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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
0	EVC			27-jul.-2021	

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
End-User Ref. No.: *201754C001*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-PSV-1003*
Service	*Fuel Gas K.O. Drum C-114 PSV*
PID No.	*P-C43-A-110990 H31*
Line No.	*1"P-3105-D1-P*
Quantity	1

GENERAL

Valve Type	*Balanced Bellows, Direct Spring-Op*		
Safety / Relief	*Safety Relief*	Balanced	*Yes*
Nozzle	*Full*	Bonnet	*Vented*

CONNECTIONS

Inlet	*1"*	*Flngd.*	*600#*	*RF*	Standard
Outlet	*2"*	*Flngd.*	*150#*	*RF*	*ASME B16.5*

MATERIALS OF CONSTRUCTION

Body / Base	*CS SA216-WCB/WCC*
Bonnet / Cylinder	*CS SA216-WCB/WCC*
Nozzle	*316 SST*
Disc	*316 SST*
Seat	*Metal*
Spindle	*416 SST*
Guide	*SS A297 Gr. HE*
Spring	*Chr. Steel - Alum. Metallized*
Gaskets	*316 SST*
Bellows	*Inconel® 625*
Cap Type	*Bolted w/ Test Rod*
NACE MR0175/ISO 15156:2015	*Yes*

Accessories: *Bug Screen*

SIZING / SELECTION SUMMARY

Valve Model No.		*1D2JLTJBS-E45M-PN2*		
Brand		*Crosby®*		
Area (cm²)	Calculated	Selected	*0.114*	*0.710*
	Data Set	Orifice	*API*	*D*
Flow	Unit	Required	kg/hr	331.8
		Maximum		2064.098
Reaction Force, Open Discharge			*300.3 N*	
Noise Level (db), Open Discharge			*133.7 at 1.0000-m*	

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Fire Case*		
Fluid State at Inlet	*Gas / Vapor*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name	*HYDROCARBON*
Molecular Weight, M	*19.45*
Compressibility, Z	*0.989*
Ratio of Sp. Heats, k (Cp / Cv)	*1.174*
Gas Constant, C	*254*

Sizing Coefficients

Effective K, Gas		*0.975*	
Kb	Kc	*1*	*1*

Required Capacity

	Unit: kg/hr
Total	*331.8*

Pressures

		Unit: kg/cm² g	
MAWP	Operating	*49*	*39.5*
Set	CDTP	*49*	*49.49*
Over Pressure		*10.29*	*21%*
Back Pressure	Built-Up		*12.25*
	Constant Superimposed		*0*
	Variable Superimposed		*0*
	Total		*12.25*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*

Temperatures

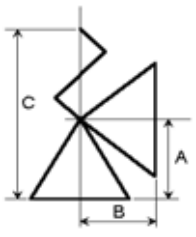
		Unit: °C	
	Normal System		
Operating	Relieving	*90*	*225.8*
Design Min	Design Max		*105*

Tag Notes

1. Radiographic Test: Body and Bonnet
2. Maximum Carbon content % C Max 0.22 / %C Equivalent. Max. 0.43 (body and bonnet)
3. Max imum Content P(%) 0.020 - S(%) 0.015. (body and bonnet)
4. Stand ard C4M acc. ISO 12944
5. Opening Adjustment 5%
6. NACE 0103 ce rtificate required (disc & bellow).
7. ASME "UV" Stamp required.

Valve Dimensions

mm	
A	104.90
B	114.30
C	514.35
kg	
Weight	16.33



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
1	EVC			7-mar.-2022	New process data.
0	EVC			27-jul.-2021	

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
End-User Ref. No.: *201754C001*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-PSV-1005*
Service	*Feed to pre-treatment*
PID No.	*201754C001-PID-0021-131*
Line No.	*3"P-3306-C5-H*
Quantity	1

GENERAL

Valve Type	*Balanced Bellows, Direct Spring-Op*		
Safety / Relief	*Safety Relief*	Balanced	*Yes*
Nozzle	*Full*	Bonnet	*Vented*

CONNECTIONS

Inlet	*1 1/2"*	*Flngd.*	*300#*	*RF*	Standard
Outlet	*3"*	*Flngd.*	*150#*	*RF*	*ASME B16.5*

MATERIALS OF CONSTRUCTION

Body / Base	*CS SA216-WCB/WCC*
Bonnet / Cylinder	*CS SA216-WCB/WCC*
Nozzle	*316 SST*
Disc	*316 SST*
Seat	*Teflon*
Spindle	*416 SST*
Guide	*SS A297 Gr. HE*
Spring	*Chr. Steel - Alum. Metallized*
Gaskets	*316 SST*
Bellows	*Inconel® 625*
Cap Type	*Bolted w/ Test Rod*
NACE MR0175/ISO 15156:2015	*Yes*

Accessories: *Bug Screen*

SIZING / SELECTION SUMMARY

Valve Model No.		*1.5G3JLTJBS-EX35M-PN2SPL*		
Brand		*Crosby®*		
Area (cm²)	Calculated	Selected	*2.086*	*3.245*
	Data Set	Orifice	*API*	*G*
Flow	Unit	Required	kg/hr	6000
		Maximum		9336.312
Reaction Force, Open Discharge			*1458 N*	
Noise Level (db), Open Discharge			*138.8 at 1.0000-m*	

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*FV-1004 fail open*		
Fluid State at Inlet	*Gas / Vapor*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name	*PROCESS GAS*
Molecular Weight, M	*17.29*
Compressibility, Z	*0.908*
Ratio of Sp. Heats, k (Cp / Cv)	*1.29*
Gas Constant, C	*262.7*

Sizing Coefficients — Unit: -

Effective K, Gas		*0.975*	
Kb	Kc	*1*	*1*

Required Capacity — Unit: kg/hr

Total	*6000*

Pressures — Unit: kg/cm² g

MAWP	Operating	*41*	*37.3*
Set	CDTP	*41*	*41.41*
Over Pressure		*4.1*	*10%*
Back Pressure	Built-Up		*8.45*
	Constant Superimposed		*0.3*
	Variable Superimposed		*1.5*
	Total		*10.25*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*

Temperatures — Unit: °C

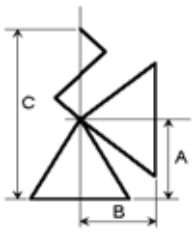
	Normal System		
Operating	Relieving	*90*	*35.7*
Design Min	Design Max		*250*

Tag Notes

1. Radiographic Test: Body and Bonnet
2. Maximum Content P(%) 0. 020 - S(%) 0.015. (body and bonnet)
3. Standard C4M acc. ISO 129 44
4. Opening Adjustment 5%
5. NACE 0103 certificate required (disc & bellow).
6. Magnetic Particle (Body and Bonnet)
7. Blowd own: 9%
8. ASME "UV" Stamp required.

Valve Dimensions

mm		kg	
A	123.95	Weight	22.68
B	152.40		
C	603.25		



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
0	EVC			27-jul.-2021	

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
End-User Ref. No.: *201754C001*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-PSV-1033*
Service	*E-761 shell side*
PID No.	*P-C43-A-110990 H42*
Line No.	*1"SH-4206-TXD15-ET*
Quantity	1

GENERAL

Valve Type	*Conventional, Direct Spring-Op*		
Safety / Relief	*Safety*	Balanced	*No*
Nozzle	*Full*	Bonnet	*Closed*

CONNECTIONS

Inlet	*1"*	*Flngd.*	*600#*	*RF*	Standard
Outlet	*2"*	*Flngd.*	*150#*	*RF*	*ASME B16.5*

MATERIALS OF CONSTRUCTION

Body / Base	*SS SA351-CF8M*
Bonnet / Cylinder	*SS SA351-CF8M*
Nozzle	*316 SST*
Disc	*17-4 PH SST*
Seat	*Metal*
Spindle	*316 SST*
Guide	*SS A297 Gr. HE*
Spring	*Inconel® X750*
Gaskets	*316 SST*
Bellows	*N/A*
Cap Type	*Packed Lift Lever w/ Test Rod*
NACE MR0175/ISO 15156:2015	*No*

Accessories

SIZING / SELECTION SUMMARY

Valve Model No.			*1D2JOS-E45S6E-PS*		
Brand			*Crosby®*		
Area (cm²)	Calculated	Selected			*0.710*
	Data Set	Orifice	*API*		*D*
Flow	Unit	Required	kg/hr		
	Saturated	Superheated	1956.951	1928.244	
Reaction Force, Open Discharge			*257.1 N*		
Noise Level (db), Open Discharge			*136.5 at 1.0000-m*		

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Blocked outlet + heat on*		
Fluid State at Inlet	*Steam*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name	*Steam*
Molecular Weight, M	*18.020*
Compressibility, Z	*1.000*
Ratio of Sp. Heats, k (Cp / Cv)	*1.31*
Saturation Temperature	*268.644 °C*

Sizing Coefficients

		Unit	-
Effective K, Steam		*0.975*	
Kb	Kc	*1*	*1*
Kn	Ksh	*1*	*0.985*
Ksc			

Required Capacity

	Unit	
Total		

Pressures

		Unit	kg/cm² g
MAWP	Operating	*49*	*34.5*
Set	CDTP	*49*	*49*
Over Pressure		*4.9*	*10%*
Back Pressure	Built-Up		*4.9*
	Constant Superimposed		*0*
	Variable Superimposed		*0*
	Total		*4.9*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*

Temperatures

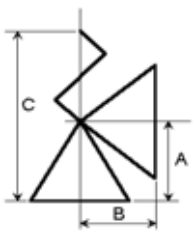
		Unit	°C
	Normal System		
Operating	Relieving	*242*	*270*
Design Min	Design Max		*270*

Tag Notes

1. Radiographic Test - Body and Bonnet
2. Liquid Penetrant Test - Body/Machined Surfaces
3. Opening Adjustment 5%
4. ASME "UV" Stamp required.

Valve Dimensions

mm	
A	104.90
B	114.30
C	508.00
kg	
Weight	16.33



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
1	EVC			20-abr.-2022	New process data
0	EVC			27-jul.-2021	

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
End-User Ref. No.: *201754C001*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-PSV-1038*
Service	*C-231 fuel gas K.O. Drum*
PID No.	*P-C43-A-110990 H45*
Line No.	*1-1/2"-FG-4512-B4-P*
Quantity	*1*

GENERAL

Valve Type	*Balanced Bellows, Direct Spring-Op*		
Safety / Relief	*Safety*	Balanced	*Yes*
Nozzle	*Full*	Bonnet	*Vented*

CONNECTIONS

Inlet	*1"*	*Flngd.*	*300#*	*RF*	Standard
Outlet	*2"*	*Flngd.*	*150#*	*RF*	*ASME B16.5*

MATERIALS OF CONSTRUCTION

Body / Base	*CS SA216-WCB/WCC*
Bonnet / Cylinder	*CS SA216-WCB/WCC*
Nozzle	*316 SST*
Disc	*316 SST*
Seat	*Metal*
Spindle	*416 SST*
Guide	*SS A297 Gr. HE*
Spring	*Chrome Steel - Corr. Rest.*
Gaskets	*316 SST*
Bellows	*Inconel® 625*
Cap Type	*Screwed w/ Test Rod*
NACE MR0175/ISO 15156:2015	*No*

Accessories: *Bug Screen*

SIZING / SELECTION SUMMARY

Valve Model No.		*1D2JBS-E35K-P*		
Brand		*Crosby®*		
Area (cm²)	Calculated	Selected	*0.642*	*0.710*
	Data Set	Orifice	*API*	*D*
Flow	Unit	Required	kg/hr	455
		Maximum		503.131
Reaction Force, Open Discharge			*37 N*	
Noise Level (db), Open Discharge			*114.1 at 1.0000-m*	

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Fire Case*		
Fluid State at Inlet	*Gas / Vapor*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name	*HYDROCARBON*
Molecular Weight, M	*45.52*
Compressibility, Z	*0.912*
Ratio of Sp. Heats, k (Cp / Cv)	*1.108*
Gas Constant, C	*248.7*

Sizing Coefficients

		Unit	-
Effective K, Gas		*0.975*	
Kb	Kc	*0.968*	*1*

Required Capacity

	Unit	kg/hr
Total	*455*	

Pressures

		Unit	kg/cm² g
MAWP	Operating	*5.8*	*3.7*
Set	CDTP	*5.8*	*5.800*
Over Pressure		*1.218*	*21%*
Back Pressure	Built-Up		*2.3*
	Constant Superimposed		*0*
	Variable Superimposed		*0*
	Total		*2.3*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*

Temperatures

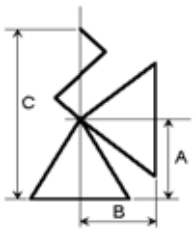
		Unit	°C
	Normal System		
Operating	Relieving	*38*	*67.9*
Design Min	Design Max		*150*

Tag Notes

1. Standard C4M acc. ISO 12944
2. Opening Adjustment:5%.
3. NAC E 0103 certificate required (disc & bellow).
4. ASME "UV" Stamp required.

Valve Dimensions

mm	
A	104.90
B	114.30
C	514.35
kg	
Weight	16.33



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
0	EVC			27-jul.-2021	

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
End-User Ref. No.: *201754C001*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-PSV-1047*
Service	*E-520 shell side inlet*
PID No.	*P-C43-A-110990 H47*
Line No.	*2"P-4701-B4*
Quantity	1

GENERAL

Valve Type	*Balanced Bellows, Direct Spring-Op*		
Safety / Relief	*Safety*	Balanced	*Yes*
Nozzle	*Full*	Bonnet	*Vented*

CONNECTIONS

Inlet	*1 1/2"*	*Flngd.*	*300#*	*RF*	Standard
Outlet	*2"*	*Flngd.*	*150#*	*RF*	*ASME B16.5*

MATERIALS OF CONSTRUCTION

Body / Base	*CS SA216-WCB/WCC*
Bonnet / Cylinder	*CS SA216-WCB/WCC*
Nozzle	*316 SST*
Disc	*316 SST*
Seat	*Metal*
Spindle	*416 SST*
Guide	*SS A297 Gr. HE*
Spring	*Chrome Steel - Corr. Rest.*
Gaskets	*316 SST*
Bellows	*Inconel® 625*
Cap Type	*Screwed w/ Test Rod*
NACE MR0175/ISO 15156:2015	*No*

Accessories: *Bug Screen*

SIZING / SELECTION SUMMARY

Valve Model No.		*1.5F2JBS-E35K-PSPL*		
Brand		*Crosby®*		
Area (cm²)	Calculated	Selected	*1.701*	*1.981*
	Data Set	Orifice	*API*	*F*
Flow	Unit	Required	kg/hr	894
		Maximum		1041.174
Reaction Force, Open Discharge		*101.3 N*		
Noise Level (db), Open Discharge		*116.7 at 1.0000-m*		

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Blocked-in heat-on*		
Fluid State at Inlet	*Gas / Vapor*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name	*PROCESS GAS*
Molecular Weight, M	*28.20*
Compressibility, Z	*0.987*
Ratio of Sp. Heats, k (Cp / Cv)	*1.323*
Gas Constant, C	*265.1*

Sizing Coefficients

		Unit	-
Effective K, Gas		*0.975*	
Kb	Kc	*0.936*	*1*

Required Capacity

	Unit	kg/hr
Total	*894*	

Pressures

		Unit	kg/cm² g
MAWP	Operating	*5.8*	*0.3*
Set	CDTP	*5.8*	*5.800*
Over Pressure		*0.58*	*10%*
Back Pressure	Built-Up		*0.5*
	Constant Superimposed		*0.3*
	Variable Superimposed		*1.5*
	Total		*2.3*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*

Temperatures

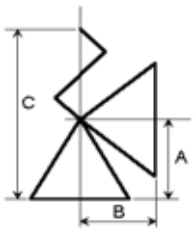
	Unit	°C
	Normal System	
Operating	Relieving	*21*	*46.6*
Design Min	Design Max		*220*

Tag Notes

1. Standard C4M acc. ISO 12944
2. Opening Adjustment 5%
3. ASME "UV" Stamp required.

Valve Dimensions

mm	
A	123.95
B	152.40
C	603.25
kg	
Weight	22.68



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
3	EVC			7-abr.-2022	New flow capacity.
2	EVC			1-feb.-2022	New process data.
1	EVC			30-ago.-2021	New process data.
0	EVC			27-jul.-2021	

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
End-User Ref. No.: *201754C001*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-PSV-1059*
Service	*CE-203 through T-501*
PID No.	*P-C43-A-110990 H51*
Line No.	*6"P-5109-C3*
Quantity	1

GENERAL

Valve Type	*Balanced Bellows, Direct Spring-Op*		
Safety / Relief	*Safety Relief*	Balanced	*Yes*
Nozzle	*Full*	Bonnet	*Vented*

CONNECTIONS

Inlet	*4"*	*Flngd.*	*300#*	*RF*	Standard
Outlet	*6"*	*Flngd.*	*150#*	*RF*	*ASME B16.5*

MATERIALS OF CONSTRUCTION

Body / Base	*CS SA216-WCB/WCC*
Bonnet / Cylinder	*CS SA216-WCB/WCC*
Nozzle	*316 SST*
Disc	*316 SST*
Seat	*Viton® (75)*
Spindle	*416 SST*
Guide	*SS A297 Gr. HE*
Spring	*Chrome Steel - Corr. Rest.*
Gaskets	*316 SST*
Bellows	*Inconel® 625*
Cap Type	*Bolted w/ Test Rod*
NACE MR0175/ISO 15156:2015	*No*

Accessories

SIZING / SELECTION SUMMARY

Valve Model No.		*4L6JLTJBS-EOR35M-P*		
Brand		*Crosby®*		
Area (cm²)	Calculated	Selected	*17.295*	*18.406*
	Data Set	Orifice	*API*	*L*
Flow	Unit	Required	kg/hr	20936
		Maximum		22280.962
Reaction Force, Open Discharge				
Noise Level (db), Open Discharge			*N/A*	

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Tube Rupture*		
Fluid State at Inlet	*Two-Phase Flow (9th, C.2.2)*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name		*PROCESS GAS*
Specific Vol. @ Flowing Press.	Vapor	*0.00101 m³/kg*
	Liquid	*0.00101 m³/kg*
Sp. Vol. @ 90% Flowing Press.		*0.02169 m³/kg*
Ratio of Sp. Heats, k (Cp / Cv)		*1.376*

Sizing Coefficients		Unit	-
Effective K, Gas		*0.975*	
Effective K, Liquid		*0.65*	
Kw	Kb	*0.914*	*1*
Kc	Kv	*1*	*1.0*

Required Capacity		Unit	kg/hr
Vapor	Liquid	*13375*	*7561*
	Total		*20936*

Pressures		Unit	kg/cm² g
MAWP	Operating	*31*	*26.2*
Set	CDTP	*29*	*29.00*
Over Pressure		*2.9*	*10%*

Back Pressure		
Built-Up		*5.45*
Constant Superimposed		*0.3*
Variable Superimposed		*1.5*
Total		*7.25*

Inlet Loss	*0*	*0%*
Atmospheric (Barometric)	*1.033*	*kg/cm² a*

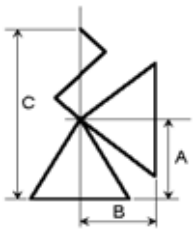
Temperatures		Unit	°C
	Normal System		
Operating	Relieving	*35*	*35*
Design Min	Design Max		*185*

Tag Notes

1. Maximum Carbon content % C Max 0.22 / %C Equivalent. Max. 0.43 (body and bonnet)
2. Maximum Content P(%) 0.020 - S(%) 0.015. (body and bonnet)
3. Standard C4M acc. ISO 12944
4. Opening Ad justment 5%
5. Magnetic Particle (Body and Bonnet)
6. Allowable Blowdown: 9.7%
7. ASME "UV" Stamp required.

Valve Dimensions

mm	
A	179.32
B	181.10
C	876.30
kg	
Weight	87.09



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
0	EVC			27-jul.-2021	

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
End-User Ref. No.: *201754C001*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-PSV-1073*
Service	*Hydrogen to battery limit*
PID No.	*P-C43-A-110990 H54*
Line No.	*3"H-5402-C2*
Quantity	1

GENERAL

Valve Type	*Balanced Bellows, Direct Spring-Op*		
Safety / Relief	*Safety*	Balanced	*Yes*
Nozzle	*Full*	Bonnet	*Vented*

CONNECTIONS

Inlet	*1 1/2"*	*Flngd.*	*300#*	*RF*	Standard
Outlet	*3"*	*Flngd.*	*150#*	*RF*	*ASME B16.5*

MATERIALS OF CONSTRUCTION

Body / Base	*CS SA216-WCB/WCC*
Bonnet / Cylinder	*CS SA216-WCB/WCC*
Nozzle	*316 SST*
Disc	*316 SST*
Seat	*Metal*
Spindle	*416 SST*
Guide	*SS A297 Gr. HE*
Spring	*Chrome Steel - Corr. Rest.*
Gaskets	*316 SST*
Bellows	*Inconel® 625*
Cap Type	*Bolted w/ Test Rod*
NACE MR0175/ISO 15156:2015	*No*

Accessories: *Bug Screen*

SIZING / SELECTION SUMMARY

Valve Model No.		*1.5G3JBS-E35M-P*		
Brand		*Crosby®*		
Area (cm²)	Calculated	Selected	*2.860*	*3.245*
	Data Set	Orifice	*API*	*G*
Flow	Unit	Required	kg/hr	1896
		Maximum		2151.442
Reaction Force, Open Discharge		*819.1 N*		
Noise Level (db), Open Discharge		*142.0 at 1.0000-m*		

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Blocked Outlet*		
Fluid State at Inlet	*Gas / Vapor*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name	*Hydrogen*
Molecular Weight, M	*2.020*
Compressibility, Z	*1.000*
Ratio of Sp. Heats, k (Cp / Cv)	*1.4*
Gas Constant, C	*270.3*

Sizing Coefficients		Unit	-
Effective K, Gas		*0.975*	
Kb	Kc	*1*	*1*

Required Capacity		Unit	kg/hr
Total		*1896*	

Pressures		Unit	kg/cm² g
MAWP	Operating	*28*	*25*
Set	CDTP	*28*	*28.00*
Over Pressure		*2.8*	*10%*
Back Pressure	Built-Up		*7*
	Constant Superimposed		*0*
	Variable Superimposed		*0*
	Total		*7*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*

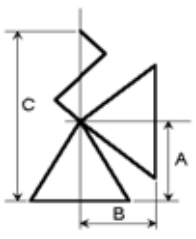
Temperatures		Unit	°C
	Normal System		
Operating	Relieving	*38*	*38*
Design Min	Design Max		*80*

Tag Notes

1. Hydrogen Service.
2. Maximum Carbon content % C Max 0.22 / %C Equivalent. Max. 0.43 (body and bonnet)
3. Maximum Content P(%) 0.020 - S(%) 0.015. (body and bonnet)
4. Standard C4M acc. IS O 12944
5. Opening Adjustment 5%
6. NACE 0103 certificate requi red (disc & bellow).
7. Magnetic Particle (Body and Bonnet)
8. ASME "UV" Stamp required.

Valve Dimensions

mm	
A	123.95
B	152.40
C	603.25
kg	
Weight	22.68



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
1	EVC			7-abr.-2022	New temperatures
0	EVC			7-mar.-2022	New valve on scope.

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
End-User Ref. No.: *201754C001*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-PSV-1140*
Service	*Nitrogen Compressor Suction*
PID No.	*P-C43-A-110990 H56*
Line No.	*4"SH-5707-D3-H*
Quantity	1

GENERAL

Valve Type	*Balanced Bellows, Direct Spring-Op*		
Safety / Relief	*Safety*	Balanced	*Yes*
Nozzle	*Full*	Bonnet	*Vented*

CONNECTIONS

Inlet	*1"*	*Flngd.*	*300#*	*RF*	Standard
Outlet	*2"*	*Flngd.*	*150#*	*RF*	*ASME B16.5*

MATERIALS OF CONSTRUCTION

Body / Base	*CS SA216-WCB/WCC*
Bonnet / Cylinder	*CS SA216-WCB/WCC*
Nozzle	*316 SST*
Disc	*316 SST*
Seat	*Metal*
Spindle	*416 SST*
Guide	*SS A297 Gr. HE*
Spring	*Ctd. Alloy Steel*
Gaskets	*316 SST*
Bellows	*Inconel® 625*
Cap Type	*Bolted w/ Test Rod*
NACE MR0175/ISO 15156:2015	*No*

Accessories: *Bug Screen*

SIZING / SELECTION SUMMARY

Valve Model No.		*1D2JBS-E36M-P*		
Brand		*Crosby®*		
Area (cm²)	Calculated	Selected		*0.710*
	Data Set	Orifice	*API*	*D*
Flow	Unit	Required	kg/hr	
		Maximum		884.335
Reaction Force, Open Discharge			*80.3 N*	
Noise Level (db), Open Discharge			*126.4 at 1.0000-m*	

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Valve Open*		
Fluid State at Inlet	*Gas / Vapor*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name	*Nitrogen*
Molecular Weight, M	*28.0*
Compressibility, Z	*1.000*
Ratio of Sp. Heats, k (Cp / Cv)	*1.400*
Gas Constant, C	*270.3*

Sizing Coefficients

		Unit	-
Effective K, Gas		*0.975*	
Kb	Kc	*1*	*1*

Required Capacity

	Unit	
Total		

Pressures

		Unit	kg/cm² g
MAWP	Operating	*15*	*6*
Set	CDTP	*13.6*	*13.600*
Over Pressure		*1.36*	*10%*
Back Pressure	Built-Up		*1.6*
	Constant Superimposed		*0.3*
	Variable Superimposed		*1.5*
	Total		*3.4*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*

Temperatures

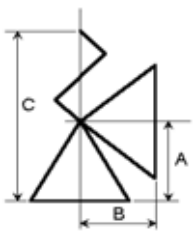
		Unit	°C
	Normal System		
Operating	Relieving	*35*	*35*
Design Min	Design Max		*80*

Tag Notes

1. Maximum Content P(%) 0.020 - S(%) 0.015. (body and bonnet)
2 . Standard C4M acc. ISO 12944
3. Opening Adjustment 5%
4. Blowd own: 11.8%
5. ASME "UV" Stamp required.

Valve Dimensions

mm	
A	104.90
B	114.30
C	514.35
kg	
Weight	16.33



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Pressure Relief Valve Sizing & Selection Report

27-jul.-2021

Quote Number: 093-093	No	Prpd.	Chk.	Appr.	Date	Revision

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN* — End-User Ref. No.: *201754C001*
Project: *C43 "New Bios 2G Hydrotreatment Unit"* — Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID			
Tag No.	608-TSV-1050		
Service	E-741 CW side		
PID No.	P-C43-A-110990 H43		
Line No.	3/4"CWR-4312-B1	Quantity	1

GENERAL			
Valve Type	Conventional, Direct Spring-Op		
Safety / Relief	Safety Relief	Balanced	No
Nozzle	Full	Bonnet	Closed

CONNECTIONS					
Inlet	3/4"	Thrd.	MNPT	Standard	
Outlet	1"	Thrd.	FNPT	ASME B1.20.1	

MATERIALS OF CONSTRUCTION	
Body Cylinder	CS SA216-WCB
Body Base	316 SST
Connections	N/A
Disc	316 SST
Seat	Metal
Seals	N/A
Spindle	416 SST
Guide	316 SST
Spring	17-7 PH SST
Cap Type	Screwed & Test Rod
NACE MR0175/ISO 15156:2015	No

Accessories

SIZING / SELECTION SUMMARY					
Valve Model No.		961101MFB-P			
Brand		Crosby®			
Area	Calculated	Selected		0.710	
(cm²)	Data Set	Orifice	API	6	
Flow	Unit	Required	L/min		
		Maximum		99.844	
Reaction Force, Open Discharge			5.4 N		
Noise Level (db), Open Discharge			N/A		

SIZING DATA			
Design Code	ASME VIII/XIII - UV	Sizing Std.	API 520
Sizing Basis	Thermal Expansion		
Fluid State at Inlet	Liquid		
Relieving Case	Pressure Relief		

Fluid Properties	
Fluid Name	COOLING WATER
Sp. Gravity, G	0.980
Viscosity	0.43824 cSt
Reynolds No.	
Reynolds No. (max)	508437.17

Sizing Coefficients		Unit	-
Effective K, Liquid		0.65	
Kw	Kc	1.0	1
Kv	Kv (max)		1.0

Required Capacity	Unit	
Total		

Pressures		Unit	kg/cm² g
MAWP	Operating	6.5	4
Set	CDTP	6.5	6.500
Over Pressure		0.65	10%
Back Pressure	Built-Up		0.65
	Constant Superimposed		0
	Variable Superimposed		0
	Total		0.65
Inlet Loss		0	0%
Atmospheric (Barometric)		1.033	kg/cm² a

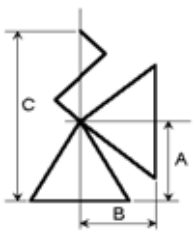
Temperatures		Unit	°C
	Normal System		
Operating	Relieving	39	65.6
Design Min	Design Max		100

Tag Notes

1. Standard C4M acc. ISO 12944
2. Opening Adjustment 5%
3. ASME "UV" Stamp required.

Valve Dimensions

mm	A	B	C
	79.38	49.21	307.98
kg	Weight		
	4.54		



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
0	EVC			27-jul.-2021	

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
End-User Ref. No.: *201754C001*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-TSV-1058*
Service	*E-308 CW side*
PID No.	*P-C43-A-110990 H51*
Line No.	*3/4"-CWR-5112-C6*
Quantity	*1*

GENERAL

Valve Type	*Conventional, Direct Spring-Op*		
Safety / Relief	*Safety Relief*	Balanced	*No*
Nozzle	*Full*	Bonnet	*Closed*

CONNECTIONS

Inlet	*3/4"*	*Thrd.*	*MNPT*	Standard
Outlet	*1"*	*Thrd.*	*FNPT*	*ASME B1.20.1*

MATERIALS OF CONSTRUCTION

Body Cylinder	*CS SA216-WCB*
Body Base	*316 SST*
Connections	*N/A*
Disc	*316 SST*
Seat	*Metal*
Seals	*N/A*
Spindle	*416 SST*
Guide	*316 SST*
Spring	*17-7 PH SST*
Cap Type	*Screwed & Test Rod*
NACE MR0175/ISO 15156:2015	*No*

Accessories

SIZING / SELECTION SUMMARY

Valve Model No.		*961101MFB-P*		
Brand		*Crosby®*		
Area (cm²)	Calculated	Selected	*0.004*	*0.710*
	Data Set	Orifice	*API*	*6*
Flow	Unit	Required	kg/hr	53.67
		Maximum		11336.151
Reaction Force, Open Discharge			*19.8 N*	
Noise Level (db), Open Discharge			*N/A*	

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Thermal Expansion*		
Fluid State at Inlet	*Liquid*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name	*COOLING WATER*
Sp. Gravity, G	*0.989*
Viscosity	*0.55303 cSt*
Reynolds No.	*3649.39*
Reynolds No. (max)	*770823.29*

Sizing Coefficients

Unit			-
Effective K, Liquid		*0.65*	
Kw	Kc	*1.0*	*1*
Kv	Kv (max)	*0.959*	*1.0*

Required Capacity

Unit		kg/hr
Total		*53.67*

Pressures

Unit		kg/cm² g	
MAWP	Operating	*24*	*3.8*
Set	CDTP	*24*	*24.00*
Over Pressure		*2.4*	*10%*
Back Pressure	Built-Up		*2.4*
	Constant Superimposed		*0*
	Variable Superimposed		*0*
	Total		*2.4*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*

Temperatures

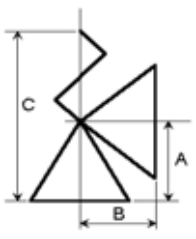
Unit			°C
	Normal System		
Operating	Relieving	*39*	*50*
Design Min	Design Max		*100*

Tag Notes

1. Standard C4M acc. ISO 12944
2. Opening Adjustment 5%
3. ASME "UV" Stamp required.

Valve Dimensions

mm	A	79.38
	B	49.21
	C	307.98
kg	Weight	4.54



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
0	EVC			27-jul.-2021	

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
End-User Ref. No.: *201754C001*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-TSV-1062*
Service	*G-761A CW*
PID No.	*P-C43-A-110990 H52*
Line No.	*3/4"CWR-5215-B1*
Quantity	1

GENERAL

Valve Type	*Conventional, Direct Spring-Op*		
Safety / Relief	*Safety Relief*	Balanced	*No*
Nozzle	*Full*	Bonnet	*Closed*

CONNECTIONS

Inlet	*3/4"*	*Thrd.*	*MNPT*	Standard
Outlet	*1"*	*Thrd.*	*FNPT*	*ASME B1.20.1*

MATERIALS OF CONSTRUCTION

Body Cylinder	*CS SA216-WCB*
Body Base	*316 SST*
Connections	*N/A*
Disc	*316 SST*
Seat	*Metal*
Seals	*N/A*
Spindle	*416 SST*
Guide	*316 SST*
Spring	*17-7 PH SST*
Cap Type	*Screwed & Test Rod*
NACE MR0175/ISO 15156:2015	*No*

Accessories

SIZING / SELECTION SUMMARY

Valve Model No.		*961101MFB-P*		
Brand		*Crosby®*		
Area (cm²)	Calculated	Selected		*0.710*
	Data Set	Orifice	*API*	*6*
Flow	Unit	Required	kg/hr	
		Maximum		5873.816
Reaction Force, Open Discharge			*5.4 N*	
Noise Level (db), Open Discharge			*N/A*	

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Thermal Expansion*		
Fluid State at Inlet	*Liquid*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name	*COOLING WATER*
Sp. Gravity, G	*0.980*
Viscosity	*0.43824 cSt*
Reynolds No.	
Reynolds No. (max)	*508437.17*

Sizing Coefficients

		Unit	-
Effective K, Liquid		*0.65*	
Kw	Kc	*1*	*1*
Kv	Kv (max)		*1.0*

Required Capacity

	Unit	
Total		

Pressures

		Unit	kg/cm² g
MAWP	Operating	*6.5*	*4*
Set	CDTP	*6.5*	*6.500*
Over Pressure		*0.65*	*10%*
Back Pressure	Built-Up		*0.65*
	Constant Superimposed		*0*
	Variable Superimposed		*0*
	Total		*0.65*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*

Temperatures

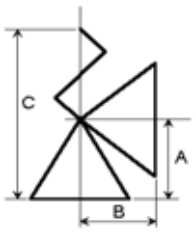
		Unit	°C
	Normal System		
Operating	Relieving	*39*	*65.6*
Design Min	Design Max		*100*

Tag Notes

1. Standard C4M acc. ISO 12944
2. Opening Adjustment 5%
3. ASME "UV" Stamp required.

Valve Dimensions

mm	A
	79.38
	B
	49.21
	C
	307.98
kg	Weight
	4.54



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
0	EVC			27-jul.-2021	

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
End-User Ref. No.: *201754C001*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID				
Tag No.	*608-TSV-1063*			
Service	*G-761B CW*			
PID No.	*P-C43-A-110990 H52*			
Line No.	*3/4"CWR-5217-B1*	Quantity		
		1		
GENERAL				
Valve Type	*Conventional, Direct Spring-Op*			
Safety / Relief	*Safety Relief*	Balanced	*No*	
Nozzle	*Full*	Bonnet	*Closed*	
CONNECTIONS				
Inlet	*3/4"*	*Thrd.*	*MNPT*	Standard
Outlet	*1"*	*Thrd.*	*FNPT*	*ASME B1.20.1*
MATERIALS OF CONSTRUCTION				
Body Cylinder	*CS SA216-WCB*			
Body Base	*316 SST*			
Connections	*N/A*			
Disc	*316 SST*			
Seat	*Metal*			
Seals	*N/A*			
Spindle	*416 SST*			
Guide	*316 SST*			
Spring	*17-7 PH SST*			
Cap Type	*Screwed & Test Rod*			
NACE MR0175/ISO 15156:2015	*No*			
Accessories				
SIZING / SELECTION SUMMARY				
Valve Model No.	*961101MFB-P*			
Brand	*Crosby®*			
Area (cm²)	Calculated	Selected		*0.710*
	Data Set	Orifice	*API*	*6*
Flow	Unit	Required	kg/hr	
		Maximum		5873.816
Reaction Force, Open Discharge	*5.4 N*			
Noise Level (db), Open Discharge	*N/A*			

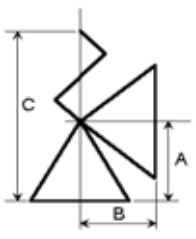
SIZING DATA			
Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Thermal Expansion*		
Fluid State at Inlet	*Liquid*		
Relieving Case	*Pressure Relief*		
Fluid Properties			
Fluid Name	*COOLING WATER*		
Sp. Gravity, G	*0.980*		
Viscosity	*0.43820 cSt*		
Reynolds No.			
Reynolds No. (max)	*508483.58*		
Sizing Coefficients	**Unit**	-	
Effective K, Liquid	*0.65*		
Kw	Kc	*1.0*	*1*
Kv	Kv (max)		*1.0*
Required Capacity	**Unit**		
Total			
Pressures	**Unit**	kg/cm² g	
MAWP	Operating	*6.5*	*4*
Set	CDTP	*6.5*	*6.500*
Over Pressure		*0.65*	*10%*
Back Pressure	Built-Up		*0.65*
	Constant Superimposed		*0*
	Variable Superimposed		*0*
	Total		*0.65*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*
Temperatures	**Unit**	°C	
	Normal System		
Operating	Relieving	*39*	*65.6*
Design Min	Design Max		*100*

Tag Notes

1. Standard C4M acc. ISO 12944
2. Opening Adjustment 5%
3. ASME "UV" Stamp required.

Valve Dimensions

mm		kg	
A	79.38	Weight	4.54
B	49.21		
C	307.98		



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
0	EVC			27-jul.-2021	

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
End-User Ref. No.: *201754C001*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-TSV-1076*
Service	*G-711A CW*
PID No.	*P-C43-A-110990 H55*
Line No.	*3/4"CWR-5517-B1*
Quantity	1

GENERAL

Valve Type	*Conventional, Direct Spring-Op*		
Safety / Relief	*Safety Relief*	Balanced	*No*
Nozzle	*Full*	Bonnet	*Closed*

CONNECTIONS

Inlet	*3/4"*	*Thrd.*	*MNPT*	Standard
Outlet	*1"*	*Thrd.*	*FNPT*	*ASME B1.20.1*

MATERIALS OF CONSTRUCTION

Body Cylinder	*CS SA216-WCB*
Body Base	*316 SST*
Connections	*N/A*
Disc	*316 SST*
Seat	*Metal*
Seals	*N/A*
Spindle	*416 SST*
Guide	*316 SST*
Spring	*17-7 PH SST*
Cap Type	*Screwed & Test Rod*
NACE MR0175/ISO 15156:2015	*No*

Accessories

SIZING / SELECTION SUMMARY

Valve Model No.		*961101MFB-P*		
Brand		*Crosby®*		
Area (cm²)	Calculated	Selected		*0.710*
	Data Set	Orifice	*API*	*6*
Flow	Unit	Required	kg/hr	
		Maximum		5873.816
Reaction Force, Open Discharge			*5.4 N*	
Noise Level (db), Open Discharge			*N/A*	

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Thermal Expansion*		
Fluid State at Inlet	*Liquid*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name	*COOLING WATER*
Sp. Gravity, G	*0.980*
Viscosity	*0.43824 cSt*
Reynolds No.	
Reynolds No. (max)	*508437.17*

Sizing Coefficients

Effective K, Liquid		*0.65*	
Kw	Kc	*1.0*	*1*
Kv	Kv (max)		*1.0*

Required Capacity

Total	

Pressures

		Unit	kg/cm² g
MAWP	Operating	*6.5*	*4*
Set	CDTP	*6.5*	*6.500*
Over Pressure		*0.65*	*10%*
Back Pressure	Built-Up		*0.65*
	Constant Superimposed		*0*
	Variable Superimposed		*0*
	Total		*0.65*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*

Temperatures

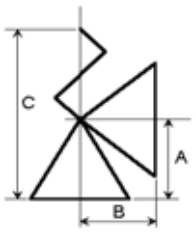
		Unit	°C
	Normal System		
Operating	Relieving	*39*	*65.6*
Design Min	Design Max		*100*

Tag Notes

1. Standard C4M acc. ISO 12944
2. Opening Adjustment 5%
3. ASME "UV" Stamp required.

Valve Dimensions

mm A	79.38
mm B	49.21
mm C	307.98
kg Weight	4.54



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
0	EVC			27-jul.-2021	

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
End-User Ref. No.: *201754C001*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-TSV-1077*
Service	*G-711B CW*
PID No.	*P-C43-A-110990 H55*
Line No.	*3/4"CWR-5519-B1*
Quantity	1

GENERAL

Valve Type	*Conventional, Direct Spring-Op*		
Safety / Relief	*Safety Relief*	Balanced	*No*
Nozzle	*Full*	Bonnet	*Closed*

CONNECTIONS

Inlet	*3/4"*	*Thrd.*	*MNPT*	Standard
Outlet	*1"*	*Thrd.*	*FNPT*	*ASME B1.20.1*

MATERIALS OF CONSTRUCTION

Body Cylinder	*CS SA216-WCB*
Body Base	*316 SST*
Connections	*N/A*
Disc	*316 SST*
Seat	*Metal*
Seals	*N/A*
Spindle	*416 SST*
Guide	*316 SST*
Spring	*17-7 PH SST*
Cap Type	*Screwed & Test Rod*
NACE MR0175/ISO 15156:2015	*No*

Accessories

SIZING / SELECTION SUMMARY

Valve Model No.		*961101MFB-P*		
Brand		*Crosby®*		
Area (cm²)	Calculated	Selected		*0.710*
	Data Set	Orifice	*API*	*6*
Flow	Unit	Required	kg/hr	
		Maximum		5873.816
Reaction Force, Open Discharge			*5.4 N*	
Noise Level (db), Open Discharge			*N/A*	

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Thermal Expansion*		
Fluid State at Inlet	*Liquid*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name	*COOLING WATER*
Sp. Gravity, G	*0.980*
Viscosity	*0.43282 cSt*
Reynolds No.	
Reynolds No. (max)	*514804.09*

Sizing Coefficients

Effective K, Liquid		*0.65*	
Kw	Kc	*1.0*	*1*
Kv	Kv (max)		*1.0*

Required Capacity

	Unit
Total	

Pressures

		Unit	kg/cm² g
MAWP	Operating	*6.5*	*4*
Set	CDTP	*6.5*	*6.500*
Over Pressure		*0.65*	*10%*
Back Pressure	Built-Up		*0.65*
	Constant Superimposed		*0*
	Variable Superimposed		*0*
	Total		*0.65*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*

Temperatures

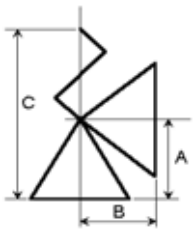
		Unit	°C
	Normal System		
Operating	Relieving	*39*	*65.6*
Design Min	Design Max		*100*

Tag Notes

1. Standard C4M acc. ISO 12944
2. Opening Adjustment 5%
3. ASME "UV" Stamp required.

Valve Dimensions

mm	A
	79.38
	B
	49.21
	C
	307.98
kg	Weight
	4.54



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Pressure Relief Valve Sizing & Selection Report

No	Prpd.	Chk.	Appr.	Date	Revision
0	EVC			7-mar.-2022	New valve on the scope.

Quote Number: 093-093

Client: *TECHNIP ENERGIES*
Location: *CARTAGENA, SPAIN*
End-User Ref. No.: *201754C001*
Project: *C43 "New Bios 2G Hydrotreatment Unit"*
Project Ref. No.: *U-608 Hydrogen Unit*

Valve ID

Tag No.	*608-TSV-1139*
Service	*E-121 CW side*
PID No.	*P-C43-A-110990 H43*
Line No.	*3/4"CWR-3231-B1*
Quantity	*1*

GENERAL

Valve Type	*Conventional, Direct Spring-Op*		
Safety / Relief	*Safety Relief*	Balanced	*No*
Nozzle	*Full*	Bonnet	*Closed*

CONNECTIONS

Inlet	*3/4"*	*Thrd.*	*MNPT*	Standard
Outlet	*1"*	*Thrd.*	*FNPT*	*ASME B1.20.1*

MATERIALS OF CONSTRUCTION

Body Cylinder	*CS SA216-WCB*
Body Base	*316 SST*
Connections	*N/A*
Disc	*316 SST*
Seat	*Metal*
Seals	*N/A*
Spindle	*416 SST*
Guide	*316 SST*
Spring	*17-7 PH SST*
Cap Type	*Screwed & Test Rod*
NACE MR0175/ISO 15156:2015	*No*

Accessories

SIZING / SELECTION SUMMARY

Valve Model No.		*961101MFB-P*		
Brand		*Crosby®*		
Area (cm²)	Calculated	Selected		*0.710*
	Data Set	Orifice	*API*	*6*
Flow	Unit	Required	kg/hr	
		Maximum		5873.816
Reaction Force, Open Discharge		*5.4 N*		
Noise Level (db), Open Discharge		*N/A*		

SIZING DATA

Design Code	*ASME VIII/XIII - UV*	Sizing Std.	*API 520*
Sizing Basis	*Thermal Expansion*		
Fluid State at Inlet	*Liquid*		
Relieving Case	*Pressure Relief*		

Fluid Properties

Fluid Name	*Cooling water*
Sp. Gravity, G	*0.980*
Viscosity	*0.43825 cSt*
Reynolds No.	
Reynolds No. (max)	*508429.05*

Sizing Coefficients

		Unit	-
Effective K, Liquid		*0.65*	
Kw	Kc	*1.0*	*1*
Kv	Kv (max)		*1.0*

Required Capacity

	Unit	
Total		

Pressures

		Unit	kg/cm² g
MAWP	Operating	*6.5*	*4*
Set	CDTP	*6.5*	*5.850*
Over Pressure		*0.65*	*10%*
Back Pressure	Built-Up		*0*
	Constant Superimposed		*0.65*
	Variable Superimposed		*0*
	Total		*0.65*
Inlet Loss		*0*	*0%*
Atmospheric (Barometric)		*1.033*	*kg/cm² a*

Temperatures

		Unit	°C
	Normal System		
Operating	Relieving	*39*	*65.6*
Design Min	Design Max		*100*

Tag Notes

1. Standard C4M acc. ISO 12944
2. Opening Adjustment 5%
3. ASME "UV" Stamp required.

Valve Dimensions

mm		kg	
A	79.38	Weight	4.54
B	49.21		
C	307.98