	N	P	E	E	E	E	B	B	B	B	A		
250	N	N	N	N	P	E	E	B	B	B	A					
200	N	N	N	N	P	E	E	B	B	B	A					
150	N	N	N	N	P	B	B	B	A							
100	N	N	N	N	U	B	A									
80	N	N	N	N	U	A										
50	N	N	M	M	J											
40	N	M	M	J												
25	M	M	J													
20	M	J														
15	J															

Code	Explanation of characters
A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel Sour			
Class no.	031441-X	Plant	
ASME rating	CLASS 300	Consignee	
Corrosion allowance	3 mm	Engineered by	
Revision letter		Principal	
Revision date		Contr. job no.	
		Project no.	

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-400	ASTM A106-B
PIPE	Pipe	DN 450-600	ASTM A333-6

Flanges

BLFL	Blind flange	DN 15-600	ASTM A105N
LJFL	Lap joint flange	--	ASTM A105N
SBNF	Spectacle blind	DN 15-350	ASTM A516-60/65/70
SPNF	Spade	DN 15-600	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15-600	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-600	ASTM A105N

Fittings

CAPB	Cap bw	DN 15-400	ASTM A234-WPB
CAPB	Cap bw	DN 450-600	ASTM A420-WPL6
E45B	Elbow 45 deg LR bw	DN 15-400	ASTM A234-WPB
E45B	Elbow 45 deg LR bw	DN 450-600	ASTM A420-WPL6
E90B	Elbow 90 deg LR bw	DN 15-400	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 450-600	ASTM A420-WPL6
TEEB	Tee equal bw	DN 15-400	ASTM A234-WPB
TEEB	Tee equal bw	DN 450-600	ASTM A420-WPL6

Reducing fittings

BN6F	Branch fitting flgd	DN 40-600	ASTM A105N
BN6B	Branch fitting bw	DN 40-600	ASTM A105N
BR3B	Branch outlet bw	DN 150-400	ASTM A105N
BR6B	Branch outlet bw	DN 450-600	ASTM A105N
BROB	Branch outlet bw	DN 400-600	ASTM A105N
RECB	Reducer concentric bw	DN 20-400	ASTM A234-WPB
RECB	Reducer concentric bw	DN 450-600	ASTM A420-WPL6
REEB	Reducer eccentric bw	DN 20-400	ASTM A234-WPB
REEB	Reducer eccentric bw	DN 450-600	ASTM A420-WPL6
TERB	Tee reducing bw	DN 20-400	ASTM A234-WPB
TERB	Tee reducing bw	DN 450-600	ASTM A420-WPL6

Valves

BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM A105N Trim: Alloy 825, filled PTFE
BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, filled PTFE
BTFF	Ball valve trunn FB flgd	DN 50-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, filled PTFE
BTRF	Ball valve trunn RB flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A216-WCB/WCC Trim: CS, Alloy 825, Stellite
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
CHVF	Check valve flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825
CHVF	Check valve flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, PTFE
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A105N Trim: Alloy 825, Stellite

Instruments

TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	Alloy 825, Graphite CS centring-/Alloy 825 inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A105N
PLUG	Plug NPT	DN 15-50	ASTM A105N
ST3B	Strainer Y-type (3 mm ca)	DN 50-400	Sieve: Alloy 825
STBT	Studbolt with nuts	--	ASTM A193-B7M/A194-2HM Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A105N HOLDER / ACCESS FITTING: Alloy 825 COUPON: ASTM A106-B
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A105N INTERNALS: Alloy 825
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: Alloy 825 VALVE & INTERNALS: Alloy 825
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A105N VALVE & INTERNALS: Alloy 825

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	Nominal pipe size																
	15 MESC	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	
Pipe																	
Pipe	743003 0	201	301	401	601	711											
Pipe	743003 1						091	491									
Pipe	743003 2								111	451	871						
Pipe	743003 3											311	791				
Pipe	743003 4												311				
Pipe	743016 1												701				
Pipe	743016 2													101	401		
Flanges																	
Blind flange	766211	1081	1121	1161	1181	1201	1221	1241	1261	1281	1301	1321	1341	1361	1381	1401	1421
Spacer ring	768908	0421	0441	0461	0481	0501	0521	0541	0561	0581	0601	0621	0641	0661	0681	0701	0721
Spade	768937	0421	0441	0461	0481	0501	0521	0541	0561	0581	0601	0621	0641	0661	0681	0701	0721
Spectacle blind	768962	0421	0441	0461	0481	0501	0521	0541	0561	0581	0601	0621	0641				
Welding neck flange	766278	6521	6541	6561	6581	6101	6121	5641	5661	5681	5701	5721	5741	5761	5781	5801	5841
Fittings																	
Cap bw	763017	5721	5781	5821	5921	6081	6281	6451	6651	6851	7051	7281	7471	7681			
Cap bw	763117													3861	3961	4061	
Elbow 45 deg LR bw	763034	5721	5781	5821	5921	6081	6281	6451	6651	6851	7051	7281	7471	7681			
Elbow 45 deg LR bw	763134													3861	3961	4061	
Elbow 90 deg LR bw	763042	5721	5781	5821	5921	6081	6281	6451	6651	6851	7051	7281	7471	7681			
Elbow 90 deg LR bw	763143													3861	3961	4061	
Tee equal bw	763081	5721	5781	5821	5921	6081	6281	6451	6651	6851	7051	7281	7471	7681			
Tee equal bw	763180													3861	3961	4061	

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																	
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600		
Valves																			
Ball valve float FB flgd	770054	8539	8549	8559	8579														
Ball valve float RB flgd	770054	3539	3549	3559	3579	3589													
Ball valve trunn FB flgd	770091					5589	5609	5629	5649	5659	5669	5679	5689	5699	5709	5719	5739		
Ball valve trunn RB flgd	770091						0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739		
Butterfly valve triple of flgd	774142							3659	3669	3679	3689	3699	3709	3719	3739				
Check valve dual plate flgd	776714							0659	0669	0679	0689	0699	0709	0719	0739				
Check Valve Wafer Lug (Solid)	776757							0599	0609	0629	0649								
Check valve flgd	771043	0539	0549	0559	0579	0599	0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739		
Gate valve flgd	772053	0539	0549	0559	0579	0599	0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739		
Globe valve flgd	773053	0539	0549	0559	0579	0599	0609	0629	0649	0659									
Valve DBBT	778551	8539	8549	8559	8579	5589													
Valve DBBF	778549	8539	8549	8559	8579	5589													
Miscellaneous																			
Gasket spiral wound	854360	4041	4061	4081	4121	4141	4181	3701	3741	3761	3781	3801	3821	3841	3861	3881	3921		
Meterrun	766496	0621	0641	0661	0681														
Orifice flange set	766295					1051	1061	0231	0241	0261	0271	0281	0291	0301	0321	0331	0341		
Plug NPT	760518	0081	0121	0161	0181	0201													
Strainer Y-type (3 mm ca)	768322						1019	1119	1129	1139	1179	1269	1339	1239	1219				

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7630661411	7630671411	7630880391
25	x	15	7630661511	7630671511	7630880491
25	x	20	7630661611	7630671611	7630880591
40	x	15	7630661711	7630671711	
40	x	20	7630661811	7630671811	7630880791
40	x	25	7630661911	7630671911	7630880891
50	x	20	7629471971	7630671931	
50	x	25	7630661991	7630671991	7630881111
50	x	40	7630662081	7630672081	7630881201
80	x	40	7630662291	7630672291	
80	x	50	7630662371	7630672371	7630881331
100	x	40	7630662521	7630672491	
100	x	50	7630662661	7630672661	7630881571
100	x	80	7629472751	7629622701	7630881691
150	x	80	7630662961	7630672961	7630881811
150	x	100	7630663051	7630673051	7630881891
200	x	100	7630663251	7630673251	7630882051
200	x	150	7630663351	7630673351	7630882251
250	x	100	7630663431	7630673431	7630882531
250	x	150	7630663551	7630673551	7630882711
250	x	200	7630663651	7630673651	7630882911
300	x	150	7630663831	7630673831	7630883101
300	x	200	7630663961	7630673961	7630883281
300	x	250	7630664041	7630674041	7630883501
350	x	150	7630664131	7630674131	
350	x	200	7630664221	7630674221	7630883901
350	x	250	7630664381	7630674381	7630884151
350	x	300	7630664471	7630674471	7630884411

Thermowell flagd DN 50	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200		7630664531	7630674531	
400	x 250		7630664621	7630674621	7630885051
400	x 300		7630664741	7630674741	7630885311
400	x 350		7630664871	7630674871	7630885561
450	x 250		7631665231	7631755231	7631886041
450	x 300		7631665531	7631755531	7631886281
450	x 350		7631665841	7631755841	7631886521
450	x 400		7631666141	7631756141	7631886761
500	x 300		7631666431	7631756431	7631887481
500	x 350		7631666741	7631756741	7631887721
500	x 400		7631667041	7631757041	7631887961
500	x 450		7631667341	7631757341	7631888201
600	x 300			7631888681	
600	x 350			7631888921	
600	x 400		7631668841	7631758841	7631889161
600	x 450		7631669141	7631759141	7631889401
600	x 500		7631669551	7631759441	7631889641

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting flgd
BN6B	Branch fitting bw
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BROB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BR6B	BROB
15	40	-	50	7672293401	7672693519		
15	80	-	150	7672293411	7672693529		
15	200	-	600	7672293421	7672693549		
20	50	-	50	7672293441	7672693569		
20	80	-	250	7672293451	7672693579		
20	300	-	600	7672293461	7672693589		
25	80	-	250	7672291931	7672693619		
25	300	-	600	7672293501	7672693629		
40	80	-	80	7672293521	7672693659		
40	100	-	100	7672293531	7672693669		
40	150	-	200	7672293541	7672693679		
40	250	-	450	7672293551	7672693689		
40	500	-	600	7672293561	7672693699		
50	150	-	150		7678311471		
50	200	-	250		7678311481		
50	300	-	400		7678311501		
50	450	-	450		7679031011		
50	500	-	600		7678903051		
80	200	-	200		7678311581		
80	250	-	250		7678311591		
80	300	-	350		7678311601		
80	400	-	400		7678311621		
80	450	-	450		7679031211		
80	500	-	500		7679031221		
80	600	-	600		7679031241		

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BR6B	BROB
100	300	-	350		7678311691		
100	400	-	400		7678311711		
100	450	-	450			7679031321	
100	500	-	500			7679031331	
100	600	-	600			7679031351	
150	350	-	350		7678311771		
150	400	-	400		7678311791		
150	450	-	450			7679008921	
150	500	-	500			7679008961	
150	600	-	600			7679008981	
200	400	-	400			7679009081	
200	450	-	450			7679009101	
200	500	-	500			7679009121	
200	600	-	600			7679009161	
250	500	-	500			7679009281	
250	600	-	600			7679009321	

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138170259
20	4	5/8	x 80	8138170739
25	4	5/8	x 80	8138170739
40	4	3/4	x 100	8138171419
50	8	5/8	x 90	8138170759
80	8	3/4	x 110	8138171439
100	8	3/4	x 120	8138171459
150	12	3/4	x 130	8138171479
200	12	7/8	x 140	8138172209
250	16	1	x 160	8138173039
300	16	1 1/8	x 180	8138173909
350	20	1 1/8	x 180	8138173909
400	20	1 1/4	x 190	8138174729
450	24	1 1/4	x 200	8138174749
500	24	1 1/4	x 210	8138174769
600	24	1 1/2	x 240	8138176319

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138170839
80	8	3/4	x 140	8138171499
100	8	3/4	x 150	8138171519
150	12	3/4	x 150	8138171519
200	12	7/8	x 170	8138172269
250	16	1	x 190	8138173099
300	16	1 1/8	x 210	8138173969
350	20	1 1/8	x 220	8138173989
400	20	1 1/4	x 230	8138174809
450	24	1 1/4	x 250	8138174849
500	24	1 1/4	x 260	8138174869
600	24	1 1/2	x 290	8138176419

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve****Coated boltset mrun flg**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	5/8	x 130	8138170839
20	4	5/8	x 130	8138170839
25	4	5/8	x 130	8138170839
40	4	3/4	x 140	8138171499

DN nr inch ;mm MESC number

50	8	5/8	x 150	8138170879
80	8	3/4	x 190	8138171599
100	8	3/4	x 200	8138171619
150	12	3/4	x 230	8138171679

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 80	8138170279
20	4	5/8	x 90	8138170759
25	4	5/8	x 90	8138170759
40	4	3/4	x 110	8138171439
50	8	5/8	x 110	8138170799
80	8	3/4	x 130	8138171479
100	8	3/4	x 140	8138171499
150	12	3/4	x 150	8138171519
200	12	7/8	x 170	8138172269
250	16	1	x 190	8138173099
300	16	1 1/8	x 210	8138173969
350	20	1 1/8	x 220	8138173989
400	20	1 1/4	x 240	8138174829
450	24	1 1/4	x 250	8138174849
500	24	1 1/4	x 260	8138174869
600	24	1 1/2	x 300	8138176439

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662111081
Welding neck flange	1	7662786521
Gasket spiral wound	1	8543604041
Studbolt with nuts	4	8138170259

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662111121
Gasket spiral wound	1	8543604061
Studbolt with nuts	4	8138170739

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662111121
Welding neck flange	1	7662786541
Gasket spiral wound	1	8543604061
Studbolt with nuts	4	8138170739

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662111161
Gasket spiral wound	1	8543604081
Studbolt with nuts	4	8138170739

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Blind flange	1	7662111181
Gasket spiral wound	1	8543604121
Studbolt with nuts	4	8138171419

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Lap joint flange	1	7662203201
Pipe	1	7430030711
Welding neck flange	1	7662786101
Gasket spiral wound	1	8543604141
Thermowell fgd DN 50 L=230 mm	1	7683385611
Studbolt with nuts	8	8138170799

Temp instr conn DN 50 Fig.HL DN150 - 600

Branch: according to branch table

Lap joint flange	1	7662203201
Pipe	1	7430030711
Welding neck flange	1	7662786101
Gasket spiral wound	1	8543604141
Thermowell fgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	8	8138170799

CLASS 031441-Z

Design limits**Temperature (°C)**

	-29	0	50	75	100	125	150
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Pressure (Barg)	DN 15-600	51.1	51.1	50.1	48.3	46.6	45.8	45.1
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class design meets full vacuum at ambient temperature condition
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Installation of thermowell shall be validated considering branch pipe (nipo flange) internal diameter during detailed design.
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**

Table of schedules

DN	Schedule
15	XXS
20	XXS
25	XXS
40	XXS
50	160
80	160
100	120
150	80
200	80
250	60/XS
300	60
350	60
400	60
450	60
500	60
600	60

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
500	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
450	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
400	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
350	N	N	N	N	P	E	E	E	E	B	B	B	B	A		
300	N	N	N	N	P	E	E	E	E	B	B	B	B	A		
250	N	N	N	N	P	E	E	B	B	B	A					
200	N	N	N	N	P	E	E	B	B	B	A					
150	N	N	N	N	P	B	B	B	A							
100	N	N	N	N	U	B	A									
80	N	N	N	N	U	A										
50	N	N	M	M	J											
40	N	M	M	J												
25	M	M	J													
20	M	J														
15	J															

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel Sour
 Class no. 031441-Z
 ASME rating CLASS 300
 Corrosion allowance **6 mm**
 Revision letter
 Revision date

Plant
 Consignee
 Engineered by
 Principal
 Contr. job no.
 Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-250	ASTM A106-B
PIPE	Pipe	DN 300-600	ASTM A333-6

Flanges

BLFL	Blind flange	DN 15-600	ASTM A105N
LJFL	Lap joint flange	--	ASTM A105N
SBNF	Spectacle blind	DN 15-350	ASTM A516-60/65/70
SPNF	Spade	DN 15-600	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15-600	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-600	ASTM A105N

Fittings

CAPB	Cap bw	DN 15-250	ASTM A234-WPB
CAPB	Cap bw	DN 300-600	ASTM A420-WPL6
E45B	Elbow 45 deg LR bw	DN 15-250	ASTM A234-WPB
E45B	Elbow 45 deg LR bw	DN 300-600	ASTM A420-WPL6
E90B	Elbow 90 deg LR bw	DN 15-250	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 300-600	ASTM A420-WPL6
TEEB	Tee equal bw	DN 15-250	ASTM A234-WPB
TEEB	Tee equal bw	DN 300-600	ASTM A420-WPL6

Reducing fittings

BN6F	Branch fitting flgd	DN 40-600	ASTM A105N
BN6B	Branch fitting bw	DN 40-600	ASTM A105N
BR3B	Branch outlet bw	DN 150-400	ASTM A105N
BR6B	Branch outlet bw	DN 450-600	ASTM A105N
BROB	Branch outlet bw	DN 400-600	ASTM A105N
RECB	Reducer concentric bw	DN 20-250	ASTM A234-WPB
RECB	Reducer concentric bw	DN 300-600	ASTM A420-WPL6
REEB	Reducer eccentric bw	DN 20-250	ASTM A234-WPB
REEB	Reducer eccentric bw	DN 300-600	ASTM A420-WPL6
TERB	Tee reducing bw	DN 20-250	ASTM A234-WPB
TERB	Tee reducing bw	DN 300-600	ASTM A420-WPL6

Valves

BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, filled PTFE
BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, filled PTFE
BTFF	Ball valve trunn FB flgd	DN 50-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, filled PTFE
BTRF	Ball valve trunn RB flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A216-WCB/WCC Trim: CS, Alloy 825, Stellite
CHDF	Check valve dual plate flgd	DN 50-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
CHVF	Check valve flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825
CHVF	Check valve flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, PTFE
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A105N Trim: Alloy 825, Stellite

Instruments

TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	Alloy 825, Graphite CS centring-/Alloy 825 inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A105N
PLUG	Plug NPT	DN 15-50	ASTM A105N
ST3B	Strainer Y-type (6 mm ca)	DN 50-400	Sieve: Alloy 825
STBT	Studbolt with nuts	---	ASTM A193-B7M/A194-2HM Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A105N HOLDER / ACCESS FITTING: Alloy 825 COUPON: ASTM A106-B
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A105N INTERNALS: Alloy 825
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: Alloy 825 VALVE & INTERNALS: Alloy 825
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A105N VALVE & INTERNALS: Alloy 825

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	Nominal pipe size															
	15 MESC	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
Pipe																
Pipe	743003 0	221	321	421	621	731										
Pipe	743003 1						131	591								
Pipe	743003 2							191	551	911						
Pipe	743016 1								211	341	431	729				
Pipe	743016 2									119	419					
Flanges																
Blind flange	766211	1081	1121	1161	1181	1201	1221	1241	1261	1281	1301	1321	1341	1361	1381	1401
Spacer ring	768908	0421	0441	0461	0481	0501	0521	0541	0561	0581	0601	0621	0641	0661	0681	0701
Spade	768937	0421	0441	0461	0481	0501	0521	0541	0561	0581	0601	0621	0641	0661	0681	0701
Spectacle blind	768962	0421	0441	0461	0481	0501	0521	0541	0561	0581	0601	0621	0641			
Welding neck flange	766278	6841	6861	6881	6901	6601	6621	6341	6161	6181	5931	5951	6009	6019	6029	6039
Fittings																
Cap bw	763017	5731	5791	5831	5931	6121	6321	6501	6681	6891	7071					
Cap bw	763117											3301	3501	3701	3879	3999
Elbow 45 deg LR bw	763034	5731	5791	5831	5931	6121	6321	6501	6681	6891	7071				4159	
Elbow 45 deg LR bw	763134											3301	3501	3701	3919	4019
Elbow 90 deg LR bw	763042	5731	5791	5831	5931	6121	6321	6501	6681	6891	7071				4119	
Elbow 90 deg LR bw	763143											3301	3501	3701	3919	4019
Tee equal bw	763081	5731	5791	5831	5931	6121	6321	6501	6681	6891	7071				4119	
Tee equal bw	763180											3301	3501	3701	3919	4019

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	
Valves																		
Ball valve float FB fgd	770054	85396	85496	85596	85796													
Ball valve float RB fgd	770054	35396	35496	35596	35796	35896												
Ball valve trunn FB fgd	770091					55896	56096	56296	56496	56596	56696	56796	56896	56996	57096	57196	57396	
Ball valve trunn RB fgd	770091						06096	06296	06496	06596	06696	06796	06896	06996	07096	07196	07396	
Butterfly valve triple of fgd	774142									36596	36696	36796	36896	36996	37096	37196	37396	
Check valve dual plate fgd	776714									06596	06696	06796	06896	06996	07096	07196	07396	
Check Valve Wafer Lug (Solid)	776757						05996	06096	06296	06496								
Check valve fgd	771043	05396	05496	05596	05796	05996	06096	06296	06496	06596	06696	06796	06896	06996	07096	07196	07396	
Gate valve fgd	772053	05396	05496	05596	05796	05996	06096	06296	06496	06596	06696	06796	06896	06996	07096	07196	07396	
Globe valve fgd	773053	05396	05496	05596	05796	05996	06096	06296	06496	06596								
Valve DBBT	778551	85396	85496	85596	85796	55896												
Valve DBBF	778549	85396	85496	85596	85796	55896												
Miscellaneous																		
Gasket spiral wound	854360	4041	4061	4081	4121	4141	4181	3701	3741	3761	3781	3801	3821	3841	3861	3881	3921	
Meterrun	766496	2621	2641	2661	2681													
Orifice flange set	766295						1421	1431	6601	0371	0381	6471	0319	0369	0419	0479	0489	0499
Plug NPT	760518	0081	0121	0161	0181	0201	2319	2339	2359	2379	2419	2439	2459	2479	2499			
Strainer Y-type (6 mm ca)	768322																	

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7630661421	7630671421	7630880401
25	x	15	7630661521	7630671521	7630880501
25	x	20	7630661621	7630671621	7630880601
40	x	15	7630661721	7630671721	
40	x	20	7630661821	7630671821	7630880801
40	x	25	7630661921	7630671921	7630880901
50	x	20	7630661901	7630671901	
50	x	25	7630662031	7630672031	7630881121
50	x	40	7630662131	7630672131	7630881211
80	x	40	7630662331	7630672331	
80	x	50	7630662411	7630672411	7630881341
100	x	40	7629472471	7629622471	
100	x	50	7630662701	7630672701	7630881611
100	x	80	7629472801	7629622801	7630881731
150	x	80	7630662931	7630672931	7630881831
150	x	100	7630663131	7630673131	7630881971
200	x	100	7630663181	7630673181	7630882151
200	x	150	7630663371	7630673371	7630882261
250	x	100	7630661019	7630671019	7630882579
250	x	150	7630663641	7630673641	7630882791
250	x	200	7630663771	7630673771	7630883011
300	x	150	7631663781	7631753901	7631883191
300	x	200	7631663911	7631753911	7631883421
300	x	250	7629455391	7631754051	7631883511
350	x	150	7631664161	7631754161	
350	x	200	7631664271	7631754321	7631884011
350	x	250	7629456781	7631754361	7631884161
350	x	300	7629457491	7631754461	7631884421

Thermowell flgd DN 50	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200		7631664601	7631754601	
400	x 250		7629458281	7631754691	7631885061
400	x 300		7629458401	7631754781	7631885321
400	x 350		7629458501	7631754851	7631885571
450	x 250		7631669679	7631755229	7631886229
450	x 300		7631669689	7631755529	7631886469
450	x 350		7631669699	7631755839	7631886689
450	x 400		7631669709	7631756139	7631886849
500	x 300		7631669719	7631756429	7631887669
500	x 350		7631669729	7631756739	7631887869
500	x 400		7631669739	7631757039	7631888049
500	x 450		7631669749	7631757339	7631888269
600	x 300				7631888829
600	x 350				7631888906
600	x 400		7631669779	7631758839	7631889269
600	x 450		7631669789	7631759139	7631889469
600	x 500		7631669799	7631759439	7631889709

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting flgd
BN6B	Branch fitting bw
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BROB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6B	BN6F	BR6B	BROB
15	40	-	50	7672693011	7672293401	
15	80	-	150	7672693021	7672293411	
15	200	-	250	7672693031	7672293421	
15	300	-	600	7672579031	7672307041	
20	50	-	50	7672693061	7672293441	
20	80	-	250	7672693071	7672293451	
20	300	-	600	7672579071	7672307081	
25	80	-	250	7672565741	7672291931	
25	300	-	600	7672579131	7672307111	
40	80	-	80	7672693161	7672293521	
40	100	-	100	7672693171	7672293531	
40	150	-	200	7672693181	7672293541	
40	250	-	250	7672693191	7672293551	
40	300	-	450	7672579181	7672307161	
40	500	-	600	7672579191	7672307171	
50	150	-	200		7679031001	
50	250	-	250		7679031011	
50	300	-	450		7679073691	
50	500	-	600		7679488051	
80	200	-	200		7679031161	
80	250	-	250		7679031171	
80	300	-	300		7679074001	
80	350	-	350		7679074021	
80	400	-	400		7679074041	
80	450	-	450		7679074051	
80	500	-	500		7679074061	
80	600	-	600		7679074071	

Metric units

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6B	BN6F	BR6B	BROB
100	300	-	300		7679074111	
100	350	-	350		7679074121	
100	400	-	400		7679074131	
100	450	-	450		7679074141	
100	500	-	500		7679074151	
100	600	-	600		7679074161	
150	350	-	350		7679045731	
150	400	-	400		7679045741	
150	450	-	450		7679045751	
150	500	-	500		7679045761	
150	600	-	600		7679045781	
200	400	-	400		7679045831	
200	450	-	450		7679045841	
200	500	-	500		7679045851	
200	600	-	600		7679045871	
250	500	-	500		7679060121	
250	600	-	600		7679060131	

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138170259
20	4	5/8	x 80	8138170739
25	4	5/8	x 80	8138170739
40	4	3/4	x 100	8138171419
50	8	5/8	x 90	8138170759
80	8	3/4	x 110	8138171439
100	8	3/4	x 120	8138171459
150	12	3/4	x 130	8138171479
200	12	7/8	x 140	8138172209
250	16	1	x 160	8138173039
300	16	1 1/8	x 180	8138173909
350	20	1 1/8	x 180	8138173909
400	20	1 1/4	x 190	8138174729
450	24	1 1/4	x 200	8138174749
500	24	1 1/4	x 210	8138174769
600	24	1 1/2	x 240	8138176319

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138170839
80	8	3/4	x 140	8138171499
100	8	3/4	x 150	8138171519
150	12	3/4	x 150	8138171519
200	12	7/8	x 170	8138172269
250	16	1	x 190	8138173099
300	16	1 1/8	x 210	8138173969
350	20	1 1/8	x 220	8138173989
400	20	1 1/4	x 230	8138174809
450	24	1 1/4	x 250	8138174849
500	24	1 1/4	x 260	8138174869
600	24	1 1/2	x 290	8138176419

Coated boltset for Dual Plate Solid Lug Wafer Check Valve

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 150	8138170879
80	8	3/4	x 190	8138171599
100	8	3/4	x 200	8138171619
150	12	3/4	x 230	8138171679

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	5/8	x 130	8138170839
20	4	5/8	x 130	8138170839
25	4	5/8	x 130	8138170839
40	4	3/4	x 140	8138171499

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 80	8138170279
20	4	5/8	x 90	8138170759
25	4	5/8	x 90	8138170759
40	4	3/4	x 110	8138171439
50	8	5/8	x 110	8138170799
80	8	3/4	x 130	8138171479
100	8	3/4	x 140	8138171499
150	12	3/4	x 150	8138171519
200	12	7/8	x 170	8138172269
250	16	1	x 190	8138173099
300	16	1 1/8	x 210	8138173969
350	20	1 1/8	x 220	8138173989
400	20	1 1/4	x 240	8138174829
450	24	1 1/4	x 250	8138174849
500	24	1 1/4	x 260	8138174869
600	24	1 1/2	x 300	8138176439

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662111081
Welding neck flange	1	7662786841
Gasket spiral wound	1	8543604041
Studbolt with nuts	4	8138170259

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662111121
Gasket spiral wound	1	8543604069
Studbolt with nuts	4	8138170739

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662111121
Welding neck flange	1	7662786861
Gasket spiral wound	1	8543604069
Studbolt with nuts	4	8138170739

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662111161
Gasket spiral wound	1	8543604089
Studbolt with nuts	4	8138170739

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Blind flange	1	7662111181
Gasket spiral wound	1	8543604129
Studbolt with nuts	4	8138171419

CLASS 031502-X

Design limits**Temperature (°C)**

	-50	0	50	75	100	125	150
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Pressure (Barg)	DN 15-600	51.1	51.1	50.1	48.3	46.6	45.8	45.1
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class design meets full vacuum at ambient temperature condition
- Non-extended bonnet valves in this piping class are intended for short term low temperature excursion (e.g non-operable during depressurization) (or) non-insulated piping only.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**

Table of schedules

DN	Schedule
15	160
20	160
25	160
40	160
50	80
80	80
100	40
150	40
200	40
250	40
300	40
350	40
400	40
450	40
500	40
600	40

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
500	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
450	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
400	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
350	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
300	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
250	N	N	N	N	P	E	E	B	B	B	B	B	B	B	A	
200	N	N	N	N	P	E	E	B	B	B	A					
150	N	N	N	N	P	B	B	B	A							
100	N	N	N	N	U	B	A									
80	N	N	N	N	U	A										
50	N	N	M	M	J											
40	N	M	M	J												
25	M	M	J													
20	M	J														
15	J															

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel LT F-Gr Sour
 Class no. 031502-X
 ASME rating CLASS 300
 Corrosion allowance 3 mm
 Revision letter
 Revision date

Plant
 Consignee
 Engineered by
 Principal
 Contr. job no.
 Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-600	ASTM A333-6
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Flanges

BLFL	Blind flange	DN 15-600	ASTM A350-LF2 cl 1
LJFL	Lap joint flange	--	ASTM A350-LF2 cl 1
SBNF	Spectacle blind	DN 15-350	ASTM A516-60/65/70
SPNF	Spade	DN 15-600	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15-600	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-600	ASTM A350-LF2 cl 1

Fittings

CAPB	Cap bw	DN 15-600	ASTM A420-WPL6
E45B	Elbow 45 deg LR bw	DN 15-600	ASTM A420-WPL6
E90B	Elbow 90 deg LR bw	DN 15-600	ASTM A420-WPL6
TEEB	Tee equal bw	DN 15-600	ASTM A420-WPL6

Reducing fittings

BN6F	Branch fitting flgd	DN 40-600	ASTM A350-LF2 cl 1
BN6B	Branch fitting bw	DN 40-600	ASTM A350-LF2 cl 1
BR3B	Branch outlet bw	DN 150-400	ASTM A350-LF2 cl 1
BR6B	Branch outlet bw	DN 450-600	ASTM A350-LF2 cl 1
BROB	Branch outlet bw	DN 400-600	ASTM A350-LF2 cl 1
RECB	Reducer concentric bw	DN 20-600	ASTM A420-WPL6
REEB	Reducer eccentric bw	DN 20-600	ASTM A420-WPL6
TERB	Tee reducing bw	DN 20-600	ASTM A420-WPL6

Valves

BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), filled PTFE
BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), filled PTFE
BNFF	Ball valve trunn FB n-ext flgd	DN 50-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316 (L), filled PTFE
BNRF	Ball valve trunn RB n-ext flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316 (L), filled PTFE
BTFF	Ball valve trunn FB flgd	DN 50-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316 (L), filled PTFE
BTRF	Ball valve trunn RB flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316 (L), filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A352-LCC Trim: LTCS, Duplex, Stellite
BVFF	Ball valve float FB n-ext flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), filled PTFE
BVRF	Ball valve float RB n-ext flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), filled PTFE
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-600	Body: ASTM A350-LF2 cl 1/ASTM A352-LCC Trim: AISI 316 (L), Stellite
CHVF	Check valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), Stellite
CHVF	Check valve flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316 (L), Stellite
GANF	Gate valve n-ext flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), Stellite
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), Stellite
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316 (L), Stellite
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), Stellite
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: AISI 316 (L), Stellite
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), PTFE
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: AISI 316 (L), Stellite

Instruments

TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	AISI 316 (L), Graphite CS centring-/SS inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A350-LF2 cl 1
PLUG	Plug NPT	DN 15-50	ASTM A350-LF2 cl 1
ST3B	Strainer Y-type (3 mm ca)	DN 50-400	Sieve: AISI 316 (L)
STBT	Studbolt with nuts	--	ASTM A320-L7M/A194-7M Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A350-LF2 cl 1 HOLDER / ACCESS FITTING: AISI 316 (L) COUPON: ASTM A 333 Gr.6
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A350-LF2 cl 1 INTERNALS: AISI 316 (L)
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: AISI 316 (L) VALVE & INTERNALS: AISI 316 (L)
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A350-LF2 cl 1 VALVE & INTERNALS: AISI 316 (L)

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	Nominal pipe size																
	15 MESC	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	
Pipe																	
Pipe	743016 0	231	301	381	541	611	691	751	841	951	071	191	321	421	701		
Pipe	743016 1																
Pipe	743016 2														101	401	
Flanges																	
Blind flange	766212	5081	5121	5161	5181	5201	5221	5241	5261	5281	5301	5321	5341	5361	5381	5401	5421
Spacer ring	768906	1081	1121	1161	1181	1201	1221	1241	1261	1281	1301	1321	1341	1361	1381	1401	1441
Spade	768935	0201	0211	0221	0231	0241	0251	0261	0271	0281	0291	0301	0311	0321	0331	0341	0351
Spectacle blind	768966	2581	2621	2661	2681	2701	2721	2741	2761	2781	2801	2821	2841				
Welding neck flange	766282	8521	8541	8561	8581	8121	8141	7641	7661	7681	7701	7721	7741	7761	7781	7801	7821
Fittings																	
Cap bw	763117	1721	1781	1821	1921	2101	2301	2461	2661	2841	3061	3281	3481	3681	3861	3961	4061
Elbow 45 deg LR bw	763134	1721	1781	1821	1921	2101	2301	2461	2661	2841	3061	3281	3481	3681	3861	3961	4061
Elbow 90 deg LR bw	763143	1721	1781	1821	1921	2101	2301	2461	2661	2841	3061	3281	3481	3681	3861	3961	4061
Tee equal bw	763180	1721	1781	1821	1921	2101	2301	2461	2661	2841	3061	3281	3481	3681	3861	3961	4061

PIPING COMPONENTS

Item description	Nominal pipe size															
	15 MESC	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
Valves																
Ball valve float FB flgd	770031	8539	8549	8559	8579											
Ball valve float FB n-ext flgd	770035	8539	8549	8559	8579											
Ball valve float RB flgd	770031	3539	3549	3559	3579	3589										
Ball valve float RB n-ext flgd	770035	3539	3549	3559	3579	3589										
Ball valve trunn FB flgd	770077					5589	5609	5629	5649	5659	5669	5679	5689	5699	5709	5719
Ball valve trunn FB n-ext flgd	770051					5589	5609	5629	5649	5659	5669	5679	5689	5699	5709	5719
Ball valve trunn RB flgd	770077					0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739
Ball valve trunn RB n-ext flgd	770051					0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739
Butterfly valve triple of flgd	774133									0659	0669	0679	0689	0699	0709	0719
Check valve dual plate flgd	776720									0499	0019	0679	0689	0699	0709	0719
Check Valve Wafer Lug (Solid)	776752					0599	0609	0629	0649							
Check valve flgd	771033	0539	0549	0559	0579	0599	0609	0629	0649	0659	0669	0679	0689	0699	0709	0719
Gate valve flgd	772033	0539	0549	0559	0579	0599										
Gate valve flgd	772041						3609	3629	3649	3659	3669	3679	3689	3699	3709	3719
Gate valve n-ext flgd	772041	3539	3549	3559	3579											
Globe valve flgd	773033	0539	0549	0559	0579	0599	6609	6629	6649	6659						
Valve DBBT	778586	8539	8549	8559	8579	5589										
Valve DBBF	778535	8539	8549	8559	8579	5589										
Miscellaneous																
Gasket spiral wound	854136	4041	4061	4081	4121	4141	4181	3701	3741	3761	3781	3801	3821	3841	3861	3881
Meterrun	766496	0621	0641	0661	0681											
Orifice flange set	766297					1121	1131	0241	0261	0271	0281	0291	0301	0321	0331	0341
Plug NPT	760563	0081	0121	0161	0181	0201										
Strainer Y-type (3 mm ca)	768322					5761	5781	5561	5581	6601	6611	5551	5571	5591		

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7631661411	7631751411	7631880391
25	x	15	7631661511	7631751511	7631880491
25	x	20	7631661611	7631751611	7631880591
40	x	15	7631661711	7631751711	
40	x	20	7631661811	7631751811	7631880791
40	x	25	7631661911	7631751911	7631880891
50	x	20	7631661931	7631751931	
50	x	25	7631661991	7631751991	7631881111
50	x	40	7631662081	7631752081	7631881201
80	x	40	7631662291	7631752291	
80	x	50	7631662371	7631752371	7631881331
100	x	40	7631662491	7631752491	
100	x	50	7631662661	7631752661	7631881581
100	x	80	7631662761	7631752761	7631881701
150	x	80	7629452941	7629602881	7631881811
150	x	100	7631663051	7631753051	7631881891
200	x	100	7631663251	7631753251	7631882051
200	x	150	7631663351	7631753351	7631882251
250	x	100	7631663431	7631753431	7631882531
250	x	150	7631663551	7631753551	7631882711
250	x	200	7631663651	7631753651	7631882911
300	x	150	7631663831	7631753831	7631883101
300	x	200	7631663961	7631753961	7631883281
300	x	250	7631664041	7631754041	7631883501
350	x	150	7631664131	7631754131	
350	x	200	7631664221	7631754221	7631883901
350	x	250	7631664381	7631754381	7631884151
350	x	300	7631664471	7631754471	7631884411

Thermowell flgd DN 50	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200	7631664531	7631754531		
400	x 250	7631664621	7631754621	7631885051	
400	x 300	7631664741	7631754741	7631885311	
400	x 350	7631664871	7631754871	7631885561	
450	x 250	7631665231	7631755231	7631886041	
450	x 300	7631665531	7631755531	7631886281	
450	x 350	7631665841	7631755841	7631886521	
450	x 400	7631666141	7631756141	7631886761	
500	x 300	7631666431	7631756431	7631887481	
500	x 350	7631666741	7631756741	7631887721	
500	x 400	7631667041	7631757041	7631887961	
500	x 450	7631667341	7631757341	7631888201	
600	x 300			7631888681	
600	x 350			7631888921	
600	x 400	7631668841	7631758841	7631889161	
600	x 450	7631669141	7631759141	7631889401	
600	x 500	7631669551	7631759441	7631889641	

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting flgd
BN6B	Branch fitting bw
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BROB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BR6B	BROB
15	40	-	50	7672307021	7672579309		
15	80	-	150	7672307031	7672579319		
15	200	-	600	7672307041	7672579329		
20	50	-	50	7672307061	7672579349		
20	80	-	250	7672307071	7672579359		
20	300	-	600	7672307081	7672579369		
25	80	-	250	7672303311	7672708149		
25	300	-	600	7672307111	7672579419		
40	80	-	80	7672307131	7672579439		
40	100	-	100	7672307141	7672579449		
40	150	-	200	7672307151	7672579459		
40	250	-	450	7672307161	7672579469		
40	500	-	600	7672307171	7672579479		
50	150	-	150		7679503571		
50	200	-	250		7679503581		
50	300	-	400		7679503601		
50	450	-	450		7679073691		
50	500	-	600		7679488051		
80	200	-	200		7679503681		
80	250	-	250		7679503691		
80	300	-	350		7679503701		
80	400	-	400		7679503721		
80	450	-	450		7679074051		
80	500	-	500		7679074061		
80	600	-	600		7679074071		

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BR6B	BROB
100	300	-	350		7679503791		
100	400	-	400		7679503811		
100	450	-	450			7679074141	
100	500	-	500			7679074151	
100	600	-	600			7679074161	
150	350	-	350		7679503871		
150	400	-	400		7679503891		
150	450	-	450			7679048921	
150	500	-	500			7679048961	
150	600	-	600			7679048981	
200	400	-	400			7679049081	
200	450	-	450			7679049101	
200	500	-	500			7679049121	
200	600	-	600			7679049161	
250	500	-	500			7679049281	
250	600	-	600			7679049321	

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138270259
20	4	5/8	x 80	8138270739
25	4	5/8	x 80	8138270739
40	4	3/4	x 100	8138271419
50	8	5/8	x 90	8138270759
80	8	3/4	x 110	8138271439
100	8	3/4	x 120	8138271459
150	12	3/4	x 130	8138271479
200	12	7/8	x 140	8138272209
250	16	1	x 160	8138273039
300	16	1 1/8	x 180	8138273909
350	20	1 1/8	x 180	8138273909
400	20	1 1/4	x 190	8138274729
450	24	1 1/4	x 200	8138274749
500	24	1 1/4	x 210	8138274769
600	24	1 1/2	x 240	8138276319

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138270839
80	8	3/4	x 140	8138271499
100	8	3/4	x 150	8138271519
150	12	3/4	x 150	8138271519
200	12	7/8	x 170	8138272269
250	16	1	x 190	8138273099
300	16	1 1/8	x 210	8138273969
350	20	1 1/8	x 220	8138273989
400	20	1 1/4	x 230	8138274809
450	24	1 1/4	x 250	8138274849
500	24	1 1/4	x 260	8138274869
600	24	1 1/2	x 290	8138276419

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve****Coated boltset mrun flg**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	5/8	x 130	8138270839
20	4	5/8	x 130	8138270839
25	4	5/8	x 130	8138270839
40	4	3/4	x 140	8138271499

DN nr inch x mm MESC number

50	8	5/8	x 150	8138270879
80	8	3/4	x 190	8138271599
100	8	3/4	x 200	8138271619
150	12	3/4	x 230	8138271679

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 80	8138270279
20	4	5/8	x 90	8138270759
25	4	5/8	x 90	8138270759
40	4	3/4	x 110	8138271439
50	8	5/8	x 110	8138270799
80	8	3/4	x 130	8138271479
100	8	3/4	x 140	8138271499
150	12	3/4	x 150	8138271519
200	12	7/8	x 170	8138272269
250	16	1	x 190	8138273099
300	16	1 1/8	x 210	8138273969
350	20	1 1/8	x 220	8138273989
400	20	1 1/4	x 240	8138274829
450	24	1 1/4	x 250	8138274849
500	24	1 1/4	x 260	8138274869
600	24	1 1/2	x 300	8138276439

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662125081
Welding neck flange	1	7662828521
Gasket spiral wound	1	8541364041
Studbolt with nuts	4	8138270259

Drain or vent point DN 20 Fig.H DN50 – 50

Branch: branch nipple flanged

Blind flange	1	7662125121
Gasket spiral wound	1	8541364061
Studbolt with nuts	4	8138270739

Drain or vent point DN 20 Fig.I DN20 – 40

Branch: according to branch table

Blind flange	1	7662125121
Welding neck flange	1	7662828541
Gasket spiral wound	1	8541364061
Studbolt with nuts	4	8138270739

Drain or vent point DN 25 Fig.H DN80 – 300

Branch: branch nipple flanged

Blind flange	1	7662125161
Gasket spiral wound	1	8541364081
Studbolt with nuts	4	8138270739

Temp instr conn DN 50 Fig.HS DN80 – 100

Branch: according to branch table

Lap joint flange	1	7662208731
Pipe	1	7430160611
Welding neck flange	1	7662828121
Gasket spiral wound	1	8541364141
Thermowell flgd DN 50 L=230 mm	1	7683385611
Studbolt with nuts	8	8138270799

Temp instr conn DN 50 Fig.HL DN150 – 600

Branch: according to branch table

Lap joint flange	1	7662208731
Pipe	1	7430160611
Welding neck flange	1	7662828121
Gasket spiral wound	1	8541364141
Thermowell flgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	8	8138270799

CLASS 031503-W

Design limits

Temperature (°C)	-50	0	50	75	100	125	150	200	
Pressure (Barg)	DN 15-600	51.1	51.1	50.1	48.3	46.6	45.8	45.1	43

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class design meets full vacuum at ambient temperature condition
- Non-extended bonnet valves in this piping class are intended for short term low temperature excursion (e.g. non-operable during depressurization) (or) non-insulated piping only.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.

Table of schedules

DN	Schedule
15	160
20	160
25	160
40	160
50	80
80	80
100	40
150	40
200	40
250	40
300	40
350	40
400	40
450	40
500	40
600	40

Branch connections 90 degrees

Branch Size	Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	N	N	N	N	P	E	E	E	E	E	B	B	B	B	B	A	
500	N	N	N	N	P	E	E	E	E	E	B	B	B	B	B	A	
450	N	N	N	N	P	E	E	E	E	E	B	B	B	B	B	A	
400	N	N	N	N	P	E	E	E	E	E	B	B	B	B	B	A	
350	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A		
300	N	N	N	N	P	E	E	B	B	B	B	A					
250	N	N	N	N	P	E	B	B	B	B	A						
200	N	N	N	N	P	E	B	B	B	A							
150	N	N	N	N	P	B	B	B	A								
100	N	N	N	N	U	B	A										
80	N	N	N	N	U	A											
50	N	N	M	M	J												
40	N	M	M	J													
25	M	M	J														
20	M	J															
15	J																

Code	Explanation of characters
A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel LT F-Gr Sour	Plant
Class no. 031503-W	Consignee
ASME rating CLASS 300	Engineered by
Corrosion allowance 3 mm	Principal
Revision letter	Contr. job no.
Revision date	Project no.

Metric units

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe				Valves			
PIPE	Pipe	DN 15-600	ASTM A333-6	BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
Flanges				BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
BLFL	Blind flange	DN 15-600	ASTM A350-LF2 cl 1	BNFF	Ball valve trunn FB n-ext flgd	DN 50-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
LJFL	Lap joint flange	--	ASTM A350-LF2 cl 1	BNRF	Ball valve trunn RB n-ext flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
SBNF	Spectacle blind	DN 15-350	ASTM A516-60/65/70	BTFF	Ball valve trunn FB flgd	DN 50-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
SPNF	Spade	DN 15-600	ASTM A516-60/65/70	BTRF	Ball valve trunn RB flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
SRNF	Spacer ring	DN 15-600	ASTM A516-60/65/70	BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A352-LCC Trim: LTCS, Alloy 825, Stellite
WNFL	Welding neck flange	DN 15-600	ASTM A350-LF2 cl 1	BVFF	Ball valve float FB n-ext flgd	DN 15-40	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
Fittings				BVRF	Ball valve float RB n-ext flgd	DN 15-50	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
CAPB	Cap bw	DN 15-600	ASTM A420-WPL6	CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
E45B	Elbow 45 deg LR bw	DN 15-600	ASTM A420-WPL6	CHVF	Check valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
E90B	Elbow 90 deg LR bw	DN 15-600	ASTM A420-WPL6	CHVF	Check valve flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
TEEB	Tee equal bw	DN 15-600	ASTM A420-WPL6	GANF	Gate valve n-ext flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
Reducing fittings				GAVF	Gate valve flgd	--	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
BN6F	Branch fitting flgd	DN 40-600	ASTM A350-LF2 cl 1	GAVF	Gate valve flgd	--	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
BN6P	Branch fitting plain	DN 40-600	ASTM A350-LF2 cl 1	GLVF	Globe valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
BR3B	Branch outlet bw	DN 150-400	ASTM A350-LF2 cl 1	GLVF	Globe valve flgd	DN 80-200	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
BR6B	Branch outlet bw	DN 450-600	ASTM A350-LF2 cl 1	DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
BROB	Branch outlet bw	DN 400-600	ASTM A350-LF2 cl 1	DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
RECB	Reducer concentric bw	DN 20-600	ASTM A420-WPL6	NVFL	Needle valve flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, Stellite
REEB	Reducer eccentric bw	DN 20-600	ASTM A420-WPL6				
TERB	Tee reducing bw	DN 20-600	ASTM A420-WPL6				

Instruments

TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	Alloy 825, Graphite CS centring-/Alloy 825 inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A350-LF2 cl 1
PLUG	Plug NPT	DN 15-50	ASTM A350-LF2 cl 1
ST3B	Strainer Y-type (3 mm ca)	DN 50-400	Sieve: Alloy 825
STBT	Studbolt with nuts	--	ASTM A320-L7M/A194-7M Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A350-LF2 cl 1 HOLDER / ACCESS FITTING: ALLOY 825 COUPON: ASTM A333-6
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A350-LF2 cl 1 INTERNAL: ALLOY 825
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: ALLOY 825 VALVE & INTERNALS: ALLOY 825
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A350-LF2 cl 1 VALVE & INTERNALS: ALLOY 825

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	Nominal pipe size																		
	MESC	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600		
Pipe																			
Pipe	743016 0	231	301	381	541	611	691	751	841	951	071	191	321	421	701				
Pipe	743016 1																		
Pipe	743016 2															101	401		
Flanges																			
Blind flange	766212	5081	5121	5161	5181	5201	5221	5241	5261	5281	5301	5321	5341	5361	5381	5401	5421		
Spacer ring	768906	1081	1121	1161	1181	1201	1221	1241	1261	1281	1301	1321	1341	1361	1381	1401	1441		
Spade	768935	0201	0211	0221	0231	0241	0251	0261	0271	0281	0291	0301	0311	0321	0331	0341	0351		
Spectacle blind	768966	2581	2621	2661	2681	2701	2721	2741	2761	2781	2801	2821	2841						
Welding neck flange	766282	8521	8541	8561	8581	8121	8141	7641	7661	7681	7701	7721	7741	7761	7781	7801	7821		
Fittings																			
Cap bw	763117	1721	1781	1821	1921	2101	2301	2461	2661	2841	3061	3281	3481	3681	3861	3961	4061		
Elbow 45 deg LR bw	763134	1721	1781	1821	1921	2101	2301	2461	2661	2841	3061	3281	3481	3681	3861	3961	4061		
Elbow 90 deg LR bw	763143	1721	1781	1821	1921	2101	2301	2461	2661	2841	3061	3281	3481	3681	3861	3961	4061		
Tee equal bw	763180	1721	1781	1821	1921	2101	2301	2461	2661	2841	3061	3281	3481	3681	3861	3961	4061		

Metric units

Item description	MESC	Nominal pipe size															
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
Valves																	
Ball valve float FB flgd	770056	8539	8549	8559	8579												
Ball valve float FB n-ext flgd	770047	8539	8549	8559	8579												
Ball valve float RB flgd	770056	3539	3549	3559	3579	3589											
Ball valve float RB n-ext flgd	770047	3539	3549	3559	3579	3589											
Ball valve trunn FB flgd	770094					5589	5609	5629	5649	5659	5669	5679	5689	5699	5709	5719	5739
Ball valve trunn FB n-ext flgd	770049					5589	5609	5629	5649	5659	5669	5679	5689	5699	5709	5719	5739
Ball valve trunn RB flgd	770094					9609	9629	9649	9659	9669	9679	9689	9699	9709	9719	9739	
Ball valve trunn RB n-ext flgd	770049					0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739	
Butterfly valve triple of flgd	774143						0659	0669	0679	0689	0699	0709	0719	0739			
Check valve dual plate flgd	776719						0659	0669	0679	0689	0699	0709	0719	0739			
Check Valve Wafer Lug (Solid)	776759						0599	0609	0629	0649							
Check valve flgd	771044	0539	0549	0559	0579	0599	0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739
Gate valve n-ext flgd	772054	6539	6549	6559	6579												
Globe valve flgd	773054	3539	3549	3559	3579	3599	6609	6629	6649	6659							
Valve DBBT	778591	8539	8549	8559	8579	5589											
Valve DBBF	778590	8539	8549	8559	8579	5589											
Miscellaneous																	
Gasket spiral wound	854360	4041	4061	4081	4121	4141	4181	3701	3741	3761	3781	3801	3821	3841	3861	3881	3921
Meterrun	766496	0621	0641	0661	0681												
Orifice flange set	766297					1121	1131	0241	0261	0271	0281	0291	0301	0321	0331	0341	0351
Plug NPT	760563	0081	0121	0161	0181	0201											
Strainer Y-type (3 mm ca)	768322					5761	5781	5561	5581	6601	6611	5551	5571	5591			

Metric units

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
20	x	15	7631661411	7631751411	7631880391
25	x	15	7631661511	7631751511	7631880491
25	x	20	7631661611	7631751611	7631880591
40	x	15	7631661711	7631751711	
40	x	20	7631661811	7631751811	7631880791
40	x	25	7631661911	7631751911	7631880891
50	x	20	7631661931	7631751931	
50	x	25	7631661991	7631751991	7631881111
50	x	40	7631662081	7631752081	7631881201
80	x	40	7631662291	7631752291	
80	x	50	7631662371	7631752371	7631881331
100	x	40	7631662491	7631752491	
100	x	50	7631662661	7631752661	7631881581
100	x	80	7631662761	7631752761	7631881701
150	x	80	7629452941	7629602881	7631881811
150	x	100	7631663051	7631753051	7631881891
200	x	100	7631663251	7631753251	7631882051
200	x	150	7631663351	7631753351	7631882251
250	x	100	7631663431	7631753431	7631882531
250	x	150	7631663551	7631753551	7631882711
250	x	200	7631663651	7631753651	7631882911
300	x	150	7631663831	7631753831	7631883101
300	x	200	7631663961	7631753961	7631883281
300	x	250	7631664041	7631754041	7631883501
350	x	150	7631664131	7631754131	
350	x	200	7631664221	7631754221	7631883901
350	x	250	7631664381	7631754381	7631884151
350	x	300	7631664471	7631754471	7631884411

Thermowell flgd DN 50	
Length (mm)	MESC number
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

Metric units

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
400	x	200	7631664531	7631754531	
400	x	250	7631664621	7631754621	7631885051
400	x	300	7631664741	7631754741	7631885311
400	x	350	7631664871	7631754871	7631885561
450	x	250	7631665231	7631755231	7631886041
450	x	300	7631665531	7631755531	7631886281
450	x	350	7631665841	7631755841	7631886521
450	x	400	7631666141	7631756141	7631886761
500	x	300	7631666431	7631756431	7631887481
500	x	350	7631666741	7631756741	7631887721
500	x	400	7631667041	7631757041	7631887961
500	x	450	7631667341	7631757341	7631888201
600	x	300			7631888681
600	x	350			7631888921
600	x	400	7631668841	7631758841	7631889161
600	x	450	7631669141	7631759141	7631889401
600	x	500	7631669551	7631759441	7631889641

Comp.name Description

BN6F	Branch fitting flgd
BN6P	Branch fitting plain
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BROB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6P	BR3B	BR6B	BROB
15	40	-	50	7672307021	7672579301		
15	80	-	150	7672307031	7672579311		
15	200	-	600	7672307041	7672579321		
20	50	-	50	7672307061	7672579341		
20	80	-	250	7672307071	7672579351		
20	300	-	600	7672307081	7672579361		
25	80	-	250	7672303311	7672708141		
25	300	-	600	7672307111	7672579411		
40	80	-	80	7672307131	7672579431		
40	100	-	100	7672307141	7672579441		
40	150	-	200	7672307151	7672579451		
40	250	-	450	7672307161	7672579461		
40	500	-	600	7672307171	7672579471		
50	150	-	150		7679503571		
50	200	-	250		7679503581		
50	300	-	400		7679503601		
50	450	-	450		7679073691		
50	500	-	600		7679488051		
80	200	-	200		7679503681		
80	250	-	250		7679503691		
80	300	-	350		7679503701		
80	400	-	400		7679503721		
80	450	-	450		7679074051		
80	500	-	500		7679074061		
80	600	-	600		7679074071		

Metric units

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6P	BR3B	BR6B	BROB
100	300	-	350		7679503791		
100	400	-	400		7679503811		
100	450	-	450			7679074141	
100	500	-	500			7679074151	
100	600	-	600			7679074161	
150	350	-	350		7679503871		
150	400	-	400		7679503891		
150	450	-	450			7679048921	
150	500	-	500			7679048961	
150	600	-	600			7679048981	
200	400	-	400			7679049081	
200	450	-	450			7679049101	
200	500	-	500			7679049121	
200	600	-	600			7679049161	
250	500	-	500			7679049281	
250	600	-	600			7679049321	

Metric units

BOLTING**Coated boltset std flange**

DN	nr	inch	x mm	MESC number
15	4	1/2	x 70	8138270259
20	4	5/8	x 80	8138270739
25	4	5/8	x 80	8138270739
40	4	3/4	x 100	8138271419
50	8	5/8	x 90	8138270759
80	8	3/4	x 110	8138271439
100	8	3/4	x 120	8138271459
150	12	3/4	x 130	8138271479
200	12	7/8	x 140	8138272209
250	16	1	x 160	8138273039
300	16	1 1/8	x 180	8138273909
350	20	1 1/8	x 180	8138273909
400	20	1 1/4	x 190	8138274729
450	24	1 1/4	x 200	8138274749
500	24	1 1/4	x 210	8138274769
600	24	1 1/2	x 240	8138276319

Coated boltset orificefig

DN	nr	inch	x mm	MESC number
50	8	5/8	x 130	8138270839
80	8	3/4	x 140	8138271499
100	8	3/4	x 150	8138271519
150	12	3/4	x 150	8138271519
200	12	7/8	x 170	8138272269
250	16	1	x 190	8138273099
300	16	1 1/8	x 210	8138273969
350	20	1 1/8	x 220	8138273989
400	20	1 1/4	x 230	8138274809
450	24	1 1/4	x 250	8138274849
500	24	1 1/4	x 260	8138274869
600	24	1 1/2	x 290	8138276419

Coated boltset mrun fig

DN	nr	inch	x mm	MESC number
15	4	5/8	x 130	8138270839
20	4	5/8	x 130	8138270839
25	4	5/8	x 130	8138270839
40	4	3/4	x 140	8138271499

Coated boltset for Dual Plate Check Valve

DN	nr	inch	x mm	MESC number
50	8	5/8	x 150	8138270879
80	8	3/4	x 190	8138271599
100	8	3/4	x 200	8138271619
150	12	3/4	x 230	8138271679
200	12	7/8	x 270	8138272469
250	16	1	x 310	8138273339
300	16	1 1/8	x 370	8138274289

Coated boltset blind/spc

DN	nr	inch	x mm	MESC number
15	4	1/2	x 80	8138270279
20	4	5/8	x 90	8138270759
25	4	5/8	x 90	8138270759
40	4	3/4	x 110	8138271439
50	8	5/8	x 110	8138270799
80	8	3/4	x 130	8138271479
100	8	3/4	x 140	8138271499
150	12	3/4	x 150	8138271519
200	12	7/8	x 170	8138272269
250	16	1	x 190	8138273099
300	16	1 1/8	x 210	8138273969
350	20	1 1/8	x 220	8138273989
400	20	1 1/4	x 240	8138274829
450	24	1 1/4	x 250	8138274849
500	24	1 1/4	x 260	8138274869
600	24	1 1/2	x 300	8138276439

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662125081
Welding neck flange	1	7662828521
Gasket spiral wound	1	8543604041
Studbolt with nuts	4	8138270259

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662125121
Gasket spiral wound	1	8543604061
Studbolt with nuts	4	8138270739

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662125121
Welding neck flange	1	7662828541
Gasket spiral wound	1	8543604061
Studbolt with nuts	4	8138270739

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662125161
Gasket spiral wound	1	8543604081
Studbolt with nuts	4	8138270739

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Blind flange	1	7662125181
Gasket spiral wound	1	8543604121
Studbolt with nuts	4	8138271419

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Lap joint flange	1	7662208731
Pipe	1	7430160611
Welding neck flange	1	7662828121
Gasket spiral wound	1	8543604141
Thermowell flgd DN 50 L=230 mm	1	7683385611
Studbolt with nuts	8	8138270799

Temp instr conn DN 50 Fig.HL DN150 - 600

Branch: according to branch table

Lap joint flange	1	7662208731
Pipe	1	7430160611
Welding neck flange	1	7662828121
Gasket spiral wound	1	8543604141
Thermowell flgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	8	8138270799

CLASS 031503-X

Design limits**Temperature (°C)**

	-50	0	50	75	100	125	150
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Pressure (Barg)	DN 15-600	51.1	51.1	50.1	48.3	46.6	45.8	45.1
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class design meets full vacuum at ambient temperature condition
- Non-extended bonnet valves in this piping class are intended for short term low temperature excursion (e.g non-operable during depressurization) (or) non-insulated piping only.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**

Table of schedules

DN	Schedule
15	160
20	160
25	160
40	160
50	80
80	80
100	40
150	40
200	40
250	40
300	40
350	40
400	40
450	40
500	40
600	40

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
500	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
450	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
400	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
350	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
300	N	N	N	N	P	E	E	E	E	B	B	B	B	B	A	
250	N	N	N	N	P	E	E	B	B	B	B	B	B	B	A	
200	N	N	N	N	P	E	E	B	B	B	A					
150	N	N	N	N	P	B	B	B	A							
100	N	N	N	N	U	B	A									
80	N	N	N	N	U	A										
50	N	N	M	M	J											
40	N	M	M	J												
25	M	M	J													
20	M	J														
15	J															

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel LT F-Gr Sour	
Class no.	031503-X
ASME rating	CLASS 300
Corrosion allowance	3 mm
Revision letter	
Revision date	

Plant
Consignee
Engineered by
Principal
Contr. job no.
Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-600	ASTM A333-6
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Flanges

BLFL	Blind flange	DN 15-600	ASTM A350-LF2 cl 1
LJFL	Lap joint flange	--	ASTM A350-LF2 cl 1
SBNF	Spectacle blind	DN 15-350	ASTM A516-60/65/70
SPNF	Spade	DN 15-600	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15-600	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-600	ASTM A350-LF2 cl 1

Fittings

CAPB	Cap bw	DN 15-600	ASTM A420-WPL6
E45B	Elbow 45 deg LR bw	DN 15-600	ASTM A420-WPL6
E90B	Elbow 90 deg LR bw	DN 15-600	ASTM A420-WPL6
TEEB	Tee equal bw	DN 15-600	ASTM A420-WPL6

Reducing fittings

BN6F	Branch fitting flgd	DN 40-600	ASTM A350-LF2 cl 1
BN6B	Branch fitting bw	DN 40-600	ASTM A350-LF2 cl 1
BR3B	Branch outlet bw	DN 150-400	ASTM A350-LF2 cl 1
BR6B	Branch outlet bw	DN 450-600	ASTM A350-LF2 cl 1
BROB	Branch outlet bw	DN 400-600	ASTM A350-LF2 cl 1
RECB	Reducer concentric bw	DN 20-600	ASTM A420-WPL6
REEB	Reducer eccentric bw	DN 20-600	ASTM A420-WPL6
TERB	Tee reducing bw	DN 20-600	ASTM A420-WPL6

Valves

BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, filled PTFE
BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, filled PTFE
BNFF	Ball valve trunn FB n-ext flgd	DN 50-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, filled PTFE
BNRF	Ball valve trunn RB n-ext flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, filled PTFE
BTFF	Ball valve trunn FB flgd	DN 50-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, filled PTFE
BTRF	Ball valve trunn RB flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A352-LCC Trim: LTCS, Alloy 825, Stellite
BVFF	Ball valve float FB n-ext flgd	DN 15-40	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, filled PTFE
BVRF	Ball valve float RB n-ext flgd	DN 15-50	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825, filled PTFE
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
CHVF	Check valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
CHVF	Check valve flgd	DN 80-600	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
GANF	Gate valve n-ext flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
GAVF	Gate valve flgd	--	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
GAVF	Gate valve flgd	--	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A350-LF2 cl 1/A352-LCC Trim: Alloy 825
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, PTFE
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A350-LF2 cl 1 Trim: Alloy 825, Stellite

Instruments

TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	---	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	---	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	Alloy 825, Graphite CS centring-/Alloy 825 inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A350-LF2 cl 1
PLUG	Plug NPT	DN 15-50	ASTM A350-LF2 cl 1
ST3B	Strainer Y-type (3 mm ca)	DN 50-400	Sieve: Alloy 825
STBT	Studbolt with nuts	---	ASTM A320-L7M/A194-7M Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A350-LF2 cl 1 HOLDER / ACCESS FITTING: ALLOY 825 COUPON: ASTM A333-6
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A350-LF2 cl 1 INTERNAL: ALLOY 825
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: ALLOY 825 VALVE & INTERNALS: ALLOY 825
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A350-LF2 cl 1 VALVE & INTERNALS: ALLOY 825

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	Nominal pipe size																
	15 MESC	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	
Pipe																	
Pipe	743016 0	231	301	381	541	611	691	751	841	951	071	191	321	421	701		
Pipe	743016 1																
Pipe	743016 2														101	401	
Flanges																	
Blind flange	766212	5081	5121	5161	5181	5201	5221	5241	5261	5281	5301	5321	5341	5361	5381	5401	5421
Spacer ring	768906	1081	1121	1161	1181	1201	1221	1241	1261	1281	1301	1321	1341	1361	1381	1401	1441
Spade	768935	0201	0211	0221	0231	0241	0251	0261	0271	0281	0291	0301	0311	0321	0331	0341	0351
Spectacle blind	768966	2581	2621	2661	2681	2701	2721	2741	2761	2781	2801	2821	2841				
Welding neck flange	766282	8521	8541	8561	8581	8121	8141	7641	7661	7681	7701	7721	7741	7761	7781	7801	7821
Fittings																	
Cap bw	763117	1721	1781	1821	1921	2101	2301	2461	2661	2841	3061	3281	3481	3681	3861	3961	4061
Elbow 45 deg LR bw	763134	1721	1781	1821	1921	2101	2301	2461	2661	2841	3061	3281	3481	3681	3861	3961	4061
Elbow 90 deg LR bw	763143	1721	1781	1821	1921	2101	2301	2461	2661	2841	3061	3281	3481	3681	3861	3961	4061
Tee equal bw	763180	1721	1781	1821	1921	2101	2301	2461	2661	2841	3061	3281	3481	3681	3861	3961	4061

PIPING COMPONENTS

Item description	MESC	Nominal pipe size															
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
Valves																	
Ball valve float FB flgd	770056	8539	8549	8559	8579												
Ball valve float FB n-ext flgd	770047	8539	8549	8559	8579												
Ball valve float RB flgd	770056	3539	3549	3559	3579	3589											
Ball valve float RB n-ext flgd	770047	3539	3549	3559	3579	3589											
Ball valve trunn FB flgd	770094						5589	5609	5629	5649	5659	5669	5679	5689	5699	5709	5719
Ball valve trunn FB n-ext flgd	770049						5589	5609	5629	5649	5659	5669	5679	5689	5699	5709	5719
Ball valve trunn RB flgd	770094							0609	0629	0649	0659	0669	0679	0689	0699	0709	0719
Ball valve trunn RB n-ext flgd	770049							0609	0629	0649	0659	0669	0679	0689	0699	0709	0719
Butterfly valve triple of flgd	774143										0659	0669	0679	0689	0699	0709	0719
Check valve dual plate flgd	776719										0659	0669	0679	0689	0699	0709	0719
Check Valve Wafer Lug (Solid)	776759						0599	0609	0629	0649							
Check valve flgd	771044	0539	0549	0559	0579	0599	0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739
Gate valve n-ext flgd	772054	6539	6549	6559	6579												
Globe valve flgd	773054	3539	3549	3559	3579	3599	6609	6629	6649	6659							
Valve DBBT	778591	8539	8549	8559	8579	5589											
Valve DBBF	778590	8539	8549	8559	8579	5589											
Miscellaneous																	
Gasket spiral wound	854360	4041	4061	4081	4121	4141	4181	3701	3741	3761	3781	3801	3821	3841	3861	3881	3921
Meterrun	766496	0621	0641	0661	0681												
Orifice flange set	766297							1121	1131	0241	0261	0271	0281	0291	0301	0321	0331
Plug NPT	760563	0081	0121	0161	0181			0201									0351
Strainer Y-type (3 mm ca)	768322							5761	5781	5561	5581	6601	6611	5551	5571	5591	

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7631661411	7631751411	7631880391
25	x	15	7631661511	7631751511	7631880491
25	x	20	7631661611	7631751611	7631880591
40	x	15	7631661711	7631751711	
40	x	20	7631661811	7631751811	7631880791
40	x	25	7631661911	7631751911	7631880891
50	x	20	7631661931	7631751931	
50	x	25	7631661991	7631751991	7631881111
50	x	40	7631662081	7631752081	7631881201
80	x	40	7631662291	7631752291	
80	x	50	7631662371	7631752371	7631881331
100	x	40	7631662491	7631752491	
100	x	50	7631662661	7631752661	7631881581
100	x	80	7631662761	7631752761	7631881701
150	x	80	7629452941	7629602881	7631881811
150	x	100	7631663051	7631753051	7631881891
200	x	100	7631663251	7631753251	7631882051
200	x	150	7631663351	7631753351	7631882251
250	x	100	7631663431	7631753431	7631882531
250	x	150	7631663551	7631753551	7631882711
250	x	200	7631663651	7631753651	7631882911
300	x	150	7631663831	7631753831	7631883101
300	x	200	7631663961	7631753961	7631883281
300	x	250	7631664041	7631754041	7631883501
350	x	150	7631664131	7631754131	
350	x	200	7631664221	7631754221	7631883901
350	x	250	7631664381	7631754381	7631884151
350	x	300	7631664471	7631754471	7631884411

Thermowell flgd DN 50	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200	7631664531	7631754531		
400	x 250	7631664621	7631754621	7631885051	
400	x 300	7631664741	7631754741	7631885311	
400	x 350	7631664871	7631754871	7631885561	
450	x 250	7631665231	7631755231	7631886041	
450	x 300	7631665531	7631755531	7631886281	
450	x 350	7631665841	7631755841	7631886521	
450	x 400	7631666141	7631756141	7631886761	
500	x 300	7631666431	7631756431	7631887481	
500	x 350	7631666741	7631756741	7631887721	
500	x 400	7631667041	7631757041	7631887961	
500	x 450	7631667341	7631757341	7631888201	
600	x 300			7631888681	
600	x 350			7631888921	
600	x 400	7631668841	7631758841	7631889161	
600	x 450	7631669141	7631759141	7631889401	
600	x 500	7631669551	7631759441	7631889641	

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting flgd
BN6B	Branch fitting bw
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BROB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BR6B	BROB
15	40	-	50	7672307021	7672579309		
15	80	-	150	7672307031	7672579319		
15	200	-	600	7672307041	7672579329		
20	50	-	50	7672307061	7672579349		
20	80	-	250	7672307071	7672579359		
20	300	-	600	7672307081	7672579369		
25	80	-	250	7672303311	7672708149		
25	300	-	600	7672307111	7672579419		
40	80	-	80	7672307131	7672579439		
40	100	-	100	7672307141	7672579449		
40	150	-	200	7672307151	7672579459		
40	250	-	450	7672307161	7672579469		
40	500	-	600	7672307171	7672579479		
50	150	-	150		7679503571		
50	200	-	250		7679503581		
50	300	-	400		7679503601		
50	450	-	450		7679073691		
50	500	-	600		7679488051		
80	200	-	200		7679503681		
80	250	-	250		7679503691		
80	300	-	350		7679503701		
80	400	-	400		7679503721		
80	450	-	450		7679074051		
80	500	-	500		7679074061		
80	600	-	600		7679074071		

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BR6B	BROB
100	300	-	350		7679503791		
100	400	-	400		7679503811		
100	450	-	450			7679074141	
100	500	-	500			7679074151	
100	600	-	600			7679074161	
150	350	-	350		7679503871		
150	400	-	400		7679503891		
150	450	-	450			7679048921	
150	500	-	500			7679048961	
150	600	-	600			7679048981	
200	400	-	400			7679049081	
200	450	-	450			7679049101	
200	500	-	500			7679049121	
200	600	-	600			7679049161	
250	500	-	500			7679049281	
250	600	-	600			7679049321	

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138270259
20	4	5/8	x 80	8138270739
25	4	5/8	x 80	8138270739
40	4	3/4	x 100	8138271419
50	8	5/8	x 90	8138270759
80	8	3/4	x 110	8138271439
100	8	3/4	x 120	8138271459
150	12	3/4	x 130	8138271479
200	12	7/8	x 140	8138272209
250	16	1	x 160	8138273039
300	16	1 1/8	x 180	8138273909
350	20	1 1/8	x 180	8138273909
400	20	1 1/4	x 190	8138274729
450	24	1 1/4	x 200	8138274749
500	24	1 1/4	x 210	8138274769
600	24	1 1/2	x 240	8138276319

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138270839
80	8	3/4	x 140	8138271499
100	8	3/4	x 150	8138271519
150	12	3/4	x 150	8138271519
200	12	7/8	x 170	8138272269
250	16	1	x 190	8138273099
300	16	1 1/8	x 210	8138273969
350	20	1 1/8	x 220	8138273989
400	20	1 1/4	x 230	8138274809
450	24	1 1/4	x 250	8138274849
500	24	1 1/4	x 260	8138274869
600	24	1 1/2	x 290	8138276419

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	5/8	x 130	8138270839
20	4	5/8	x 130	8138270839
25	4	5/8	x 130	8138270839
40	4	3/4	x 140	8138271499

Coated boltset for Dual Plate Check Valve

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 150	8138270879
80	8	3/4	x 190	8138271599
100	8	3/4	x 200	8138271619
150	12	3/4	x 230	8138271679

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 80	8138270279
20	4	5/8	x 90	8138270759
25	4	5/8	x 90	8138270759
40	4	3/4	x 110	8138271439
50	8	5/8	x 110	8138270799
80	8	3/4	x 130	8138271479
100	8	3/4	x 140	8138271499
150	12	3/4	x 150	8138271519
200	12	7/8	x 170	8138272269
250	16	1	x 190	8138273099
300	16	1 1/8	x 210	8138273969
350	20	1 1/8	x 220	8138273989
400	20	1 1/4	x 240	8138274829
450	24	1 1/4	x 250	8138274849
500	24	1 1/4	x 260	8138274869
600	24	1 1/2	x 300	8138276439

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662125081
Welding neck flange	1	7662828521
Gasket spiral wound	1	8543604041
Studbolt with nuts	4	8138270259

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662125121
Gasket spiral wound	1	8543604061
Studbolt with nuts	4	8138270739

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662125121
Welding neck flange	1	7662828541
Gasket spiral wound	1	8543604061
Studbolt with nuts	4	8138270739

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662125161
Gasket spiral wound	1	8543604081
Studbolt with nuts	4	8138270739

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Blind flange	1	7662125181
Gasket spiral wound	1	8543604121
Studbolt with nuts	4	8138271419

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Lap joint flange	1	7662208731
Pipe	1	7430160611
Welding neck flange	1	7662828121
Gasket spiral wound	1	8543604141
Thermowell flgd DN 50 L=230 mm	1	7683385611
Studbolt with nuts	8	8138270799

Temp instr conn DN 50 Fig.HL DN150 - 600

Branch: according to branch table

Lap joint flange	1	7662208731
Pipe	1	7430160611
Welding neck flange	1	7662828121
Gasket spiral wound	1	8543604141
Thermowell flgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	8	8138270799

CLASS 033411-Z

Design limits**Temperature (°C)**

	-29	0	50	75	100	125	150
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Pressure (Barg)	DN 15-600	49.6	49.6	48.1	45.1	42.2	40.3	38.5
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 2.2
- For basis of design see DEP 31.38.01.10-Gen.
- External protection is required for design temperatures > 50 degr. C [120 °F] in saliferous atmospheres to prevent chloride stress corrosion cracking.
- When chlorides are present in the process fluid in conjunction with free oxygen, the max. temperature is limited to 50 deg C [120 °F], to prevent chloride stress corrosion cracking
- Piping class design meets full vacuum at ambient temperature condition
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**

Table of schedules

DN	Schedule
15	40S
20	40S
25	10S
40	10S
50	10S
80	10S
100	10S
150	40S
200	40S
250	40S
300	40S
350	30S
400	40S
450	30S
500	30S
600	40S

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
500	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
450	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
400	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
350	C	C	C	C	E	E	E	E	E	B	B	B	B	A		
300	C	C	C	C	E	E	E	E	E	B	B	B	B	A		
250	C	C	C	C	E	E	B	B	B	A						
200	C	C	C	C	E	E	B	B	B	A						
150	C	C	C	C	E	B	B	B	A							
100	C	C	C	C	B	B	B	A								
80	C	C	C	C	B	B	A									
50	C	C	B	B	A											
40	C	B	B	A												
25	B	B	A													
20	B	A														
15	A															

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
C	Branch fitting
E	Branch outlet

Stainl steel AISI 316	033411-Z	Plant
Class no.	033411-Z	Consignee
ASME rating	CLASS 300	Engineered by
Corrosion allowance	0 mm	Principal
Revision letter		Contr. job no.
Revision date		Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-300	ASTM A312-TP316L
PIPE	Pipe	DN 150-600	ASTM A358-316L

Flanges

BLFL	Blind flange	DN 15-600	ASTM A182-F316
LJFL	Lap joint flange	--	ASTM A105
SBNF	Spectacle blind	DN 15-350	ASTM A240-TP316
SPNF	Spade	DN 15-600	ASTM A240-TP316
SRNF	Spacer ring	DN 15-600	ASTM A240-TP316
WNFL	Welding neck flange	DN 15-600	ASTM A182-F316

Fittings

CAPB	Cap bw	DN 15-600	ASTM A403-WP316L
E45B	Elbow 45 deg LR bw	DN 15-150	ASTM A403-WP316L
E45B	Elbow 45 deg LR bw	DN 200-600	ASTM A403 Class WP-S/WX-316L
E90B	Elbow 90 deg LR bw	DN 15-150	ASTM A403-WP316L
E90B	Elbow 90 deg LR bw	DN 200-600	ASTM A403 Class WP-S/WX-316L
TEEB	Tee equal bw	DN 15-600	ASTM A403-WP316L

Reducing fittings

BN3F	Branch fitting flgd	DN 400-500	ASTM A182-F316
BN3B	Branch fitting bw	DN 40-500	ASTM A182-F316
BN6F	Branch fitting flgd	DN 600-600	ASTM A182-F316
BN6B	Branch fitting bw	DN 600-600	ASTM A182-F316
BNLF	Branch fitting flgd	DN 40-350	ASTM A182-F316
BR3B	Branch outlet bw	DN 400-500	ASTM A182-F316
BR6B	Branch outlet bw	DN 600-600	ASTM A182-F316
BR0B	Branch outlet bw	DN 400-600	ASTM A182-F316
BRSB	Branch outlet bw	DN 150-350	ASTM A182-F316
RECB	Reducer concentric bw	DN 20-150	ASTM A403-WP316L
RECB	Reducer concentric bw	DN 200-600	ASTM A403 Class WP-S/WX-316L
REEB	Reducer eccentric bw	DN 20-150	ASTM A403-WP316L
REEB	Reducer eccentric bw	DN 200-600	ASTM A403 Class WP-S/WX-316L
TERB	Tee reducing bw	DN 20-600	ASTM A403-WP316L

Valves

BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, filled PTFE
BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, filled PTFE
BTFF	Ball valve trunn FB flgd	DN 50-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, filled PTFE
BTRF	Ball valve trunn RB flgd	DN 80-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A351-CF8M Trim: AISI 316, Duplex, Stellite
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50 -600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, Stellite
CHVF	Check valve flgd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316, Stelite
CHVF	Check valve flgd	DN 80-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, Stelite
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316, Stelite
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, Stelite
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316, Stelite
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, Stelite

Instruments

TWND	Thermowell flgd DN 40	DN 40-40	ASTM B564 UNS N04400
TWNS	Thermowell flgd DN 40 L=230 mm	--	ASTM B564 UNS N04400
TWNL	Thermowell flgd DN 40 L=255 mm	--	ASTM B564 UNS N04400
TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	AISI 316, Graphite CS centring-/SS inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/AISI 316 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A182-F316
STBT	Studbolt with nuts	--	ASTM A193-B7/A194-2H Coated with Xylan 1070 or Takecoat 1000 Sieve: AISI 316
STYB	Strainer Y-type	DN 50-400	

PIPING COMPONENTS

Item description	Nominal pipe size																
	15 MESC	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	
Pipe																	
Pipe	743633 0	181	261	331	491	571	651	731	831	941							
Pipe	743633 1										061	181					
Pipe	743634 0										741	941					
Pipe	743634 1										061	181	251	411	521	621	831
Flanges																	
Blind flange	766510	4121	4141	4161	4181	4201	4221	4241	4261	4281	4301	4321	4341	4361	4381	4401	4421
Spacer ring	768915	4581	4621	4661	4681	4701	4721	4741	4761	4781	4801	4821	4841	4861	4881	4901	4941
Spade	768950	2921	2941	2961	2981	3001	3021	3041	3061	3081	3101	3121	3141	3161	3181	3201	3221
Spectacle blind	768981	2081	2121	2161	2181	2201	2221	2241	2261	2281	2301	2321	2341				
Welding neck flange	766579			4061	4081	4101	4121	4141					3951		3971	3981	
Welding neck flange	766580	4021	4041						4161	4181	4201	4221		1071			1101
Fittings																	
Cap bw	763319	2861	2961	3041	3241	3341	3541	3741	3961	4091	4211	4381	4501	4611	4711	4821	4911
Elbow 45 deg LR bw	763337	2861	2961	3041	3241	3341	3541	3741	3961	4091	4211	4381	4511	4621	4701	4801	4921
Elbow 90 deg LR bw	763341	2861	2961	3041	3241	3341	3541	3741	3961	4091	4211	4381	4511	4621	4701	4801	4921
Tee equal bw	763384	7861	7961	8041	8241	8341	8541	8741	8961	9091	9211	9381	9511	9611	9721	9861	9941

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																	
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600		
Valves																			
Ball valve float FB flgd	770326	8539	8549	8559	8579														
Ball valve float RB flgd	770326	3539	3549	3559	3579	3589													
Ball valve trunn FB flgd	770349					5589	5609	5629	5649	5659	5669	5679	5689	5699	5709	5719	5739		
Ball valve trunn RB flgd	770349						0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739		
Butterfly valve triple of flgd	774431							0659	0669	0679	0689	0699	0709	0719	0739				
Check valve dual plate flgd	776814							0659	0669	0679	0689	0699	0709	0719	0739				
Check Valve Wafer Lug (Solid)	776851						0599	0609	0629	0649									
Check valve flgd	771303					0599	0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739		
Check valve flgd	771319	0539	0549	0559	0579														
Gate valve flgd	772303	0539	0549	0559	0579	0599	3609	3629	3649	3659	3669	3679	3689	3699	3709	3719	3739		
Globe valve flgd	773303	0539	0549	0559	0579	0599	0609	0629	0649	0659									
Miscellaneous																			
Gasket spiral wound	854136	4041	4061	4081	4121	4141	4181	3701	3741	3761	3781	3801	3821	3841	3861	3881	3921		
Meterrun	766496	0121	0141	0161	0181														
Orifice flange set	766592					4911	4931	4011	4371	4381	4391	4401	3841	3961	3861	3871	4001		
Strainer Y-type	768321					4529	4549	4569	4579	4619	4679	4709	4849	4689					

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7633705661	7633725661	7633856181
25	x	15	7633705791	7633725791	7633856321
25	x	20	7633705891	7633725891	7633856371
40	x	15	7633705991	7633725991	
40	x	20	7633706191	7633726191	7633856491
40	x	25	7633706241	7633726241	7633856561
50	x	20	7636500901	7636630901	
50	x	25	7633706341	7633726341	7633856721
50	x	40	7633706441	7633726441	7633856831
80	x	40	7633706741	7633726741	
80	x	50	7633706841	7633726841	7633893521
100	x	40	7633706931	7633726931	
100	x	50	7633707041	7633727041	7633893681
100	x	80	7633707141	7633727141	7633893761
150	x	80	7633707491	7633727491	7633893851
150	x	100	7633707591	7633727591	7633893931
200	x	100	7633707661	7633727661	7633894011
200	x	150	7633707791	7633727791	7633894101
250	x	100	7636502581	7636632581	7633894171
250	x	150	7633707931	7633727931	7633894231
250	x	200	7633708091	7633728091	7633894281
300	x	150	7633708171	7633728171	7633894331
300	x	200	7633708301	7633728301	7633894381
300	x	250	7633708421	7633728421	7633894431
350	x	150	7636485101	7636655101	
350	x	200	7636485451	7636655451	7636865461
350	x	250	7636485791	7636655791	7633894601
350	x	300	7636486091	7636656091	7636866081

Thermowell flgd DN 50

<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

Thermowell flgd DN 40

<u>Length (mm)</u>	<u>MESC number</u>
230	7683375111
255	7683375121
305	7683375131
355	7683375141
405	7683375151
455	7683375161

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200	7636486441	7636656441		
400	x 250	7636486611	7636656611	7633894781	
400	x 300	7636486761	7636656761	7633894831	
400	x 350	7636487591	7636657601	7636866951	
450	x 250	7636487271	7636657141	7633894951	
450	x 300	7636487451	7636657341	7633895051	
450	x 350	7636487511	7633729071	7633895091	
450	x 400	7636487761	7636657741	7636867821	
500	x 300	7636488301	7636658341	7636868281	
500	x 350	7636488361	7636658441	7633895341	
500	x 400	7636488611	7636658751	7636868591	
500	x 450	7636488701	7633729381	7633895461	
600	x 300			7633895531	
600	x 350			7636869201	
600	x 400	7636489451	7636659451	7633895631	
600	x 450	7636489721	7636659741	7636869811	
600	x 500	7636489961	7636659941	7636869921	

<u>Comp.name</u>	<u>Description</u>
BN3F	Branch fitting flgd
BN3B	Branch fitting bw
BN6F	Branch fitting flgd
BN6B	Branch fitting bw
BNLF	Branch fitting flgd
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN6F	BNLF	BN3B	BN6B	BR3B	BR6B	BROB	BRSB
15	40	-	40		7680550791	7680316039					
15	50	-	50		7680550801	7680316059					
15	80	-	200		7680550811	7680316079					
15	250	-	350		7680550271						
15	250	-	500			7672604349					
15	400	-	500	7672325731							
15	600	-	600	7672327131			7672604639				
20	50	-	50		7680550841	7680316199					
20	80	-	100		7680550851	7680316209					
20	150	-	300		7680550861	7680316219					
20	350	-	350		7680550321						
20	350	-	500			7672604499					
20	400	-	500	7672325781				7672604689			
20	600	-	600	7672327181					7672604689		
25	80	-	80		7680550891	7680316249					
25	100	-	100		7680550901	7680316259					
25	150	-	250		7680550911	7680316269					
25	300	-	350		7680550371						
25	300	-	500			7672604549					
25	400	-	500	7672325831					7672604719		
25	600	-	600	7672327231						7672604719	
40	80	-	80		7680550941	7680316299					
40	100	-	100		7680550951	7680316309					
40	150	-	150		7680550961	7680316319					
40	200	-	300		7680550971	7680316339					
40	350	-	350		7680550411						
40	350	-	500			7680316359					
40	400	-	500	7680396171				7672604779			
40	600	-	600	7672327291						7672604779	
50	150	-	150							7679696381	
50	200	-	250							7679696431	
50	300	-	350							7679696451	
50	400	-	450			7679703691					
50	500	-	500			7679510051					
50	600	-	600				7678533101				
80	200	-	200						7679696641		
80	250	-	250						7679696661		
80	300	-	350						7679696691		
80	400	-	500			7679703951					
80	600	-	600					7679719351			

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN6F	BNLF	BN3B	BN6B	BR3B	BR6B	BROB	BRSB
100	300	-	350					7679704181			7679696911
100	400	-	500								
100	600	-	600								
150	350	-	350								
150	400	-	400					7679704391			
150	450	-	450					7679704401			
150	500	-	500					7679704411			
150	600	-	600								7679698461
200	400	-	400								7679698471
200	450	-	450								7679681671
200	500	-	500								7679681681
200	600	-	600								7679698491
250	500	-	500								7679681741
250	600	-	600								7679698551

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138150259
20	4	5/8	x 80	8138150739
25	4	5/8	x 80	8138150739
40	4	3/4	x 100	8138151419
50	8	5/8	x 90	8138150759
80	8	3/4	x 110	8138151439
100	8	3/4	x 120	8138151459
150	12	3/4	x 130	8138151479
200	12	7/8	x 140	8138152209
250	16	1	x 160	8138153039
300	16	1 1/8	x 180	8138153909
350	20	1 1/8	x 180	8138153909
400	20	1 1/4	x 190	8138154729
450	24	1 1/4	x 200	8138154749
500	24	1 1/4	x 210	8138154769
600	24	1 1/2	x 240	8138156319

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138150839
80	8	3/4	x 140	8138151499
100	8	3/4	x 150	8138151519
150	12	3/4	x 150	8138151519
200	12	7/8	x 170	8138152269
250	16	1	x 190	8138153099
300	16	1 1/8	x 210	8138153969
350	20	1 1/8	x 220	8138153989
400	20	1 1/4	x 230	8138154809
450	24	1 1/4	x 250	8138154849
500	24	1 1/4	x 260	8138154869
600	24	1 1/2	x 290	8138156419

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	5/8	x 130	8138150839
20	4	5/8	x 130	8138150839
25	4	5/8	x 130	8138150839
40	4	3/4	x 140	8138151499

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 150	8138150879
80	8	3/4	x 190	8138151599
100	8	3/4	x 200	8138151619
150	12	3/4	x 230	8138151679

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 80	8138150279
20	4	5/8	x 90	8138150759
25	4	5/8	x 90	8138150759
40	4	3/4	x 110	8138151439
50	8	5/8	x 110	8138150799
80	8	3/4	x 130	8138151479
100	8	3/4	x 140	8138151499
150	12	3/4	x 150	8138151519
200	12	7/8	x 170	8138152269
250	16	1	x 190	8138153099
300	16	1 1/8	x 210	8138153969
350	20	1 1/8	x 220	8138153989
400	20	1 1/4	x 240	8138154829
450	24	1 1/4	x 250	8138154849
500	24	1 1/4	x 260	8138154869
600	24	1 1/2	x 300	8138156439

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7665104121
Welding neck flange	1	7665804021
Gasket spiral wound	1	8541364041
Studbolt with nuts	4	8138150251

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7665104141
Gasket spiral wound	1	8541364061
Studbolt with nuts	4	8138150731

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7665104141
Welding neck flange	1	7665804041
Gasket spiral wound	1	8541364061
Studbolt with nuts	4	8138150731

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7665104161
Gasket spiral wound	1	8541364081
Studbolt with nuts	4	8138150731

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Blind flange	1	7665104181
Gasket spiral wound	1	8541364121
Studbolt with nuts	4	8138151411

Temp instr conn DN 40 Fig.NL DN150 - 500

Branch: branch nipple flanged

Lap joint flange	1	7662203181
Gasket spiral wound	1	8541364121
Thermowell flgd DN 40 L=255 mm	1	7683375121
Studbolt with nuts	4	8138151411

Temp instr conn DN 40 Fig.NS DN80 - 100

Branch: branch nipple flanged

Lap joint flange	1	7662203181
Gasket spiral wound	1	8541364121
Thermowell flgd DN 40 L=230 mm	1	7683375111
Studbolt with nuts	4	8138151439

Temp instr conn DN 50 Fig.HL DN600 - 600

Branch: according to branch table

Lap joint flange	1	7662203201
Pipe	1	7436330571
Welding neck flange	1	7665794101
Gasket spiral wound	1	8541364141
Thermowell flgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	8	8138150799

CLASS 033461-Y

Design limits**Temperature (°C)**

	-101	0	50	75	100	125	150
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Pressure (Barg)	DN 15-600	49.6	49.6	48.1	45.1	42.2	40.3	38.5
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 2.2
- For basis of design see DEP 31.38.01.10-Gen.
- External protection is required for design temperatures > 50 degr. C [120 °F] in saliferous atmospheres to prevent chloride stress corrosion cracking.
- When chlorides are present in the process fluid in conjunction with free oxygen, the max. temperature is limited to 50 deg C [120 °F], to prevent chloride stress corrosion cracking
- Piping class design meets full vacuum at ambient temperature condition
- Non-extended bonnet valves in this piping class are intended for short term low temperature excursion (e.g non-operable during depressurization) (or) non-insulated piping only.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**

Table of schedules

DN	Schedule
15	40S
20	40S
25	10S
40	10S
50	10S
80	10S
100	10S
150	40S
200	40S
250	40S
300	40S
350	30S
400	40S
450	30S
500	30S
600	40S

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
500	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
450	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
400	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
350	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
300	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
250	C	C	C	C	E	E	B	B	B	A						
200	C	C	C	C	E	E	B	B	B	A						
150	C	C	C	C	E	B	B	B	A							
100	C	C	C	C	B	B	B	A								
80	C	C	C	C	B	B	A									
50	C	C	B	B	A											
40	C	B	B	A												
25	B	B	A													
20	B	A														
15	A															

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
C	Branch fitting
E	Branch outlet

Stainl steel AISI 316 LT Sour
 Class no. 033461-Y
 ASME rating CLASS 300
 Corrosion allowance 0 mm

Plant
 Consignee
 Engineered by
 Principal
 Contr. job no.
 Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-300	ASTM A312-TP316L
PIPE	Pipe	DN 150-600	ASTM A358-316L

Flanges

BLFL	Blind flange	DN 15-600	ASTM A182-F316
LJFL	Lap joint flange	--	ASTM A182-F316
SBNF	Spectacle blind	DN 15-350	ASTM A240-TP316
SPNF	Spade	DN 15-600	ASTM A240-TP316
SRNF	Spacer ring	DN 15-600	ASTM A240-TP316
WNFL	Welding neck flange	DN 15-600	ASTM A182-F316

Fittings

CAPB	Cap bw	DN 15-600	ASTM A403-WP316L
E45B	Elbow 45 deg LR bw	DN 15-150	ASTM A403-WP316L
E45B	Elbow 45 deg LR bw	DN 200-600	ASTM A403 Class WP-S/WX-316L
E90B	Elbow 90 deg LR bw	DN 15-150	ASTM A403-WP316L
E90B	Elbow 90 deg LR bw	DN 200-600	ASTM A403 Class WP-S/WX-316L
TEEB	Tee equal bw	DN 15-600	ASTM A403-WP316L

Reducing fittings

BN3F	Branch fitting flgd	DN 400-500	ASTM A182-F316
BN3B	Branch fitting bw	DN 40-500	ASTM A182-F316
BN6F	Branch fitting flgd	DN 600-600	ASTM A182-F316
BN6B	Branch fitting bw	DN 600-600	ASTM A182-F316
BNLF	Branch fitting flgd	DN 40-350	ASTM A182-F316
BR3B	Branch outlet bw	DN 400-500	ASTM A182-F316
BR6B	Branch outlet bw	DN 600-600	ASTM A182-F316
BR0B	Branch outlet bw	DN 400-600	ASTM A182-F316
BRSB	Branch outlet bw	DN 150-350	ASTM A182-F316
RECB	Reducer concentric bw	DN 20-150	ASTM A403-WP316L
RECB	Reducer concentric bw	DN 200-600	ASTM A403 Class WP-S/WX-316L
REEB	Reducer eccentric bw	DN 20-150	ASTM A403-WP316L
REEB	Reducer eccentric bw	DN 200-600	ASTM A403 Class WP-S/WX-316L
TERB	Tee reducing bw	DN 20-600	ASTM A403-WP316L

Valves

BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM A182-F316(L) Trim: AISI 316(L), filled PTFE
BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM A182-F316(L) Trim: AISI 316(L), filled PTFE
BNFF	Ball valve trunn FB n-ext flgd	DN 50-600	Body: ASTM A182-F316(L)/A351-CF8M Trim: AISI 316(L), filled PTFE
BNRF	Ball valve trunn RB n-ext flgd	DN 80-600	Body: ASTM A182-F316(L)/A351-CF8M Trim: AISI 316(L), filled PTFE
BTFF	Ball valve trunn FB flgd	DN 50-600	Body: ASTM A182-F316(L)/A351-CF8M Trim: AISI 316(L), filled PTFE
BTRF	Ball valve trunn RB flgd	DN 80-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A351-CF8M Trim: AISI 316(L), Nitronic, Stellite
BVFF	Ball valve float FB n-ext flgd	DN 15-40	Body: ASTM A182-F316(L) Trim: AISI 316(L), filled PTFE
BVRF	Ball valve float RB n-ext flgd	DN 15-50	Body: ASTM A182-F316(L) Trim: AISI 316(L), filled PTFE
CHDF	Check valve dual plate solid wafer lug/flgd	DN 50-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), Stellite
CHVF	Check valve flgd	DN 15-50	Body: ASTM A182-F316(L) Trim: AISI 316(L), Stellite
CHVF	Check valve flgd	DN 80-600	Body: ASTM A182-F316(L)/A351-CF8M Trim: AISI 316(L), Stellite
GANF	Gate valve n-ext flgd	DN 15-50	Body: ASTM A182-F316(L) Trim: AISI 316(L), Stellite
GANF	Gate valve n-ext flgd	DN 80-600	Body: ASTM A182-F316(L)/A351-CF8M Trim: AISI 316(L), Stellite
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A182-F316(L) Trim: AISI 316(L), Stellite
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A182-F316(L)/A351-CF8M Trim: AISI 316(L), Stellite
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A182-F316(L) Trim: AISI 316(L), Stellite
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A182-F316(L)/A351-CF8M Trim: AISI 316(L), Stellite
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A182-F316(L) Trim: AISI 316 (L), PTFE
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A182-F316(L) Trim: AISI 316 (L), PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A182-F316(L) Trim: AISI 316 (L), Stellite

Instruments

TWND	Thermowell flgd DN 40	DN 40-40	ASTM B564 UNS N04400
TWNS	Thermowell flgd DN 40 L=230 mm	--	ASTM B564 UNS N04400
TWNL	Thermowell flgd DN 40 L=255 mm	--	ASTM B564 UNS N04400
TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	AISI 316, Graphite CS centring-/SS inner ring (G-10/11) with 316 SS CORE, PTFE SS Pres Enrg Spirl Spring
GKIK	Insulating Gasket kit	DN 15-50	
MTRR	Meterrun	DN 15-40	
ORFS	Orifice flange set	DN 50-600	Alloy 400/AISI 316 end flanges ASTM A182-F316
STBT	Studbolt with nuts	--	ASTM A193 GRADE B8M-CLASS 2/ASTM A194 GRADE 8M Coated with Xylan 1070 or Takecoat 1000

PIPING COMPONENTS

Item description	Nominal pipe size																			
	15 MESC	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600				
Pipe																				
Pipe	743633 0	181	261	331	491	571	651	731	831	941										
Pipe	743633 1										061	181								
Pipe	743634 0										741	941								
Pipe	743634 1										061	181	251	411	521	621	831			
Flanges																				
Blind flange	766510	4121	4141	4161	4181	4201	4221	4241	4261	4281	4301	4321	4341	4361	4381	4401	4421			
Spacer ring	768915	4581	4621	4661	4681	4701	4721	4741	4761	4781	4801	4821	4841	4861	4881	4901	4941			
Spade	768950	2921	2941	2961	2981	3001	3021	3041	3061	3081	3101	3121	3141	3161	3181	3201	3221			
Spectacle blind	768981	2081	2121	2161	2181	2201	2221	2241	2261	2281	2301	2321	2341							
Welding neck flange	766579			4061	4081	4101	4121	4141			3951		3971	3981						
Welding neck flange	766580	4021	4041						4161	4181	4201	4221		1071			1101			
Fittings																				
Cap bw	763319	2861	2961	3041	3241	3341	3541	3741	3961	4091	4211	4381	4501	4611	4711	4821	4911			
Elbow 45 deg LR bw	763337	2861	2961	3041	3241	3341	3541	3741	3961	4091	4211	4381	4511	4621	4701	4801	4921			
Elbow 90 deg LR bw	763341	2861	2961	3041	3241	3341	3541	3741	3961	4091	4211	4381	4511	4621	4701	4801	4921			
Tee equal bw	763384	7861	7961	8041	8241	8341	8541	8741	8961	9091	9211	9381	9511	9611	9721	9861	9941			

PIPING COMPONENTS

Item description	MESC	Nominal pipe size															
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
Valves																	
Ball valve float FB flgd	770325	8539	8549	8559	8579												
Ball valve float FB n-ext flgd	770327	8539	8549	8559	8579												
Ball valve float RB flgd	770325	3539	3549	3559	3579	3589											
Ball valve float RB n-ext flgd	770327	3539	3549	3559	3579	3589											
Ball valve trunn FB flgd	770373					5589	5609	5629	5649	5659	5669	5679	5689	5699	5709	5719	5739
Ball valve trunn FB n-ext flgd	770355					5589	5609	5629	5649	5659	5669	5679	5689	5699	5709	5719	5739
Ball valve trunn RB flgd	770373					0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739	
Ball valve trunn RB n-ext flgd	770355					0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739	
Butterfly valve triple of flgd	774426					0659	0669	0679	0689	0699	0709	0719	0739				
Check valve dual plate flgd	776813					0499	0019	0679	0689	0699	0709	0719	0739				
Check valve wafer lug (solid)	776856					0599	0609	0629	0649								
Check valve flgd	771319	0539	0549	0559	0579	0599	0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739
Gate valve flgd	772305	0539	0549	0559	0579	0599	3609	3629	3649	3659	3669	3679	3689	3699	3709	3719	3739
Gate valve n-ext flgd	772305	6539	6549	6559	6579	6599	6609	6629	6649	6659	6669	6679	6689	6699	6709	6719	6739
Globe valve flgd	773305	0539	0549	0559	0579	0599	0609	0629	0649	0659							
Valve DBBT	778556	8539	8549	8559	8579	8589											
Valve DBBF	778595	8539	8549	8559	8579	8589											
Miscellaneous																	
Gasket spiral wound	854136	4041	4061	4081	4121	4141	4181	3701	3741	3761	3781	3801	3821	3841	3861	3881	3921
Insulating Gasket Kit	854610					0541											
Meterrun	766496	0121	0141	0161	0181												
Orifice flange set	766592					4911	4931	4011	4371	4381	4391	4401	3841	3961	3861	3871	4001

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7633705661	7633725661	7633856181
25	x	15	7633705791	7633725791	7633856321
25	x	20	7633705891	7633725891	7633856371
40	x	15	7633705991	7633725991	
40	x	20	7633706191	7633726191	7633856491
40	x	25	7633706241	7633726241	7633856561
50	x	20	7636500901	7636630901	
50	x	25	7633706341	7633726341	7633856721
50	x	40	7633706441	7633726441	7633856831
80	x	40	7633706741	7633726741	
80	x	50	7633706841	7633726841	7633893521
100	x	40	7633706931	7633726931	
100	x	50	7633707041	7633727041	7633893681
100	x	80	7633707141	7633727141	7633893761
150	x	80	7633707491	7633727491	7633893851
150	x	100	7633707591	7633727591	7633893931
200	x	100	7633707661	7633727661	7633894011
200	x	150	7633707791	7633727791	7633894101
250	x	100	7636502581	7636632581	7633894171
250	x	150	7633707931	7633727931	7633894231
250	x	200	7633708091	7633728091	7633894281
300	x	150	7633708171	7633728171	7633894331
300	x	200	7633708301	7633728301	7633894381
300	x	250	7633708421	7633728421	7633894431
350	x	150	7636485101	7636655101	
350	x	200	7636485451	7636655451	7636865461
350	x	250	7636485791	7636655791	7633894601
350	x	300	7636486091	7636656091	7636866081

Thermowell flgd DN 50

<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

Thermowell flgd DN 40

<u>Length (mm)</u>	<u>MESC number</u>
230	7683375111
255	7683375121
305	7683375131
355	7683375141
405	7683375151
455	7683375161

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200	7636486441	7636656441		
400	x 250	7636486611	7636656611	7633894781	
400	x 300	7636486761	7636656761	7633894831	
400	x 350	7636487591	7636657601	7636866951	
450	x 250	7636487271	7636657141	7633894951	
450	x 300	7636487451	7636657341	7633895051	
450	x 350	7636487511	7633729071	7633895091	
450	x 400	7636487761	7636657741	7636867821	
500	x 300	7636488301	7636658341	7636868281	
500	x 350	7636488361	7636658441	7633895341	
500	x 400	7636488611	7636658751	7636868591	
500	x 450	7636488701	7633729381	7633895461	
600	x 300			7633895531	
600	x 350			7636869201	
600	x 400	7636489451	7636659451	7633895631	
600	x 450	7636489721	7636659741	7636869811	
600	x 500	7636489961	7636659941	7636869921	

<u>Comp.name</u>	<u>Description</u>
BN3F	Branch fitting flgd
BN3B	Branch fitting bw
BN6F	Branch fitting flgd
BN6B	Branch fitting bw
BNLF	Branch fitting flgd
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN6F	BNLF	BN3B	BN6B	BR3B	BR6B	BROB	BRSB
15	40	-	40		7680550791	7680316039					
15	50	-	50		7680550801	7680316059					
15	80	-	200		7680550811	7680316079					
15	250	-	350		7680550271						
15	250	-	500			7672604349					
15	400	-	500	7672325731							
15	600	-	600		7672327131		7672604639				
20	50	-	50		7680550841	7680316199					
20	80	-	100		7680550851	7680316209					
20	150	-	300		7680550861	7680316219					
20	350	-	350		7680550321						
20	350	-	500			7672604499					
20	400	-	500	7672325781							
20	600	-	600		7672327181		7672604689				
25	80	-	80		7680550891	7680316249					
25	100	-	100		7680550901	7680316259					
25	150	-	250		7680550911	7680316269					
25	300	-	350		7680550371						
25	300	-	500			7672604549					
25	400	-	500	7672325831							
25	600	-	600		7672327231		7672604719				
40	80	-	80		7680550941	7680316299					
40	100	-	100		7680550951	7680316309					
40	150	-	150		7680550961	7680316319					
40	200	-	300		7680550971	7680316339					
40	350	-	350		7680550411						
40	350	-	500			7680316359					
40	400	-	500	7680396171							
40	600	-	600		7672327291		7672604779				
50	150	-	150							7679696381	
50	200	-	250							7679696431	
50	300	-	350							7679696451	
50	400	-	450			7679703691					
50	500	-	500			7679510051					
50	600	-	600					7678533101			
80	200	-	200							7679696641	
80	250	-	250							7679696661	
80	300	-	350							7679696691	
80	400	-	500			7679703951					
80	600	-	600					7679719351			

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN6F	BNLF	BN3B	BN6B	BR3B	BR6B	BROB	BRSB
100	300	-	350					7679704181			7679696911
100	400	-	500								
100	600	-	600								
150	350	-	350								
150	400	-	400					7679704391			
150	450	-	450					7679704401			
150	500	-	500					7679704411			
150	600	-	600								7679698461
200	400	-	400								7679698471
200	450	-	450								7679681671
200	500	-	500								7679681681
200	600	-	600								7679698491
250	500	-	500								7679681741
250	600	-	600								7679698551

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	1/2	x	70	8138461559
20	4	5/8	x	80	8138462699
25	4	5/8	x	80	8138462699
40	4	3/4	x	100	8138463299
50	8	5/8	x	90	8138462719
80	8	3/4	x	110	8138463309
100	8	3/4	x	120	8138463329
150	12	3/4	x	130	8138463349
200	12	7/8	x	140	8138464049
250	16	1	x	160	8138464729
300	16	1 1/8	x	180	8138460129
350	20	1 1/8	x	180	8138460129
400	20	1 1/4	x	190	8138461279
450	24	1 1/4	x	200	8138460839
500	24	1 1/4	x	210	8138461719
600	24	1 1/2	x	240	8138461189

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	8	5/8	x	130	8138462789
80	8	3/4	x	140	8138463359
100	8	3/4	x	150	8138461589
150	12	3/4	x	150	8138461589
200	12	7/8	x	170	8138464099
250	16	1	x	190	8138460709
300	16	1 1/8	x	210	8138460159
350	20	1 1/8	x	220	8138460999
400	20	1 1/4	x	230	8138460589
450	24	1 1/4	x	250	8138461139
500	24	1 1/4	x	260	8138460599
600	24	1 1/2	x	290	8138461779

Coated boltset for Dual Plate Solid Lug Wafer Check Valve

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	8	5/8	x	150	8138462819
80	8	3/4	x	190	8138463439
100	8	3/4	x	200	8138461209
150	12	3/4	x	230	8138460509

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	1/2	x	80	8138461579
20	4	5/8	x	90	8138462719
25	4	5/8	x	130	8138462719
40	4	3/4	x	140	8138463359
40	4	3/4	x	110	8138463309
50	8	5/8	x	110	8138462749
80	8	3/4	x	130	8138463349
100	8	3/4	x	140	8138463359
150	12	3/4	x	150	8138461589
200	12	7/8	x	170	8138464099
250	16	1	x	190	8138460709
300	16	1 1/8	x	210	8138460159
350	20	1 1/8	x	220	8138460999
400	20	1 1/4	x	240	8138460849
450	24	1 1/4	x	250	8138461139
500	24	1 1/4	x	260	8138460599
600	24	1 1/2	x	300	8138461489

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	5/8	x	130	8138462789
20	4	5/8	x	130	8138462789
25	4	5/8	x	130	8138462789
40	4	3/4	x	140	8138463359

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7665104121
Welding neck flange	1	7665804021
Gasket spiral wound	1	8541364041
Studbolt with nuts	4	8138461559

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7665104141
Gasket spiral wound	1	8541364061
Studbolt with nuts	4	8138462699

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7665104141
Welding neck flange	1	7665804041
Gasket spiral wound	1	8541364061
Studbolt with nuts	4	8138462699

Drain or vent point DN 25 Fig.H DN80 - 600

Branch: branch nipple flanged

Blind flange	1	7665104161
Gasket spiral wound	1	8541364081
Studbolt with nuts	4	8138462699

Temp instr conn DN 40 Fig.NL DN150 - 500

Branch: branch nipple flanged

Lap joint flange	1	7665205181
Gasket spiral wound	1	8541364121
Thermowell flgd DN 40 L=255 mm	1	7683375121
Studbolt with nuts	4	8138463309

Temp instr conn DN 40 Fig.NS DN80 - 100

Branch: branch nipple flanged

Lap joint flange	1	7665205181
Gasket spiral wound	1	8541364121
Thermowell flgd DN 40 L=230 mm	1	7683375111
Studbolt with nuts	4	8138463309

Temp instr conn DN 50 Fig.HL DN600 - 600

Branch: according to branch table

Lap joint flange	1	7665205201
Pipe	1	7436330571
Welding neck flange	1	7665794101
Gasket spiral wound	1	8541364141
Thermowell flgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	8	8138462749

CLASS 033842-X

Design limits**Temperature (°C)**

-29	0	50	75	100	125	150
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Pressure (Barg)	/FV
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DN 15-600	51.7	51.7	51.7	51.2	49.7	48.3	45.9
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 2.8 and ASME B31.3 allowable internal pressure.
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class range DN 15 [NPS 1/2] up to / incl DN 600 [NPS 24] design meets full vacuum at ambient condition
For DN 700 [NPS 28] & Above, if vacuum condition can occur, piping to be designed accordingly
- Min./Max. temperature of piping class and min./max. specified application temperature of plug valve lubricant have been aligned.
- Where two options are given for pipe, welded pipe is normally the most economic choice
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Alternate super duplex material grade UNS S32750 may be used. Design limits have been verified with ASME B31.3.
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Select plug valves where service is loaded with mildly abrasive particles.
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**

Table of schedules

DN	Schedule
15	40S
20	40S
25	10S
40	10S
50	10S
80	10S
100	10S
150	10S
200	10S
250	40S
300	40S
350	40S
400	40S
450	20S
500	40S
600	80S
700	20S

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700
700	C	C	C	C	E	E	E	E	E	E	E	E	B	B	B	B	A
600	C	C	C	C	E	E	E	E	E	E	E	B	B	B	B	B	A
500	C	C	C	C	E	E	E	E	E	E	E	B	B	B	B	B	A
450	C	C	C	C	E	E	E	E	E	B	B	B	B	B	B	B	A
400	C	C	C	C	E	E	E	E	E	B	B	B	B	B	B	B	A
350	C	C	C	C	E	E	E	E	E	B	B	B	B	B	B	B	A
300	C	C	C	C	E	E	E	E	B	B	B	B	B	B	B	B	A
250	C	C	C	C	E	E	B	B	B	B	B	B	B	B	B	B	A
200	C	C	C	C	E	E	B	B	B	B	B	B	B	B	B	B	A
150	C	C	C	C	E	B	B	B	B	A							
100	C	C	C	C	B	B	B	B	A								
80	C	C	C	C	B	A											
50	C	C	B	B	A												
40	C	B	B	A													
25	B	B	A														
20	B	A															
15	A																

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
C	Branch fitting
E	Branch outlet

Super Duplex SS steel Sour
 Class no. 033842-X
 ASME rating CLASS 300
 Corrosion allowance 0 mm
 Revision letter
 Revision date

Plant
 Consignee
 Engineered by
 Principal
 Contr. job no.
 Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-100	ASTM A790 UNS S32760
PIPE	Pipe	DN 150- 700	ASTM A790/A928 cl 1UNS S32760

Flanges

BLFL	Blind flange	DN 15- 700	ASTM A182-F55
LJFL	Lap joint flange	--	ASTM A182-F55
SBNF	Spectacle blind	DN 15-350	ASTM A240 UNS S32760
SPNF	Spade	DN 15- 700	ASTM A240 UNS S32760
SRNF	Spacer ring	DN 15- 700	ASTM A240 UNS S32760
WNFL	Welding neck flange	DN 15- 700	ASTM A182-F55

Fittings

CAPB	Cap bw	DN 15-600	ASTM A815 WP-S UNS S32760
CAPB	Cap bw	DN 700	ASTM A815 WP-S/WX UNS S32760
E45B	Elbow 45 deg LR bw	DN 15-100	ASTM A815 WP-S UNS S32760
E45B	Elbow 45 deg LR bw	DN 150- 700	ASTM A815 WP-S/WX UNS S32760
E90B	Elbow 90 deg LR bw	DN 15-100	ASTM A815 WP-S UNS S32760
E90B	Elbow 90 deg LR bw	DN 150- 700	ASTM A815 WP-S/WX UNS S32760
TEEB	Tee equal bw	DN 15-600	ASTM A815 WP-S UNS S32760
TEEB	Tee equal bw	DN 700	ASTM A815 WP-S/WX UNS S32760

Reducing fittings

BN3B	Branch fitting bw	DN 40-700	ASTM A182-F55
BNLF	Branch fitting flgd	DN 40-700	ASTM A182-F55
BROB	Branch outlet bw	DN 400-700	ASTM A182-F55
BRSB	Branch outlet bw	DN 150-700	ASTM A182-F55
RECB	Reducer concentric bw	DN 150-700	ASTM A815 WP-S/WX UNS S32760
RECB	Reducer concentric bw	DN 20-100	ASTM A815 WP-S UNS S32760
REEB	Reducer eccentric bw	DN 150-700	ASTM A815 WP-S/WX UNS S32760
REEB	Reducer eccentric bw	DN 20-100	ASTM A815 WP-S UNS S32760
TERB	Tee reducing bw	DN 20-600	ASTM A815 WP-S UNS S32760
TERB	Tee reducing bw	DN 600-700	ASTM A815 WP-S/WX UNS S32760

Valves

BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM A182-F55 Trim: Super Duplex, filled PTFE
BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM A182-F55 Trim: Super Duplex, filled PTFE
BTFF	Ball valve trunn FB flgd	DN 50- 700	Body: ASTM A182-F55/A995-6A Trim: Super Duplex, filled PTFE
BTRF	Ball valve trunn RB flgd	DN 80- 700	Body: ASTM A182-F55/A995-6A Trim: Super Duplex, filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200- 700	Body: ASTM A182-F33/F55 / ASTM A995-6A Trim: Super Duplex, Alloy 625, Stellite
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50- 700	Body: ASTM A182-F55/ ASTM A995-6A Trim: Super Duplex
CHVF	Check valve flgd	DN 15-50	Body: ASTM A182-F53/55 Trim: Super Duplex
CHVF	Check valve flgd	DN 80-600	Body: ASTM A182-F55/A995-6A Trim: Super Duplex
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A182-F53/55 Trim: Super Duplex
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A182-F55/A995-6A Trim: Super Duplex
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A182-F53/55 Trim: Super Duplex
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A182-F55/A995-6A Trim: Super Duplex
DBBT	Valve ass double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A182 F55 Trim: UNS S32760, PTFE
DBBF	Valve ass double block ball & bleed flgd	DN 15-50	Body: ASTM A182 F55 Trim: UNS S32760, PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A182 F55 Trim: UNS S32760,Stellite
PLLR	Plug valve flgd lub.inv.regul	DN 150-250	Body: ASTM A182-F55/A995-6A Trim: Super Duplex, ENP
PLLS	Plug valve flgd lub.inv.short	DN 15-100	Body: ASTM A182-F55/A995-6A Trim: Super Duplex, ENP
PLLV	Plug valve flgd lub.inv.ventur	DN 300-600	Body: ASTM A182-F55/A995-6A Trim: Super Duplex, ENP

Instruments

TWND	Thermowell flgd DN 40	DN 40-400	ASTM A182-F55
TWNS	Thermowell flgd DN 40 L=230 mm	--	ASTM A182-F55
TWNL	Thermowell flgd DN 40 L=255 mm	--	ASTM A182-F55

Miscellaneous

GKMA	Gasket camprofile or approved equal	DN 700-700	6Mo, Graphite SS centring ring
GKSW	Gasket spiral wound	DN 15-600	6Mo, Graphite CS centring ring/6Mo inner ring
GKIK	Insulating Gasket kit	DN 15-600	(G-10/11) with 316 SS CORE, PTFE SS Pres Enrg Spirl Spring
MTRR	Meterrun	DN 15-40	ASTM A182-F55/A790 UNS S32760
ORFS	Orifice flange set	DN 50-600	ASTM A182-F55
STBT	Studbolt with nuts	---	ASTM A193-B7M/A194-2HM Coated with Xylan 1070 or Takecoat 1000
STYB	Strainer Y-type	DN 50-400	Sieve: Super Duplex UNS S32760

Special Fittings

AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-1)	DN 50	BODY: ASTM A182-F55 VALVE & INTERNALS: Super Duplex
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-1)	DN 50	BODY: ASTM A182-F55 VALVE & INTERNALS: Super Duplex

Notes for Special Fittings

1. Retrievable Tee Type With Solid Plug Assembly, Heavy SS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	Nominal pipe size																	
	15 MESC	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	
Pipe																		
Pipe	743662 0	361	461	541	741	841												
Pipe	743662 1						041	241	431	531	661	821	981					
Pipe	743662 2																	
Flanges																		
Blind flange	766615	0421	0441	0461	0481	0501	0521	0541	0561	0581	0601	0621	0641	0661	0681	0701	0721	0739
Spacer ring	768914	7921	7941	7961	7981	8001	8021	8041	8061	8081	8101	8121	8141	8161	8181	8201	8221	8239
Spade	768952	0421	0441	0461	0481	0501	0521	0541	0561	0581	0601	0621	0641	0661	0681	0701	0721	0739
Spectacle blind	768985	0421	0441	0461	0481	0501	0521	0541	0561	0581	0601	0621	0641	0661	0681	0701	0721	0739
Welding neck flange	766632	2341	2361	2061	2081	2101	2121	2141	2161	2181	2201	2221	2241	2261	2021	2031	1991	2009
Fittings																		
Cap bw	763608	0361	0461	0541	0741	0841	1041	1241	1431	1531	1661	1821	1981	2131	2301	2451	2631	2649
Elbow 45 deg LR bw	763617	0361	0461	0541	0741	0841	1041	1241	1431	1531	1661	1821	1981	2131	2301	2451	2631	2649
Elbow 90 deg LR bw	763627	0361	0461	0541	0741	0841	1041	1241	1431	1531	1661	1821	1981	2131	2301	2451	2631	2649
Tee equal bw	763675	0361	0461	0541	0741	0841	1041	1241	1431	1531	1661	1821	1981	2131	2301	2451	2631	2649

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																	
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	
Valves																			
Ball valve float FB flgd	770545	8539	8549	8559	8579														
Ball valve float RB flgd	770545	3539	3549	3559	3579	3589													
Ball valve trunn FB flgd	770537					5589	5609	5629	5649	5659	5669	5679	5689	5699	5709	5719	5739	5759	
Ball valve trunn RB flgd	770537						0609	0629	0649	0659	0669	0679	0689	0699	0709	0719	0739	0759	
Butterfly valve triple of flgd	774471									3659	3669	3679	3689	3699	3709	3719	3739	3759	
Check valve dual plate flgd	776809									0439	0019	3679	3689	3699	3709	3719	3739	3759	
Check Valve Wafer Lug (Solid)	776839	3539	3549	3559	3579	0599	3609	3629	3649										
Check valve flgd	771342	3539	3549	3559	3579	0599	3609	3629	3649	3659	3669	3679	3689	3699	3709	3719	3739		
Gate valve flgd	772345	0539	0549	0559	0579	0599	6609	6629	6649	6659	6669	6679	6689	6699	6709	6719	6739		
Globe valve flgd	773343	0539	0549	0559	0579	0599	6609	6629	6649	6659	6669	6679	6689	6699	6709	6719	6739		
Plug valve flgd lub.inv.regul	777108									0649	0659	0669							
Plug valve flgd lub.inv.short	777108	0539	0549	0559	0579	0589	0609	0629											
Plug valve flgd lub.inv.ventur	777108												0679	0689	0699	0709	0719	0739	
Valve DBBT	778553	8539	8549	8559	8579	5589													
Valve DBBF	778548	8539	8549	8559	8579	5589													
Miscellaneous																			
Gasket camprofile	854158															0949			
Gasket spiral wound	854158	1041	1061	1081	1121	1141	1181	0701	0741	0761	0781	0801	0821	0841	0861	0881	0921		
Insulating Gasket Kit	854610					0541		0841	1021	1201					2321		2769		
Meterrun	766596	8531	8551	8571	8591														
Orifice flange set	766691					0811	0831	0011	0021	0031	0041	0051	0071	0091	0211	0231	0331		
Strainer Y-type	768322							0139	0149	0159									

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7636440031	7636590031	7636930031
25	x	15	7636440251	7636590251	7636930251
25	x	20	7636440411	7636590411	7636930411
40	x	15	7636440571	7636590571	
40	x	20	7636440751	7636590751	7636930751
40	x	25	7636440861	7636590861	7636930861
50	x	20	7636441071	7636591071	
50	x	25	7636441201	7636591201	7636931201
50	x	40	7636441361	7636591361	7636931361
80	x	40	7636441521	7636591521	
80	x	50	7636441701	7636591701	7636931701
100	x	40	7636441861	7636591861	
100	x	50	7636442051	7636592051	7636932051
100	x	80	7636442241	7636592241	7636932241
150	x	80	7636442431	7636592431	7636932431
150	x	100	7636442601	7636592601	7636932601
200	x	100	7636442801	7636592801	7636932801
200	x	150	7636443041	7636593041	7636933041
250	x	100	7636443241	7636593241	7636933281
250	x	150	7636443511	7636593511	7636933511
250	x	200	7636443741	7636593741	7636933741
300	x	150	7636444091	7636594091	7636934091
300	x	200	7636444361	7636594361	7636934361
300	x	250	7636444701	7636594701	7636934701
350	x	150	7636445041	7636595041	
350	x	200	7636445301	7636595301	7636935301
350	x	250	7636445631	7636595631	7636935631
350	x	300	7636445961	7636595961	7636935961

Thermowell flagd DN 40	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683378211
255	7683378221
305	7683378231
355	7683378241
405	7683378251
455	7683378261

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200	7636446311	7636596311		
400	x 250	7636446481	7636596481	7636936481	
400	x 300	7636446651	7636596651	7636936651	
400	x 350	7636446821	7636596821	7636936821	
450	x 250	7636447261	7636597261	7636937261	
450	x 300	7636447431	7636597431	7636937431	
450	x 350	7636447601	7636597601	7636937601	
450	x 400	7636447771	7636597771	7636937771	
500	x 300	7636448281	7636598281	7636938281	
500	x 350	7636448451	7636598451	7636938451	
500	x 400	7636448621	7636598621	7636938621	
500	x 450	7636448661	7636598661	7636938661	
600	x 300			7636939151	
600	x 350			7636939331	
600	x 400	7636449531	7636599531	7636939531	
600	x 450	7636449731	7636599731	7636939731	
600	x 500	7636449921	7636599921	7636939921	
700	x 600	7636449939	7636599939	7636939939	

<u>Comp.name</u>	<u>Description</u>
BN3P	Branch fitting plain
BNLF	Branch fitting fgfd
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BNLF	BN3B	BROB	BRSB
15	40	-	40	7680557791	7680322629	
15	50	-	50	7680557801	7680322639	
15	80	-	200	7680557811	7680322649	
15	250	-	700	7680557831	7672654349	
20	50	-	50	7680557841	7680322669	
20	80	-	100	7680557851	7680322679	
20	150	-	300	7680557861	7680322689	
20	350	-	700	7680557881	7672654499	
25	80	-	80	7680557891	7680322719	
25	100	-	100	7680557901	7680322729	
25	150	-	250	7680557911	7680322739	
25	300	-	700	7680557931	7672654549	
40	80	-	80	7680557941	7680322769	
40	100	-	100	7680557951	7680322779	
40	150	-	150	7680557961	7680322789	
40	200	-	300	7680557971	7680322799	
40	350	-	600	7680557991	7680322809	
40	700	-	700	7680558009	7680322819	
50	150	-	150		7679795091	
50	200	-	250		7679795041	
50	300	-	450		7679795051	
50	500	-	700		7679795111	
80	200	-	200		7679795151	
80	250	-	250		7679795141	
80	300	-	350		7679795161	
80	400	-	500		7679795171	
80	600	-	600		7679795181	
80	700	-	700		7679795109	

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BNLF	BN3B	BROB	BRSB
100	300	-	350			7679795221
100	400	-	500			7679795231
100	600	-	600			7679795241
150	350	-	350			7679795251
150	400	-	400			7679795271
150	450	-	450			7679795281
150	500	-	500			7679795291
150	600	-	600			7679795301
200	400	-	400			7679794581
200	450	-	450			7679793401
200	500	-	500			7679793411
200	600	-	600			7679793001
250	500	-	500			7679793451
250	600	-	600			7679793061

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138170259
20	4	5/8	x 80	8138170739
25	4	5/8	x 80	8138170739
40	4	3/4	x 100	8138171419
50	8	5/8	x 90	8138170759
80	8	3/4	x 110	8138171439
100	8	3/4	x 120	8138171459
150	12	3/4	x 130	8138171479
200	12	7/8	x 140	8138172209
250	16	1	x 160	8138173039
300	16	1 1/8	x 180	8138173909
350	20	1 1/8	x 180	8138173909
400	20	1 1/4	x 190	8138174729
450	24	1 1/4	x 200	8138174749
500	24	1 1/4	x 210	8138174769
600	24	1 1/2	x 240	8138176319
700	28	1 5/8	x 280	8138177069

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138170839
80	8	3/4	x 140	8138171499
100	8	3/4	x 150	8138171519
150	12	3/4	x 150	8138171519
200	12	7/8	x 170	8138172269
250	16	1	x 190	8138173099
300	16	1 1/8	x 210	8138173969
350	20	1 1/8	x 220	8138173989
400	20	1 1/4	x 230	8138174809
450	24	1 1/4	x 250	8138174849
500	24	1 1/4	x 260	8138174869
600	24	1 1/2	x 290	8138176419

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 150	8138170879
80	8	3/4	x 190	8138171599
100	8	3/4	x 200	8138171619
150	12	3/4	x 230	8138171679

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	5/8	x 130	8138170839
20	4	5/8	x 130	8138170839
25	4	5/8	x 130	8138170839
40	4	3/4	x 140	8138171499

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 80	8138170279
20	4	5/8	x 90	8138170759
25	4	5/8	x 90	8138170759
40	4	3/4	x 110	8138171439
50	8	5/8	x 110	8138170799
80	8	3/4	x 130	8138171479
100	8	3/4	x 140	8138171499
150	12	3/4	x 150	8138171519
200	12	7/8	x 170	8138172269
250	16	1	x 190	8138173099
300	16	1 1/8	x 210	8138173969
350	20	1 1/8	x 220	8138173989
400	20	1 1/4	x 240	8138174829
450	24	1 1/4	x 250	8138174849
500	24	1 1/4	x 260	8138174869
600	24	1 1/2	x 300	8138176439
700	28	1 5/8	x 350	8138177209

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Gasket spiral wound	1	8541581041
Blind flange	1	7666150421
Welding neck flange	1	7666322341
Studbolt with nuts	4	8138170259

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Gasket spiral wound	1	8541581061
Blind flange	1	7666150441
Studbolt with nuts	4	8138170739

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Gasket spiral wound	1	8541581061
Blind flange	1	7666150441
Welding neck flange	1	7666322361
Studbolt with nuts	4	8138170739

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Gasket spiral wound	1	8541581081
Blind flange	1	7666150461
Studbolt with nuts	4	8138170739

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Gasket spiral wound	1	8541581121
Blind flange	1	7666150481
Studbolt with nuts	4	8138171419

Temp instr conn DN 40 Fig.NS DN80 - 100

Branch: branch nipple flanged

Gasket spiral wound	1	8541581121
Lap joint flange	1	7665218981
Thermowell fgd DN 40 L=230 mm	1	7683378219
Studbolt with nuts	4	8138170799

Temp instr conn DN 40 Fig.NL DN150 - 600

Branch: branch nipple flanged

Gasket spiral wound	1	8541581121
Lap joint flange	1	7665218981
Thermowell fgd DN 40 L=255 mm	1	7683378221
Studbolt with nuts	4	8138170799

CLASS 036620-X

Design limits**Temperature (°C)**

-50	0	50	75	100	125	150
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Pressure (Barg)

DN 15-100	51.7	51.7	51.7	51.6	51.5	50.9	50.3
DN 150-1000	51.1	51.1	50.1	48.3	46.6	45.8	45.1

Notes

- DN 15-100 [NPS 1/2 - 6]: Design limits acc. to ASME B16.5 flange rating mat. grp 3.8
- DN 150-1000 [NPS 8 - 24]: Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class contains a combination of solid and carbon steel with clad material
- **Piping class range DN 15 [NPS 1/2] up to / incl DN 600 [NPS 24] design meets full vacuum at ambient condition**
For DN 700 [NPS 28] & Above, if vacuum condition can occur, piping to be designed accordingly.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- **Piping wall thicknesses shall be validated over and above specified wall thicknesses, in case cladding/ weld overlay is not practical by approved cladding/ weld overlay vendors.**
- Welding branches on Alloy 825 cladded pipes shall be prefabricated by cladding vendor.
- Socket welding connection is not permitted. Threaded connection only allowed for instrumentation/ piping hook up connection in line with approved project specification or SHELL DEP as applicable.
- Solid Alloy825 reducing fittings (i.e. TERB, REEB, RECB) shall be used for all possible sizes e.g. 10"x4", 8"x4", 6"x4", 6"x3" wherever transition between solid versus cladded CRA fitting is required. The thickness of large end shall meet the main run pipe and smaller end with solid CRA thickness.

Table of schedules

Alloy 825		Cladded Base Material LTCS	
DN	Schedule	DN	Schedule
15	40S	150	40
20	40S	200	20
25	10S	250	20
40	10S	300	30
50	10S	350	30
80	10S	400	30
100	10S	450	30
		500	30
		600	30
		700	30
		750	30
		900	HOLD-7
		1000	HOLD-7

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000
1000	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
900	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
750	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
700	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
600	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
500	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
450	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
400	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
350	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
300	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
250	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
200	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
150	-	-	-	-	E	E	E	E	E	E	E	E	E	E	B	B	B	B	A	
100	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	B	B	B	A	
80	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	B	B	B	A	
50	C	C	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A	
40	C	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A	
25	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A	
20	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
15	A																			

Code | Explanation of characters

-	Not applicable
A	Equal tee BW
B	Reducing tee BW
C	Branch fitting
E	Branch outlet

Alloy 825 LT Sour		Plant
Class no.	036620-X	Consignee
ASME rating	CLASS 300	Engineered by
Corrosion allowance	0 mm	Principal
Revision letter		Contr. job no.
Revision date		Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-100	ASTM B423 UNS N08825
PIPE	Pipe	DN 150-600	ASTM A333-6 + Clad UNS N08825
PIPE	Pipe	DN 700-1000	A671-CC65 cl 22 + Clad UNS N08825

Flanges

BLFL	Blind flange	DN 15-100	ASTM B564 UNS N08825
BLFL	Blind flange	DN 150-1000	ASTM A350-LF2 cl 1 + Clad UNS N08825
LJFL	Lap joint flange	--	ASTM B564 UNS N08825
SBNF	Spectacle blind	DN 15-350	ASTM B424 UNS N08825
SPNF	Spade	DN 15-1000	ASTM B424 UNS N08825
SRNF	Spacer ring	DN 15-1000	ASTM B424 UNS N08825
WNFL	Welding neck flange	DN 15-100	ASTM B564 UNS N08825
WNFL	Welding neck flange	DN 150-1000	ASTM A350-LF2 cl 1 + Clad UNS N08825

Fittings

CAPB	Cap bw	DN 15-100	ASTM B366-WPNICMC
CAPB	Cap bw	DN 150-600	ASTM A420-WPL6 + Clad UNS N08825
CAPB	Cap bw	DN 700-1000	ASTM A420-WPL6W+ Clad UNS N08825
E45B	Elbow 45 deg LR bw	DN 15-100	ASTM B366-WPNICMC
E45B	Elbow 45 deg LR bw	DN 150-600	ASTM A420-WPL6 + Clad UNS N08825
E45B	Elbow 45 deg LR bw	DN 700-1000	ASTM A420-WPL6W- Clad UNS N08825
E90B	Elbow 90 deg LR bw	DN 15-100	ASTM B366-WPNICMC
E90B	Elbow 90 deg LR bw	DN 150-600	ASTM A420-WPL6 + Clad UNS N08825
E90B	Elbow 90 deg LR bw	DN 700-1000	ASTM A420-WPL6W+ Clad UNS N08825
TEEB	Tee equal bw	DN 15-100	ASTM B366-WPNICMC
TEEB	Tee equal bw	DN 150-600	ASTM A420-WPL6 + Clad UNS N08825
TEEB	Tee equal bw	DN 700-1000	ASTM A420-WPL6W+ Clad UNS N08825

Reducing fittings

BN3B	Branch fitting bw	DN 40-100	ASTM B564 UNS N08825
BNLF	Branch fitting fgd	DN 40-100	ASTM B564 UNS N08825
BR3B	Branch outlet bw	DN 450-500	ASTM B564 UNS N08825
BR6B	Branch outlet bw	DN 600-600	ASTM B564 UNS N08825
BROB	Branch outlet bw	DN 400-1000	ASTM A350-LF2 cl 1 + Clad UNS N08825
BROB	Branch outlet bw	DN 600-600	ASTM B564 UNS N08825
BRSB	Branch outlet bw	DN 100-400	ASTM B564 UNS N08825
RECB	Reducer concentric bw	DN 20-350	ASTM B366-WPNICMC
RECB	Reducer concentric bw	DN 250-600	ASTM A420-WPL6 + Clad UNS N08825
RECB	Reducer concentric bw	DN 650-1000	ASTM A420-WPL6W + Clad UNS N08825
REEB	Reducer eccentric bw	DN 20-350	ASTM B366-WPNICMC
REEB	Reducer eccentric bw	DN 250-600	ASTM A420-WPL6 + Clad UNS N08825
REEB	Reducer eccentric bw	DN 650-1000	ASTM A420-WPL6W + Clad UNS N08825
TERB	Tee reducing bw	DN 20-300	ASTM B366-WPNICMC
TERB	Tee reducing bw	DN 250-600	ASTM A420-WPL6 + Clad UNS N08825
TERB	Tee reducing bw	DN 650-1000	ASTM A420-WPL6W + Clad UNS N08825

Valves

BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM B564 UNS N08825/A494-CU5MCUC Trim: Alloy 825, filled PTFE
BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM B564 UNS N08825/A494-CU5MCUC Trim: Alloy 825, filled PTFE
BTFF	Ball valve trunn FB flgd	DN 150- 1000	Body: ASTM A350-LF2 cl 1/A352-LCC + Clad UNS N08825 Trim: Alloy 825, filled PTFE
BTFF	Ball valve trunn FB flgd	DN 50-100	Body: ASTM B564 UNS N08825/A494-CU5MCUC Trim: Alloy 825, filled PTFE
BTRF	Ball valve trunn RB flgd	DN 150- 1000	Body: ASTM A350-LF2 cl 1/A352-LCC + Clad UNS N08825 Trim: Alloy 825, filled PTFE
BTRF	Ball valve trunn RB flgd	DN 80-100	Body: ASTM B564 UNS N08825/A494-CU5MCUC Trim: Alloy 825, filled PTFE
BUTF	Butterfly valve triple of flgd	DN 150- 1000	Body: ASTM A350-LF2 cl 1/A352-LCC + Clad UNS N08825 Trim: Alloy 825
CHDF	Check valve dual plate Solid Wafer lug	DN 50-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite 6
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 150- 1000	Body: ASTM A352-LCC + Clad UNS N08825 Trim: Alloy 825, Stellite 6
CHVF	Check valve flgd	DN 15-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825
CHVF	Check valve flgd	DN 150- 1000	Body: ASTM A350-LF2 cl 1/A352-LCC + Clad UNS N08825 Trim: Alloy 825
CHVF	Check valve flgd	DN 80-100	Body: ASTM B564 UNS N08825/A494-CU5MCUC Trim: Alloy 825
GAVF	Gate valve flgd	DN 150- 1000	Body: ASTM A350-LF2 cl 1/A352-LCC + Clad UNS N08825 Trim: Alloy 825
GAVF	Gate valve flgd	DN 50-50	Body: ASTM B564 UNS N08825 Trim: Alloy 825
GAVF	Gate valve flgd	DN 80-100	Body: ASTM B564 UNS N08825/A494-CU5MCUC Trim: Alloy 825
GLVF	Globe valve flgd	DN 15-50	Body: ASTM B564 UNS N08825 Trim: Alloy 825
GLVF	Globe valve flgd	DN 150- 250	Body: ASTM A350-LF2 cl 1/A352-LCC + Clad UNS N08825 Trim: Alloy 825
GLVF	Globe valve flgd	DN 80-100	Body: ASTM B564 UNS N08825/A494-CU5MCUC Trim: Alloy 825
DBBT	Valve ass double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM B564 UNS N08825 Trim: Alloy 825,PTFE
DBBF	Valve ass double block ball & bleed flgd	DN 15-50	Body: ASTM B564 UNS N08825 Trim: Alloy 825,PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM B564 UNS N08825 Trim: Alloy 825, Stellite

Instruments

TWND	Thermowell fgd DN 40	DN 40-40	ASTM B564 UNS N08825
TWNS	Thermowell fgd DN 40 L=230 mm	--	ASTM B564 UNS N08825
TWNL	Thermowell fgd DN 40 L=255 mm	--	ASTM B564 UNS N08825
TWHD	Thermowell fgd DN 50	DN 50-50	ASTM B564 UNS N08825
TWHS	Thermowell fgd DN 50 L=230 mm	--	ASTM B564 UNS N08825
TWHL	Thermowell fgd DN 50 L=255 mm	--	ASTM B564 UNS N08825

Miscellaneous

GKSW	Gasket spiral wound	DN 15-1000	Alloy 825, Graphite CS centring ring/Alloy 825 inner ring
GKMA	Gasket camprofile or approved equal	DN 700-1000	Alloy 825, Graphite SS centring ring
GKIK	Insulating Gasket kit	DN 15-1000	(G-10/11) with 316 SS CORE, PTFE SS Pres Enrg Spirl Spring
MTRR	Meterrun	DN 15-40	Alloy 825
ORFS	Orifice flange set	DN 50-600	ASTM B564 UNS N08825
STBT	Studbolt with nuts	--	ASTM A320-L7M/A194-7M (Coated with Xylan 1070 or Takecoat 1000)
STYB	Strainer Y-type	DN 50-400	Sieve: Alloy 825

Special Fittings

AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-1)	DN 50	BODY: ALLOY 825 VALVE & INTERNALS: ALLOY 825
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-1)	DN 50	BODY: ALLOY 825 VALVE & INTERNALS: ALLOY 825

Notes for Special Fittings

1. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	Nominal pipe size		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000
	MESC																					
Pipe																						
Pipe	747861	0	181	261	331	491	571	651	751													
Pipe	749100	0								851												
Pipe	749100	1									041	281	551	841								
Pipe	749100	2																				
Pipe	749100	3																				
Pipe	749101																		101			
Flanges																						
Blind flange	766000	0191	0201	0211	0221	0231	0241	0251														
Blind flange	769127																					
Blind flange	769126																					
Spacer ring	768926	8201	8211	8221	8231	8241	8251	8261	8271	8281	8291	8301	8311	8321	8331	8341	8351	0359	0369	0379	0389	
Spade	768958	0201	0211	0221	0231	0241	0251	0261	0271	0281	0291	0301	0311	0321	0331	0341	0351	0869	0879	0369	0379	
Spectacle blind	768996	0201	0211	0221	0231	0241	0251	0261	0271	0281	0291	0301	0311									
Welding neck flange	766078	2091	2101	1901	1921	1931	1951	1971														
Welding neck flange	769140																					
Welding neck flange	769139																		2169	2179	2189	2199
Fittings																						
Cap bw	762817	0361	0461	0541	0741	0841	1041	1241														
Cap bw	769112																					
Cap bw	769113																		3209	3309	3409	3509
Elbow 45 deg LR bw	762837	0361	0461	0541	0741	0841	1041	1241														
Elbow 45 deg LR bw	769117																					
Elbow 45 deg LR bw	769118																		3209	3309	3409	3509
Elbow 90 deg LR bw	762842	0361	0461	0541	0741	0841	1041	1241														
Elbow 90 deg LR bw	769122																					
Elbow 90 deg LR bw	769123																		3209	3309	3409	3509
Tee equal bw	762887	0361	0461	0541	0741	0841	1041	1241														
Tee equal bw	769183																					
Tee equal bw	769184																		3209	3309	3409	3509

PIPING COMPONENTS	Nominal pipe size MESC	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	700	750	900	1000
Item description																					
Valves																					
Ball valve float FB flgd	770655	8539	8549	8559	8579																
Ball valve float RB flgd	770655	3539	3549	3559	3579	3589															
Ball valve trunn FB flgd	770092																				
Ball valve trunn FB flgd	770660																				
Ball valve trunn RB flgd	770092																				
Ball valve trunn RB flgd	770660																				
Butterfly valve triple of flgd	774155																				
Check valve dual plate flgd	776724																				
Check Valve Wafer Lug (Solid)	776998																				
Check valve flgd	771053	0539	0549	0559	0579	0599	3609	3629													
Check valve flgd	771640	0539	0549	0559	0579	0599	3609	3629													
Gate valve flgd	772056																				
Gate valve flgd	772641																				
Globe valve flgd	773055																				
Globe valve flgd	773641	0539	0549	0559	0579	0599	3609	3629													
Valve DBBT	778568	8539	8549	8559	8579	8589															
Valve DBBF	778598	8539	8549	8559	8579	8589															
Miscellaneous																					
Gasket spiral wound	854360	4041	4061	4081	4121	4141	4181	3701	3741	3761	3781	3801	3821	3841	3861	3881	3921				
Gasket camprofile	854390																				
Insulating Gasket Kit	854610	0049	0161	0261	0401	0541	0681	0841	1061	1221	1441	1721	1981	2161	2341	2521	2701	3939	3949	3959	3969
Meterrun	766496	1621	1641	1661	1681																
Orifice flange set	766096							1011	1021	0011	0021	0111	0121	0221	0231	0241	0251	0261	0271		
Strainer Y-type	768307							1011	1111	1121	1131	1171	1261	1331	1231	1211					

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7628670661	7628750661	7628926181
25	x	15	7628670791	7628750791	7628926321
25	x	20	7628670891	7628750891	7628926371
40	x	15	7628670991	7628750991	
40	x	20	7628671191	7628751191	7628926471
40	x	25	7628671241	7628751241	7628926721
50	x	20	7628671311	7628751311	
50	x	25	7628671341	7628751341	7628926771
50	x	40	7628671441	7628751441	7628926831
80	x	40	7628671741	7628751741	
80	x	50	7628671841	7628751841	7628926891
100	x	40	7628671941	7628751941	
100	x	50	7628672041	7628752041	7628926921
100	x	80	7628672141	7628752141	7628926961
150	x	80	7628672499	7628752499	7628927169
150	x	100	7628672539	7628752539	7628927179
200	x	100	7628672591	7628752591	7628927051
200	x	150	7691513569	7691623569	7691883589
250	x	100	7628672621	7628752621	7628927081
250	x	150	7691514149	7691624149	7691884149
250	x	200	7691514221	7691624221	7691884221
300	x	150	7691514619	7691624619	7691884619
300	x	200	7691514831	7691624831	7691884831
300	x	250	7691515051	7691625051	7691885051
350	x	150	7691515289	7691625289	
350	x	200	7691515511	7691625511	7691885511
350	x	250	7691515731	7691625731	7691885731
350	x	300	7691515811	7691625811	7691885811

Thermowell fild DN 50

<u>Length (mm)</u>	<u>MESC number</u>
230	7683386411
255	7683386421
305	7683386431
355	7683386441
405	7683386451
455	7683386461

Thermowell fild DN 40

<u>Length (mm)</u>	<u>MESC number</u>
230	7683371811
255	7683371821
305	7683371831
355	7683371841
405	7683371851
455	7683371861

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200		7691516191	7691626191	
400	x 250		7691516401	7691626401	7691886401
400	x 300		7691516491	7691626491	7691886491
400	x 350		7691516701	7691626701	7691886701
450	x 250		7691517091	7691627091	7691887091
450	x 300		7691517171	7691627171	7691887171
450	x 350		7691517381	7691627381	7691887381
450	x 400		7691517591	7691627591	7691887591
500	x 300		7691518061	7691628061	7691888061
500	x 350		7691518271	7691628271	7691888271
500	x 400		7691518481	7691628481	7691888481
500	x 450		7691518691	7691628691	7691888691
600	x 300				7691888941
600	x 350				7691889161
600	x 400		7691519371	7691629371	7691889371
600	x 450		7691519581	7691629581	7691889581
600	x 500		7691519791	7691629791	7691889791
700	x 350				<u>7691909809</u>
700	x 400				<u>7691909819</u>
700	x 450		<u>7691539829</u>	<u>7691649829</u>	<u>7691909829</u>
700	x 500		<u>7691539839</u>	<u>7691649839</u>	<u>7691909839</u>
700	x 600		<u>7691539849</u>	<u>7691649849</u>	<u>7691909849</u>

<u>Comp.name</u>	<u>Description</u>
BN3B	Branch fitting bw
BNLF	Branch fitting fgd
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
750	x 400				<u>7691909859</u>
750	x 450				<u>7691909879</u>
750	x 500		<u>7691539889</u>	<u>7691649889</u>	<u>7691909889</u>
750	x 600		<u>7691539869</u>	<u>7691649869</u>	<u>7691909869</u>
750	x 700		<u>7691539899</u>	<u>7691649899</u>	<u>7691909899</u>
900	x 450				<u>7691909909</u>
900	x 500				<u>7691909919</u>
900	x 600		<u>7691539929</u>	<u>7691649929</u>	<u>7691909929</u>
900	x 700				<u>7691909939</u>
900	x 750		<u>7691539949</u>	<u>7691649949</u>	<u>7691909949</u>
1000	x 500				<u>7691909959</u>
1000	x 600				<u>7691909969</u>
1000	x 700				<u>7691909979</u>
1000	x 750		<u>7691539989</u>	<u>7691649989</u>	<u>7691909989</u>
1000	x 900		<u>7691539999</u>	<u>7691649999</u>	<u>7691909999</u>

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BNLF	BN3B	BR3B	BR6B	BROB	BRSB
15	40	-	40	7680543791	7680306029			
15	50	-	50	7680543801	7680306039			
15	80	-	100	7680543811	7680306049			
20	50	-	50	7680543841	7680306069			
20	80	-	100	7680543851	7680306079			
25	80	-	80	7680543891	7680306119			
25	100	-	100	7680543901	7680306129			
40	80	-	80	7680543941	7680306169			
40	100	-	100	7680543951	7680306179			
50	150	-	150			7677355671		
50	300	-	400			7677355701		
50	450	-	450		7677357101			
50	500	-	500		7677357841			
50	600	-	600			7677359241		
50	700	-	700				7677341109	
50	750	-	750				7677341119	
50	900	-	900				7677341129	
50	1000	-	1000				7677341139	
80	200	-	200				7677355781	
80	250	-	250				7677355791	
80	300	-	350				7677355801	
80	400	-	400				7677355821	
80	450	-	500		7677357221			
80	600	-	600		7677358651			
80	700	-	700				7677341149	
80	750	-	750				7677341159	
80	900	-	900				7677341169	
80	1000	-	1000				7677341179	

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BNLF	BN3B	BR3B	BR6B	BROB	BRSB
100	300	-	350					7677355891
100	400	-	400					7677355911
100	450	-	500		7677357311			
100	600	-	600			7677358741		
100	700	-	700				<u>7677341189</u>	
100	750	-	750				<u>7677341199</u>	
100	900	-	900				<u>7677341209</u>	
100	1000	-	1000				<u>7677341219</u>	
150	350	-	350					<u>7691001609</u>
150	400	-	400					<u>7691001619</u>
150	450	-	450		<u>7691001629</u>			
150	500	-	500		<u>7691001639</u>			
150	600	-	600				<u>7691001649</u>	
150	700	-	700				<u>7691021659</u>	
150	750	-	750				<u>7691021669</u>	
150	900	-	900				<u>7691021679</u>	
150	1000	-	1000				<u>7691021689</u>	
200	400	-	400					7691001161
200	450	-	450					7691001171
200	500	-	500					7691001181
200	600	-	600					7691001191
200	700	-	700		<u>7691021109</u>			
200	750	-	750				<u>7691021119</u>	
200	900	-	900		<u>7691021129</u>			
200	1000	-	1000				<u>7691021139</u>	
250	500	-	500					7691001241
250	600	-	600					7691001251
250	700	-	700					<u>7691021149</u>
250	750	-	750					<u>7691021159</u>
250	900	-	900					<u>7691021169</u>
250	1000	-	1000					<u>7691021179</u>
300	700	-	700					<u>7691021189</u>
300	750	-	750					<u>7691021199</u>
300	900	-	900					<u>7691021209</u>
300	1000	-	1000					<u>7691021219</u>
350	750	-	750					<u>7691021229</u>
350	900	-	900					<u>7691021239</u>
350	1000	-	1000					<u>7691021249</u>
400	900	-	900					<u>7691021259</u>
400	1000	-	1000					<u>7691021269</u>
450	1000	-	1000					<u>7691021279</u>

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 70	8138270259
20	4	5/8	x 80	8138270739
25	4	5/8	x 80	8138270739
40	4	3/4	x 100	8138271419
50	8	5/8	x 90	8138270759
80	8	3/4	x 110	8138271439
100	8	3/4	x 120	8138271459
150	12	3/4	x 130	8138271479
200	12	7/8	x 140	8138272209
250	16	1	x 160	8138273039
300	16	1 1/8	x 180	8138273909
350	20	1 1/8	x 180	8138273909
400	20	1 1/4	x 190	8138274729
450	24	1 1/4	x 150	8138274749
500	24	1 1/4	x 210	8138274769
600	24	1 1/2	x 240	8138276319
700	28	1 5/8	x 280	8138277069
750	28	1 3/4	x 300	8138277729
900	32	2	x 340	8138278899
1050	32	1 5/8	x 350	8138277209

Coated boltset orifice flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138270839
80	8	3/4	x 140	8138271499
100	8	3/4	x 100	8138271519
150	12	3/4	x 100	8138271519
200	12	7/8	x 170	8138272269
250	16	1	x 190	8138273099
300	16	1 1/8	x 210	8138273969
350	20	1 1/8	x 220	8138273989
400	20	1 1/4	x 240	8138274829
450	24	1 1/4	x 250	8138274849
500	24	1 1/4	x 260	8138274869
600	24	1 1/2	x 290	8138276419

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	5/8	x 130	8138270839
20	4	5/8	x 130	8138270839
25	4	5/8	x 130	8138270839
40	4	3/4	x 140	8138271499

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 150	8138270879
80	8	3/4	x 190	8138271599
100	8	3/4	x 200	8138271619
150	12	3/4	x 230	8138271679

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 80	8138270279
20	4	5/8	x 90	8138270759
25	4	5/8	x 90	8138270759
40	4	3/4	x 110	8138271439
50	8	5/8	x 110	8138270799
80	8	3/4	x 130	8138271479
100	8	3/4	x 140	8138271499
150	12	3/4	x 100	8138271519
200	12	7/8	x 170	8138272269
250	16	1	x 190	8138273099
300	16	1 1/8	x 210	8138273969
350	20	1 1/8	x 220	8138273989
400	20	1 1/4	x 240	8138274829
450	24	1 1/4	x 250	8138274849
500	24	1 1/4	x 260	8138274869
600	24	1 1/2	x 300	8138276439

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7660000191
Gasket spiral wound	1	8543604041
Welding neck flange	1	7660782091
Studbolt with nuts	4	8138270259

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7660000201
Gasket spiral wound	1	8543604061
Studbolt with nuts	4	8138270739

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7660000201
Gasket spiral wound	1	8543604061
Welding neck flange	1	7660782101
Studbolt with nuts	4	8138270739

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7660000211
Gasket spiral wound	1	8543604081
Studbolt with nuts	4	8138270739

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Blind flange	1	7660000221
Gasket spiral wound	1	8543604121
Studbolt with nuts	4	8138271419

Temp instr conn DN 40 Fig.NS DN80 - 100

Branch: branch nipple flanged

Thermowell flgd DN 40 L=230 mm	1	7683371811
Gasket spiral wound	1	8543604121
Lap joint flange	1	7660240221
Studbolt with nuts	4	8138271439

Temp instr conn DN 50 Fig.HL DN100 - 75600

Branch: according to branch table

Pipe	1	7478610571
Gasket spiral wound	1	8543604141
Welding neck flange	1	7660781931
Thermowell flgd DN 50 L=255 mm	1	7683386421
Studbolt with nuts	8	8138270799

CLASS 061440-X

Design limits

Temperature (°C)	0	50	75	100	125	150
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Pressure (Barg) /FV	DN 15- 900	102.1	100.2	96.7	93.2	91.7	90.2
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class design meets full vacuum at ambient condition.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**

Table of schedules

DN	Schedule
15	160
20	160
25	160
40	160
50	160
80	80
100	80
150	80
200	80
250	80
300	80
350	80
400	80
450	80
500	80
600	80
750	33.35mm
900	31.75mm
1000	HOLD-7

Branch connections 90 degrees

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900
900	N	N	N	N	P	E	E	E	E	E	E	E	E	E	B	B	B	A
750	N	N	N	N	P	E	E	E	E	E	E	E	E	E	B	B	B	A
600	N	N	N	N	P	E	E	E	E	E	E	E	E	E	B	B	B	A
500	N	N	N	N	P	E	E	E	E	E	E	E	E	E	B	B	B	A
450	N	N	N	N	P	E	E	E	E	E	E	E	E	E	B	B	B	A
400	N	N	N	N	P	E	E	E	E	E	E	E	E	E	B	B	B	A
350	N	N	N	N	P	E	E	E	E	E	E	E	E	E	B	B	B	A
300	N	N	N	N	P	E	E	E	E	E	E	E	E	E	B	B	B	A
250	N	N	N	N	P	E	E	E	E	E	E	E	E	E	B	B	B	A
200	N	N	N	N	P	E	E	E	E	E	E	E	E	E	B	B	B	A
150	N	N	N	N	P	E	E	E	E	E	E	E	E	E	B	B	B	A
100	N	N	N	N	U	B	B	B	B	B	B	B	B	B	A	B	B	A
80	N	N	N	N	U	A	A	A	A	A	A	A	A	A	B	B	B	A
50	N	N	M	M	M	J	J	J	J	J	J	J	J	J	B	B	B	A
40	N	M	M	M	M	J	J	J	J	J	J	J	J	J	B	B	B	A
25	M	M	M	M	M	J	J	J	J	J	J	J	J	J	B	B	B	A
20	M	M	M	M	M	J	J	J	J	J	J	J	J	J	B	B	B	A
15	J	J	J	J	J	J	J	J	J	J	J	J	J	J	B	B	B	A

Code | Explanation of characters

A	Equal tee
B	Reducing tee
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel Sour	Plant
Class no.	061440-X
ASME rating	CLASS 600
Corrosion allowance	3 mm
Revision letter	Principal
Revision date	Contr. job no.
	Project no.

Metric units

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-450	ASTM A106-B
PIPE	Pipe	DN 500-600	ASTM A333-6
PIPE	Pipe	DN 750-900	ASTM A671 – CC65 CL22

Flanges

BLFL	Blind flange	DN 15-900	ASTM A105N
LJFL	Lap joint flange	--	ASTM A105N
SBNF	Spectacle blind	DN 15-300	ASTM A516-60/65/70
SPNF	Spade	DN 15- 900	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15- 900	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15- 900	ASTM A105N

Fittings

CAPB	Cap bw	DN 15-450	ASTM A234-WPB
CAPB	Cap bw	DN 500-600	ASTM A234-WPB
CAPB	Cap bw	DN 750-900	ASTM A420-WPL6(W)
E45B	Elbow 45 deg LR bw	DN 15-450	ASTM A234-WPB
E45B	Elbow 45 deg LR bw	DN 500-600	ASTM A234-WPB
E45B	Elbow 45 deg LR bw	DN 750-900	ASTM A420-WPL6(W)
E90B	Elbow 90 deg LR bw	DN 15-450	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 500-600	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 750-900	ASTM A420-WPL6(W)
TEEB	Tee equal bw	DN 15-450	ASTM A234-WPB
TEEB	Tee equal bw	DN 500-600	ASTM A234-WPB
TEEB	Tee equal bw	DN 750-900	ASTM A420-WPL6(W)

Reducing fittings

BN6F	Branch fitting flgd	DN 40-900	ASTM A105N
BN6B	Branch fitting bw	DN 40- 900	ASTM A105N
BR3B	Branch outlet bw	DN 200-200	ASTM A105N
BR6B	Branch outlet bw	DN 150- 900	ASTM A105N
BROB	Branch outlet bw	DN 350- 900	ASTM A105N
RECB	Reducer concentric bw	DN 20-450	ASTM A234-WPB
RECB	Reducer concentric bw	DN 500-600	ASTM A420-WPL6
RECB	Reducer concentric bw	DN 750-900	ASTM A420-WPL6(W)
REEB	Reducer eccentric bw	DN 20-450	ASTM A234-WPB
REEB	Reducer eccentric bw	DN 500-600	ASTM A420-WPL6
REEB	Reducer eccentric bw	DN 750-900	ASTM A420-WPL6(W)
TERB	Tee reducing bw	DN 20-450	ASTM A234-WPB
TERB	Tee reducing bw	DN 500-600	ASTM A420-WPL6
TERB	Tee reducing bw	DN 750-900	ASTM A420-WPL6(W)

Valves

BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM A105N Trim: AISI 316 (L), Devlon V
BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), Devlon V
BTFF	Ball valve trunn FB flgd	DN 50- 900	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), Devlon V
BTRF	Ball valve trunn RB flgd	DN 80- 900	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), Devlon V
BUTF	Butterfly valve triple of flgd	DN 200- 900	Body: ASTM A216-WCB/WCC Trim: CS, Duplex, Stellite
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50- 900	Body: ASTM A105N/ASTM A216-WCB/WCC Trim: AISI 316 (L), Stellite
CHVF	Check valve flgd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), Stellite
CHVF	Check valve flgd	DN 80- 900	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), Stellite
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), Stellite
GAVF	Gate valve flgd	DN 80- 900	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), Stellite
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), Stellite
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), Stellite
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), Devlon V
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A105N Trim: AISI 316 (L), Devlon V
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A105N Trim: AISI 316 (L), Stellite

Instruments

TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	AISI 316 (L), Graphite CS centring-/SS 316(L) inner ring
GKMA	Gasket camprofile or approved equal	DN 750-900	AISI 316 (L), Graphite SS centring ring
GKIK	Insulating Gasket kit	DN 15-50	(G-10/11) with 316 SS CORE, PTFE SS Pres Enrg Spirl Spring
MTRR	Meterrun	DN 15-40	Alloy 400/ASTM A350-LF2 cl 1 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A105
PLUG	Plug NPT	DN 15-50	ASTM A105
STBT	Studbolt with nuts	--	ASTM A193-B7M/A194-2HM Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A105N HOLDER / ACCESS FITTING: AISI 316 (L) COUPON: ASTM A106-B
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A105N INTERNAL: AISI 316 (L)
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: AISI 316 (L) VALVE & INTERNALS: AISI 316 (L)
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A105N VALVE & INTERNALS: AISI 316 (L)

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	Nominal pipe size		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900	
	MESC																				
Pipe																					
Pipe	743003 0	201	301	401	601	731															
Pipe	743003 1						091	571													
Pipe	743003 2								191	551	951										
Pipe	743003 3									411	911										
Pipe	743003 4											451	971								
Pipe	743016 2												141	441							
Pipe	743010 3													821							
Pipe	743010 5														359						
Flanges																					
Blind flange	766210	2081	2121	2161	2181	2201	2221	2241	2261	2281	2301	2321	2341	2361	2381	2401	2421				
Blind flange	767012																	2061	2121		
Spacer ring	768908	0821	0841	0861	0881	0901	0921	0941	0961	0981	1001	1021	1041	1061	1081	1101	1121	1139	1149		
Spade	768937	0821	0841	0861	0881	0901	0921	0941	0961	0981	1001	1021	1041	1061	1081	1101	1121	1139	1149		
Spectacle blind	768962	0821	0841	0861	0881	0901	0921	0941	0961	0981	1001	1021									
Welding neck flange	766279	8021	8041	8061	8081	8101	7621	7641	7661	7681	7701	7721	7741	7761	7781	7801	7841				
Welding neck flange	767085																	1309	1339		
Fittings																					
Cap bw	763017	5721	5781	5821	5921	6121	6281	6481	6681	6891	7101	7331	7521	7721	7941						
Cap bw	763117																	3981	4091	5521	6181
Elbow 45 deg LR bw	763034	5721	5781	5821	5921	6121	6281	6481	6681	6891	7101	7331	7521	7721	7941						
Elbow 45 deg LR bw	763134																	3981	4081	5341	6841
Elbow 90 deg LR bw	763042	5721	5781	5821	5921	6121	6281	6481	6681	6891	7101	7331	7521	7721	7941						
Elbow 90 deg LR bw	763143																	3981	4081	5321	6841
Tee equal bw	763081	5721	5781	5821	5921	6121	6281	6481	6681	6891	7101	7331	7521	7721	7941						
Tee equal bw	763180																	3981	4081	5321	6841

PIPING COMPONENTS

Item description	Nominal pipe size MESC	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900
Valves																			
Ball valve float FB flgd	770025	6039	6049	6059	6079														
Ball valve float RB flgd	770025	1039	1049	1059	1079	1089													
Ball valve trunn FB flgd	770067					6089	6109	6129	6149	6159	6169	6179	6189	6199	6209	6219	6239	6269	6299
Ball valve trunn RB flgd	770067						1109	1129	1149	1159	1169	1179	1189	1199	1209	1219	1239	1269	1299
Butterfly valve triple of flgd	774131																		
Check valve dual plate flgd	776716																		
Check valve wafer lug (Solid)	776751						1089	1109	1129	1149									
Check valve flgd	771005	1039	1049	1059	1079	1089	1109	1129	1149	1159	1169	1179	1189	1199	1209	1219	1239	1269	1299
Gate valve flgd	772004	1039	1049	1059	1079	1089	1109	1129	1149	1159	1169	1179	1189	1199	1209	1219	1239	1269	1299
Globe valve flgd	773005	1039	1049	1059	1079	1089	1109	1129	1149	1159									
DBBF	778546	9039	9049	9059	9079	9089													
DBBT	778545	9039	9049	9059	9079	9089													
Miscellaneous																			
Gasket Camprofile	854190															2481	2541		
Gasket spiral wound	854136	4041	4061	4081	4121	4141	4181	4201	4241	4261	4281	4301	4321	4341	4361	4381	4421		
Insulating Gasket Kit	854606							7281											
Meterrun	766496	0731	0751	0771	0791														
Orifice flange set	766295																		
Plug NPT	760518	0081	0121	0161	0181	0201													

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7630661411	7630671411	7630880391
25	x	15	7630661511	7630671511	7630880491
25	x	20	7630661611	7630671611	7630880591
40	x	15	7630661711	7630671711	
40	x	20	7630661811	7630671811	7630880791
40	x	25	7630661911	7630671911	7630880891
50	x	20	7630661951	7630671951	
50	x	25	7630662011	7630672011	7630881071
50	x	40	7630662111	7630672111	7630881161
80	x	40	7630662291	7630672291	
80	x	50	7630662381	7630672381	7630881381
100	x	40	7630662531	7630672531	
100	x	50	7630662681	7630672681	7630881591
100	x	80	7630662771	7630672771	7630881661
150	x	80	7630662971	7630672971	7630881781
150	x	100	7630663071	7630673071	7630881901
200	x	100	7630663271	7630673271	7630882061
200	x	150	7630663371	7630673371	7630882261
250	x	100	7630663451	7630673451	7630882541
250	x	150	7630663581	7630673581	7630882721
250	x	200	7630663681	7630673681	7630882931
300	x	150	7630663851	7630673851	7630883111
300	x	200	7630663981	7630673981	7630883301
300	x	250	7630664081	7630674081	7630883521
350	x	150	7630664151	7630674151	
350	x	200	7630664241	7630674241	7630883921
350	x	250	7630664391	7630674391	7630884171
350	x	300	7630664491	7630674491	7630884431

Thermowell fild DN 50	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200		7630664551	7630674551	
400	x 250		7630664641	7630674641	7630885071
400	x 300		7630664751	7630674751	7630885331
400	x 350		7630664891	7630674891	7630885581
450	x 250		7630665261	7630675261	7630886061
450	x 300		7630665561	7630675561	7630886301
450	x 350		7630665871	7630675871	7630886541
450	x 400		7630666171	7630676171	7630886781
500	x 300		7631666461	7631756461	7631887501
500	x 350		7631666771	7631756771	7631887741
500	x 400		7631667071	7631757071	7631887981
500	x 450		7631667371	7631757371	7631888221
600	x 300				7631888701
600	x 350				7631888941
600	x 400		7631668871	7631758871	7631889181
600	x 450		7631669171	7631759171	7631889421
600	x 500		7631669571	7631759471	7631889661
750	x 350				<u>7631549769</u>
750	x 400				<u>7631549779</u>
750	x 450				<u>7631549789</u>
750	x 500		<u>7631539789</u>	<u>7631769789</u>	<u>7631549799</u>
750	x 600		<u>7631539809</u>	<u>7631769809</u>	<u>7631549809</u>
900	x 450				<u>7631549819</u>
900	x 500				<u>7631549829</u>
900	x 600		<u>7631539839</u>	<u>7631769839</u>	<u>7631549839</u>
900	x 750		<u>7631539849</u>	<u>7631769849</u>	<u>7631549849</u>

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting flgd
BN6P	Branch fitting plain
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BROB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BR6B	BROB
15	40	-	50	7672293601	7672693519		
15	80	-	150	7672293611	7672693529		
15	200	-	900	7672293621	7672693549		
20	50	-	50	7672293641	7672693569		
20	80	-	250	7672293651	7672693579		
20	300	-	900	7672293661	7672693589		
25	80	-	250	7672292151	7672693619		
25	300	-	900	7672293701	7672693629		
40	80	-	80	7672293721	7672693659		
40	100	-	100	7672293731	7672693669		
40	150	-	200	7672293741	7672693679		
40	250	-	450	7672293751	7672693689		
40	500	-	900	7672293761	7672693699		
50	150	-	200		7679031001		
50	250	-	450		7679031011		
50	500	-	600		7678903051		
80	200	-	200		7678311581		
80	250	-	250		7679031171		
80	300	-	300		7679031181		
80	350	-	350		7679031191		
80	400	-	400		7679031201		
80	450	-	450		7679031211		
80	500	-	500		7679031221		
80	600	-	600		7679031241		
80	750	-	750		7679101609		
80	900	-	900		7679101629		

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BR6B	BROB
100	300	-	300			7679031291	
100	350	-	350			7679031301	
100	400	-	400			7679031311	
100	450	-	450			7679031321	
100	500	-	500			7679031331	
100	600	-	600			7679031351	
100	750	-	750			<u>7679101649</u>	
100	900	-	900			<u>7679101659</u>	
150	350	-	350			7679014381	
150	400	-	400			7679014401	
150	450	-	450			7679014421	
150	500	-	500			7679014441	
150	600	-	600			7679014481	
150	750	-	750			<u>7679101669</u>	
150	900	-	900			<u>7679101679</u>	
200	400	-	400			7679014581	
200	450	-	450			7679014601	
200	500	-	500			7679014621	
200	600	-	600			7679014661	
200	750	-	750			<u>7679101689</u>	
200	900	-	900			<u>7679101699</u>	
250	500	-	500			7679014781	
250	600	-	600			7679014821	
250	750	750				<u>7679101709</u>	
250	900	900				<u>7679101719</u>	
300	750	750				<u>7679101729</u>	
300	900	900				<u>7679101739</u>	
350	900	900				<u>7679101749</u>	
400	900	900				<u>7679101759</u>	

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 80	8138170279
20	4	5/8	x 90	8138170759
25	4	5/8	x 100	8138170779
40	4	3/4	x 110	8138171439
50	8	5/8	x 110	8138170799
80	8	3/4	x 130	8138171479
100	8	7/8	x 150	8138172229
150	12	1	x 180	8138173079
200	12	1 1/8	x 200	8138173949
250	16	1 1/4	x 220	8138174789
300	20	1 1/4	x 230	8138174809
350	20	1 3/8	x 240	8138175599
400	20	1 1/2	x 260	8138176359
450	20	1 5/8	x 280	8138177069
500	24	1 5/8	x 290	8138177089
600	24	1 7/8	x 330	8138178359
750	28	2	x 440	8138179099
900	28	2 1/2	x 510	8138184859

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138170839
80	8	3/4	x 140	8138171499
100	8	7/8	x 160	8138172249
150	12	1	x 190	8138173099
200	12	1 1/8	x 220	8138173989
250	16	1 1/4	x 240	8138174829
300	20	1 1/4	x 250	8138174849
350	20	1 3/8	x 270	8138175659
400	20	1 1/2	x 290	8138176419
450	20	1 5/8	x 320	8138177149
500	24	1 5/8	x 340	8138177189
600	24	1 7/8	x 390	8138178479

Coated boltset for Dual Plate Check Valve

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 170	8138170919
80	8	3/4	x 210	8138171639
100	8	7/8	x 230	8138172389
150	12	1	x 320	8138173359
200	12	1 1/8	x 370	8138174289
250	16	1 1/4	x 440	8138175229

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	7/8	x 150	8138172229
20	4	7/8	x 150	8138172229
25	4	7/8	x 150	8138172229
40	4	1	x 160	8138173039

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 90	8138170299
20	4	5/8	x 100	8138170779
25	4	5/8	x 110	8138170799
40	4	3/4	x 130	8138171479
50	8	5/8	x 130	8138170839
80	8	3/4	x 150	8138171519
100	8	7/8	x 170	8138172269
150	12	1	x 200	8138173119
200	12	1 1/8	x 240	8138174029
250	16	1 1/4	x 260	8138174869
300	20	1 1/4	x 270	8138174889
350	20	1 3/8	x 290	8138175699
400	20	1 1/2	x 320	8138176479
450	20	1 5/8	x 340	8138177189
500	24	1 5/8	x 360	8138177229
600	24	1 7/8	x 420	8138178539
750	28	2	x 520	8138183589
900	28	2 1/2	x 590	8138184939

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662102081
Welding neck flange	1	7662798021
Gasket spiral wound	1	8541364041
Studbolt with nuts	4	8138170279

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662102121
Gasket spiral wound	1	8541364061
Studbolt with nuts	4	8138170759

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662102121
Welding neck flange	1	7662798041
Gasket spiral wound	1	8541364061
Studbolt with nuts	4	8138170759

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662102161
Gasket spiral wound	1	8541364081
Studbolt with nuts	4	8138170779

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Blind flange	1	7662102181
Gasket spiral wound	1	8541364121
Studbolt with nuts	4	8138171439

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Lap joint flange	1	7662204201
Pipe	1	7430030731
Welding neck flange	1	7662798101
Gasket spiral wound	1	8541364141
Thermowell flgd DN 50 L=230 mm	1	7683385611
Studbolt with nuts	4	8138170839

Temp instr conn DN 50 Fig.HL DN150 - 600

Branch: according to branch table

Lap joint flange	1	7662204201
Pipe	1	7430030731
Welding neck flange	1	7662798101
Gasket spiral wound	1	8541364141
Thermowell flgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	4	8138170839

CLASS 061441-Z

Design limits

Temperature (°C)	-29	0	50	75	100	125	150
Pressure (Barg)	102.1	102.1	100.2	96.7	93.2	91.7	90.2
DN 15-600							

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class design meets full vacuum at ambient temperature condition
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.

Table of schedules

DN	Schedule
15	7.74mm
20	7.96mm
25	XXS
40	XXXS
50	XXS
80	160
100	160
150	120
200	120
250	100
300	100
350	100
400	100
450	100
500	100
600	100

Branch connections 90 degrees

Branch Size	Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	N	N	N	N	P	E	E	E	E	E	B	B	B	B	B	B	A
500	N	N	N	N	P	E	E	E	E	E	B	B	B	B	B	B	A
450	N	N	N	N	P	E	E	E	E	E	B	B	B	B	B	B	A
400	N	N	N	N	P	E	E	E	E	E	B	B	B	B	B	B	A
350	N	N	N	N	P	E	E	E	E	E	B	B	B	B	B	B	A
300	N	N	N	N	P	E	E	E	E	E	B	B	B	B	B	B	A
250	N	N	N	N	P	E	E	E	E	E	B	B	B	B	B	B	A
200	N	N	N	N	P	E	E	E	E	E	B	B	B	B	B	B	A
150	N	N	N	N	P	B	B	B	B	B	A						
100	N	N	N	N	U	B	B	A									
80	N	N	N	N	U	A											
50	N	N	M	M	J												
40	N	M	M	J													
25	M	M	J														
20	M	J															
15	J																

Code	Explanation of characters
A	Equal tee
B	Reducing tee
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel Sour	Plant
Class no.	061441-Z
ASME rating	CLASS 600
Corrosion allowance	6 mm
Revision letter	Engineered by
Revision date	Consignee
	Principal
	Contr. job no.
	Project no.

Metric units

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15- 200	ASTM A106-B
PIPE	Pipe	DN 250 -600	ASTM A333-6

Flanges

BLFL	Blind flange	DN 15-600	ASTM A105N
LJFL	Lap joint flange	--	ASTM A105N
SBNF	Spectacle blind	DN 15-300	ASTM A516-60/65/70
SPNF	Spade	DN 15-600	ASTM A516-60/65/70
SRNF	Spacer ring	DN 15-600	ASTM A516-60/65/70
WNFL	Welding neck flange	DN 15-600	ASTM A105N

Fittings

CAPB	Cap bw	DN 15- 200	ASTM A234-WPB
CAPB	Cap bw	DN 250 -600	ASTM A420-WPL6
E45B	Elbow 45 deg LR bw	DN 15- 200	ASTM A234-WPB
E45B	Elbow 45 deg LR bw	DN 250 -600	ASTM A420-WPL6
E90B	Elbow 90 deg LR bw	DN 15- 200	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 250 -600	ASTM A420-WPL6
TEEB	Tee equal bw	DN 15- 200	ASTM A234-WPB
TEEB	Tee equal bw	DN 250 -600	ASTM A420-WPL6

Reducing fittings

BN6F	Branch fitting fgd	DN 40-600	ASTM A105N
BN6B	Branch fitting bw	DN 40-600	ASTM A105N
BR6B	Branch outlet bw	DN 150-600	ASTM A105N
BROB	Branch outlet bw	DN 300 -600	ASTM A105N
RECB	Reducer concentric bw	DN 20- 200	ASTM A234-WPB
RECB	Reducer concentric bw	DN 250 -600	ASTM A420-WPL6
REEB	Reducer eccentric bw	DN 20- 200	ASTM A234-WPB
REEB	Reducer eccentric bw	DN 250 -600	ASTM A420-WPL6
TERB	Tee reducing bw	DN 20- 200	ASTM A234-WPB
TERB	Tee reducing bw	DN 250 -600	ASTM A420-WPL6

Valves

BAFF	Ball valve float FB fgd	DN 15-40	Body: ASTM A105N Trim: Alloy 825, Devlon V
BARF	Ball valve float RB fgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, Devlon V
BTFF	Ball valve trunn FB fgd	DN 50-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, Devlon V
BTRF	Ball valve trunn RB fgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, Devlon V
BUTF	Butterfly valve triple of fgd	DN 200-600	Body: ASTM A216-WCB/WCC Trim: CS, Alloy 825, Stellite
CHDF	Check valve dual plate Solid Wafer lug / fgd	DN 50 -600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
CHVF	Check valve fgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825
CHVF	Check valve fgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
GAVF	Gate valve fgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825
GAVF	Gate valve fgd	DN 80-600	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
GLVF	Globe valve fgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825
GLVF	Globe valve fgd	DN 80-200	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825
DBBT	Valve assy Double block ball & bleed fgd/thrd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, Devlon V
DBBF	Valve assy Double block ball & bleed fgd	DN 15-50	Body: ASTM A105N Trim: Alloy 825, Devlon V
NVFL	Needle valve fgd	DN 15-40	Body: ASTM A105N Trim: Alloy 825, Stellite

Instruments

TWHD	Thermowell fgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell fgd DN 50 L=230 mm	---	ASTM B564 UNS N04400
TWHL	Thermowell fgd DN 50 L=255 mm	---	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	Alloy 825, Graphite
MTRR	Meterrun	DN 15-40	CS centring-/Alloy 825 inner ring
GKIK	Insulating Gasket kit	DN 15-50	Alloy 400/ASTM A350-LF2 cl 1 end flanges (G-10/11) with 316 SS CORE, PTFE SS Pres Enrg Spirl Spring
ORFS	Orifice flange set	DN 50-600	ASTM A105N
PLUG	Plug NPT	DN 15-50	ASTM A105N
STBT	Studbolt with nuts	--	ASTM A193-B7M/A194-2HM Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A105N HOLDER / ACCESS FITTING: Alloy 825
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	COUPON: ASTM A106-B BODY: ASTM A105N
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	INTERNAL: Alloy 825 BODY: Alloy 825
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	VALVE & INTERNALS: Alloy 825 BODY: ASTM A105N VALVE & INTERNALS: Alloy 825

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																	
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600		
Pipe																			
Pipe	743003 0	221	321	421	601	731													
Pipe	743003 1						131	591											
Pipe	743003 2								231	591									
Pipe	743016 1										111	231	361	451	781				
Pipe	743016 2															181	481		
Flanges																			
Blind flange	766210	2081	2121	2161	2181	2201	2221	2241	2261	2281	2301	2321	2341	2361	2381	2401	2421		
Spacer ring	768908	0821	0841	0861	0881	0901	0921	0941	0961	0981	1001	1021	1041	1061	1081	1101	1121		
Spade	768937	0821	0841	0861	0881	0901	0921	0941	0961	0981	1001	1021	1041	1061	1081	1101	1121		
Spectacle blind	768962	0821	0841	0861	0881	0901	0921	0941	0961	0981	1001	1021							
Welding neck flange	766278	7351	7361	7371															
Welding neck flange	766279				8081	8101	8121	7941	7961	7861	7871	7881	7891	7901	7911	7921	7931		
Fittings																			
Cap bw	763017	5731	5791	5831	5921	6121	6321	6501	6701	6901									
Cap bw	763117										3111	3341	3541	3741	3901	4001	4111		
Elbow 45 deg LR bw	763034	5731	5791	5831	5921	6121	6321	6501	6701	6901									
Elbow 45 deg LR bw	763134										3111	3341	3541	3741	3891	3991	4091		
Elbow 90 deg LR bw	763042	5731	5791	5831	5921	6121	6321	6501	6701	6901									
Elbow 90 deg LR bw	763143										3111	3341	3541	3741	3891	3991	4091		
Tee equal bw	763081	5731	5791	5831	5921	6121	6321	6501	6701	6901									
Tee equal bw	763180										3111	3341	3541	3741	3891	3991	4091		

Metric units

PIPING COMPONENTS

Nominal pipe size

Item description	MESC	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
Valves																	
Ball valve float FB fgd	770054	6109	6119	6129	6139												
Ball valve float RB fgd	770054	1209	1219	1229	1239	1249											
Ball valve trunn FB fgd	770091						6309	6319	6329	6339	6349	6359	6369	6379	6389	6399	6409
Ball valve trunn RB fgd	770091						1319	1329	1339	1349	1359	1369	1379	1389	1399	1409	1419
Butterfly valve triple of fgd	774142									6349	6359	6369	6379	6389	6399	6409	6419
Check valve dual plate fgd	776714									7309	7319	7329	7339	7349	7359	7369	7379
Check valve wafer lug (solid)	776757						4099	4109	4129	4149							
Check valve fgd	771043	1309	1319	1329	1339	1349	1359	1369	1379	1389	1399	1409	1419	1429	1439	1449	1459
Gate valve fgd	772053	1309	1319	1329	1339	1349	1359	1369	1379	1389	1399	1409	1419	1429	1439	1449	1459
Globe valve fgd	773053	1309	1319	1329	1339	1349	1359	1369	1379	1389							
Valve DBBT	778551	6109	6119	6129	6139	6149											
Valve DBBF	778549	6109	6119	6129	6139	6149											
Miscellaneous																	
Gasket spiral wound	854360	4041	4061	4081	4121	4141	4181	4201	4241	4261	4281	4301	4321	4341	4361	4381	4421
Insulating Gasket Kit	854606						7301										
Meterrun	766496	0731	0751	0771	0791												
Orifice flange set	766295						1421	1431	1299	1309	1211	1221	1231	1241	1251	1261	1271
Plug NPT	760518	0081	0121	0161	0181	0201											

Metric units

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
20	x	15	7630661421	7630671421	7630880401
25	x	15	7630661521	7630671521	7630880501
25	x	20	7630661621	7630671621	7630880601
40	x	15	7630661739	7630671739	
40	x	20	7630661839	7630671839	7630880819
40	x	25	7630661889	7630671889	7630880919
50	x	20	7630661901	7630671901	
50	x	25	7630662031	7630672031	7630881121
50	x	40	7630662111	7630672111	7630881161
80	x	40	7630662311	7630672311	
80	x	50	7630662411	7630672411	7630881341
100	x	40	7630662561	7630672561	
100	x	50	7630662701	7630672701	7630881611
100	x	80	7630662801	7630672801	7630881731
150	x	80	7630663001	7630673001	7630881851
150	x	100	7630663091	7630673091	7630881911
200	x	100	7630663281	7630673281	7630882171
200	x	150	7630663381	7630673381	7630882371
250	x	100	7631663429	7631753429	7631882641
250	x	150	7631663511	7631753511	7631882811
250	x	200	7631663681	7631753681	7631882941
300	x	150	7631663791	7631753791	7631883211
300	x	200	7631663981	7631753981	7631883311
300	x	250	7631664071	7631754071	7631883531
350	x	150	7631664059	7631754059	
350	x	200	7631664251	7631754251	7631883931
350	x	250	7631664371	7631754371	7631884181
350	x	300	7631664481	7631754481	7631884441

Thermowell flgd DN 50	
Length (mm)	MESC number
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
400	x 200		7631664561	7631754561	
400	x 250		7631664651	7631754651	7631885081
400	x 300		7631664771	7631754771	7631885341
400	x 350		7631664881	7631754881	7631885591
450	x 250		7631665271	7631755271	7631886071
450	x 300		7631665571	7631755571	7631886311
450	x 350		7631665881	7631755881	7631886551
450	x 400		7631666181	7631756181	7631886791
500	x 300		7631666471	7631756471	7631887511
500	x 350		7631666781	7631756781	7631887751
500	x 400		7631667081	7631757081	7631887991
500	x 450		7631667381	7631757381	7631888231
600	x 300				7631888711
600	x 350				7631888951
600	x 400		7631668881	7631758881	7631889191
600	x 450		7631669181	7631759181	7631889431
600	x 500		7631669581	7631759481	7631889671

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting fgd
BN6B	Branch fitting bw
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BROB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR3B	BR6B	BROB
15	40	-	50	7672293601	7672693519		
15	80	-	150	7672293611	7672693529		
15	200	-	600	7672293621	7672693549		
20	50	-	50	7672293641	7672693569		
20	80	-	250	7672293651	7672693579		
20	300	-	600	7672293661	7672693589		
25	80	-	250	7672292151	7672693619		
25	300	-	600	7672293701	7672693629		
40	80	-	80	7672293721	7672693659		
40	100	-	100	7672293731	7672693669		
40	150	-	200	7672293741	7672693679		
40	250	-	450	7672293751	7672693689		
40	500	-	600	7672293761	7672693699		
50	150	-	200			7679031001	
50	250	-	450			7679031011	
50	500	-	600			7678903051	
80	200	-	200			7679031161	
80	250	-	250			7679031171	
80	300	-	300			7679031181	
80	350	-	350			7679031191	
80	400	-	400			7679031201	
80	450	-	450			7679031211	
80	500	-	500			7679031221	
80	600	-	600			7679031241	

Metric units

REDUCING/PIPING COMPONENTS c

Branch	Run	pipe	BN6F	BN6B	BR3B	BR6B	BROB
100	300	-	300				7679025309
100	350	-	350				7679025319
100	400	-	400				7679025329
100	450	-	450				7679025339
100	500	-	500				7679025349
100	600	-	600				7679025359
150	350	-	350				7679025431
150	400	-	400				7679025441
150	450	-	450				7679025451
150	500	-	500				7679025461
150	600	-	600				7679025481
200	400	-	400				7679016961
200	450	-	450				7679016971
200	500	-	500				7679016981
200	600	-	600				7679016991
250	500	-	500				7679017041
250	600	-	600				7679017051

Metric units

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	1/2	x	80	8138170279
20	4	5/8	x	90	8138170759
25	4	5/8	x	100	8138170779
40	4	3/4	x	110	8138171439
50	8	5/8	x	110	8138170799
80	8	3/4	x	130	8138171479
100	8	7/8	x	150	8138172229
150	12	1	x	180	8138173079
200	12	1 1/8	x	200	8138173949
250	16	1 1/4	x	220	8138174789
300	20	1 1/4	x	230	8138174809
350	20	1 3/8	x	240	8138175599
400	20	1 1/2	x	260	8138176359
450	20	1 5/8	x	280	8138177069
500	24	1 5/8	x	290	8138177089
600	24	1 7/8	x	330	8138178359

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	8	5/8	x	130	8138170839
80	8	3/4	x	140	8138171499
100	8	7/8	x	160	8138172249
150	12	1	x	190	8138173099
200	12	1 1/8	x	220	8138173989
250	16	1 1/4	x	240	8138174829
300	20	1 1/4	x	250	8138174849
350	20	1 3/8	x	270	8138175659
400	20	1 1/2	x	290	8138176419
450	20	1 5/8	x	320	8138177149
500	24	1 5/8	x	340	8138177189
600	24	1 7/8	x	390	8138178479

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	1/2	x	90	8138170299
20	4	5/8	x	100	8138170779
25	4	5/8	x	110	8138170799
40	4	3/4	x	130	8138171479
50	8	5/8	x	130	8138170839
80	8	3/4	x	150	8138171519
100	8	7/8	x	170	8138172269
150	12	1	x	200	8138173119
200	12	1 1/8	x	240	8138174029
250	16	1 1/4	x	260	8138174869
300	20	1 1/4	x	270	8138174889
350	20	1 3/8	x	290	8138175699
400	20	1 1/2	x	320	8138176479
450	20	1 5/8	x	340	8138177189
500	24	1 5/8	x	360	8138177229
600	24	1 7/8	x	420	8138178539

Coated boltset mrun flg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	7/8	x	150	8138172229
20	4	7/8	x	150	8138172229
25	4	7/8	x	150	8138172229
40	4	1	x	160	8138173039

Coated boltset for Dual Plate Solid Lug

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	8	5/8	x	170	8138170919
80	8	3/4	x	210	8138171639
100	8	7/8	x	230	8138172389
150	12	1	x	320	8138173359

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7662102081
Welding neck flange	1	7662787351
Gasket spiral wound	1	8543604041
Studbolt with nuts	4	8138170759

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7662102121
Gasket spiral wound	1	8543604061
Studbolt with nuts	4	8138170759

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7662102121
Welding neck flange	1	7662787361
Gasket spiral wound	1	8543604061
Studbolt with nuts	4	8138170759

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7662102161
Gasket spiral wound	1	8543604081
Studbolt with nuts	4	8138170779

Drain or vent point DN 40 Fig.H DN350 - 600

Branch: branch nipple flanged

Blind flange	1	7662102181
Gasket spiral wound	1	8543604121
Studbolt with nuts	4	8138171439

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Lap joint flange	1	7662204201
Pipe	1	7430030731
Welding neck flange	1	7662798101
Gasket spiral wound	1	8543604141
Thermowell flgd DN 50 L=230 mm	1	7683385611
Studbolt with nuts	4	8138170839

Temp instr conn DN 50 Fig.HL DN150 - 600

Branch: according to branch table

Lap joint flange	1	7662204201
Pipe	1	7430030731
Welding neck flange	1	7662798101
Gasket spiral wound	1	8543604141
Thermowell flgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	4	8138170839

CLASS 063411-Z

Design limits**Temperature (°C)**

	-29	0	50	75	100	125	150
--	-----	---	----	----	-----	-----	-----

Pressure (Barg)	DN 15-600	99.3	99.3	96.2	90.3	84.4	80.7	77.0
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 2.2
- For basis of design see DEP 31.38.01.10-Gen.
- External protection is required for design temperatures > 50 degr. C [120 °F] in saliferous atmospheres to prevent chloride stress corrosion cracking.
- When chlorides are present in the process fluid in conjunction with free oxygen, the max. temperature is limited to 50 deg C [120 °F], to prevent chloride stress corrosion cracking
- Piping class design meets full vacuum at ambient temperature condition
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- The use of triple eccentric butterfly valves is considered most economical.
- Use gate valves only where fouling and abrasion are negatively affecting their functionality
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**

Table of schedules

DN	Schedule
15	40S
20	40S
25	40S
40	40S
50	40S
80	40S
100	40S
150	80S
200	80S
250	80S
300	80S
350	80S
400	80S
450	80S
500	80S
600	80S

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
500	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
450	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
400	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
350	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
300	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
250	C	C	C	C	E	E	B	B	B	A						
200	C	C	C	C	E	E	B	B	B	A						
150	C	C	C	C	E	B	B	B	A							
100	C	C	C	C	B	B	B	A								
80	C	C	C	C	B	B	A									
50	C	C	B	B	A											
40	C	B	B	A												
25	B	B	A													
20	B	A														
15	A															

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
C	Branch fitting
E	Branch outlet

Stainl steel AISI 316	063411-Z	Plant
Class no.	063411-Z	Consignee
ASME rating	CLASS 600	Engineered by
Corrosion allowance	0 mm	Principal
Revision letter		Contr. job no.
Revision date		Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-300	ASTM A312-TP316
PIPE	Pipe	DN 150-600	ASTM A358-316

Flanges

BLFL	Blind flange	DN 15-600	ASTM A182-F316
LJFL	Lap joint flange	--	ASTM A105
SBNF	Spectacle blind	DN 15-300	ASTM A240-TP316
SPNF	Spade	DN 15-600	ASTM A240-TP316
SRNF	Spacer ring	DN 15-600	ASTM A240-TP316
WNFL	Welding neck flange	DN 15-600	ASTM A182-F316

Fittings

CAPB	Cap bw	DN 15-600	ASTM A403-WP316
E45B	Elbow 45 deg LR bw	DN 15-150	ASTM A403-WP316
E45B	Elbow 45 deg LR bw	DN 200-600	ASTM A403 Class WP-S/WX-316
E90B	Elbow 90 deg LR bw	DN 15-150	ASTM A403-WP316
E90B	Elbow 90 deg LR bw	DN 200-600	ASTM A403 Class WP-S/WX-316
TEEB	Tee equal bw	DN 15-600	ASTM A403-WP316

Reducing fittings

BN3F	Branch fitting flgd	DN 40-250	ASTM A182-F316
BN3P	Branch fitting plain	DN 40-250	ASTM A182-F316
BN6F	Branch fitting flgd	DN 300-600	ASTM A182-F316
BN6P	Branch fitting plain	DN 300-600	ASTM A182-F316
BR3B	Branch outlet bw	DN 150-250	ASTM A182-F316
BR6B	Branch outlet bw	DN 300-600	ASTM A182-F316
BROB	Branch outlet bw	DN 350-600	ASTM A182-F316
RECB	Reducer concentric bw	DN 20-150	ASTM A403-WP316
RECB	Reducer concentric bw	DN 200-600	ASTM A403 Class WP-S/WX-316
REEB	Reducer eccentric bw	DN 20-150	ASTM A403-WP316
REEB	Reducer eccentric bw	DN 200-600	ASTM A403 Class WP-S/WX-316
TERB	Tee reducing bw	DN 20-600	ASTM A403-WP316

Valves

BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, Devlon V
BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, Devlon V
BTFF	Ball valve trunn FB flgd	DN 50-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, Devlon V
BTRF	Ball valve trunn RB flgd	DN 80-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, Devlon V
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A351-CF8M Trim: AISI 316, Duplex, Stellite
CHVF	Check valve flgd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316, Stellite
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, Stellite 6
CHVF	Check valve flgd	DN 80-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, Stellite
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316, Stellite
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, Stellite
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316, Stelite
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316, Stelite
DBBT	Valve ass double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316, Devlon V
DBBF	Valve ass double block ball & bleed flgd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316, Devlon V
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A182-F316 Trim: AISI 316, Stelite

Instruments

TWND	Thermowell flgd DN 40	DN 40-40	ASTM B564 UNS N04400
TWNS	Thermowell flgd DN 40 L=230 mm	--	ASTM B564 UNS N04400
TWNL	Thermowell flgd DN 40 L=255 mm	--	ASTM B564 UNS N04400
TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	AISI 316, Graphite CS centring-/SS inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/AISI 316 end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A182-F316
STBT	Studbolt with nuts	--	ASTM A193-B7/A194-2H <i>Coated with Xylan 1070 or Takecoat 1000</i>

PIPING COMPONENTS

Item description	Nominal pipe size																			
	15 MESC	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600				
Pipe																				
Pipe	743623 0	181	261	341	501	581	661	741	851	961										
Pipe	743623 1																			
Pipe	743625 0										841	961								
Pipe	743625 1												101	211						
Flanges																				
Blind flange	766510	4621	4641	4661	4681	4701	4721	4741	4761	4781	4801	4821	4831	4841	4851	4861	4871			
Spacer ring	768915	5081	5121	5161	5181	5201	5221	5241	5261	5281	5301	5321	5341	5361	5381	5401	5421			
Spade	768950	3321	3341	3361	3381	3401	3421	3441	3461	3481	3501	3521	3541	3561	3581	3601	3621			
Spectacle blind	768981	4081	4121	4161	4181	4201	4221	4241	4261	4281	4301	4321								
Welding neck flange	766580	4821	4841	4861	4881	4901	4921	4941	5561	5581	5601	5201	5221	5241	5261	5281	5301			
Fittings																				
Cap bw	763318	2861	2961	3061	3261	3361	3561	3761	3981	4111	4251	4391	4511	4611	4731	4841	5041			
Elbow 45 deg LR bw	763338	2861	2961	3061	3261	3361	3561	3761	3981	4111	4251	4391	4511	4621	4731	4841	5041			
Elbow 90 deg LR bw	763346	2861	2961	3061	3261	3361	3561	3761	3981	4111	4251	4391	4511	4621	4731	4841	5041			
Tee equal bw	763384	2861	2961	3061	3261	3361	3561	3761	3981	4111	4251	4421	4531	4621	4741	4851	5051			

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																	
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600		
Valves																			
Ball valve float FB flgd	770326	6039	6049	6059	6079														
Ball valve float RB flgd	770326	1039	1049	1059	1079	1089													
Ball valve trunn FB flgd	770349					6089	6109	6129	6149	6159	6169	6179	6189	6199	6209	6219	6239		
Ball valve trunn RB flgd	770349						1109	1129	1149	1159	1169	1179	1189	1199	1209	1219	1239		
Butterfly valve triple of flgd	774431							1159	1169	1179	1189	1199	1209	1219	1239				
Check Valve dual plate flgd	776814								0109	0119	1179	1189	1199	1209	1219	1239			
Check Valve Wafer Lug (Solid)	776851						1099	1109	1129	1149									
Check valve flgd	771319	1039	1049	1059	1079		1099	1109	1129	1149	1159	1169	1179	1189	1199	1209	1219	1239	
Check valve flgd	771303					1099	4109	4129	4149	4159	4169	4179	4189	4199	4209	4219	4239		
Gate valve flgd	772303	1039	1049	1059	1079	1099	4109	4129	4149	4159	4169	4179	4189	4199	4209	4219	4239		
Globe valve flgd	773303	1039	1049	1059	1079	1099	1109	1129	1149	1159									
DBBT	778556	8039	8049	8059	8079	8089													
DBBF	778595	8039	8049	8059	8079	8089													
Miscellaneous																			
Gasket spiral wound	854136	4041	4061	4081	4121	4141	4181	4201	4241	4261	4281	4301	4321	4341	4361	4381	4421		
Meterrun	766496	0231	0251	0271	0291														
Orifice flange set	766592					5091	5101	5111	5191	5201	5211	5371	5381	5391	5401	5411	5421		

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7633695661	7633715661	7633855181
25	x	15	7633695761	7633715761	7633855281
25	x	20	7633695871	7633715861	7633855381
40	x	15	7633695961	7633715961	
40	x	20	7633696161	7633716161	7633855481
40	x	25	7633696261	7633716261	7633855581
50	x	20	7633696311	7633716351	
50	x	25	7633696361	7633716361	7633855741
50	x	40	7633696461	7633716461	7633855841
80	x	40	7633696761	7633716761	
80	x	50	7633696861	7633716861	7633858041
100	x	40	7633697021	7633717011	
100	x	50	7633697061	7633717061	7633858201
100	x	80	7633697161	7633717161	7633858281
150	x	80	7633697461	7633717461	7633858371
150	x	100	7633697561	7633717561	7633858451
200	x	100	7633697681	7633717681	7633858531
200	x	150	7633697811	7633717811	7633858621
250	x	100	7633697851	7633717851	7638813871
250	x	150	7633697951	7633717951	7633858741
250	x	200	7633698101	7633718111	7633858771
300	x	150	7633698231	7633718181	7633858571
300	x	200	7633698361	7633718361	7633858961
300	x	250	7633698451	7633718451	7633858971
350	x	150	7633698481	7633718481	
350	x	200	7633698531	7633718531	7633859031
350	x	250	7633698611	7633718621	7633859061
350	x	300	7633698681	7633718701	7633859091

Thermowell flgd DN 50

<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

Thermowell flgd DN 40

<u>Length (mm)</u>	<u>MESC number</u>
230	7683375111
255	7683375121
305	7683375131
355	7683375141
405	7683375151
455	7683375161

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200	7633698731	7633718731		
400	x 250	7633698761	7633718761	7633859181	
400	x 300	7633698881	7633718881	7638816531	
400	x 350	7633698971	7633718971	7633859231	
450	x 250	7633699001	7633719001	7633859271	
450	x 300	7633699021	7633719021	7633859331	
450	x 350	7633699101	7633719101	7638817421	
450	x 400	7633699131	7633719151	7633859391	
500	x 300	7633699221	7633719221	7633859481	
500	x 350	7633699241	7633719241	7638818311	
500	x 400	7633699321	7633719321	7638818521	
500	x 450	7633699411	7633719431	7633859571	
600	x 300			7633859631	
600	x 350			7633859661	
600	x 400	7633699541	7633719551	7638819411	
600	x 450	7633699741	7633719721	7633859721	
600	x 500	7633699911	7633719901	7633859751	

<u>Comp.name</u>	<u>Description</u>
BN3F	Branch fitting fgd
BN3P	Branch fitting plain
BN6F	Branch fitting fgd
BN6P	Branch fitting plain
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BR0B	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN6F	BN3P	BN6P	BR3B	BR6B	BROB
15	40	-	40	7672326001	7680316031				
15	50	-	50	7672326011	7680316051				
15	80	-	200	7672326021	7680316071				
15	250	-	250	7672326031	7672604341				
15	300	-	600		7672604631				
20	50	-	50	7672326051	7680316191				
20	80	-	100	7672326061	7680316201				
20	150	-	250	7672326071	7680316211				
20	300	-	600		7672604681				
25	80	-	80	7672326111	7680316241				
25	100	-	100	7672326121	7680316251				
25	150	-	250	7672326131	7680316261				
25	300	-	600		7672604711				
40	80	-	80	7672326161	7680316291				
40	100	-	100	7672326171	7680316301				
40	150	-	150	7672326181	7680316311				
40	200	-	250	7672326191	7680316331				
40	300	-	450		7672604761				
40	500	-	600	7672327551	7672604771				
50	150	-	150		7679703641				
50	200	-	250		7679703671				
50	300	-	450			7679719191			
50	500	-	600			7678533101			
80	200	-	200		7679703901				
80	250	-	250		7679703911				
80	300	-	300			7679719301			
80	350	-	350			7679719311			
80	400	-	400			7679719321			
80	450	-	450			7679719331			
80	500	-	500			7679719341			
80	600	-	600			7679719351			

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN6F	BN3P	BN6P	BR3B	BR6B	BROB
100	300	-	300					7679719391	
100	350	-	350					7679719401	
100	400	-	400					7679719411	
100	450	-	450					7679719421	
100	500	-	500					7679719431	
100	600	-	600					7679719441	
150	350	-	350					7679709591	
150	400	-	400					7679709601	
150	450	-	450					7679709611	
150	500	-	500					7679709621	
150	600	-	600					7679709631	
200	400	-	400					7679709671	
200	450	-	450					7679709681	
200	500	-	500					7679709691	
200	600	-	600					7679709701	
250	500	-	500					7679709751	
250	600	-	600					7679709761	

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 80	8138150279
20	4	5/8	x 90	8138150759
25	4	5/8	x 100	8138150779
40	4	3/4	x 110	8138151439
50	8	5/8	x 110	8138150799
80	8	3/4	x 130	8138151479
100	8	7/8	x 150	8138152229
150	12	1	x 180	8138153079
200	12	1 1/8	x 200	8138153949
250	16	1 1/4	x 220	8138154789
300	20	1 1/4	x 230	8138154809
350	20	1 3/8	x 240	8138155599
400	20	1 1/2	x 260	8138156359
450	20	1 5/8	x 280	8138157069
500	24	1 5/8	x 290	8138157089
600	24	1 7/8	x 330	8138158359

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138150839
80	8	3/4	x 140	8138151499
100	8	7/8	x 160	8138152249
150	12	1	x 190	8138153099
200	12	1 1/8	x 220	8138153989
250	16	1 1/4	x 240	8138154829
300	20	1 1/4	x 250	8138154849
350	20	1 3/8	x 270	8138155659
400	20	1 1/2	x 290	8138156419
450	20	1 5/8	x 320	8138157149
500	24	1 5/8	x 340	8138157189
600	24	1 7/8	x 390	8138158479

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 170	8138150919
80	8	3/4	x 210	8138151639
100	8	7/8	x 230	8138152389
150	12	1	x 310	8138153339

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 90	8138150299
20	4	5/8	x 100	8138150779
25	4	5/8	x 110	8138150799
40	4	3/4	x 130	8138151479
50	8	5/8	x 130	8138150839
80	8	3/4	x 150	8138151519
100	8	7/8	x 170	8138152269
150	12	1	x 200	8138153119
200	12	1 1/8	x 240	8138154029
250	16	1 1/4	x 260	8138154869
300	20	1 1/4	x 270	8138154889
350	20	1 3/8	x 290	8138155699
400	20	1 1/2	x 320	8138156479
450	20	1 5/8	x 340	8138157189
500	24	1 5/8	x 360	8138157229
600	24	1 7/8	x 420	8138158539

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7665104621
Welding neck flange	1	7665804821
Gasket spiral wound	1	8541364041
Studbolt with nuts	4	8138150279

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7665104641
Welding neck flange	1	7665804841
Gasket spiral wound	1	8541364061
Studbolt with nuts	4	8138150759

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7665104641
Gasket spiral wound	1	8541364061
Studbolt with nuts	4	8138150759

Drain or vent point DN 25 Fig.H DN80 - 600

Branch: branch nipple flanged

Blind flange	1	7665104661
Gasket spiral wound	1	8541364081
Studbolt with nuts	4	8138150779

Temp instr conn DN 40 Fig.NS DN80 - 100

Branch: branch nipple flanged

Lap joint flange	1	7662204181
Gasket spiral wound	1	8541364121
Thermowell flgd DN 40 L=230 mm	1	7683375111
Studbolt with nuts	4	8138151459

Temp instr conn DN 40 Fig.NL DN150 - 250

Branch: branch nipple flanged

Lap joint flange	1	7662204181
Gasket spiral wound	1	8541364121
Thermowell flgd DN 40 L=255 mm	1	7683375121
Studbolt with nuts	4	8138151459

Temp instr conn DN 50 Fig.HL DN300 - 600

Branch: according to branch table

Lap joint flange	1	7662204201
Pipe	1	7436230581
Welding neck flange	1	7665804901
Gasket spiral wound	1	8541364141
Thermowell flgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	4	8138150839

CLASS 063461-Y

Design limits**Temperature (°C)**

	-101	0	50	75	100	120	150
--	------	---	----	----	-----	-----	-----

Pressure (Barg)	DN 15-600	99.3	99.3	96.2	90.3	84.4	80.7	77.0
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 2.2.
- For basis of design see DEP 31.38.01.10-Gen.
- External protection is required for design temperatures > 50 degr. C [120 °F] in saliferous atmospheres to prevent chloride stress corrosion cracking.
- When chlorides are present in the process fluid in conjunction with free oxygen, the max. temperature is limited to 50 deg C [120 °F], to prevent chloride stress corrosion cracking
- Piping class design meets full vacuum at ambient temperature condition
- Non-extended bonnet valves in this piping class are intended for short term low temperature excursion (e.g non-operable during depressurization) (or) non-insulated piping only.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**

Table of schedules

DN	Schedule
15	40S
20	40S
25	40S
40	40S
50	40S
80	40S
100	40S
150	80S
200	80S
250	80S
300	80S
350	80S
400	80S
450	80S
500	80S
600	80S

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
500	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
450	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
400	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
350	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
300	C	C	C	C	E	E	E	E	E	B	B	B	B	B	A	
250	C	C	C	C	E	E	B	B	B	A						
200	C	C	C	C	E	E	B	B	B	A						
150	C	C	C	C	E	B	B	B	A							
100	C	C	C	C	B	B	A									
80	C	C	C	C	B	B	A									
50	C	C	B	B	A											
40	C	B	B	A												
25	B	B	A													
20	B	A														
15	A															

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
C	Branch fitting
E	Branch outlet

Stainl steel AISI 316(L) Sour
 Class no. 063461-Y
 ASME rating CLASS 600
 Corrosion allowance 0 mm
 Revision letter
 Revision date

Plant
 Consignee
 Engineered by
 Principal
 Contr. job no.
 Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-300	ASTM A312-TP316(L)
PIPE	Pipe	DN 150-600	ASTM A358-316(L)

Flanges

BLFL	Blind flange	DN 15-600	ASTM A182-F316(L)
LJFL	Lap joint flange	--	ASTM A182-F316
SBNF	Spectacle blind	DN 15-300	ASTM A240-TP316(L)
SPNF	Spade	DN 15-600	ASTM A240-TP316(L)
SRNF	Spacer ring	DN 15-600	ASTM A240-TP316(L)
WNFL	Welding neck flange	DN 15-600	ASTM A182-F316(L)

Fittings

CAPB	Cap bw	DN 15-600	ASTM A403-WP316(L)
E45B	Elbow 45 deg LR bw	DN 15-150	ASTM A403-WP316(L)
E45B	Elbow 45 deg LR bw	DN 200-600	ASTM A403 Class WP-S/WX-316(L)
E90B	Elbow 90 deg LR bw	DN 15-150	ASTM A403-WP316(L)
E90B	Elbow 90 deg LR bw	DN 200-600	ASTM A403 Class WP-S/WX-316(L)
TEEB	Tee equal bw	DN 15-600	ASTM A403-WP316(L)

Reducing fittings

BN3F	Branch fitting flgd	DN 40-250	ASTM A182-F316(L)
BN3B	Branch fitting bw	DN 40-250	ASTM A182-F316(L)
BN6F	Branch fitting flgd	DN 300-600	ASTM A182-F316(L)
BN6B	Branch fitting bw	DN 300-600	ASTM A182-F316(L)
BR3B	Branch outlet bw	DN 150-250	ASTM A182-F316(L)
BR6B	Branch outlet bw	DN 300-600	ASTM A182-F316(L)
BROB	Branch outlet bw	DN 350-600	ASTM A182-F316(L)
RECB	Reducer concentric bw	DN 20-150	ASTM A403-WP316(L)
RECB	Reducer concentric bw	DN 200-600	ASTM A403 Class WP-S/WX-316(L)
REEB	Reducer eccentric bw	DN 20-150	ASTM A403-WP316(L)
REEB	Reducer eccentric bw	DN 200-600	ASTM A403 Class WP-S/WX-316(L)
TERB	Tee reducing bw	DN 20-600	ASTM A403-WP316(L)

Valves

BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), filled PTFE
BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), filled PTFE
BNFF	Ball valve trunn FB n-ext flgd	DN 50-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), filled PTFE
BNRF	Ball valve trunn RB n-ext flgd	DN 80-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), filled PTFE
BTFF	Ball valve trunn FB flgd	DN 50-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), filled PTFE
BTRF	Ball valve trunn RB flgd	DN 80-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), filled PTFE
BUTF	Butterfly valve triple of flgd	DN 200-600	Body: ASTM A351-CF8M Trim: AISI 316(L), Nitronic, Stellite
BVFF	Ball valve float FB n-ext flgd	DN 15-40	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), filled PTFE
BVRF	Ball valve float RB n-ext flgd	DN 15-50	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), filled PTFE
CHDF	Check valve dual plate Solid wafer lug/ flgd	DN 50-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), Stellite
CHVF	Check valve flgd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316(L), Stellite
CHVF	Check valve flgd	DN 80-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), Stellite
GANF	Gate valve n-ext flgd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316(L), Stellite
GANF	Gate valve n-ext flgd	DN 80-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), Stelite
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316(L), Stelite
GAVF	Gate valve flgd	DN 80-600	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), Stelite
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316(L), Stelite
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A182-F316/A351-CF8M Trim: AISI 316(L), Stelite
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316(L), filled PTFE
DBBF	Valve assy Double block ball & bleed flgd	DN 15-50	Body: ASTM A182-F316 Trim: AISI 316(L), filled PTFE
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A182-F316 (L) Trim: AISI 316 (L), Stelite

Instruments

TWND	Thermowell flgd DN 40	DN 40-40	ASTM B564 UNS N04400
TWNS	Thermowell flgd DN 40 L=230 mm	--	ASTM B564 UNS N04400
TWNL	Thermowell flgd DN 40 L=255 mm	--	ASTM B564 UNS N04400
TWHD	Thermowell flgd DN 50	DN 50-50	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	AISI 316(L), Graphite CS centring-/SS inner ring
MTRR	Meterrun	DN 15-40	Alloy 400/AISI 316(L) end flanges
ORFS	Orifice flange set	DN 50-600	ASTM A182-F316(L)
STBT	Studbolt with nuts	DN 15-400	ASTM A193 GRADE B8M-CLASS 2/ASTM A194 GRADE 8M Coated with Xylan 1070 or Takecoat 1000
STBT	Studbolt with nuts	UPTO 1 1/2" Bolt DIA. DN 450-600 BOLT DIA >1 1/2"≤1 7/8"	ASTM A193 GRADE B8M2-CLASS 2B/ASTM A194 GRADE 8M Coated with Xylan 1070 or Takecoat 1000

PIPING COMPONENTS

Item description	Nominal pipe size																
	15 MESC	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	
Pipe																	
Pipe	743623 0	181	261	341	501	581	661	741	851	961							
Pipe		743623 1									101	211					
Pipe	743625 0										841	961					
Pipe		743625 1									081	191	311	421	511	621	811
Flanges																	
Blind flange	766510	4621	4641	4661	4681	4701	4721	4741	4761	4781	4801	4821	4831	4841	4851	4861	4871
Spacer ring	768915	5081	5121	5161	5181	5201	5221	5241	5261	5281	5301	5321	5341	5361	5381	5401	5421
Spade	768950	3321	3341	3361	3381	3401	3421	3441	3461	3481	3501	3521	3541	3561	3581	3601	3621
Spectacle blind	768981	4081	4121	4161	4181	4201	4221	4241	4261	4281	4301	4321					
Welding neck flange	766580	4821	4841	4861	4881	4901	4921	4941	5561	5581	5601	5201	5221	5241	5261	5281	5301
Fittings																	
Cap bw	763318	2861	2961	3061	3261	3361	3561	3761	3981	4111	4251	4391	4511	4611	4731	4841	5041
Elbow 45 deg LR bw	763338	2861	2961	3061	3261	3361	3561	3761	3981	4111	4251	4391	4511	4621	4731	4841	5041
Elbow 90 deg LR bw	763346	2861	2961	3061	3261	3361	3561	3761	3981	4111	4251	4391	4511	4621	4731	4841	5041
Tee equal bw	763384	2861	2961	3061	3261	3361	3561	3761	3981	4111	4251	4421	4531	4621	4741	4851	5051

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																		
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600			
Valves																				
Ball valve float FB flgd	770325	6039	6049	6059	6079															
Ball valve float RB flgd	770325	1039	1049	1059	1079	1089														
Ball valve trunn FB n-ext flgd	770355					6089	6109	6129	6149	6159	6169	6179	6189	6199	6209	6219	6239			
Ball valve trunn RB n-ext flgd	770355						1109	1129	1149	1159	1169	1179	1189	1199	1209	1219	1239			
Ball valve trunn FB flgd	770373					6089	6109	6129	6149	6159	6169	6179	6189	6199	6209	6219	6239			
Ball valve trunn RB flgd	770373						1109	1129	1149	1159	1169	1179	1189	1199	1209	1219	1239			
Ball valve float FB n-ext flgd	770327	6039	6049	6059	6079															
Ball valve float RB n-ext flgd	770327	1039	1049	1059	1079															
Butterfly valve triple of flgd	774426										1159	1169	1179	1189	1199	1209	1219	1239		
Check valve dual plate flgd	776813										0059	0069	1179	1189	1199	1209	1219	1239		
Check valve wafer lug (solid)	776856					1099	1109	1129	1149											
Check valve flgd	771319	1039	1049	1059	1079	1099	1109	1129	1149	1159	1169	1179	1189	1199	1209	1219	1239			
Gate valve flgd	772305	1039	1049	1059	1079	1099	4109	4129	4149	4159	4169	4179	4189	4199	4209	4219	4239			
Gate valve n-ext flgd	772305	7039	7049	7059	7079	7099	7109	7129	7149	7159	7169	7179	7189	7199	7209	7219	7239			
Globe valve flgd	773305	1039	1049	1059	1079	1099	1109	1129	1149	1159										
Valve DBBT	778556	6029	6049	6059	6079	6089														
Valve DBBF	778595	6029	6049	6059	6079	6089														
Miscellaneous																				
Gasket spiral wound	854136	4041	4061	4081	4121	4141	4181	4201	4241	4261	4281	4301	4321	4341	4361	4381	4421			
Meterrun	766496	0231	0251	0271	0291															
Orifice flange set	766592					5091	5101	5111	5191	5201	5211	5371	5381	5391	5401	5411	5421			

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7633695661	7633715661	7633855181
25	x	15	7633695761	7633715761	7633855281
25	x	20	7633695871	7633715861	7633855381
40	x	15	7633695961	7633715961	
40	x	20	7633696161	7633716161	7633855481
40	x	25	7633696261	7633716261	7633855581
50	x	20	7633696311	7633716351	
50	x	25	7633696361	7633716361	7633855741
50	x	40	7633696461	7633716461	7633855841
80	x	40	7633696761	7633716761	
80	x	50	7633696861	7633716861	7633858041
100	x	40	7633697021	7633717011	
100	x	50	7633697061	7633717061	7633858201
100	x	80	7633697161	7633717161	7633858281
150	x	80	7633697461	7633717461	7633858371
150	x	100	7633697561	7633717561	7633858451
200	x	100	7633697681	7633717681	7633858531
200	x	150	7633697811	7633717811	7633858621
250	x	100	7633697851	7633717851	7638813871
250	x	150	7633697951	7633717951	7633858741
250	x	200	7633698101	7633718111	7633858771
300	x	150	7633698231	7633718181	7633858571
300	x	200	7633698361	7633718361	7633858961
300	x	250	7633698451	7633718451	7633858971
350	x	150	7633698481	7633718481	
350	x	200	7633698531	7633718531	7633859031
350	x	250	7633698611	7633718621	7633859061
350	x	300	7633698681	7633718701	7633859091

Thermowell flgd DN 50

<u>Length (mm)</u>	<u>MESC number</u>
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

Thermowell flgd DN 40

<u>Length (mm)</u>	<u>MESC number</u>
230	7683375111
255	7683375121
305	7683375131
355	7683375141
405	7683375151
455	7683375161

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200	7633698731	7633718731		
400	x 250	7633698761	7633718761	7633859181	
400	x 300	7633698881	7633718881	7638816531	
400	x 350	7633698971	7633718971	7633859231	
450	x 250	7633699001	7633719001	7633859271	
450	x 300	7633699021	7633719021	7633859331	
450	x 350	7633699101	7633719101	7638817421	
450	x 400	7633699131	7633719151	7633859391	
500	x 300	7633699221	7633719221	7633859481	
500	x 350	7633699241	7633719241	7638818311	
500	x 400	7633699321	7633719321	7638818521	
500	x 450	7633699411	7633719431	7633859571	
600	x 300			7633859631	
600	x 350			7633859661	
600	x 400	7633699541	7633719551	7638819411	
600	x 450	7633699741	7633719721	7633859721	
600	x 500	7633699911	7633719901	7633859751	

<u>Comp.name</u>	<u>Description</u>
BN3F	Branch fitting flgd
BN3B	Branch fitting bw
BN6F	Branch fitting flgd
BN6B	Branch fitting bw
BR3B	Branch outlet bw
BR6B	Branch outlet bw
BR0B	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN6F	BN3B	BN6B	BR3B	BR6B	BROB
15	40	-	40	7672326001	7680316039				
15	50	-	50	7672326011	7680316059				
15	80	-	200	7672326021	7680316079				
15	250	-	250	7672326031	7672604349				
15	300	-	600		7672604639				
20	50	-	50	7672326051	7680316199				
20	80	-	100	7672326061	7680316209				
20	150	-	250	7672326071	7680316219				
20	300	-	600		7672604689				
25	80	-	80	7672326111	7680316249				
25	100	-	100	7672326121	7680316259				
25	150	-	250	7672326131	7680316269				
25	300	-	600		7672604719				
40	80	-	80	7672326161	7680316299				
40	100	-	100	7672326171	7680316309				
40	150	-	150	7672326181	7680316319				
40	200	-	250	7672326191	7680316339				
40	300	-	450		7672604769				
40	500	-	600		7672604779				
50	150	-	150			7679703641			
50	200	-	250			7679703671			
50	300	-	450				7679719191		
50	500	-	600				7678533101		
80	200	-	200			7679703901			
80	250	-	250			7679703911			
80	300	-	300				7679719301		
80	350	-	350				7679719311		
80	400	-	400				7679719321		
80	450	-	450				7679719331		
80	500	-	500				7679719341		
80	600	-	600				7679719351		

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN6F	BN3B	BN6B	BR3B	BR6B	BROB
100	300	-	300					7679719391	
100	350	-	350					7679719401	
100	400	-	400					7679719411	
100	450	-	450					7679719421	
100	500	-	500					7679719431	
100	600	-	600					7679719441	
150	350	-	350					7679709591	
150	400	-	400					7679709601	
150	450	-	450					7679709611	
150	500	-	500					7679709621	
150	600	-	600					7679709631	
200	400	-	400					7679709671	
200	450	-	450					7679709681	
200	500	-	500					7679709691	
200	600	-	600					7679709701	
250	500	-	500					7679709751	
250	600	-	600					7679709761	

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 80	8138461579
20	4	5/8	x 90	8138462719
25	4	5/8	x 100	8138462739
40	4	3/4	x 110	8138463309
50	8	5/8	x 110	8138462749
80	8	3/4	x 130	8138463349
100	8	7/8	x 150	8138464069
150	12	1	x 180	8138464759
200	12	1 1/8	x 200	8138460149
250	16	1 1/4	x 220	8138460579
300	20	1 1/4	x 230	8138460589
350	20	1 3/8	x 240	8138460181
400	20	1 1/2	x 260	8138461191
450	20	1 5/8	x 280	8138387229
500	24	1 5/8	x 290	8138387249
600	24	1 7/8	x 330	8138387869

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 130	8138462789
80	8	3/4	x 140	8138463359
100	8	7/8	x 160	8138464079
150	12	1	x 190	8138460709
200	12	1 1/8	x 220	8138460999
250	16	1 1/4	x 240	8138460849
300	20	1 1/4	x 250	8138461139
350	20	1 3/8	x 270	8138460219
400	20	1 1/2	x 290	8138461779
450	20	1 5/8	x 320	8138387289
500	24	1 5/8	x 340	8138387329
600	24	1 7/8	x 390	8138387969

**Coated boltset for Dual Plate Solid Lug
Wafer Check Valve**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
50	8	5/8	x 170	8138462849
80	8	3/4	x 210	8138463459
100	8	7/8	x 230	8138460969
150	12	1	x 310	8138464839

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x mm</u>	<u>MESC number</u>
15	4	1/2	x 90	8138461599
20	4	5/8	x 100	8138462731
25	4	5/8	x 110	8138462749
40	4	3/4	x 130	8138463349
50	8	5/8	x 130	8138462789
80	8	3/4	x 150	8138461589
100	8	7/8	x 170	8138464099
150	12	1	x 200	8138461119
200	12	1 1/8	x 240	8138461439
250	16	1 1/4	x 260	8138460599
300	20	1 1/4	x 270	8138461149
350	20	1 3/8	x 290	8138460229
400	20	1 1/2	x 320	8138460249
450	20	1 5/8	x 340	8138387329
500	24	1 5/8	x 360	8138387369
600	24	1 7/8	x 420	8138388039

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7665104621
Welding neck flange	1	7665804821
Gasket spiral wound	1	8541364041
Studbolt with nuts	4	8138461579

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7665104641
Welding neck flange	1	7665804841
Gasket spiral wound	1	8541364061
Studbolt with nuts	4	8138462719

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7665104641
Gasket spiral wound	1	8541364061
Studbolt with nuts	4	8138462719

Drain or vent point DN 25 Fig.H DN80 - 600

Branch: branch nipple flanged

Blind flange	1	7665104661
Gasket spiral wound	1	8541364081
Studbolt with nuts	4	8138462739

Temp instr conn DN 40 Fig.NS DN80 - 100

Branch: branch nipple flanged

Lap joint flange	1	7665207621
Gasket spiral wound	1	8541364121
Thermowell flgd DN 40 L=230 mm	1	7683375111
Studbolt with nuts	4	8138463329

Temp instr conn DN 40 Fig.NL DN150 - 250

Branch: branch nipple flanged

Lap joint flange	1	7665207621
Gasket spiral wound	1	8541364121
Thermowell flgd DN 40 L=255 mm	1	7683375121
Studbolt with nuts	4	8138463329

Temp instr conn DN 50 Fig.HL DN300 - 600

Branch: according to branch table

Lap joint flange	1	7665200031
Pipe	1	7436230581
Welding neck flange	1	7665804901
Gasket spiral wound	1	8541364141
Thermowell flgd DN 50 L=255 mm	1	7683385621
Studbolt with nuts	4	8138462789

CLASS 251441-Z

Design limits

Temperature (°C)	-29	0	50	75	100	120
Pressure (Barg)	DN 25-100	315.5	315.5	315.5	315.5	315.5
	DN 150-400	287.7	287.7	287.7	287.7	287.7

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1 and ASME B31.3 allowable internal pressure
- For size DN 400, Flanges as per API 6A, TYPE 6BX, Ring Joint Type (RJ).
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class design meets full vacuum at ambient temperature condition
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 25-40) [NPS 1-1-1/2] for horizontal mounting only
- Installation of thermowell shall be validated considering branch pipe (nipo flange) internal diameter during detailed design.
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.
- EPC Contractor shall validate item coding for uniqueness.

Table of schedules

DN	Schedule
25	10.86mm
40	12.65mm
50	14.08mm
80	17.51mm
100	20.55mm
150	25.38mm
200	30.97mm
250	36.90mm
300	42.50mm
400	51.8mm

ASME Size	API 5000 Size
DN 50	2-1/16" Type 6B
DN 100	4-1/816" Type 6B
DN 250	11"
DN 400	

Branch connections 90 degrees

Run size	Branch Size									
	25	40	50	80	100	150	200	250	300	400
400	-	-	P	E	E	E	B	B	B	A
300	N	N	P	E	E	B	B	B	A	
250	N	N	P	E	B	B	B	A		
200	N	N	P	E	B	B	B	A		
150	N	N	P	B	B	B	A			
100	N	N	U	B	A					
80	N	N	U	A						
50	M	M	J							
40	M	J								
25	J									

Code	Explanation of characters
A	Equal tee BW
B	Reducing tee BW
E	Branch outlet BW
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel Sour	Plant
Class no.	Consignee

251441-Z

Metric units

ADNOC Classification: Internal

ASME rating	CLASS 2500	Engineered by
Corrosion allowance	6 mm	Principal
Revision letter		Contr. job no.
Revision date		Project no.

Metric units

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 25-40	ASTM A106-B
PIPE	Pipe	DN 50-400	ASTM A333-6

Flanges

BLFL	Blind flange	DN 25-300	ASTM A105N
BLFL	Blind flange API 6A, RJ	DN 400	ASTM A694 GR. F60
LJFL	Lap joint flange	--	ASTM A105N
SBNF	Spectacle blind	DN 25-250	ASTM A516-60/65/70
SPNF	Spade	DN 25-300	ASTM A516-60/65/70
SPNF	Spade	DN 400	ASTM A516N-70
SRNF	Spacer ring	DN 25-300	ASTM A516-60/65/70
SRNF	Spacer ring	DN 400	ASTM A516N-70
WNFL	Welding neck flange	DN 25-300	ASTM A105N
WNFL	Welding neck flange API 6A, RJ	DN 400	ASTM A694 GR. F60

Fittings

CAPB	Cap bw	DN 25-40	ASTM A234-WPB
CAPB	Cap bw	DN 50-400	ASTM A420-WPL6
E45B	Elbow 45 deg LR bw	DN 25-40	ASTM A234-WPB
E45B	Elbow 45 deg LR bw	DN 50-400	ASTM A420-WPL6
E90B	Elbow 90 deg LR bw	DN 25-40	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 50-400	ASTM A420-WPL6
TEEB	Tee equal bw	DN 25-40	ASTM A234-WPB
TEEB	Tee equal bw	DN 50-400	ASTM A420-WPL6

Reducing fittings

BN6B	Branch fitting bw	DN 80-300	ASTM A105N
BN6F	Branch fitting fgd	DN 80-300	ASTM A105N
BNXB	Branch fitting bw	DN 200-250	ASTM A105N
BNXF	Branch fitting fgd	DN 200-250	ASTM A105N
BR6B	Branch outlet bw	DN 150-300	ASTM A105N
BROB	Branch outlet bw	DN 150- 400	ASTM A105N
RECB	Reducer concentric bw	DN 40	ASTM A234-WPB
RECB	Reducer concentric bw	DN 50-400	ASTM A420-WPL6
REEB	Reducer eccentric bw	DN 40	ASTM A234-WPB
REEB	Reducer eccentric bw	DN 50-400	ASTM A420-WPL6
TERB	Tee reducing bw	DN 40	ASTM A234-WPB
TERB	Tee reducing bw	DN 50-400	ASTM A420-WPL6

Valves

BAFF	Ball valve float FB flgd	DN 25-40	Body: ASTM A105N Trim: Alloy 825, PEEK
BARF	Ball valve float RB flgd	DN 25-50	Body: ASTM A105N Trim: Alloy 825, PEEK
BTFF	Ball valve trunn FB flgd	DN 50-300	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, PEEK
BTFF	Ball valve trunn FB flgd	DN 400	Body: ASTM A694 GR. F60 Trim: Alloy 825, PEEK
BTRF	Ball valve trunn RB flgd	DN 80-300	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, PEEK
BTRF	Ball valve trunn RB flgd	DN 400	Body: ASTM A694 GR. F60 Trim: Alloy 825, PEEK
CHVF	Check valve flgd	DN 25-50	Body: ASTM A105N Trim: Alloy 825, Stellite
CHVF	Check valve flgd	DN 80-300	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, Stellite
CHVF	Check valve dual plate Solid Wafer lug/flgd	DN 400	Body: ASTM A694 GR. F60 Trim: Alloy 825, Stellite
GAVF	Gate valve flgd	DN 25-50	Body: ASTM A105N Trim: Alloy 825, Stellite
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-300	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, Stellite
GAVF	Gate valve flgd	DN 80-300	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, Stellite
GAVF	Gate valve flgd	DN 400	Body: ASTM A694 GR. F60 Trim: Alloy 825, Stellite
GLVF	Globe valve flgd	DN 25-50	Body: ASTM A105N Trim: Alloy 825, Stellite
GLVF	Globe valve flgd	DN 80-100	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, Stellite
GLVF	Globe valve flgd	DN 400	Body: ASTM A694 GR. F60 Trim: Alloy 825, Stellite
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 25-50	Body: ASTM A105N Trim: Alloy 825, PEEK
DBBF	Valve assy Double block ball & bleed flgd	DN 25-50	Body: ASTM A105N Trim: Alloy 825, PEEK
NVFL	Needle valve flgd	DN 25-40	Body: ASTM A105N Trim: Alloy 825, Stellite

Instruments

TWHD	Thermowell flgd DN 50	DN 50-5100	ASTM B564 UNS N04400
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM B564 UNS N04400
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM B564 UNS N04400

Miscellaneous

GKRJ	Gasket API 6A-6BX OCT. RING	DN 4050-100	API 6A Soft Iron, Zinc Plated, 90HB Max.
GKSW	Gasket spiral wound	DN 25-300	Alloy 825, Graphite CS centring/Alloy 825 inner ring
GKIK	Insulating Gasket kit	DN 15-50	(G-10/11) with 316 SS CORE, PTFE SS Pres Enrg Spirl Spring
ORFS	Orifice flange set	DN 50-300	ASTM A105N
STBT	Studbolt with nuts	25-300	ASTM A193-B7M/A194-2HM Coated with Xylan 1070 or Takecoat 1000

Special Fittings

AFCC	Access Fitting Flarweld Corrosion coupon (note-1)	DN 50	BODY: ASTM A105N HOLDER / ACCESS FITTING: Alloy 825 COUPON: ASTM A106-B
AFCP	Access Fitting Flarweld Corrosion Probe (note-2)	DN 50	BODY: ASTM A105N INTERNALS: Alloy 825
AFCI	Access Fitting Flanged Corrosion Inhibition Side connection ½" to 1" (note-3)	DN 50	BODY: Alloy 825 VALVE & INTERNALS: Alloy 825
AFSC	Access Fitting Flanged Sampling Connection Side connection ½" to 1" (note-3)	DN 50	BODY: ASTM A105N VALVE & INTERNALS: Alloy 825
APIF	API 5000, FLANGE, WN LINE-PIPE FLANGE, FORGED STEEL, RJ, API 6A TYPE 6B	DN50-100 (2-1/16"-4-1/16")	ASTM A694 GR F60
APIF	API 5000, WN FLANGE, FORGED, RJ, API 6A TYPE 6BX	DN 350-400	ASTM A694 GR F60
APIB	API 5000, BLIND FLANGE, FORGED, RJ, API 6A TYPE 6BX	DN 350-400	ASTM A694 GR F60

Notes for Special Fittings

1. Retrievable Type, Flarweld, Non-Tee Type With Disc Coupon Holder, Solid Plug Assembly, Heavy Duty Cover Without Hole Fitted, Coupon Holder: Multiple Coupon Holders (The Coupon Holder Shall Allow The Mounting Of 2 Discs, One Flush With The Bottom Pipe Wall, The Second One At Mid Diameter).
2. Retractable Type, Flare Weld, Non-Tee Type, Hollow Plug Assembly With ER Probe, Heavy Duty Cover Without Hole Fitted.
3. Retrievable Tee Type With Solid Plug Assembly, Heavy CS Protective Cover With Quill And Side Connection Flanged RF, Quill Length upto Middle Of Header Pipe

PIPING COMPONENTS

Nominal pipe size	MESC	25	40	50	80	100	150	200	250	300	400	600
<u>Item description</u>												
Pipe												
Pipe	743003 0	<u>239</u>	<u>639</u>									
Pipe	7430160			<u>669</u>	<u>749</u>	<u>839</u>						
Pipe	743016 2					<u>629</u>						
Pipe	743016 1						<u>029</u>	<u>149</u>	<u>279</u>			<u>399</u>
Flanges												
Blind flange	766210	4729	4749	4769	4789	4809	4849	4869	4889	4909		
Spacer ring	768908	2029	2049	2069	2089	2109	2129	2149	2169	2189		
Spade	768937	2029	2049	2069	2089	2109	2129	2149	2169	2189		
Spectacle blind	768962	2029	2049	2069	2089	2109	2129	2149	2169			
Welding neck flange	766278	0529	0549	0569	0589	0609	0649	0669	0689	0709		
Fittings												
Cap bw	763017	5739	5799									
Cap bw	763117			5839	5939	6139	6339	6539	6739	1449		
Elbow 45 deg LR bw	763034	5859	5959									
Elbow 45 deg LR bw	763134			2159	2359	2609	2809	2959	3209	3409		
Elbow 90 deg LR bw	763042	5859	5959									
Elbow 90 deg LR bw	763143			2209	2359	2609	2809	2959	3209	3409		
Tee equal bw	763081	5859	5959									
Tee equal bw	763180			2159	2359	2609	2809	2959	3209	3409		

Metric units

PIPING COMPONENTS

Item description	MESC	25	40	50	80	100	150	200	250	300	400
Valves											
Ball valve float FB fgd	770054	7539	7549								
Ball valve float RB fgd	770054	2539	2549	2559							
Ball valve trunn FB fgd	770091		7549	7569	7589	7609	7629	7649	7669	7679	
Ball valve trunn RB fgd	770091			2569	2589	2609	2629	2649	2669		
Check valve fgd	771043	2539	2549	2559	2579	2599	2609	2629	2649	2659	
Gate valve fgd	772053	2539	2549	2559	2579	2599	2609	2629	2649	2659	
Globe valve fgd	773640	2539	2549	2559	2579	2599				2639	
DBBT	778598	2539	2549	2559							
DBBF	778568	2539	2549	2559							
Miscellaneous											
Gasket spiral wound	854360	5581	5621	5641	5681	5701	5741	5761	5781	5801	
Insulating Gasket Kit	854605			6879							
Orifice flange set	766295			4829	4839	4859	4869	5229	5389	5539	

Metric units

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
40	x	25	7630661929	7630671929	7630880909
50	x	25	7630662029	7630672029	7630881089
50	x	40	7630662129	7630672129	7630881179
80	x	40	7630662329	7630672329	
80	x	50	7630662429	7630672429	7630881359
100	x	40	7630662609	7630672609	
100	x	50	7630662729	7630672729	7630881569
100	x	80	7630662829	7630672829	7630881689
150	x	80	7630663129	7630673029	7630881809
150	x	100	7630663229	7630673129	7630881939
200	x	100	7631641669	7631651669	7631941669
200	x	150	7631642009	7631652009	7631942019
250	x	100	7631642499	7631652519	7631942369
250	x	150	7631642819	7631652829	7631942819
250	x	200	7631643329	7631653329	7631943329
300	x	150	7631643849	7631653849	7631943849
300	x	200	7631644479	7631654479	7631944469
300	x	250	7631645109	7631655109	7631945099
400	x	200	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
400	x	250	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx

Metric units

REDUCING/PIPING COMPONENTS

<u>Comp.name</u>	<u>Description</u>
BN6B	Branch fitting bw
BN6F	Branch fitting fgd
BNXB	Branch fitting bw
BNXF	Branch fitting fgd
BR6B	Branch outlet bw
BROB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6B	BNXB	BN6F	BNXF	BR6B	BROB
25	80	-	200	7672565749	7672294149			
25	250	-	250		7672567679	7672162289		
25	300	-	300	7672693149	7672294159			
25	400	-	400	xxxxxxxxxx	xxxxxxxxxx			
40	80	-	80	7672693169	7672294179			
40	100	-	100	7672693179	7672294189			
40	150	-	150	7672693189	7672294199			
40	200	-	200		7672568119	7672162459		
40	250	-	300	7672693199	7672294209			
40	400	-	400	xxxxxxxxxx	xxxxxxxxxx			
50	150	-	150			7679031039		
50	200	-	200				7679080629	
50	250	-	300			7679031049		
50	400	-	400	7672803149		xxxxxxxxxx		
80	200	-	200				7679083029	
80	250	-	250				7679083529	
80	300	-	300				7679084039	
80	400	-	400				xxxxxxxxxx	

Metric units

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6B	BNXB	BN6F	BNXF	BR6B	BR6B
100	300	-	300				7679086531	
100	400	-	400				xxxxxxxxxx	

Metric units

BOLTING**Coated boltset std flange**

DN	nr	inch	x mm	MESC number
25	4	7/8	x 140	8138172209
40	4	1 1/8	x 180	8138173909
50	8	1	x 180	8138173079
80	8	1 1/4	x 230	8138174809
100	8	1 1/2	x 300	8138176439
150	8	2	x 400	8138179019
200	12	2	x 440	8138179099
250	12	2 1/2	x 550	8138184899
300	12	2 3/4	x 610	8138185669

Coated boltset blind/spc

DN	nr	inch	x mm	MESC number
25	4	7/8	x 160	8138172249
40	4	1 1/8	x 190	8138173929
50	8	1	x 200	8138173119
80	8	1 1/4	x 280	8138174909
100	8	1 1/2	x 330	8138176499
150	8	2	x 340	8138178899
200	12	2	x 390	8138178999
250	12	2 1/2	x 640	8138184989
300	12	2 3/4	x 700	8138185759

Coated boltset orificeflg

DN	nr	inch	x mm	MESC number
50	8	1	x 190	8138173099
80	8	1 1/4	x 240	8138174829
100	8	1 1/2	x 310	8138176459
150	8	2	x 410	8138179039
200	12	2	x 460	8138179139
250	12	2 1/2	x 570	8138184919
300	12	2 3/4	x 640	8138185699

Coated boltset for Dual Plate Check Valve

DN	nr	inch	x mm	MESC number
50	8	1	x 250	8138173219
80	8	1 1/4	x 320	8138174989
100	8	1 1/2	x 410	8138176659
150	8	2	x 560	8138179259
200	12	2	x 650	8138179269
250	12	2 1/2	x 810	8138179909
300	12	2 3/4	x 920	8138179959

Coated boltset Standard RTJ 5000

DN	nr	inch	x mm	MESC number
4 1/16	8	1 1/4	x 205	8138154759
3 1/8	8	1 1/8	x 185	8138153919
2 1/16	8	7/8	x 170	8138172269
13 5/8	16	1 5/8	x 370	xxxxxxxxxx

ASSEMBLIES**Drain or vent point DN 25 Fig.H DN80 – 300**

Branch: branch nipple flanged	
Blind flange	1 7662104761
Gasket spiral wound	1 854360 5581X XXX
Studbolt with nuts	4 8138664049

Temp instr conn DN 50 Fig.HL DN150 – 300

Branch: according to branch table	
Lap joint flange	1 7662205701
Pipe	1 7430030759
Welding neck flange	1 7662800609
Gasket spiral wound	1 854360XXXX 5641
Thermowell flgd DN 50 L=255 mm	1 7683385621
Studbolt with nuts	8 8138664979

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table	
Lap joint flange	1 7662205701
Pipe	1 7430030751
Welding neck flange	1 7662800609
Gasket spiral wound	1 854360XXXX 5641
Thermowell flgd DN 50 L=230 mm	1 7683385611
Studbolt with nuts	8 8138664979

Thermowell flgd DN 50

Length (mm)	MESC number
230	7683385611
255	7683385621
305	7683385731
355	7683385751
405	7683385761
455	7683385771

CLASS 253842-X

Design limits**Temperature (°C)**

-29	0	50	75	100	120
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Pressure (Barg)

DN 15-300	363.5	363.5	362.6	360.1	357.7	352.3
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 2.8 and ASME B31.3 allowable internal pressure.
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class design meets full vacuum at ambient temperature condition
- Min./Max. temperature of piping class and min./max. specified application temperature of plug valve lubricant have been aligned.
- Where two options are given for pipe, the most economic choice should be checked with the supplier
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Alternate super duplex material grade UNS S32750 may be used. Design limits have been verified with ASME B31.3.
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Select plug valves where service is loaded with mildly abrasive particles.
- **Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification or SHELL DEP as applicable.**

Table of schedules

DN	Schedule
15	80S
20	80S
25	80S
40	80S
50	160S
80	160S
100	120S
150	160S
200	160S
250	160S
300	160S

Branch connections 90 degrees**Branch Size**

Run size	15	20	25	40	50	80	100	150	200	250	300
300	C	C	C	C	E	E	E	B	B	B	A
250	C	C	C	C	E	E	B	B	B	A	
200	C	C	C	C	E	E	B	B	A		
150	C	C	C	C	E	B	B	B	A		
100	C	C	C	C	B	B	B	A			
80	C	C	C	C	B	B	A				
50	C	C	B	B	B	A					
40	C	B	B	B	A						
25	B	B	B	A							
20	B	B	A								
15	A										

Code | Explanation of characters

A	Equal tee
B	Reducing tee
C	Branch fitting
E	Branch outlet

Super Duplex SS steel Sour		Plant
Class no.	253842-X	Consignee
ASME rating	CLASS 2500	Engineered by
Corrosion allowance	0 mm	Principal
Revision letter		Contr. job no.
Revision date		Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-200	ASTM A790 UNS S32760
PIPE	Pipe	DN 250-300	ASTM A790/A928 cl 1UNS S32760

Flanges

BLFL	Blind flange	DN 15-300	ASTM A182-F55
LJFL	Lap joint flange	--	ASTM A182-F55
SBNF	Spectacle blind	DN 15-250	ASTM A240 UNS S32760
SPNF	Spade	DN 15-300	ASTM A240 UNS S32760
SRNF	Spacer ring	DN 15-300	ASTM A240 UNS S32760
WNFL	Welding neck flange	DN 15-300	ASTM A182-F55

Fittings

CAPB	Cap bw	DN 15-300	ASTM A815 WP-S UNS S32760
E45B	Elbow 45 deg LR bw	DN 15-100	ASTM A815 WP-S UNS S32760
E45B	Elbow 45 deg LR bw	DN 150-300	ASTM A815 WP-S/WX UNS S32760
E90B	Elbow 90 deg LR bw	DN 15-100	ASTM A815 WP-S UNS S32760
E90B	Elbow 90 deg LR bw	DN 150-300	ASTM A815 WP-S/WX UNS S32760
TEEB	Tee equal bw	DN 15-300	ASTM A815 WP-S UNS S32760

Reducing fittings

BN3F	Branch fitting flgd	DN 40-100	ASTM A182-F55
BN3B	Branch fitting bw	DN 40-100	ASTM A182-F55
BN6F	Branch fitting flgd	DN 50-300	ASTM A182-F55
BN6B	Branch fitting bw	DN 50-300	ASTM A182-F55
BR6B	Branch outlet bw	DN 150-300	ASTM A182-F55
RECB	Reducer concentric bw	DN 150-300	ASTM A815 WP-S/WX UNS S32760
RECB	Reducer concentric bw	DN 20-100	ASTM A815 WP-S UNS S32760
REEB	Reducer eccentric bw	DN 150-300	ASTM A815 WP-S/WX UNS S32760
REEB	Reducer eccentric bw	DN 20-100	ASTM A815 WP-S UNS S32760
TERB	Tee reducing bw	DN 20-300	ASTM A815 WP-S UNS S32760

Valves

BAFF	Ball valve float FB flgd	DN 15-40	Body: ASTM A182-F55 Trim: Super Duplex, PEEK
BARF	Ball valve float RB flgd	DN 15-50	Body: ASTM A182-F55 Trim: Super Duplex, PEEK
BTFF	Ball valve trunn FB flgd	DN 50-300	Body: ASTM A182-F55/A995-6A Trim: Super Duplex, PEEK
BTRF	Ball valve trunn RB flgd	DN 80-300	Body: ASTM A182-F55/A995-6A Trim: Super Duplex, PEEK
CHVF	Check valve flgd	DN 15-50	Body: ASTM A182-F55 Trim: Super Duplex, Stellite
CHVF	Check valve flgd	DN 80-300	Body: ASTM A182-F55/A995-6A Trim: Super Duplex, Stellite
GAVF	Gate valve flgd	DN 15-50	Body: ASTM A182-F53/55 Trim: Super Duplex, Stellite
GAVF	Gate valve flgd	DN 80-300	Body: ASTM A182-F55/A995-6A Trim: Super Duplex, Stellite
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A182-F53/55 Trim: Super Duplex, Stellite
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A182-F55/A995-6A Trim: Super Duplex, Stellite
CHDF	Check valve dual plate Solid wafer lug/flgd	DN 50-300	Body: ASTM A182-F55/A995-6A Trim: Duplex, filled PTFE

DBBT	Valve assy Double Block & Bleed Valve flgd/thrd	DN 15-50	Body: ASTM A182-F55 Trim: SDSS 32760, PEEK
DBBF	Valve assy Double Block & Bleed Valve flgd	DN 15-50	Body: ASTM A182-F55 Trim: SDSS 32760, PEEK
NVFL	Needle valve flgd	DN 15-40	Body: ASTM A182 F55 Trim: UNS S32760,Stellite

Instruments

TWHD	Thermowell flgd DN 50	DN 50-50	ASTM A182-F55
TWHS	Thermowell flgd DN 50 L=230 mm	--	ASTM A182-F55
TWHL	Thermowell flgd DN 50 L=255 mm	--	ASTM A182-F55

Miscellaneous

GKSW	Gasket spiral wound	DN 15-300	6Mo, Graphite CS centring ring/6Mo inner ring
ORFS	Orifice flange set	DN 50-300	ASTM A182-F55
STBT	Studbolt with nuts	--	ASTM A453 GR660 CLASS D Coated with Xylan 1070 or Takecoat 1000

PIPING COMPONENTS

<u>Item description</u>	Nominal pipe size											
	15	20	25	40	50	80	100	150	200	250	300	
<u>MESC</u>												
Pipe												
Pipe	743662 0	371	501	571	771	901						
Pipe	743662 1						131	391	491	611	761	941
Flanges												
Blind flange	766615	1201	1211	1221	1231	1241	1251	1261	1271	1281	1291	1301
Spacer ring	768914	8751	8761	8771	8781	8791	8801	8811	8821	8831	8841	8851
Spade	768952	1251	1261	1271	1281	1291	1301	1311	1321	1331	1341	1351
Spectacle blind	768985	1231	1241	1251	1261	1271	1281	1291	1301	1311	1321	
Welding neck flange	766632	8741	8751	8761	8771	8971	8981	8851	8861	8871	8881	8891
Fittings												
Cap bw	763608	0371	0501	0571	0771	0901	1131	1391	1491	1601	1761	1941
Elbow 45 deg LR bw	763617	0371	0501	0571	0771	0901	1131	1391	1491	1611	1761	1941
Elbow 90 deg LR bw	763627	0371	0501	0571	0771	0901	1131	1391	1491	1611	1761	1941
Tee equal bw	763675	0371	0501	0571	0771	0901	1131	1391	1491	1611	1761	1941

PIPING COMPONENTS

<u>Item description</u>	Nominal pipe size MESC	Nominal pipe size										
		15	20	25	40	50	80	100	150	200	250	300
Valves												
Ball valve float FB flgd	770545	7539	7549	7559	7579							
Ball valve float RB flgd	770545	2539	2549	2559	2579	2589						
Ball valve trunn FB flgd	770537					7589	7609	7629	7649	7659	7669	7679
Ball valve trunn RB flgd	770537						2609	2629	2649	2659	2669	2679
Check valve flgd	771372	5539	5549	5559	5579	2599	5609	5629	5649	5659	5669	5679
Check Valve Wafer Lug (Solid)	776839					2599	5609	5629	5649			
Gate valve flgd	772345						8609	8629	8649	8659	8669	8679
Gate valve flgd	772382	2539	2549	2559	2579	2599						
Globe valve flgd	773343						8609	8629	8649	8669		
Globe valve flgd	773377	2539	2549	2559	2579	2599						
Valve DBBT	778553	7539	7549	7559	7579	7589						
Valve DBBF	778548	7539	7549	7559	7579	7589						
Miscellaneous												
Gasket spiral wound	854158	2541	2561	2581	2621	2641	2681	2701	2741	2761	2781	2801
Orifice flange set	766691					4091	4101	4011	4021	4031	4041	4051

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	7636440041	7636590041	7636930041
25	x	15	7636440221	7636590221	7636930221
25	x	20	7636440381	7636590381	7636930381
40	x	15	7636440541	7636590541	
40	x	20	7636440721	7636590721	7636930721
40	x	25	7636440891	7636590891	7636930891
50	x	20	7636441171	7636591171	
50	x	25	7636441331	7636591331	7636931331
50	x	40	7636441491	7636591491	7636931491
80	x	40	7636441671	7636591671	
80	x	50	7636441751	7636591751	7636931751
100	x	40	7636442011	7636592011	
100	x	50	7636442201	7636592201	7636932201
100	x	80	7636442391	7636592391	7636932391
150	x	80	7636442561	7636592561	7636932561
150	x	100	7636442631	7636592631	7636932631
200	x	100	7636442841	7636592841	7636932841
200	x	150	7636443071	7636593071	7636933071
250	x	100	7636443291	7636593291	7636933331
250	x	150	7636443551	7636593551	7636933551
250	x	200	7636443821	7636593821	7636933821
300	x	150	7636444141	7636594141	7636934141
300	x	200	7636444451	7636594451	7636934451
300	x	250	7636444791	7636594791	7636934791

Thermowell flgd DN 50	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683380321
255	7683380311
305	7683380431
355	7683380441
405	7683380451
455	7683380461

REDUCING/PIPING COMPONENTS

<u>Comp.name</u>	<u>Description</u>
BN3F	Branch fitting flgd
BN3B	Branch fitting bw
BN6F	Branch fitting flgd
BN6B	Branch fitting bw
BR6B	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN6F	BN3B	BN6B	BR6B
15	40	-	40	7680414321	7680322629		
15	50	-	50		7672257801	7672654619	
15	80	-	100	7680414341		7680322649	
15	150	-	150		7672257811		7672654669
15	200	-	300		7672257821		7672654639
20	50	-	50		7672257841		7672654659
20	80	-	250		7672257851		7672654679
20	300	-	300		7672257861		7672654689
25	80	-	250		7672257881		7672654709
25	300	-	300		7672257891		7672654719
40	80	-	80		7672257911		7672654739
40	100	-	100		7672257921		7672654749
40	150	-	200		7672257931		7672654759
40	250	-	300		7672257941		7672654769
50	150	-	200				7679530771
50	250	-	300				7679530791
80	200	-	200				7679530881
80	250	-	250				7679530891
80	300	-	300				7679530901

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN6F	BN3B	BN6B	BR6B
100	300	-	300				7679530991

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	3/4	x	130	8138819019
20	4	3/4	x	130	8138819019
25	4	7/8	x	140	8138819029
40	4	1 1/8	x	180	8138819039
50	8	1	x	180	8138819049
80	8	1 1/4	x	230	8138819059
100	8	1 1/2	x	300	8138819069
150	8	2	x	400	8138819079
200	12	2	x	440	8138819089
250	12	2 1/2	x	550	8138819099
300	12	2 3/4	x	610	8138819109

Coated boltset blind/spc

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	3/4	x	150	8138819209
20	4	3/4	x	150	8138819209
25	4	7/8	x	160	8138819219
40	4	1 1/8	x	190	8138819229
50	8	1	x	200	8138819239
80	8	1 1/4	x	280	8138819249
100	8	1 1/2	x	330	8138819259
150	8	2	x	340	8138819269
200	12	2	x	390	8138819279
250	12	2 1/2	x	640	8138819289
300	12	2 3/4	x	700	8138819299

Coated boltset orificeflg

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	8	1	x	190	8138819129
80	8	1 1/4	x	240	8138819139
100	8	1 1/2	x	310	8138819149
150	8	2	x	410	8138819159
200	12	2	x	460	8138819169
250	12	2 1/2	x	570	8138819189
300	12	2 3/4	x	640	8138819199

Coated boltset for Dual Plate Solid Lug**Wafer Check Valve**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	8	1	x	250	8138819309
80	8	1 1/4	x	320	8138819319
100	8	1 1/2	x	410	8138819329
150	8	2	x	560	8138819339

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Gasket spiral wound	1	8541582541
Blind flange	1	7666151201
Welding neck flange	1	7666328741
Studbolt with nuts	4	8138819019

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Gasket spiral wound	1	8541582561
Blind flange	1	7666151211
Welding neck flange	1	7666328751
Studbolt with nuts	4	8138819019

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Gasket spiral wound	1	8541582561
Blind flange	1	7666151211
Studbolt with nuts	4	8138819019

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Gasket spiral wound	1	8541582581
Blind flange	1	7666151221
Studbolt with nuts	4	8138819029

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Gasket spiral wound	1	8541582641
Pipe	1	7436620901
Lap joint flange	1	7665219821
Welding neck flange	1	7666328971
Thermowell flgd DN 50 L=230 mm	1	7683380311
Studbolt with nuts	8	8138819239

Temp instr conn DN 50 Fig.HL DN150 - 300

Branch: according to branch table

Gasket spiral wound	1	8541582641
Pipe	1	7436620901
Lap joint flange	1	7665219821
Welding neck flange	1	7666328971
Thermowell flgd DN 50 L=255 mm	1	7683380321
Studbolt with nuts	8	8138819239

CLASS 256620-X

Design limits

Temperature (°C)	-48	0	50	100	120
Pressure (Barg)	DN 15-600	275.8	275.8	275.8	275.8

Notes

- DN 15-100: Design limits acc. to ASME B16.5 flange rating mat. grp 3.8, and limited by allowable stress of bolting material
- DN 150-300: Design limits acc. to ASME B16.5 flange rating mat. grp 1.1, and limited by allowable stress of bolting material.
- DN 300-600: Design limits acc. to API 6A 5000 rating. Temperature Rating as per design condition. Material Class EE sour service. Product Specification Level PSL 3G. Performance Requirement Level PR2.
- For basis of design see DEP 31.38.01.10-Gen.
- Piping class contains a combination of solid and carbon steel with clad material
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) for horizontal mounting only
- The use of triple eccentric butterfly valves and dual plate check valves is considered most economical. Use gate valves and swing check valves only where fouling and abrasion are negatively affecting their functionality.
- Above DN 300 piping flanges and valve facing shall be as per equivalent API 6A 5000# flanges. Refer API flanges equivalent size table.
- Piping wall thicknesses shall be validated over and above specified wall thicknesses, in case cladding/ weld overlay is not practical by approved cladding/ weld overlay vendors.
- Welding branches on Alloy 825 cladded pipes shall be prefabricated by cladding vendor.
- Socket welding connection is not permitted. Threaded connection only allowed for instrumentation/ piping hook up connection in line with approved project specification or SHELL DEP as applicable.
- Solid Alloy825 reducing fittings (i.e. TERB, REEB, RECBB) shall be used for all possible sizes e.g. 10"x4", 8"x4", 6"x4", 6"x3" wherever transition between solid versus cladded CRA fitting is required. The thickness of large end shall meet the main run pipe and smaller end with solid CRA thickness.

Branch connections 90 degrees

Branch Size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	-	-	-	-	E	E	E	E	E	E	B	B	B	B	B	A
500	-	-	-	-	E	E	E	E	E	E	B	B	B	B	B	A
450	-	-	-	-	E	E	E	E	E	B	B	B	B	B	A	
400	-	-	-	-	E	E	E	E	E	B	B	B	B	B	A	
350	-	-	-	-	E	E	E	E	B	B	B	B	A			
300	-	-	-	-	E	E	E	E	B	B	B	B	A			
250	-	-	-	-	E	E	E	E	B	B	B	A				
200	-	-	-	-	E	E	E	B	B	A						
150	-	-	-	-	E	B	B	A								
100	C	C	C	C	B	B	A									
80	C	C	C	C	B	A										
50	C	C	B	B	A											
40	C	B	B	A												
25	B	B	A													
20	B	A														
15	A															

Code	Explanation of characters
-	Not Applicable
A	Equal tee BW
B	Reducing tee BW
C	Branch fitting
E	Branch outlet BW

Table of schedules

Solid Alloy 825		Cladded Base Material LTCS		ASME Size	API 5000 Size
DN	Schedu le	DN	Schedule	DN 350	11" Type 6B
15	40S	150	160	DN 400	13-5/8" Type 6BX
20	40S	200	23.2mm	DN 450	13-5/8" Type 6BX (Refer notes)
25	40S	250	29mm	DN 500	16-3/4" Type 6BX
40	80S	300	34.5mm	DN 600	18-3/4" Type 6BX
50	80S	350	38mm		
80	160	400	43.5mm		
100	120	450	48.5mm		
		500	54mm		
		600	64.5mm		

Alloy 825 LT Sour [A]		Plant Consignee
Class no.	256620-X	Engineered by
ASME rating	CLASS 2500	Principal
Corrosion allowance	0 mm	Contr. job no.
Revision letter		Project no.
Revision date		

COMPONENT MATERIAL DESCRIPTION
 (For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-100	ASTM B423 UNS N08825
PIPE	Pipe	DN 150-600	ASTM A333-6/A671-CC65 cl 22 + Clad UNS N08825

Flanges

BLFL	Blind flange	DN 15-100	ASTM B564 UNS N08825
BLFL1	Blind flange	DN 150-300	ASTM A350-LF2 cl 1 + Clad UNS N08825
BLFL2	Blind flange RTJ API 5000	DN 350-600	ASTM A350-LF2 cl 1 + Clad UNS N08825
LJFL	Lap joint flange	--	ASTM B564 UNS N08825
SBFL	Spectacle blind	DN 15-100	ASTM B424 UNS N08825
SPFL	Spade	DN 15-100	ASTM B424 UNS N08825
SRNF	Spacer ring	DN 15-100	ASTM B424 UNS N08825
WNFL	Welding neck flange	DN 15-100	ASTM B564 UNS N08825
WNFL1	Welding neck flange	DN 150-300	ASTM A350-LF2 cl 1+Clad UNSN08825
WNFL2	Welding neck flange RTJ API 5000	DN 350-600	ASTM A350-LF2 cl 1+Clad UNSN08825

Fittings

CAPB	Cap bw	DN 15-100	ASTM B366-WPNICMC
CAPB	Cap bw	DN 150-600	ASTM A420 WPL6 + Clad UNS N08825
E45B	Elbow 45 deg LR bw	DN 15-100	ASTM B366-WPNICMC
E45B	Elbow 45 deg LR bw	DN 150-600	ASTM A420 WPL6 + Clad UNS N08825
E90B	Elbow 90 deg LR bw	DN 15-100	ASTM B366-WPNICMC
E90B	Elbow 90 deg LR bw	DN 150-600	ASTM A420 WPL6 + Clad UNS N08825
TEEB	Tee equal bw	DN 15-100	ASTM B366-WPNICMC
TEEB	Tee equal bw	DN 150-600	ASTM A420 WPL6 + Clad UNS N08825

Reducing fittings

BN6F	Branch fitting fgd	DN 40-100	ASTM B564 UNS N08825
BN6B	Branch fitting bw	DN 40-100	ASTM B564 UNS N08825
BR6B	Branch outlet bw	DN 150-600	ASTM B564 UNS N08825
BROB	Branch outlet bw	DN 300-600	ASTM A350-LF2 cl 1 + Clad UNS N08825
RECB	Reducer concentric bw	DN 20-250	ASTM B366-WPNICMC
RECB	Reducer concentric bw	DN 150-600	ASTM A420 WPL6 + Clad UNS N08825
REEB	Reducer eccentric bw	DN 20-250	ASTM B366-WPNICMC
REEB	Reducer eccentric bw	DN 150-600	ASTM A420 WPL6 + Clad UNS N08825
TERB	Tee reducing bw	DN 20-250	ASTM B366-WPNICMC
TERB	Tee reducing bw	DN 150-600	ASTM A420 WPL6 + Clad UNS N08825

Valve s			
	Ball valve float FB flgd	DN 15-40	Body: ASTM B564 UNS N08825 Trim: Alloy 825, PEEK
BARF	Ball valve float RB flgd	DN 15-40	Body: ASTM B564 UNS N08825 Trim: Alloy 825, PEEK
BTRF	Ball valve trun RB flgd	DN 50-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825, PEEK
BTRF	Ball valve trun RB flgd	DN 150-600	Body: ASTM A350-LF2/ ASTM A352-LCC Clad UNS N08825 Trim: Alloy 825, PEEK
BTFF	Ball valve trun FB flgd	DN 50-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825, PEEK
BTFF	Ball valve trun FB flgd	DN 150-600	Body: ASTM A350-LF2/ ASTM A352-LCC Clad UNS N08825 Trim: Alloy 825, PEEK
CHDF	Check valve Dual Plate Solid Wafer Lug	DN 50-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825 Stellite 6
CHDF	Check valve Dual Plate flgd	DN150-600	Body: ASTM A350-LF2/ ASTM A352-LCC Clad UNS N08825 Trim: Alloy 825 Stellite 6
CHVF	Check valve flgd	DN 15-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825 Stellite 6
CHVF	Check valve flgd	DN 150-600	Body: ASTM A350-LF2/ ASTM A352-LCC Clad UNS N08825 Trim: Alloy 825, PEEK
GAVF	Gate valve flgd	DN 15-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825 Stellite 6
GAVF	Gate valve flgd	DN150-600	Body: ASTM A350-LF2/ ASTM A352-LCC Clad UNS N08825 Trim: Alloy 825, PEEK
GLVF	Globe valve flgd	DN 15-100	Body: ASTM B564 UNS N08825 Trim: Alloy 825 Stellite 6
GLVF	Globe valve flgd	DN 150-600	Body: ASTM A352-LCC + Clad UNS Trim: Alloy 825 Stellite 6
DBBT	Valve assembly double block ball & bleed flgd/thrd	DN 15-50	Body: ASTM B564 UNS N08825 Trim: Alloy 825, PEEK
DBBF	Valve assembly double block ball & bleed flgd	DN 15-50	Body: ASTM B564 UNS N08825 Trim: Alloy 825, PEEK

Instruments

TWND	Thermowell fgd DN 40	DN 40-40	ASTM B564 UNS N08825
TWNL	Thermowell fgd DN 40 L=255 mm	--	ASTM B564 UNS N08825
TWNS	Thermowell fgd DN 40 L=230 mm	--	ASTM B564 UNS N08825

Miscellaneous

GKSW	Gasket spiral wound	DN 15-300	Alloy 825, Graphite CS centring ring/Alloy 825 inner ring
GKRJ	Gasket Ring Joint	DN 350-600	Alloy 825, R no. to match with flange
MTRR	Meterrun	DN 15-40	Alloy 825
ORFS	Orifice flange set	DN 50-300	ASTM B564 UNS N08825
STBT	Studbolt with nuts	--	ASTM A193-B7M/A194-2HM (Coated with Xylan 1070 or Takecoat 1000)

PIPING COMPONENTS		Nominal Pipe Size															
Item description	MESC	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
Pipe	747861 0	181	261	341	519	599	679	779									
Pipe	749100 0								909								
Pipe	749100 3									419	429	439	449	459	469	479	489
Flanges																	
Blind flange	766000	0809	0819	0829	0839	0849	0859	0869									
Blind flange	769127								0709	0719	0729	0739					
Blind flange RTJ API 5000	091521																
Spacer ring	768926	7019	7029	7039	7049	7059	7069	7079									
Spade	768958	0919	0929	0939	0949	0959	0969	0979									
Spectacle blind	768996	0919	0929	0939	0949	0959	0969	0979									
Welding neck flange	766078	8019	8029	8039	8049	8059	8069	8079									
Welding neck flange	769140								7019	7029	7039	7049					
Welding neck flange RTJ API 5000	091552																
Fittings																	
Cap bw	762817	0361	0461	0561	1809	1819	1829	1839									
Cap bw	769112								3609	3619	3629	3639	3649	3659	3669	3679	3689
Elbow 45 deg LR bw	762837	0361	0461	0561	1809	1819	1829	1839									
Elbow 45 deg LR bw	769117								3609	3619	3629	3639	3649	3659	3669	3679	3689
Elbow 90 deg LR bw	762842	0361	0461	0561	1809	1819	1829	1839									
Elbow 90 deg LR bw	769122								3609	3619	3629	3639	3649	3659	3669	3679	3689
Tee equal bw	762887	0361	0461	0561	0781	0881	1829	1839									
Tee equal bw	769183								3609	3619	3629	3639	3649	3659	3669	3679	3689

PIPING COMPONENTS	Nominal pipe size MESCC																
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
Item description																	
Valves																	
Ball valve float FB flgd	770655	<u>8219</u>	<u>8229</u>	<u>8239</u>	<u>8249</u>												
Ball valve float RB flgd	770655	<u>8319</u>	<u>8329</u>	<u>8339</u>	<u>8349</u>												
Ball valve trunn FB flgd	770092								<u>9509</u>	<u>9519</u>	<u>9529</u>	<u>9539</u>					
Ball valve trunn FB flgd (API 5000)									<u>9609</u>	<u>9619</u>	<u>9629</u>				<u>9549</u>	<u>9559</u>	<u>9569</u>
Ball valve trunn FB flgd	770660								<u>9709</u>	<u>9719</u>	<u>9729</u>	<u>9739</u>			<u>9749</u>	<u>9759</u>	<u>9769</u>
Ball valve trunn RB flgd	770092														<u>9779</u>	<u>9789</u>	
Ball valve trunn RB flgd (API 5000)									<u>9809</u>	<u>9819</u>	<u>9829</u>						
Ball valve trunn RB flgd	770660														<u>0319</u>	<u>0329</u>	<u>0339</u>
Check valve dual plate flgd	776724														<u>0349</u>	<u>0509</u>	<u>0519</u>
Check valve dual plate flgd															<u>0529</u>	<u>0539</u>	<u>0549</u>
Check valve wafer lug (solid)	776998								<u>9809</u>	<u>9819</u>	<u>9829</u>						
Check valve flgd	771053														<u>9509</u>	<u>9519</u>	<u>9529</u>
Check valve flgd (AP 5000)															<u>9539</u>	<u>9549</u>	<u>9559</u>
Check valve flgd	771640	<u>5609</u>	<u>5619</u>	<u>5629</u>	<u>5639</u>	<u>5649</u>	<u>5659</u>	<u>5669</u>							<u>9569</u>	<u>9579</u>	<u>9589</u>
Gate valve flgd	772056														<u>9509</u>	<u>9519</u>	<u>9529</u>
Gate valve flgd (API 5000)															<u>9539</u>	<u>9549</u>	<u>9559</u>
Gate valve flgd	772641	<u>5609</u>	<u>5619</u>	<u>5629</u>	<u>5639</u>	<u>5649</u>	<u>5659</u>	<u>5669</u>							<u>9569</u>	<u>9579</u>	<u>9589</u>
Globe valve flgd	773055														<u>9509</u>	<u>9519</u>	<u>9529</u>
Globe valve flgd (API 5000)															<u>9539</u>	<u>9549</u>	<u>9559</u>
Globe valve flgd	773641	<u>5609</u>	<u>5619</u>	<u>5629</u>	<u>5639</u>	<u>5649</u>	<u>5659</u>	<u>5669</u>							<u>9569</u>	<u>9579</u>	<u>9589</u>
Valve DBBT	778568	<u>8219</u>	<u>8229</u>	<u>8239</u>	<u>8249</u>	<u>8259</u>											
Valve DBBF	778598	<u>8219</u>	<u>8229</u>	<u>8239</u>	<u>8249</u>	<u>8259</u>											
Miscellaneous																	
Gasket spiral wound	854360	5541	5561	5581	5621	5641	5681	5701	5741	5761	5781	5801					
Gasket RTJ 5000	854320					<u>0249</u>	<u>0359</u>	<u>0399</u>							<u>5909</u>	<u>5919</u>	<u>5929</u>
Meterrun	766496	<u>1919</u>	<u>1939</u>	<u>1959</u>	<u>1979</u>										<u>5939</u>	<u>5949</u>	
Orifice flange set	766096					<u>4019</u>	<u>4029</u>	<u>4039</u>	<u>4049</u>	<u>4059</u>	<u>4069</u>	<u>4079</u>					

REDUCING/PIPING COMPONENTS

Run	x	Br	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
20	x	15	<u>7628670661</u>	<u>7628750661</u>	<u>7628926181</u>
25	x	15	<u>7628670761</u>	<u>7628750761</u>	<u>7628926281</u>
25	x	20	<u>7628670861</u>	<u>7628750861</u>	<u>7628926381</u>
40	x	15	<u>7628679409</u>	<u>7628759409</u>	-
40	x	20	<u>7628679419</u>	<u>7628759419</u>	<u>7628922019</u>
40	x	25	<u>7628679429</u>	<u>7628759429</u>	<u>7628922029</u>
50	x	20	<u>7628679439</u>	<u>7628759439</u>	-
50	x	25	<u>7628679449</u>	<u>7628759449</u>	<u>7628922039</u>
50	x	40	<u>7628671481</u>	<u>7628751481</u>	<u>7628922049</u>
80	x	40	<u>7628679459</u>	<u>7628759459</u>	-
80	x	50	<u>7628679469</u>	<u>7628759469</u>	<u>7628922059</u>
100	x	40	<u>7628679479</u>	<u>7628759479</u>	-
100	x	50	<u>7628679489</u>	<u>7628759489</u>	<u>7628922069</u>
100	x	80	<u>7628679499</u>	<u>7628759499</u>	<u>7628922079</u>
150	x	80	<u>7628679509</u>	<u>7628759509</u>	<u>7628922089</u>
150	x	100	<u>7628679519</u>	<u>7628759519</u>	<u>7628922099</u>
200	x	100	<u>7628679529</u>	<u>7628759529</u>	<u>7628922109</u>
200	x	150	<u>7691511019</u>	<u>7691621019</u>	<u>7691881019</u>
250	x	100	<u>7628679539</u>	<u>7628759539</u>	<u>7628922119</u>
250	x	150	<u>7691511039</u>	<u>7691621039</u>	<u>7691881039</u>
250	x	200	<u>7691511049</u>	<u>7691621049</u>	<u>7691881049</u>
300	x	150	<u>7691511059</u>	<u>7691621059</u>	<u>7691881059</u>
300	x	200	<u>7691511069</u>	<u>7691621069</u>	<u>7691881069</u>
300	x	250	<u>7691511079</u>	<u>7691621079</u>	<u>7691881079</u>
350	x	150	<u>7691511089</u>	<u>7691621089</u>	
350	x	200	<u>7691511099</u>	<u>7691621099</u>	<u>7691881099</u>
350	x	250	<u>7691511109</u>	<u>7691621109</u>	<u>7691881109</u>
350	x	300	<u>7691511119</u>	<u>7691621119</u>	<u>7691881119</u>

Thermowell fgd DN 50	
<u>Length (mm)</u>	<u>MESC number</u>
230	7683386411
255	7683386421
305	7683386431
355	7683386441
405	7683386451
455	7683386461

REDUCING/PIPING COMPONENTS

<u>Run</u>	<u>x</u>	<u>Br</u>	<u>RECB</u>	<u>REEB</u>	<u>TERB</u>
400	x 200		7691511129	7691621129	
400	x 250		7691511139	7691621139	7691881139
400	x 300		7691511149	7691621149	7691881149
400	x 350		7691511159	7691621159	7691881159
450	x 250		7691511169	7691621169	7691881169
450	x 300		7691511179	7691621179	7691881179
450	x 350		7691511189	7691621189	7691881189
450	x 400		7691511199	7691621199	7691881199
500	x 300		7691511209	7691621209	7691881209
500	x 350		7691511219	7691621219	7691881219
500	x 400		7691511229	7691621229	7691881229
500	x 450		7691511239	7691621239	7691881239
600	x 300				7691881309
600	x 350				7691881319
600	x 400		7691511309	7691621309	7691881329
600	x 450		7691511319	7691621319	7691881339
600	x 500		7691511329	7691621329	7691881139

<u>Comp.name</u>	<u>Description</u>
BN6F	Branch fitting fgd
BN6B	Branch fitting bw
BR6B	Branch outlet bw
BROB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR6B	BROB
15	40	-	50	7672117809	7672515009	
15	80	-	100	7672117819	7672515019	
20	50	-	50	7672117829	7672515029	
20	80	-	100	7672117839	7672515039	
25	80	-	100	7672117849	7672515049	
40	80	-	80	7672117859	7672515059	
40	100	-	100	7672117869	7672515069	
50	150	-	200		7677358489	
50	250	-	450		7677358491	
50	500	-	600		7677359259	
80	200	-	200		7677358589	
80	250	-	250		7677358591	
80	300	-	300		7677358601	
80	350	-	350		7677358611	
80	400	-	400		7677358621	
80	450	-	450		7677358631	
80	500	-	500		7677358641	
80	600	-	600		7677358651	

Metric units

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6B	BR6B	BROB
100	300	-	300			<u>7677352019</u>
100	350	-	350			<u>7677352029</u>
100	400	-	400			<u>7677352039</u>
100	450	-	450			<u>7677352049</u>
100	500	-	500			<u>7677352059</u>
100	600	-	600			<u>7677352079</u>
150	300	-	300			<u>7691005019</u>
150	350	-	350			<u>7691005029</u>
150	400	-	400			<u>7691005039</u>
150	450	-	450			<u>7691005049</u>
150	500	-	500			<u>7691005059</u>
150	600	-	600			<u>7691005079</u>
200	300	-	300			<u>7691005089</u>
200	350	-	350			<u>7691005099</u>
200	400	-	400			<u>7691005109</u>
200	450	-	450			<u>7691005119</u>
200	500	-	500			<u>7691005129</u>
200	600	-	600			<u>7691005149</u>
250	400	-	400			<u>7691005159</u>
250	450	-	450			<u>7691005169</u>
250	500	-	500			<u>7691005179</u>
250	600	-	600			<u>7691005199</u>
300	450	-	450			<u>7691005209</u>
300	500	-	500			<u>7691005219</u>
300	600	-	600			<u>7691005239</u>
350	500	-	500			<u>7691005249</u>
350	600	-	600			<u>7691005269</u>
400	600	-	600			<u>7691005279</u>

BOLTING**Coated boltset std flange**

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	3/4	x	130	8138271479
20	4	3/4	x	130	8138271479
25	4	7/8	x	140	8138272209
40	4	1 1/8	x	180	8138273909
50	8	1	x	180	8138273079
80	8	1 1/4	x	230	8138274809
100	8	1 1/2	x	300	8138276439
150	8	2	x	400	8138279019
200	12	2	x	440	8138279099
250	12	2 1/2	x	550	8138284899
300	12	2 3/4	x	610	8138285669

Coated boltset blind/spacer

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	3/4	x	150	8138271519
20	4	3/4	x	150	8138271519
25	4	7/8	x	160	8138272249
40	4	1 1/8	x	190	8138273929
50	8	1	x	200	8138273119
80	8	1 1/4	x	280	8138274909
100	8	1 1/2	x	330	8138276499
150	8	2	x	340	8138278899
200	12	2	x	390	8138278899
250	12	2 1/2	x	640	8138284989
300	12	2 3/4	x	700	8138285759

Coated boltset mrun fig.

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
15	4	7/8	x	150	8138272229
20	4	7/8	x	150	8138272229
25	4	7/8	x	150	8138272229
40	4	1 1/8	x	180	8138273909

Coated boltset Standard RTJ 5000

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
4 1/16	8	1 1/4	x	210	
3 1/8	8	1 1/8	x	190	8138273929
2 1/16	8	7/8	x	160	8138272249

Coated boltset for Dual Plate Check Valve

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	8	1	x	250	8138273219
80	8	1 1/4	x	320	8138274989
100	8	1 1/2	x	410	8138276659
150	8	2	x	560	8138283629

Coated boltset orifice fig

<u>DN</u>	<u>nr</u>	<u>inch</u>	<u>x</u>	<u>mm</u>	<u>MESC number</u>
50	8	1	x	190	8138273099
80	8	1 1/4	x	240	8138274829
100	8	1 1/2	x	310	8138276459
150	8	2	x	410	8138279039
200	12	2	x	460	8138279139
250	12	2 1/2	x	570	8138284919
300	12	2 3/4	x	640	8138285699

ASSEMBLIES**Drain or vent point DN 15 Fig.I DN15 - 15**

Branch: according to branch table

Blind flange	1	7660000809
Welding neck flange	1	7660788019
Gasket spiral wound	1	8543605541
Studbolt with nuts	4	8138271479

Drain or vent point DN 20 Fig.I DN20 - 40

Branch: according to branch table

Blind flange	1	7660000819
Welding neck flange	1	7660788029
Gasket spiral wound	1	8543605561
Studbolt with nuts	4	8138271479

Drain or vent point DN 20 Fig.H DN50 - 50

Branch: branch nipple flanged

Blind flange	1	7660000819
Gasket spiral wound	1	8543605561
Studbolt with nuts	4	8138271479

Drain or vent point DN 25 Fig.H DN80 - 300

Branch: branch nipple flanged

Blind flange	1	7660000829
Gasket spiral wound	1	8543605581
Studbolt with nuts	4	8138272209

Temp instr conn DN 50 Fig.HS DN80 - 100

Branch: according to branch table

Lap joint flange	1	7660240729
Pipe	1	7478610599
Welding neck flange	1	7660788059
Gasket spiral wound	1	8543605641
Thermowell flgd DN 50 L=230 mm	1	7683386411
Studbolt with nuts	8	8138273119

Temp instr conn DN 50 Fig.HL DN150 - 600

Branch: according to branch table

Lap joint flange	1	7660240729
Pipe	1	7478610599
Welding neck flange	1	7660788059
Gasket spiral wound	1	8543605641
Thermowell flgd DN 50 L=255 mm	1	7683386411
Studbolt with nuts	8	8138273119

CLASS 011440-Z

Design limits

Temperature (°C)	-29	0	50	75	100	125	150
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Pressure (Barg)	DN 15-600	19.6	19.6	19.2	18.4	17.7	16.7	15.8
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- Piping class range DN 15 [NPS 1/2] up to/incl DN 600[NPS 24] design meets full vacuum at ambient condition
- For hydrotest vent & drains reference is made to standard drawing S.38.154
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection.
- For bending of pipe see DEP 31.38.01.31-Gen
- For basis of design see DEP 31.38.01.10-Gen.
- Use of coated bolt sets should be considered when exposed to marine environments
- Selection of relevant Monoflange valve assembly to be agreed with principal based on associated local instrument tube fitting standard.

Table of schedules

DN	Schedule
15	160
20	160
40	160
50	80
80	80
100	80
150	80
200	40
250	40
300	40
350	40
400	6.24mm
500	7.05mm

Branch connections 90 degrees

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
500	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
450	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
400	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
350	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
300	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
250	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
200	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
150	N	N	N	N	P	B	B	B	B	A						
100	N	N	N	N	U	B	B	A								
80	N	N	N	N	U	A										
50	N	N	M	M	J											
40	N	M	M	J												
25	M	M	J													
20	M	J														
15	J															

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel Sour	Plant
Class no.	011440-Z
ASME rating	CLASS 150
Corrosion allowance	3 mm
Revision letter	Principal
Revision date	Contr. job no.
	Project no.

Metric units

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-500	ASTM A106-B
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Flanges

BLFL	Blind flange	DN 15-200	ASTM A105N
SBNF	Spectacle blind	DN 15-500	ASTM A516-60/65/70
SPNF	Spade	DN 600	ASTM A516-60/65/70
SRNF	Spacer ring	DN 600	ASTM A516-60/65/70

Fittings

E45B	Elbow 45 deg LR bw	DN 500	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 50-500	ASTM A234-WPB
TEEB	Tee equal bw	DN 50-500	ASTM A234-WPB

Reducing fittings

BN3P	Branch fitting plain	DN 20-600	ASTM A105N
BRSB	Branch outlet bw	DN 50-600	ASTM A105N
RECB	Reducer concentric bw	DN 15-500	ASTM A234-WPB
TERB	Tee reducing bw	DN 500	ASTM A234-WPB

Valves

BARF	Ball valve float RB flgd	DN 20-80	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), PTFE
BTFF	Ball valve trunn FB flgd	DN 200	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), filled PTFE
BTRF	Ball valve trunn RB flgd	DN 200-600	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), filled PTFE
BUTF	Butterfly valve triple of flgd	DN 50	Body: ASTM A216-WCB/WCC Trim: F6A / Duplex, Stellite 6 / 21
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 250	Body: ASTM A105N/ ASTM A216-WCB/WCC Trim: AISI 316 (L), Stellite 6
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A105N Trim: AISI 410, Stellite 6
GLVF	Globe valve flgd	DN 250-500	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 410, Stellite 6
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 50	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L)

Miscellaneous

GKSW	Gasket spiral wound	DN 15-500	AISI 316 (L), Graphite CS centring-/SS inner ring
GKIK	Insulating Gasket kit	DN 15-500	(G-10/11) with 316 SS CORE, PTFE SS Pres Enrg Spirl Spring
STBT	Studbolt with nuts	---	ASTM A193-B7MA194-2HM Coated with Xylan 1070 or Takecoat 1000

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750
Pipe																		
Pipe	743003 0																	
Pipe	743003 1								711	091	571							
Pipe	743003 2											191	451	871				
Pipe	743003 3												311					889
Flanges																		
Blind flange	766211	0581	0621					0701				0781						
Spacer ring	768846																0569	
Spectacle blind	768837	0041										0181					0629	
Welding neck flange	766278	4021	4041					4081	3601	3621		3661	3181	3201	3241	3241	3359	3469

Metric units

PIPING COMPONENTS

Item description	MESC	Nominal pipe size															
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
Fittings																	
Elbow 45 deg LR bw	763034																8051
Elbow 90 deg LR bw	763042					6081		6481	6681	6851		7281				8051	
Tee equal bw	763081					6081			6851			7281				8439	
Valves																	
Ball valve float RB flgd	770025		0041			0081											
Ball valve trunn FB flgd	770067									0559							
Ball valve trunn RB flgd	770067									0151						0209	0219
Butterfly valve triple of flgd	776009					6739											
Check valve dual plate flgd	776775									0359							
Globe valve flgd	773014		7269			7589				7289						7769	
Valve assy Double block ball & bleed flgd/thrd	778546					0589											
Miscellaneous																	
Gasket spiral wound	854136	3049	3069			3149		3209	3249	3269	3280	3309	3329	3349		3389	
Insulating Gasket Kit	854609							0921									

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
20	x	15	7630661411	-	-
200	X	80	7630665269		
500	x	300	7630694779	-	-
500	x	350	7630695679	-	7630885619
500	x	400	7630694869	-	-
500	x	450	7630693629	-	

Comp.name Description

BN3F	Branch fitting flgd
BN3P	Branch fitting plain
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN3P	BROB	BRSB
20	150	-	300	-	7680310211	
20	350	-	900	-	7680310609	
25	300	-	900	-	7680310709	
40	350	-	600	-	7680310809	
50	200	-	250			7679010661
100	600	-	900			7679012409
150	600	-	600			7679012509

REDUCING/PIPING COMPONENTS

BOLTING**Coated boltset std flange**

DN	nr	inch	x mm	MESC number
15	4	1/2	x 60	8138170239
20	4	1/2	x 70	8138170259
40	4	1/2	x 80	8138170279
50	4	5/8	x 90	8138170759
80	4	5/8	x 100	8138170779
150	8	3/4	x 110	8138171439
200	8	3/4	x 110	8138171439
250	12	7/8	x 120	8138172169
300	12	7/8	x 120	8138172169
350	12	1	x 140	8138172999
400	16	1	x 140	8138172999
500	20	1 1/8	x 160	8138173869
600	20	1 1/4	x 180	8138174709

Coated boltset blind/spc

DN	nr	inch	x mm	MESC number
20	4	1/2	x 80	8138170279
200	8	3/4	x 130	8138171479
500	20	1 1/8	x 200	8138173949
600	20	1 1/4	x 220	8138174789

Coated boltset for Dual Plate Solid Lug

DN	nr	inch	x mm	MESC number
250	12	7/8	x 280	8138172489

Coated boltset blind flg

DN	nr	inch	x mm	MESC number
15	4	1/2	x 70	8138170259
20	4	1/2	x 80	8138170279
50	4	5/8	x 100	8138170779
200	8	3/4	x 130	8138171479

CLASS 011441-Y

Design limits

Temperature (°C)	-29	0	50	75	100	125	150	
Pressure (Barg)	DN 15-600	19.6	19.6	19.2	18.4	17.7	16.7	15.8

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- Piping class range DN 15 [NPS 1/2] up to/incl DN 600[NPS 24] design meets full vacuum at ambient condition
- For hydrotest vent & drains reference is made to standard drawing S.38.154
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection.
- For bending of pipe see DEP 31.38.01.31-Gen
- For basis of design see DEP 31.38.01.10-Gen.
- Use of coated bolt sets should be considered when exposed to marine environments
- Selection of relevant Monoflange valve assembly to be agreed with principal based on associated local instrument tube fitting standard.

Table of schedules

DN	Schedule
15	XXS
20	XXS
25	XXS
40	XXS
50	160
80	80
100	80
150	80
300	STD
400	40
500	30
600	11.33MM
900	13.87MM

Branch connections 90 degrees

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	900
900	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	B	A
750	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	B	A
600	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	B	A
500	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	B	A
450	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	B	A
400	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	B	A
350	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	B	A
300	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	B	A
250	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	B	A
200	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	B	B	A
150	N	N	N	N	P	B	B	B	B	A								
100	N	N	N	N	U	B	B	A										
80	N	N	N	N	U	U	A											
50	N	N	M	M	J													
40	N	M	M	J														
25	M	M	J															
20	M	J																
15	J																	

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel Sour	Plant
Class no.	011441-Y
ASME rating	CLASS 150
Corrosion allowance	6 mm
Revision letter	Principal
Revision date	Contr. job no.
	Project no.

Metric units

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 40-400	ASTM A106-B
PIPE	Pipe	DN 900	ASTM A671-CC65 CL22

Flanges

BLFL	Blind flange	DN 20-80	ASTM A105N
SBNF	Spectacle blind	DN 50-400	ASTM A516-60/65/70

WNFL Welding neck flange

WNFL	Welding neck flange	DN 20-900	ASTM A105N
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Fittings

E45B	Elbow 45 deg LR bw	DN 150	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 50-400	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 900	ASTM A234-WPBW
TEEB	Tee equal bw	DN 150-400	ASTM A234-WPB
TEEB	Tee equal bw	DN 750-900	ASTM A234-WPBW

Reducing fittings

BN3P	Branch fitting plain	DN 20-25	ASTM A105N
BRSB	Branch outlet bw	DN 50-80	ASTM A105N
RECB	Reducer concentric bw	DN 80-600	ASTM A234-WPB
RECB	Reducer concentric bw	DN 650-900	ASTM A234-WPBW
TERB	Tee reducing bw	DN 50-80	ASTM A234-WPB

Valves

BARF	Ball valve float RB flgd	DN 50-150	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, PTFE
BTRF	Ball valve trunn RB flgd	DN 300-900	Body: ASTM A105N/A216-WCB/WCC Trim: AISI 316 (L), filled PTFE
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 50-400	Body: ASTM A105N/ ASTM A216-WCB/WCC Trim: Alloy 825 Stellite 6
GLVF	Globe valve flgd	DN 20-50	Body: ASTM A105N/A216-WCB/WCC Trim: Alloy 825, Stellite 6
DBBT	Valve assy Double block ball & bleed flgd/thrd	DN 15	Body: ASTM A105N/A216-WCB/WCC Trim: Super Duplex

Miscellaneous

GKSW	Gasket spiral wound	DN 20-900	AISI 316 (L), Graphite CS centring-/SS inner ring
STBT	Studbolt with nuts	---	ASTM A193-B7M/A194-2HM Coated with Xylan 1070 or Takecoat 1000

Special Fittings

HSCL	Hose Coupling Flgd / Female Conn.	DN 50	AISI 316 (L) / Aluminium Bronze
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PIPING COMPONENTS

Item description	MESC	Nominal pipe size																			
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	800	850	900
Pipe																					
Pipe	743003 0				621	731															
Pipe	743003 1						091	571													
Pipe	743003 2							191	451	871											
Pipe	743003 3										311										
Pipe	743003 4											311									
Pipe	743021 1																			119	
Flanges																					
Blind flange	766211		0621	0661			0721														
Spectacle blind	768837				0101																
Welding neck flange	766278		4361	4381	4401	4101	3621	3641	3661			0621		0309							
Welding neck flange	766279													3621		2701	1241				0699

PIPING COMPONENTS

Item description	MESC	Nominal pipe size																			
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	750	800	850	900
Fittings																					
Elbow 45 deg LR bw	763034											6681									
Elbow 90 deg LR bw	763042							6121	6281			6681					7681				2939
Tee equal bw	763081							6121				6681					7681				
Tee equal bw	763085																		9419		9429
Valves																					
Ball valve float RB flgvd	770205							0089				0149									
Ball valve trunn RB flgd	770261															0179	0199				0299
Check valve dual plate flgd	776775																0199				
Check valve dual plate flgd	776779							0089													
Globe valve flgd	773044			0049								0089									
Valve assy Double block ball & bleed flgd/thrd	778564	1139																			
Miscellaneous																					
Gasket spiral wound	854136		3061	3081	3121	3141	3041	3201	3061							3201	3261	3281			
Gasket spiral wound	854137																		3149		

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
80	X	50	-	-	7630881381
150	X	80	7630662971	-	-
200	X	100	7630663201	-	-
300	X	200	7630663979	-	-
150	X	100	7630663071	-	-
500	X	400	7630667161	-	-
750	X	500	7629561159	-	-
900	X	600	7729564199	-	-

Comp.name	Description
BN3F	Branch fitting flgd
BN3P	Branch fitting plain
BROB	Branch outlet bw
BRSB	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN3F	BN3P	BROB	BRSB
20	350	-	900	-	7680518149	
25	150	-	250	-	7680497049	
50	150	-	150			7679021841
50	500	-	900	-	-	7678031289
80	400	-	500	-	-	7679010981
80	750	-	900	-	-	7678032209
100	400	-	500	-	-	7679012931
150	900	-	900	-	-	7678033219

BOLTING

Coated boltset std flange				
DN	nr	inch	x mm	MESC number
20	4	1/2	x 70	8138170259
25	4	1/2	X 70	8138170259
40	4	1/2	x 80	8138170279
50	4	5/8	x 90	8138170759
80	4	5/8	x 100	8138170779
100	8	5/8	X 100	8138170779
150	8	3/4	x 110	8138171439
200	8	3/4	x 110	8138171439
400	16	1	x 140	8138172999
500	20	1 1/8	x 160	8138173869
600	20	1 1/4	x 180	8138174709
900	32	1 1/2	X 280	8138666931

Coated boltset for Dual Plate Solid Lug Wafer Check Valve				
DN	nr	inch	x mm	MESC number
50	4	5/8	x 150	8138170879
400	16	1	X 340	8138665029

Coated boltset blind/spc				
DN	nr	inch	x mm	MESC number
50	4	5/8	x 100	8138170779
400	16	1	x 170	8138173059

CLASS 013600-Z

Design limits

Temperature (°C)	-29	0	50	75	100	
Pressure (Barg)	DN 15-600	20	20	19.5	18.6	17.7

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- Piping class range DN 15 [NPS 1/2] up to/inch DN 600[NPS 24] design meets full vacuum at ambient condition
- For hydrotest vent & drains reference is made to standard drawing 30-99-12-127.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification as applicable.

Table of schedules

DN	Schedule
15	10S
20	10S
25	10S
40	10S
50	10S
80	10S
100	10S
150	10S
200	10S

Branch connections 90 degrees

Run size	15	20	25	40	50	80	100	150	200
200	N	N	N	N	E	E	B	B	A
150	N	N	N	N	E	B	B	B	A
100	N	N	N	N	B	B	B	A	
80	N	N	N	N	B	B	A		
50	N	N	B	B	A				
40	N	B	B	A					
25	B	B	A						
20	B	A							
15	A								

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
N	Branch fitting

Duplex Stainless steel	Plant
Class no. 013600-Z	Consignee
ASME rating CLASS 150	Engineered by
Corrosion allowance 0 mm	Principal
Revision letter	Contr. job no.
Revision date	Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-200	ASTM A790 Gr. UNS 31803-S
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Flanges

BLFL	Blind flange	DN 15-200	ASTM A182-F51
WNFL	Welding neck flange	DN 15-200	ASTM A182-F51

Fittings

E45B	Elbow 45 deg LR bw	DN 15-200	ASTM A815-Gr. UNS 31803 WP-S
E90B	Elbow 90 deg LR bw	DN 15-200	ASTM A815-Gr. UNS 31803 WP-S
TEEB	Tee equal bw	DN 15-200	ASTM A815-Gr. UNS 31803 WP-S

Reducing fittings

BROB	Branch outlet bw	DN 50-200	ASTM A182-F51
RECB	Reducer concentric bw	DN 50-200	ASTM A815-Gr. UNS S31803
REEB	Reducer eccentric bw	DN 50-200	ASTM A815-Gr. UNS S31803
TERB	Tee reducing bw	DN 50-200	ASTM A815-Gr. UNS S31803

Miscellaneous

GKSW	Gasket spiral wound	DN 15-200	UNS S31803 , Graphite CS centring-/UNS S34803 inner ring, ASTM A193-B8M CL.1/8M Coated with Xylan 1070 or Take coat 1000
STBT	Stud bolt with nuts	---	

PIPING COMPONENTS

Item description	MESC	15	20	25	40	50	80	100	150	200
Pipe										
Pipe	743661 1							539		
Flanges										
Blind flange	766615							0189		
Welding neck flange	766632							0181		
Fittings										
Elbow 45 deg LR bw	763617						1531			
Elbow 90 deg LR bw	763627						1531			
Tee equal bw	763675						1539			
Miscellaneous										
Gasket spiral wound	851950						2969			

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEB	TERB
200	x	80	763442909		

Comp.name Description

RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

BOLTING**Coated boltset std flange**

DN	nr	inch	x	mm	MESC number
200	8	3/4	x	110	8138621129

CLASS 015028-X

Design limits

Temperature (°C)	0	50	85
Pressure (Barg)	DN 15-80	16	16

Notes

- Design limits acc. to EEMUA 144, 145 & 146
- For bending of pipe see DEP 31.38.01.31-Gen.
- For basis of design see DEP 31.38.01.10-Gen.
- The use of Red.bore ball valves is preferred. Use full bore ball valves only, When necessary for process/operating requirements.
- Piston type check valves (DN 15-40) for horizontal mounting only.
- The use of dual plate check valves is preferred.

Table of schedules

DN	Schedule
15	40S
20	40S
25	10S
40	10S
50	10S
80	10S

Branch connections 90 degrees

Run size	15	20	25	40	50	80
80	-	-	C	C	B	A
50	-	-	B	B	A	
40	-	-	B	A		
25	-	-	A			
20	-	A				
15	A					

Code	Explanation of characters
A	Equal tee
B	Reducing tee
C	Branch fitting (Nipolet & Nipolet Flanged)
-	Not applicable

Copper alloy	Plant
Class no.	015028-X
ASME rating	CLASS 150
Corrosion allowance	Consignee
Revision letter	Engineered by
Revision date	Principal
	Contr. job no.
	Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-80	Pipe Smls Bevelled Ends Alloy 70-30 ASTM B466 UNS C71500 Dims to ASME B36.19M
PIPE	Nipple	DN 15-25	Pipe Nipple Smls, 100mm long, POE x TOE ASME B1.20.1 NPT Male. Cu Ni UNS C71500 Dims to ASME B36.19M
PIPE	Nipple	DN 15-25	Pipe Nipple Smls, 50mm long, POE x TOE ASME B1.20.1 NPT Male. Cu Ni UNS C71500 Dims to ASME B36.19M
PIPE	Nipple	DN 15-25	Pipe Nipple Smls, 100mm long, TBE ASME B1.20.1 NPT Male. Cu Ni UNS C71500 Dims to ASME B36.19M
PIPE	Nipple	DN 15-25	Pipe Nipple Smls, 50mm long, TBE ASME B1.20.1 NPT Male. Cu Ni UNS C71500 Dims to ASME B36.19M

Flanges

BLFL	Blind flange	DN 15-80	Cu Ni UNS C71500
WNFL	Weld Neck Flange, RF	DN 15-80	Cu Ni UNS C71500
WNFF	Weld Neck Flange, FF	DN 15-80	Cu Ni UNS C71500
WNFL	Weld Neck Flange (For 300#, RF)	DN 15-80	Cu Ni UNS C71500
WNFF	Weld Neck Flange (For 300#, FF)	DN 15-80	Cu Ni UNS C71500

Fittings

CAPB	Cap bw	DN 15-80	Cu Ni UNS C71500 Dims ASME B16.9
CPL	Coupling	DN 15	Full Coupling Thrd ASME B1.20.1 (NPT) Female. CL3000 Cu Ni UNS C71500 Dims to ASME B16.11
E45B	Elbow 45 deg LR bw	DN 15-80	Cu Ni UNS C71500 Dims ASME B16.9
E90B	Elbow 90 deg LR bw	DN 15-80	Cu Ni UNS C71500 Dims ASME B16.9
TEEB	Tee equal bw	DN 15-80	Cu Ni UNS C71500 Dims ASME B16.9
TERB	Tee Reducing bw	DN 25-80	Cu Ni UNS C71500 Dims ASME B16.9

Reducing fittings

RECB	Reducer Concentric bw	DN 15-80	Cu Ni UNS C71500 Dims ASME B16.9
REEB	Reducer Eccentric bw	DN 15-80	Cu Ni UNS C71500 Dims ASME B16.9
CPLR	Reducing Coupling	DN 15-25	Full Coupling Thrd ASME B1.20.1 (NPT) Female. CL3000 Cu Ni UNS C71500 Dims to ASME B16.11

Branch Fittings

BN3P	Branch Fitting Plain (Nipolet)	DN 25-80	Cu Ni UNS C71500 Dims to MESC STD DRG S-38.090 D
BNLF	Branch Fitting Flanged (Nipolet Flanged)	DN 25-80	Cu Ni UNS C71500 Dims to MESC STD DRG S-38.090 D, To suit Flanges to ASME B16.5

Valves

BALR	Ball valve RB	DN 15-80	Ball Valve Reduced Bore. Flgd CL150 RF Smooth ASTM B369-C96400
BALF	Ball valve FB	DN 15-80	TRIM: ASTM B369-C96400, PTFE To suit Flanges to ASME B16.5
GATF	Gate valve	DN 15-80	Ball Valve Full Bore. Flgd CL150 RF Smooth ASTM B369-C96400
GLVF	Globe valve	DN 15-80	TRIM: ASTM B369-C96400, PTFE To suit Flanges to ASME B16.5
CHVF	Check Valve, Piston Lift	DN 15-40	Gate Valve Flgd CL150 RF Smooth ASTM B369-C96400
CHDF	Dual plate Check valve Solid Wafer lug	DN 50-80	TRIM: ASTM B369-C96400 To suit Flanges to ASME B16.5
DBBT	Double Block & Bleed valve	DN 15-25	Check Valve Piston Type Flgd CL150 RF Smooth ASTM B369-C96400
			TRIM: ASTM B369-C96400 To suit Flanges to ASME B16.5
			Dual Plate Check Valve Wafer Lug Type To Suit Flgs CL150 RF Smooth ASTM B369-C96400
			TRIM: ASTM B369-C96400 To suit Flanges to ASME B16.5
			Double Block & Bleed valve One end 1/2" NPT Female threaded Outlet as per ASME B1.20.1 Design as per manufacturer's std. Flgd CL150 RF Smooth ASTM B369-C96400
			TRIM: ASTM B369-C96400, PTFE To suit Flanges to ASME B16.5

Miscellaneous

GKFR	Gasket Flat Ring	DN 15-80	Gasket Flat Ring. Raised Face. Compressed Non-Asbestos Synthetic Fibre CL150 Design & Dims to ASME B16.21 To suit Flanges to ASME B16.5
GKFR	Gasket Flat Ring (For 300#)	DN 15-80	Gasket Flat Ring. Raised Face. Compressed Non-Asbestos Synthetic Fibre CL300 Design & Dims to ASME B16.21, To suit Flanges to ASME B16.5
GKFF	Gasket Full Face	DN 15-80	Gasket Compressed Non-Asbestos Synthetic Fibre Full Face. CL150 Design & Dims to ASME B16.21, To suit Flanges to ASME B16.5
GKIN	Gasket Insulating	DN 15-80	Flange Insulation set. Type E, FF, CL150 Manufacturers Standard. To suit Flanges to ASME B16.5
STBT	Stud bolt with nuts	---	Stud bolt AS Bolts ASTM A193-B7, Nuts ASTM A194-2H With 2 hvy hex head nuts. ASME B1.1 Bolts CL2A Nuts CL2B Dims to ASME B18.2.1 & ASME B18.2.2 (Coated with Xylan 1070 or Take coat 1000)

PIPING COMPONENTS

Item description	MESC	Nominal pipe size						
		15	20	25	40	50	80	
Pipe								
Pipe	746630	0189	0269	0339	0499	0579	0659	
Pipe Nipple (100mm)	760157	9139	9119	9129				
Pipe Nipple (50mm)	760157	9509	9519	9529				
Pipe Nipple (100mm), TBE	760157	8109	8119	8129				
Pipe Nipple (50mm), TBE	760157	8509	8519	8529				
Flanges								
Blind flange	766002	1019	1029	1039	1049	1059	1069	
Weld neck flange, FF	766086	0309	0319	0069	0089	0099	0119	
Weld neck flange (300#), FF	766086	1419	1429	1219	1239	1249	1269	
Weld neck flange, RF	766083	0309	0319	0069	0089	0099	0119	
Weld neck flange (300#), RF	766083	1419	1429	1219	1239	1249	1269	
Fittings								
Cap bw	762819	0369	0469	0549	0749	0849	1049	
Elbow 45 deg LR bw	762845	5679	5659	0169	0239	0319	0449	
Elbow 90 deg LR bw	762833	5679	5659	0169	0239	0319	0449	
Tee equal bw	762897	0329	0429	0509	0609	0709	0809	
Coupling, Threaded	764628	9199						
Valves								
Ball valve, RB, Flanged	770602	0039	0049	0059	0079	0089	0109	
Ball valve, FB, Flanged	770602	5039	5049	5059	5079	5089	5109	
Gate valve, Flanged	772601	0031	0041	0051	0071	0081	0101	
Globe valve, Flanged	773601	0039	0049	0059	0079	0089	0109	
Check valve, Piston type, Flanged	771601	0039	0049	0059	0069			
Check valve, Dual plate, Wafer lug	776921				6079	6089		
DBBT	778595	0039	0049	0069				
Miscellaneous								
Gasket, Flat Ring, RF, CL150	854505	5029	5049	5089	5129	5149	5189	
Gasket, Flat Ring, RF, CL 300	854505	6029	6049	6089	6129	6149	6189	
Gasket, FF, CL150	854505	0029	0049	0089	0129	0149	0189	

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEP	TERB	BN3F	BN3P	CPLR	
20	x	15	7628610239	7628780239					
25	x	15	7628610319	7628780319					
25	x	20	7628610359	7628780359					7646290259
40	x	15	7628610419	7628780419					
40	x	20	7628610459	7628780459					
40	x	25	7628610499	7628780499	7628960469				
50	x	20	7628610539	7628780539					
50	x	25	7628610579	7628780579	7628960529				
50	x	40	7628610619	7628780619	7628960569				
80	x	25	7628610659	7628780659		7680920439	7680339179		
80	x	40	7628610659	7628780659		7680920499	7680339199		
80	x	50	7628610699	7628780699	7628960629				

Comp.name	Description
BN3F	Branch fitting flgd (Nipolet Flanged)
BN3P	Branch fitting plain (Nipolet)
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw
CPLR	Coupling reducing thrd

BOLTING**Coated boltset std flange**

DN	nr	inch	x mm	MESC number
15	4	1/2	x 60	8138150239
20	4	1/2	x 70	8138150259
25	4	1/2	x 70	8138150259
40	4	1/2	x 80	8138150279
50	4	5/8	x 90	8138150759
80	4	5/8	x 100	8138150759

Coated boltset for Insulating Gasket Kit

DN	nr	inch	x mm	MESC number
15	4	1/2	x 80	8138150279
20	4	1/2	x 90	8138150299
25	4	1/2	x 90	8138150299
40	4	1/2	x 100	8138150319
50	4	5/8	x 110	8138150799
80	4	5/8	x 110	8138150799

CLASS 017015-Y

Design limits

Temperature (°C) 0 85

Pressure (Barg) DN 25-300 10 10

Branch connections 90 degrees**Notes**

- Design limits acc. to the nom. pressure of valves.
- Ball valves are in accordance with ISO17292.
- For basis of design see DEP 31.38.01.10-Gen.
- For requirements regarding GRP piping systems, see DEP 31.40.10.19-Gen.
- Bolts for GRP flanges to be provided with washers
- Piping material: glass reinforced epoxy resin (GRE) aliphatic amine, hot cured, tg > 115 deg C [240°F], all executed with aluminium foil barrier
- Flanges to be drilled acc. to ASME B16.5, class 150
- Bolt sets not shown in piping class; flange thickness differs per manufacturer
- Piping components for potable water service shall be approved by local health authorities
- Underground carbon steel components (incl. bolting) shall be protected by a coating as per DEP 30.48.00.31-Gen.

Table of schedules

DN	Schedule
25	-
40	-
50	-
80	-
100	-
150	-
200	-
250	-
300	-

GRE-Aliphatic amine+alum foil		Plant
Class no.	017015-Y	Consignee
ASME rating	CLASS 150	Engineered by
Corrosion allowance	<u>0 mm</u>	Principal
Revision letter		Contr. job no.
Revision date		Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE Pipe DN 50-300 GRE-Sour

Flanges

WNFF Weld Neck Flange, FF DN 50-300 GRE-Sour

Reducing fittings

RECB Reducer Concentric DN 200-300 GRE-Sour

PIPING COMPONENTS

REDUCING/PIPING COMPONENTS

Run x Br RECB
300 x 200 **7628610239**

<u>Comp.name</u>	<u>Description</u>
RECB	Reducer concentric bw

CLASS 031440-Z

Design limits

Temperature (°C)					
0	50	75	100	125	150
Pressure (Barg)					
DN 15-80	51.1	50.1	48.3	46.6	45.8
					45.1

Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- For bending of pipe see DEP 31.38.01.31-Gen.
- For basis of design see DEP 31.38.01.10-Gen.
- Use of coated bolt sets should be considered when exposed to marine environments.
- Piping class design meets full vacuum at ambient temperature condition
- Monoflange slimline valves shall be selected for clean services only.
- Monoflange valve assemblies are offered fitted with 1/2" BSP to either 1/2", 3/8" or 10mm. compression tube fittings. In the assemblies as a default, the 1/2" compression tube fitting is listed. However, selection of relevant Monoflange valve assembly to be agreed with principal based on associated local instrument tube fitting standard.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements.
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- The choice of gate valves, swing type check valves vs triple eccentric butterfly valves, dual plate check valves shall be based upon total purchase and installation cost, as well as weight and space savings. Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.

Table of schedules

DN	Schedule
20	XXS
25	XXS
300	XS
350	80
400	60
500	60

Branch connections 90 degrees

Run size	20	25	300	350	400	500
500	N	N	B	B	B	A
400	N	N	B	B	A	
350	N	N	B	A		
300	N	N	A			
25	M	J				
20	J					

Code	Explanation of characters
A	Equal tee BW
B	Reducing tee BW
J	Equal Tee BW
M	Reducing tee BW
N	Branch fitting

Carbon steel Sour, NACE	Plant
Class no. 031440-Z	Consignee
ASME rating CLASS 300	Engineered by
Corrosion allowance 6 mm	Principal
Revision letter	Contr. job no.
Revision date	Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-600	ASTM A106-B
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Flanges

BLFL	Blind flange	DN 15-600	ASTM A105
WNFL	Weld Neck Flange, RF	DN 15-600	ASTM A105

Fittings

CAPB	Cap bw	DN 15-600	ASTM A234-WPB
E45B	Elbow 45 deg LR bw	DN 15-600	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 15-600	ASTM A234-WPB
TEEB	Tee equal bw	DN 15-600	ASTM A234-WPB

Reducing fittings

RECB	Reducer Concentric bw	DN 20-600	ASTM A234-WPB
REEB	Reducer Eccentric bw	DN 20-600	ASTM A234-WPB
TERB	Tee Reducing bw	DN 20-600	ASTM A234-WPB

Branch Fittings

BN6P	Branch Fitting Plain	DN 40-600	ASTM A105
BN6F	Branch Fitting Flanged	DN 50-350	ASTM A105
BROP	Branch outlet bw	DN 400-600	ASTM A105
BR6B	Branch outlet bw	DN 450-600	ASTM A105

Valves

BTFF	Ball valve trunn FB flgd	DN 50-600	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, filled PTFE
BTRF	Ball valve trunn RB flgd	DN 80-600	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, filled PTFE
GLVF	Globe valve flgd	DN 15-50	Body: ASTM A105 Trim: AISI 316, Stellite
GLVF	Globe valve flgd	DN 80-200	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Stellite
CHDF	Check valve dual plate flgd	DN 300-600	Body: ASTM A216 Gr. WCB, NACE
CHVF	Check valve flgd	DN 15-50	Trim: ASTM 316 Hard Facing Seat Body: ASTM A105 Trim: AISI 316, Stellite
CHVF	Check valve flgd	DN 80-600	Body: ASTM A105/A216-WCB/WCC Trim: AISI 316, Stellite

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	AISI 316 (L), Graphite CS centring-/SS inner ring
STBT	Stud bolt with nuts	---	ASTM A193-B7/A194-2H Coated with Xylan 1070 or Takecoat 1000

PIPING COMPONENTS

	Nominal pipe size				
	20	25	300	350	400
Item description	MESC				

Pipe					
Pipe					

Flanges					
Blind flange					
Weld neck flange, RF					

Fittings					
Cap bw					
Elbow 45 deg LR bw					
Elbow 90 deg LR bw					
Tee equal bw					

Valves					
Ball valve float FB flgd					
Ball valve float RB flgd					
Ball valve trunn FB flgd					
Ball valve trunn RB flgd					
Gate valve flgd					
Globe valve flgd					
Check valve dual plate flgd					
Check valve flgd					

Miscellaneous					
Gasket spiral wound					

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEP	TERB
25	x	20			
40	x	20			
40	x	25			
50	x	25			
350	x	300			
400	x	300			
400	x	350			
450	x	350			
450	x	400			
500	x	300			
500	x	350			
500	x	400			
600	x	300			
600	x	350			
600	x	400			
600	x	450			
600	x	500			

Comp.name	Description
BN6F	Branch fitting flgd
BN6P	Branch fitting plain
BR3B	Branch outlet bw
BR6B	Branch outlet bw
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

REDUCING/PIPING COMPONENTS

Branch	Run	pipe	BN6F	BN6P	BR3B	BR6B	BROB
50	300	400					
80	300	350					
80	400	400					
80	450	450					
80	500	500					
100	300	350					
100	400	400					
100	450	450					
100	500	500					
150	350	350					
150	400	400					
150	500	500					
200	400	400					
200	500	500					
250	500	500					

Coated boltset std flange

DN	nr	inch	x mm	MESC number
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20	4	5/8	x 80	8138170731
25	4	5/8	x 80	8138170731
300	16	1 1/8	180	8138173901
350	20	1 1/8	180	8138173901
400	20	1 1/4	190	8138174721
500	24	1 1/4	210	8138174761

CLASS 031441-Y

Design limits

Temperature (°C)							
	0	50	75	100	125	150	
Pressure (Barg)	DN 15-100	51.1	50.1	48.3	46.6	45.8	45.1

Notes

- Design limits acc. to EEMUA 144, 145 & 146
- For bending of pipe see DEP 31.38.01.31-Gen.
- For basis of design see DEP 31.38.01.10-Gen.
- The use of Red.bore ball valves is preferred. Use full bore ball valves only, When necessary for process/operating requirements.
- Piston type check valves (DN 15-40) for horizontal mounting only.
- The use of dual plate check valves is preferred.

Table of schedules

DN	Schedule
15	XXS
20	XXS
25	XXS
40	XXS
50	160
80	160
100	120

Run size	Branch Size							
	15	20	25	40	50	80	100	
100	N	N	N	N	U	B	A	
80	N	N	N	N	U	A		
50	N	N	M	M	J			
40	N	M	M	J				
25	M	M	J					
20	M	J						
15	J							

Code	Explanation of characters
A	Equal tee BW
B	Reducing tee BW
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
U	Reducing tee BW

Carbon steel Sour	Plant
Class no.	031441-Y
ASME rating	CLASS 300
Corrosion allowance	6MM
Revision letter	Principal
Revision date	Constr. job no.
	Project no.

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-80	ASTM A106-B
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Flanges

BLFL	Blind flange	DN 15-80	ASTM A105
WNFL	Weld Neck Flange, RF	DN 15-80	ASTM A105
SBNF	Spectacle blind	DN 15-80	ASTM A516-60

Fittings

E90B	Elbow 90 deg LR bw	DN 15-80	ASTM A234-WPB
TEEB	Tee equal bw	DN 15-80	ASTM A234-WPB
TERB	Tee Reducing bw	DN 15-80	ASTM A234-WPB

Reducing fittings

RECB	Reducer Concentric bw	DN 15-80	ASTM A234-WPB
REEB	Reducer Eccentric bw	DN 15-80	ASTM A234-WPB

Branch Fittings

BN3P	Branch Fitting Plain (Nipolet)	DN 40-80	ASTM A105
BNLF	Branch Fitting Flanged (Nipolet Flanged)	DN 40-80	ASTM A105

Valves

BALR	Ball valve RB	DN 50-80	Body: ASTM A216 Gr. WCB, NACE Trim: INCONEL 625, PTFE Seats
BALF	Ball valve FB	DN 50-80	Body: ASTM A216 Gr. WCB, NACE Trim: INCONEL 625, PTFE Seats
GATF	Gate valve	DN 15-40	Body: ASTM A105N, NACE Trim: INCONEL 625 Stellited
GATF	Gate valve	DN 50-80	Body: ASTM A216 Gr. WCB, NACE Trim: INCONEL 625 Stellited
CHDF	Check valve dual plate Solid Wafer lug / flgd	DN 15-40	Body: ASTM A105N, NACE Trim: INCONEL 625 Stellited
CHVF	Check valve dual flgd	DN 50-80	Body: ASTM A216 Gr. WCB, NACE Trim: INCONEL 625 Stellited

Miscellaneous

GKSW	Gasket spiral wound	DN 15-80	AISI 316 (L), Graphite CS centring-/SS inner ring
GKIK	Insulating Gasket kit	DN 15-80	(G-10/11) with 316 SS CORE, PTFE SS Pres Enrg Spirl Spring
STBT	Stud bolt with nuts	---	ASTM A193-B7M/A194-2HM

PIPING COMPONENTS

Item description	MESC	Nominal pipe size					
		15	20	25	40	50	80

Pipe

Pipe	743003 0	221	321	421	621	731	
Pipe	743003 1						131

Flanges

Blind flange	766211	1081	1121	1161	1181	1201	1221
Spectacle blind	768837	0421	0441	0461	0481	0501	0521
Weld neck flange	766278	6841	6861	6881	6901	6601	6621

Fittings

Elbow 90 deg LR bw	763042	5731	5791	5831	5931	6121	6321
Tee equal bw	763081	5731	5791	5831	5931	6121	6321

Valves

Ball valve, RB, Flanged	770261				0589	0609	
Ball valve, FB, Flanged	770261				5589	5609	
Gate valve, Flanged	772637	0529	0549	0559	0579		
Gate valve, Flanged	772045				0509	0529	
Check valve, Piston type, Flanged							
Check valve, Dual plate, Wafer lug	776779				0589		

Miscellaneous

Gasket spiral wound	854136	4041	4061	4081	4121	4141	4181
Insulating Gasket Kit	854610					0641	

REDUCING/PIPING COMPONENTS

Run	x	Br	RECB	REEP	TERB	BN3F	BN3P	
20	x	15	7630661421	7630671421				
25	x	15	7630661521	7630671521				
25	x	20	7630661621	7630671621				
40	x	15	7630661721	7630671721		7680310721		
40	x	20	7630661821	7630671821				
40	x	25	7630661921					
50	x	20	7630671921			7680371891	7680497099	
50	x	25				7680498629		
50	x	40				7680498639		
80	x	25				7680371921	7680310761	
80	x	40	7630672331			7680371941	7680310791	
80	x	50		7630672411	7630881341			

BOLTING**Coated boltset std flange**

DN	nr	inch	x	mm	MESC number
20	4	1/2	x	70	8138661541
25	4	1/2	x	70	8138661541
50	4	5/8	x	90	8138662711
80	4	5/8	x	100	8138662731

Comp.name Description

BN3F	Branch fitting flgd (Nipolet Flanged)
BN3P	Branch fitting plain (Nipolet)
RECB	Reducer concentric bw
REEB	Reducer eccentric bw
TERB	Tee reducing bw

CLASS 061441-Y

Design limits

Temperature (°C)	-29	0	50	75	100	125	150
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Pressure (Barg)	DN 15-600	102.1	99.6	99.6	96.4	93.2	91.7	90.2
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Notes

- Design limits acc. to ASME B16.5 flange rating mat. grp 1.1
- Piping class range DN 15 [NPS 1/2]up to/incl DN 600[NPS 24] design meets full vacuum at ambient condition
- For hydrotest vent & drains reference is made to standard drawing 30-99-12-127.
- The use of red. bore ball valves is considered most economical. Use full bore ball valves only when necessary for process/operating requirements
- Piston type check valves (DN 15-40) [NPS 1/2-1-1/2] for horizontal mounting only
- Eccentric butterfly valves and dual plate check valves shall not be used in fouling or abrasive services.
- Socket welding connection is not permitted. Threaded connection only allowed at instrumentation/piping hook up connection in line with approved project specification as applicable.

Table of schedules

DN	Schedule
15	XXS
20	XXS
25	XXS
40	XXS
50	XXS
80	160
100	160
150	120
200	120
250	100
300	100
600	80

Branch connections 90 degrees

Run size	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
500	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
450	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
400	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
350	N	N	N	N	P	E	E	E	E	B	B	B	B	B	B	A
300	N	N	N	N	P	E	E	B	B	B	B	B	B	B	B	A
250	N	N	N	N	P	E	B	B	B	B	B	B	B	B	B	A
200	N	N	N	N	P	E	B	B	B	B	B	B	B	B	B	A
150	N	N	N	N	P	B	B	B	B	A						
100	N	N	N	N	U	B	A									
80	N	N	N	N	U	A										
50	N	N	M	M	J											
40	N	M	M	J												
25	M	M	J													
20	M	J														
15	J															

Code | Explanation of characters

A	Equal tee BW
B	Reducing tee BW
E	Branch outlet
J	Equal tee BW
M	Reducing tee BW
N	Branch fitting
P	Branch outlet BW
U	Reducing tee BW

Carbon steel		Plant
Class no.	061441-Y	Consignee
ASME rating	CLASS 600	Engineered by
Corrosion allowance	<u>6 mm</u>	Principal
Revision letter		Contr. job no.
Revision date		Project no.

Metric units

COMPONENT MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description.)

Pipe

PIPE	Pipe	DN 15-450	ASTM A106-B
PIPE	Pipe	DN 500-600	ASTM A333-6

Flanges

BLFL	Blind flange	DN 15-750	ASTM A105N
WNFL	Welding neck flange	DN 15-750	ASTM A105N

Fittings

E45B	Elbow 45 deg LR bw	DN 500-600	ASTM A420-WPL6
E90B	Elbow 90 deg LR bw	DN 15-450	ASTM A234-WPB
E90B	Elbow 90 deg LR bw	DN 500-600	ASTM A420-WPL6
TEEB	Tee equal bw	DN 250-300	ASTM A234-WPB

Reducing fittings

BN3F	Branch fitting flgd	DN 40-750	ASTM A105N
BN3P	Branch fitting plain	DN 40-750	ASTM A105N
BROB	Branch outlet bw	DN 400-750	ASTM A105N
BRSB	Branch outlet bw	DN 150-750	ASTM A105N

Miscellaneous

GKSW	Gasket spiral wound	DN 15-600	AISI 316, Graphite CS centring-/SS inner ring ASTM A193-B7/A194-2H Coated with Xylan 1070 or Takecoat 1000
STBT	Studbolt with nuts	---	

PIPING COMPONENTS

Item description	MESC	Nominal pipe size															
		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
Pipe																	
Pipe	743003 0	201	301	401	601	731											
Pipe	743003 1						091	571									
Pipe	743003 2								191	551	951						
Pipe	743003 3											411	911				
Pipe	743003 4												451	971			
Pipe	743016 2													141	441		
Flanges																	
Blind flange	766210	2081	2121	2161	2181	2201	2221	2241	2261	2281	2301	2321	2341	2361	2381	2401	2421
Welding neck flange	766279	8021	8041	8061	8081	8101	7621	7641	7661	7681	7701	7721	7741	7761	7781	7801	7841
Fittings																	
Elbow 45 deg LR bw	763134															4801	
Elbow 90 deg LR bw	763042	5721	5781	5821	5921	6121	6281	6481	6681	6891	7101	7331	7521	7721	7921		
Elbow 90 deg LR bw	763134															3981	4081
Miscellaneous																	
Gasket spiral wound	854136	4041	4061	4081	4121	4141	4181	4201	4241	4261	4281	4301	4321	4341	4361	4381	4421

BOLTING**Coated boltset std flange (Non Lethal)**

DN	nr	inch	x	mm	MESC number
15	4	1/2	x	80	8138170279
20	4	5/8	x	90	8138170759
25	4	5/8	x	100	8138170779
40	4	3/4	x	110	8138171439
50	8	5/8	x	110	8138170799
80	8	3/4	x	130	8138171479
100	8	7/8	x	150	8138172229
150	12	1	x	180	8138173079
200	12	1 1/8	x	200	8138173949
250	16	1 1/4	x	220	8138174789
300	20	1 1/4	x	230	8138174809
350	20	1 3/8	x	240	8138175599
400	20	1 1/2	x	260	8138176359
450	20	1 5/8	x	280	8138177069
500	24	1 5/8	x	290	8138177089
600	24	1 7/8	x	330	8138178359

Coated boltset std flange (Lethal)

DN	nr	inch	x	mm	MESC number
15	4	1/2	x	80	8138170279
20	4	5/8	x	90	8138170759
25	4	5/8	x	100	8138170779
40	4	3/4	x	110	8138171439
50	8	5/8	x	110	8138170799
80	8	3/4	x	130	8138171479
100	8	7/8	x	150	8138172229
150	12	1	x	200	8138173119
200	12	1 1/8	x	230	8138174009
250	16	1 1/4	x	250	8138174849
300	20	1 1/4	x	260	8138174869
350	20	1 3/8	x	270	8138175659
400	20	1 1/2	x	300	8138176439
450	20	1 5/8	x	320	8138177149
500	24	1 5/8	x	330	8138177169
600	24	1 7/8	x	380	8138178459

