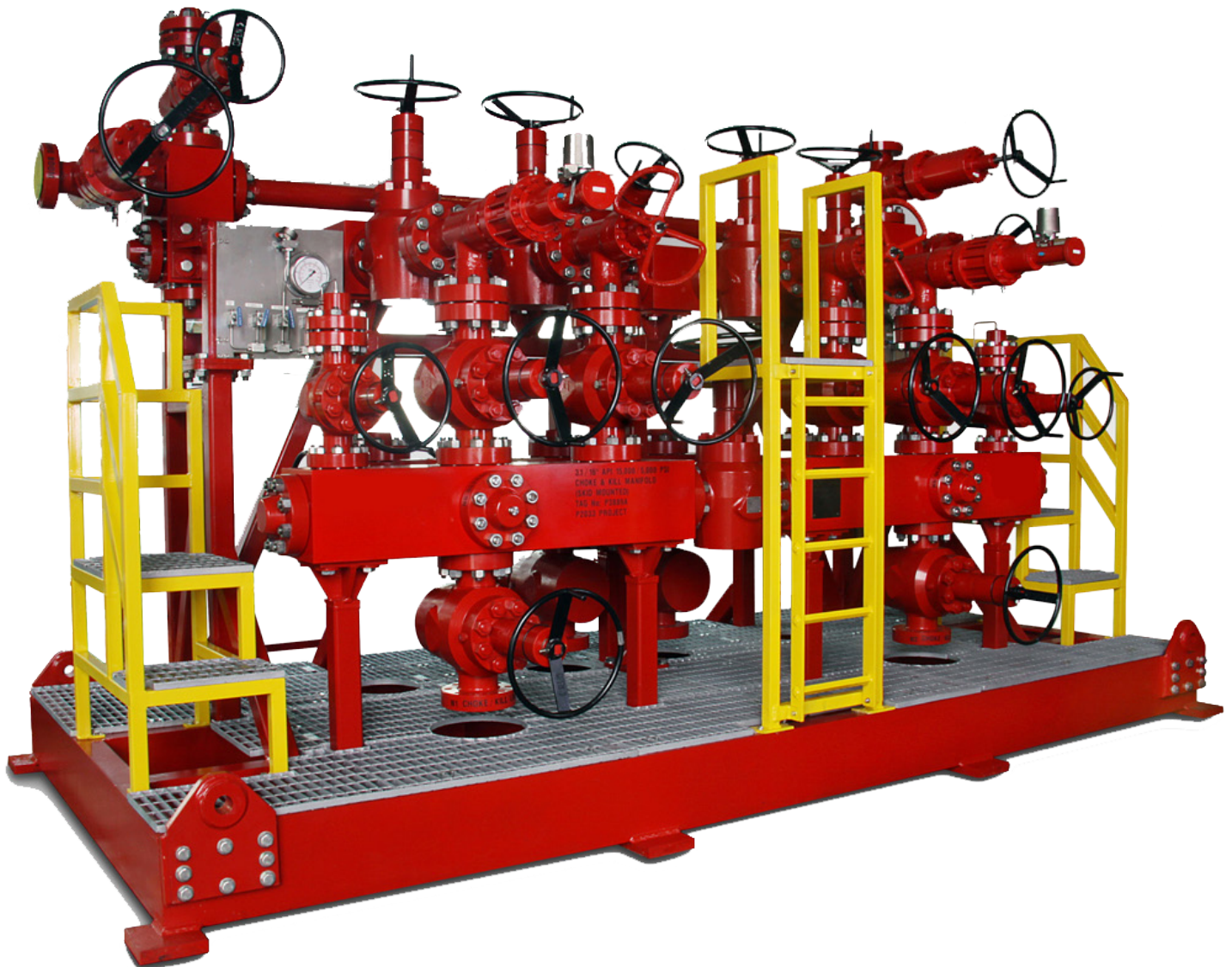


# MANIFOLDS & PIPING

+1 713-351-7900

f-e-t.com/drilling

ForumDP.Sales@f-e-t.com



# Manifolds & Piping

## High Pressure Piping & Drilling Equipment

FET provides premier design and supply of high pressure drilling equipment to exceed your expectations, and maintain a full range of stocks at locations worldwide for quick delivery. We also produce complete turnkey packages, from concept and surveys to installation and commissioning. Our service engineers and supervisors support these projects and perform recertification and maintenance.

- HP Drilling Manifolds - Choke & Kill, Mud and Cement Standpipes
- HP Pipe - AISI 4130 and API 5L X52
- Long Sweep Manifold Fittings - For Mud, Cement and Choke & Kill Services
- API Flanges, Studded Blocks, Hubs and Clamps
- Hammer Lug Unions - Fig. 602 1002, 1502, and 2202
- Mud Gas Separators - Standard Range and Custom—Design
- HP Valves - For Mud, Cement and Choke & Kill Services

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## HIGH PRESSURE PIPING & DRILLING EQUIPMENT

### Drilling Manifolds

Design and supply a wide range of drill floor manifolds, including:

- Choke and Kill manifolds, complete with Mud Gas Separator and Choke Control System
- Mud Standpipe and Mud Pump Room Manifolds
- Cement Manifolds

### High Pressure ASTM A519 Gr 4130 and API 5L X52 Pipe

Stocklist of pipe in sizes from 2 to 8 inches Sch XXS and heavier

- 5000 psi and below—API 5L X52N
- 7500 psi—ASTM A519 Gr 4130 Q&T

### Long Sweep Manifold Fittings

Design and manufacture of a full range of Forged Long Sweep Manifold Fittings in sizes from 2 to 6 inches, including:

- Long Sweep 90° and 45° Elbows
- Tees—Full Flow and Reducing
- Standpipe Goosenecks
- Block and Cushion Type and ANSI B16.9 Fittings

### API 6A Flanges, Studded Blocks, Hubs and Clamps

Stock and supply a full range of:

- API 6A Flanges
- API 6A Studded Blocks
- API 16A Hubs and Clamps, including pipeline clamp connectors

### Hammer Lug Unions

Stock and supply a range of Hammer Lug Unions, from Fig 602 through Fig 2202

### High Pressure Valves

- API 6A Choke & Kill Valves
- Mud Gate Valves
- API 6A Cement Plug Valves

# Pipe & High Pressure Manifold Fittings

## PIPE

All pipe supplied by FET is complete with BS EN 10204.3.1 certificates as standard with BS EN 10204.3.1.C certificates available upon request. Pipe supplied in accordance with the following, as applicable to the product:

<b>API</b>	American Petroleum Institute
<b>NACE MR-01-75</b>	Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment
<b>ASTM</b>	American Society for Testing and Materials
<b>ANSI B16.10</b>	Welded and Seamless Wrought Steel Pipes

### Pipe Wall Thickness Schedule XXs & Weights (Kg/m)

Nominal Bore (NB)	Outside Diameter (in)	Outside Diameter (mm)	W.T. Weight	Sch 80	Sch XS	Sch 100	Sch 120	Sch 140	Sch 160	Sch XXS
2"	2.375	60.325	mm	5.54	5.54	-	-	-	8.74	11.07
			Kg/m	7.60	7.60	-	-	-	11.29	13.65
3"	3.500	88.900	mm	7.62	7.62	-	-	-	11.13	15.24
			Kg/m	15.51	15.51	-	-	-	21.67	28.11
4"	4.500	114.300	mm	8.56	8.56	-	11.13	-	13.49	17.12
			Kg/m	22.64	22.64	-	28.75	-	34.05	41.66
5"	5.563	141.300	mm	9.53	9.53	-	12.70	-	15.88	19.05
			Kg/m	31.44	31.44	-	40.90	-	49.94	58.32
6"	6.625	168.275	mm	10.97	10.97	-	14.27	-	18.26	21.95
			Kg/m	43.21	43.21	-	55.03	-	68.53	80.43
8"	8.625	219.075	mm	12.70	12.70	15.09	18.26	20.62	23.01	22.23
			Kg/m	64.58	64.58	76.94	90.23	102.47	111.16	109.57

### NORSOK & Special Wall Thickness & Weights (Kg/m) (Available in ASTM A519 Gr 4130 Only)

Nominal Bore (NB)	Outside Diameter (in)	Outside Diameter (mm)	WT. Weight	NORSOK	Special
2"	2.375	60.3	mm	-	14.27
			kg/m	-	16.20
3"	3.500	88.9	mm	-	20.00
			kg/m	-	34.34
4"	4.500	114.3	mm	20.00	-
			kg/m	46.50	-
4"	4.500	114.3	mm	-	30.00
			kg/m	-	60.15
4"	4.500	114.3	mm	-	20.00
			kg/m	-	46.50
5"	5.000	127.0	mm	-	25.40
			kg/m	-	63.60
5"	5.563	141.3	mm	25.00	-
			kg/m	72.00	-
5 1/2" O/D	5.500	139.7	mm	-	31.75
			kg/m	-	83.73
6"	6.625	168.3	mm	30.00	-
			kg/m	102.30	-
6 3/4"	6.750	171.5	mm	-	22.23
			kg/m	-	81.81

## HIGH PRESSURE MANIFOLD FITTINGS

Forged Long Sweep Manifold Fittings are designed and manufactured in accordance with the following specifications:

<b>MSS-SP-75</b>	Specifications for High Pressure Test Wrought Butt Weld Fittings
<b>ANSI B31.3</b>	Chemical Plant and Petroleum Refinery Piping
<b>ASME B16.9</b>	Factory-Made Wrought Steel Buttwelding Fittings
<b>API 6A</b>	Specification for Wellhead and Christmas Tree Equipment
<b>NACE MR-01-75</b>	Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment

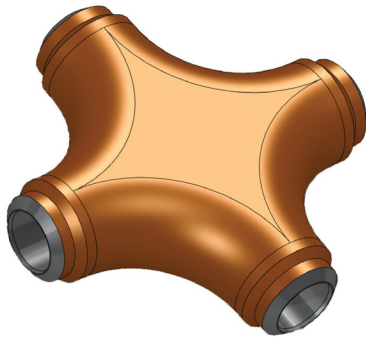
Manifold Fittings are available either Full Flow or with reducing configuration in all pipe wall schedules, for the following pressure ratings:

Max. Working Pressure	5,000 psi	7,500 psi	10,000 psi	15,000 psi
Test Pressure	7,500 psi	11,250 psi	15,000 psi	22,500 psi
Operating Temperature Range	-46 to + 121 deg C	-46 to + 121 deg C	-46 to + 121 deg C	-46 to + 121 deg C
Min. Yield	75,000 psi	75,000 psi	75,000 psi	>80,000 psi
Min. Tensile	95,000 psi	95,000 psi	95,000 psi	100,000 psi
Material	AISI 4130 Q&T	AISI 4130 Q&T	AISI 4130 Q&T	AISI 4130 Q&T

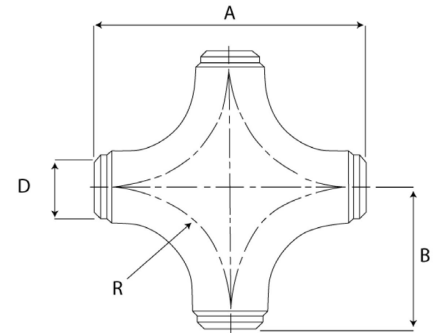
General Note: Please contact FET for any special material or dimensional requirements. For operating temperatures above those stated, De-rating of max. working pressure will occur. Consult FET for further details.

# HIGH PRESSURE MANIFOLD FITTINGS

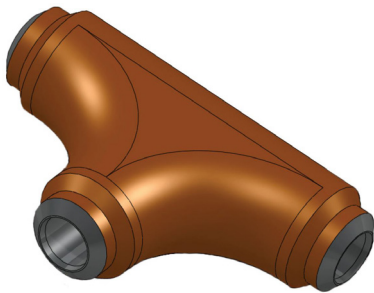
## Full Flow Cross



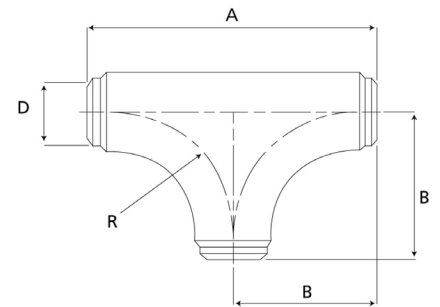
Size	All dimensions in mm				Approx. Weight (kg)
	D	A	B	R	
2"	60.3	406	203	150	32
3"	88.9	406	203	150	48
4"	114.3	560	280	210	94
5"	141.3	610	305	240	138
6"	168.3	762	381	305	208



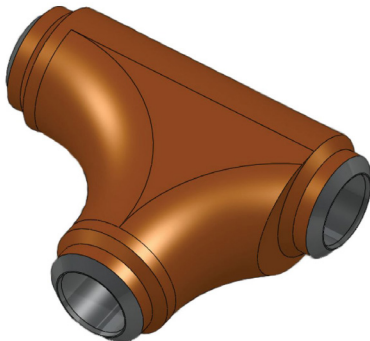
## Full Flow Tee



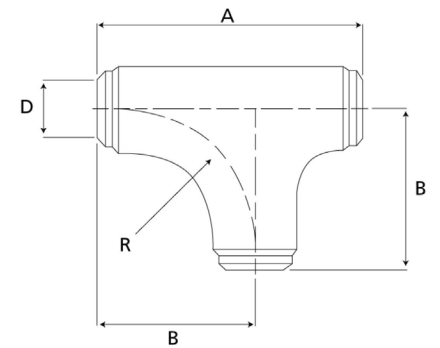
Size	All dimensions in mm				Approx. Weight (kg)
	D	A	B	R	
2"	60.3	406	203	150	39
3"	88.9	406	203	150	33
4"	114.3	560	280	210	64
5"	141.3	610	305	240	90
6"	168.3	762	381	305	143



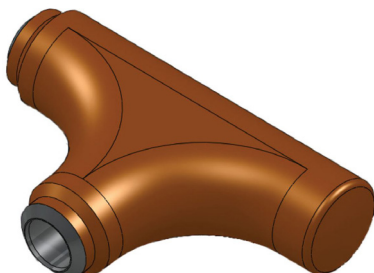
## Long Sweep Tee



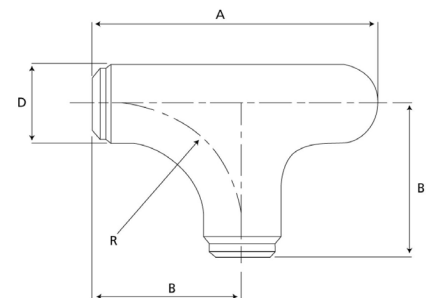
Size	All dimensions in mm				Approx. Weight (kg)
	D	A	B	R	
2"	60.3	330	203	150	34
3"	88.9	330	203	150	28
4"	114.3	406	280	210	51
5"	141.3	483	305	240	76
6"	168.3	686	381	305	732



## Long Sweep Tee C/W Integral Bull Plug



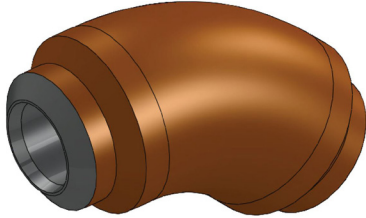
Size	All dimensions in mm				Approx. Weight (kg)
	D	A	B	R	
2"	60.3	406	203	150	34
3"	88.9	406	203	150	28
4"	114.3	560	280	210	51
5"	141.3	610	305	240	76
6"	168.3	762	381	305	132



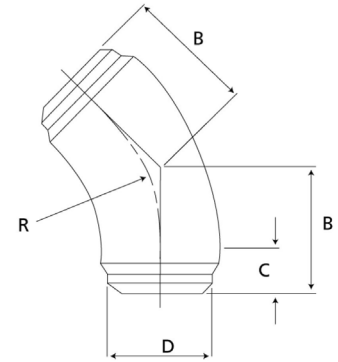


# HIGH PRESSURE MANIFOLD FITTINGS

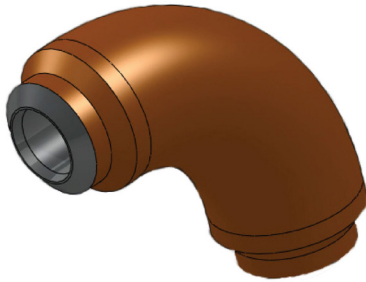
## 45° Long Sweep Elbow



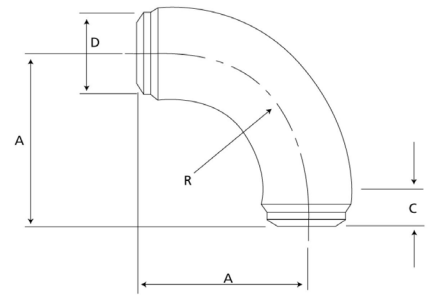
Size	All dimensions in mm				Approx. Weight (kg)
	D	B	R	C	
2"	60.3	118	150	56	9
3"	88.9	118	150	56	14
4"	114.3	162	210	75	26
5"	141.3	171	240	72	37
6"	168.3	203	305	25	57



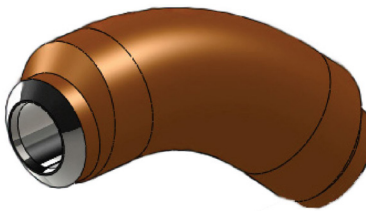
## 90° Long Sweep Elbow



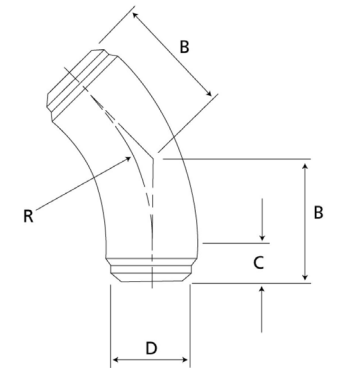
Size	All dimensions in mm				Approx. Weight (kg)
	D	A	R	C	
2"	60.3	203	150	53	14
3"	88.9	203	150	53	20
4"	114.3	280	210	70	39
5"	141.3	305	240	65	57
6"	168.3	381	305	25	105



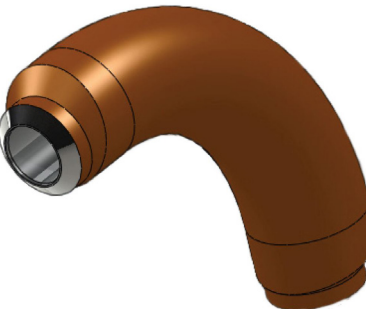
## 45° Long Sweep Elbow



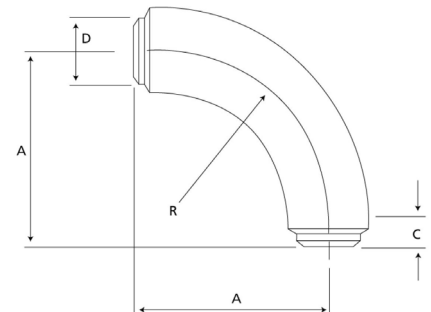
Size	All dimensions in mm				Approx. Weight (kg)
	D	B	R	C	
2"	60.3	121	152	58	7
3"	88.9	171	229	76	19
4"	114.3	177	305	51	31
5"	141.3	209	381	51	50
6"	168.3	265	457	76	89



## 90° 3D Double Backed Bend

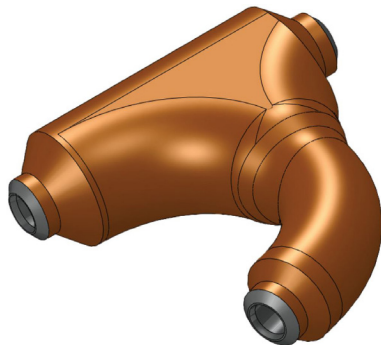


Size	All dimensions in mm				Approx. Weight (kg)
	D	A	R	C	
2"	60.3	178	152	26	8
3"	88.9	305	229	76	29
4"	114.3	356	305	51	52
5"	141.3	432	381	51	87
6"	168.3	533	457	76	177

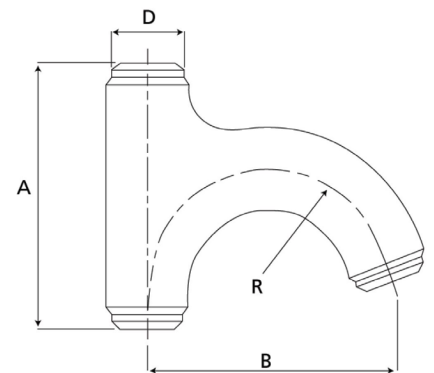


# HIGH PRESSURE MANIFOLD FITTINGS

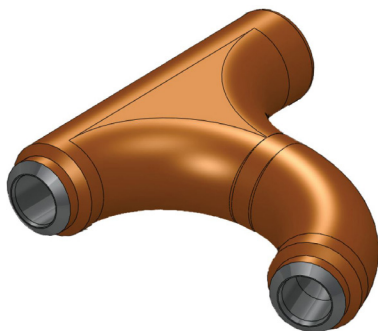
## Standpipe Goosneck 160 deg C/W Top Outlet



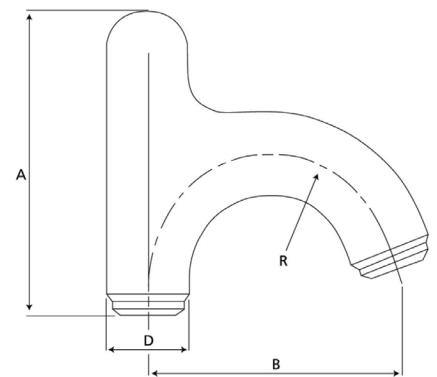
Size	All dimensions in mm				Approx. Weight (kg)
	D	A	B	R	
2"	60.3	330	310	150	47
3"	88.9	330	310	150	48
4"	114.3	406	431	210	91
5"	141.3	483	487	240	133
6"	168.3	686	600	305	238



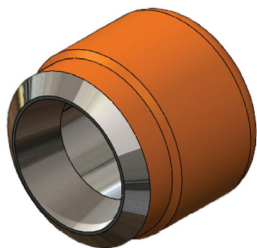
## Standpipe Goosneck 160 deg C/W Integral Bull Plug



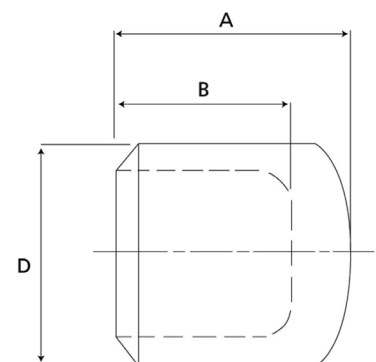
Size	All dimensions in mm				Approx. Weight (kg)
	D	A	B	R	
2"	60.3	406	310	150	48
3"	88.9	406	310	150	51
4"	114.3	560	431	210	97
5"	141.3	610	487	240	142
6"	168.3	762	600	305	255



## Bull Plug



Size	All dimensions in mm			Approx. Weight (kg)
	D	A	H	
2"	60.3	70	48	1
3"	88.9	90	60	3
4"	114.3	115	81	6
5"	141.3	140	102	10
6"	168.3	170	126	18



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# **API 6A Flanges**

## **API 6A Type 6B and 6BX Flanges**

# API 6A FLANGES

## API 6A TYPE 6B and 6BX Flanges

Flanges are designed and manufactured in accordance with the following specifications:

- API 6A** Specifications for Wellhead and Christmas Tree Equipment
- ANSI B31.3** Chemical Plant and Petroleum Refinery Piping
- ASME VIII** Boiler and Pressure Vessel Code
- MSS-SP-55** Quality Standards for Steel Castings for Valves, Flanges and Fittings and other Piping Components
- NACE MR-01-75** Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment

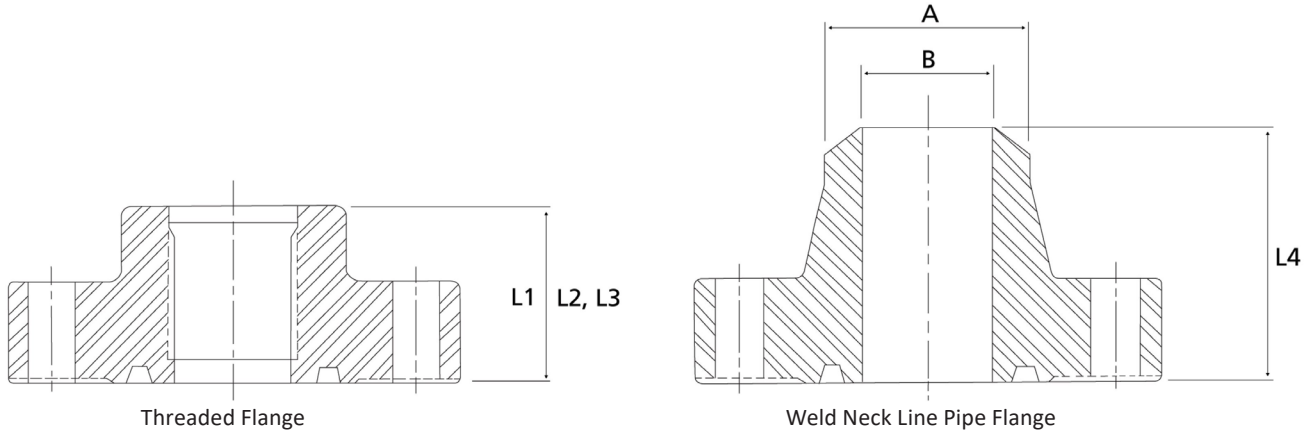
Flanges are available as Weld Neck, Integral, Blinds, Target & Test Blinds for use with the following pressure ratings:

Max Working Pressure	5,000 psi	10,000 psi	15,000 psi	20,000 psi
Test Pressure	7,500 psi	15,000 psi	22,500 psi	30,000 psi
Product Specification Levels	1,2,3 & 4	1,2,3 & 4	1,2,3 & 4	1,2,3 & 4
<b>Integral, Blind, Target Blind &amp; Test Flanges</b>				
Min. Yield	60,000 psi	60,000 psi	75,000 psi	75,000 psi
Min. Tensile	85,000 psi	85,000 psi	95,000 psi	95,000 psi
Material	API 60K	API 60K	API 75K	API 75K
<b>Weld Neck Flanges</b>				
Min. Yield	45,000 psi	60,000 psi	75,000 psi	75,000 psi
Min. Tensile	70,000 psi	85,000 psi	95,000 psi	95,000 psi
Material	API 45K	API 60K	API 75K	API 75K

General Note: Please contact FET for any special material or dimensional requirements Max. working pressures stated are suitable for temperatures up to 121°C. De-rating of max working pressure will occur as the operating temperature increases above 121°C. Consult FET for further details.

# API 6A FLANGES

Type 6B Flanges for 5,000 PSI Rated Working Pressure



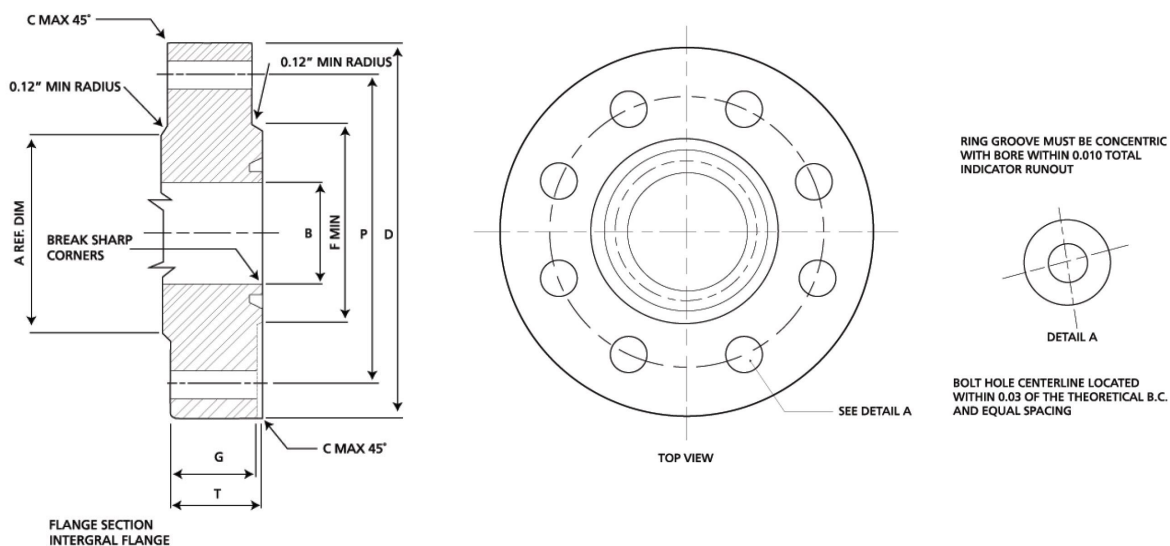
## Hub and Bore Dimensions

Nominal Size and Bore of Flange	Hub Length Threaded Line-Pipe Flange	Hub Length Threaded Casing Flange	Hub Length Tubing Flange	Hub Length Welding Neck Line-Pipe Flange	Neck Diameter Welding Neck Line-Pipe Flange	Tolerance	Maximum Bore of Welding Neck Flange
	L1	L2	L3	L4±0.06	A	A	B
2 1/16	2.56	–	2.56	4.31	2.38	+0.09/-0.03	1.72
2 9/16	2.81	–	2.81	4.44	2.88	+0.09/-0.03	2.16
3 1/8	3.19	–	3.19	4.94	3.50	+0.09/-0.03	2.65
4 1/16	3.88	3.88	3.88	5.19	4.50	+0.09/-0.03	3.47
5 1/8	4.44	4.44	–	6.44	5.56	+0.09/-0.03	4.34
7 1/16	5.06	5.06	–	7.13	6.63	+0.016/-0.03	5.22
9	6.06	6.06	–	8.81	8.63	+0.016/-0.03	6.84
11	6.69	6.69	–	10.44	10.75	+0.016/-0.03	8.53

General Note: Dimensions are in inches.

# API 6A FLANGES

## Type 6B Flanges for 5,000 PSI Rated Working Pressure



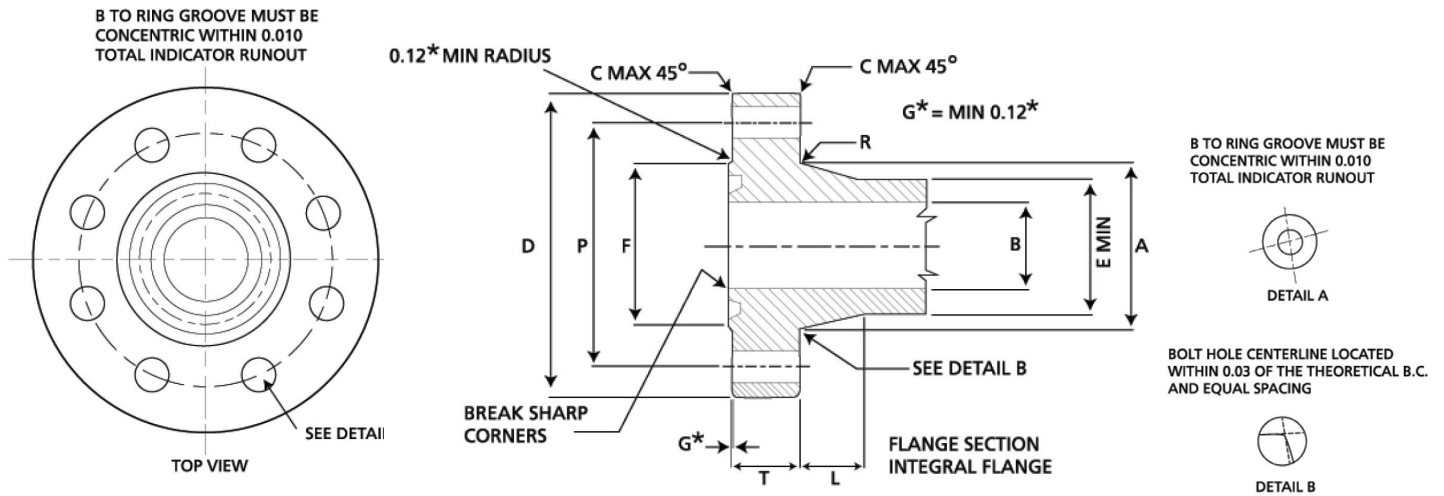
### Hub and Bore Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Basic Thickness of Flange	Diameter Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Holes Tolerance (see note)	Length of Bolts	Ring Number, R or RX
	B	D	D	C	F	T	G	A	P						
2 1/16	2.09	8.50	±0.06	0.12	4.88	1.81	1.50	4.12	6.50	8	7/8	1.00	+0.06	6.00	24
2 9/16	2.59	9.62	±0.06	0.12	5.38	1.94	1.62	4.88	7.50	8	1	1.12	+0.06	6.50	27
3 1/8	3.22	10.50	±0.06	0.12	6.62	2.19	1.88	5.25	8.00	8	1 1/8	1.25	+0.06	7.25	35
4 1/16	4.28	12.25	±0.06	0.12	7.62	2.44	2.12	6.38	9.50	8	1 1/4	1.38	+0.06	8.00	39
5 1/8	5.16	14.75	±0.06	0.12	9.00	3.19	2.88	7.75	11.50	8	1 1/2	1.62	+0.06	10.00	44
7 1/16	7.16	15.50	±0.12	0.25	9.75	3.62	3.25	9.00	12.50	12	1 3/8	1.50	+0.06	10.75	46
9	9.03	19.00	±0.12	0.25	12.50	4.06	3.62	11.50	15.50	12	1 5/8	1.75	+0.09	12.00	50
11	11.03	23.00	±0.12	0.25	14.63	4.69	4.25	14.50	19.00	12	1 7/8	2.00	+0.09	13.75	54

General Note: Dimensions are in inches. Minimum Bolt Hole Tolerance is -0.02".

# API 6A FLANGES

Type 6BX Integral Flanges for 5,000, and 10,000 psi Rated Working Pressure



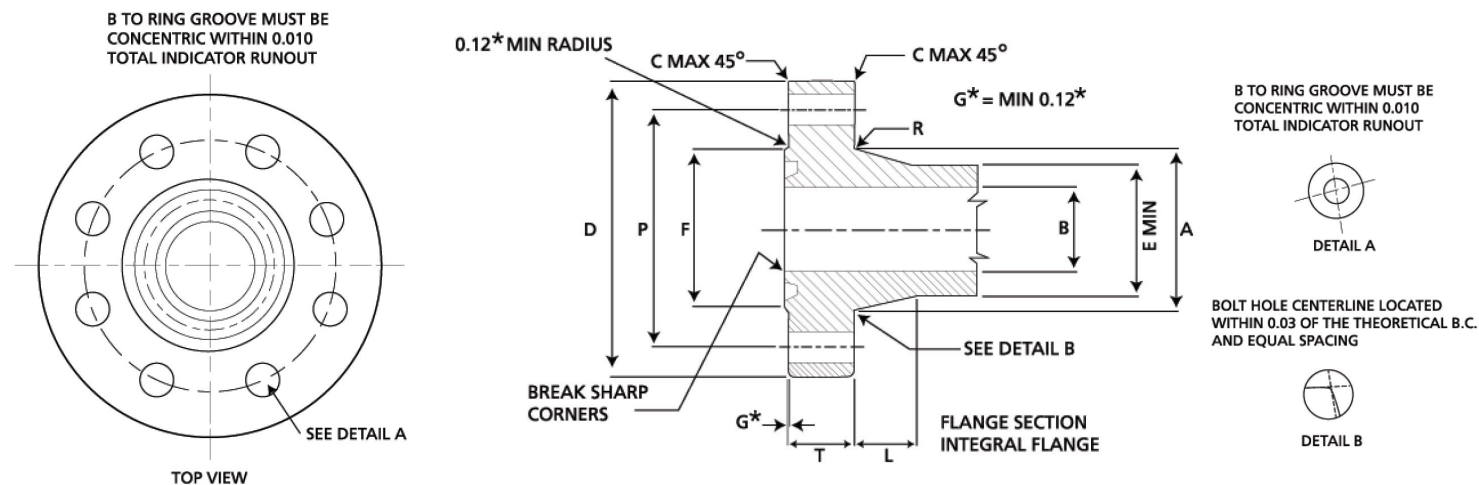
## Hub and Bore Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Large Diameter of Hub	Small Diameter of Hub	Length of Hub	Radius of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Holes Tolerance (see note)	Minimum Length of Stud Bolts	Ring Number
	B	D	D	C	F	T	A	E	L	R	P						BX
<b>5,000 psi</b>																	
13 3/8	13.66	26.50	±0.12	0.25	18.00	4.44	18.94	16.69	4.50	0.62	23.25	16	1 5/8	1.75	+0.09	12.50	160
16 3/4	16.78	30.38	±0.12	0.25	21.06	5.13	21.88	20.75	3.00	0.75	26.62	16	1 7/8	2.00	+0.09	14.50	162
18 3/4	18.78	35.62	±0.12	0.25	24.69	6.53	26.56	23.56	6.00	0.62	31.62	20	2	2.12	+0.09	17.50	163
21 1/4	21.28	39.00	±0.12	0.25	27.62	7.12	29.88	26.75	6.50	0.69	34.88	24	2	2.12	+0.09	18.75	165
<b>10,000 psi</b>																	
1 13/16	1.84	7.38	±0.06	0.12	4.12	1.66	3.50	2.56	1.91	0.38	5.75	8	3/4	0.88	+0.06	5.00	151
2 1/16	2.09	7.88	±0.06	0.12	4.38	1.73	3.94	2.94	2.03	0.38	6.25	8	3/4	0.88	+0.06	5.20	152
2 9/16	2.59	9.12	±0.06	0.12	5.19	2.02	4.75	3.62	2.25	0.38	7.25	8	7/8	1.00	+0.06	6.00	153
3 1/16	3.09	10.62	±0.06	0.12	6.00	2.30	5.59	4.34	2.50	0.38	8.50	8	1	1.12	+0.06	6.75	154
4 1/16	4.09	12.44	±0.06	0.12	7.28	2.77	7.19	5.75	2.88	0.38	10.19	8	1 1/8	1.25	+0.06	8.00	155
5 1/8	5.16	14.06	±0.06	0.12	8.69	3.12	8.81	7.19	3.19	0.38	11.81	12	1 1/8	1.25	+0.06	8.75	169
7 1/16	7.09	18.88	±0.12	0.25	11.88	4.06	11.88	10.00	3.75	0.62	15.88	12	1 1/2	1.62	+0.09	11.25	156
9	9.03	21.75	±0.12	0.25	14.12	4.88	14.75	12.88	3.69	0.62	18.75	16	1 1/2	1.62	+0.09	13.00	157
11	11.03	25.75	±0.12	0.25	16.88	5.56	17.75	15.75	4.06	0.62	22.25	16	1 3/4	1.88	+0.09	15.00	158
13 5/8	13.66	30.25	±0.12	0.25	20.38	6.62	21.75	19.50	4.50	0.62	26.50	20	1 7/8	2.00	+0.09	17.25	159
16 3/4	16.78	34.31	±0.12	0.25	22.69	6.62	25.81	23.69	3.00	0.75	30.56	24	1 7/8	2.00	+0.09	17.50	162
18 3/4	18.78	40.94	±0.12	0.25	27.44	8.78	29.62	26.56	6.12	0.62	36.44	24	2 1/4	2.38	+0.09	22.50	164
21 1/4	21.28	45.00	±0.12	0.25	30.75	9.50	33.38	30.00	6.50	0.81	40.25	24	2 1/2	2.62	+0.09	24.50	166

General Note: Dimensions are in inches. Minimum Bolt Hole Tolerance is -0.02".

# API 6A FLANGES

## Type 6BX Integral Flanges for 15,000 and 20,000 psi Rated Working Pressure



### Hub and Bore Dimensions

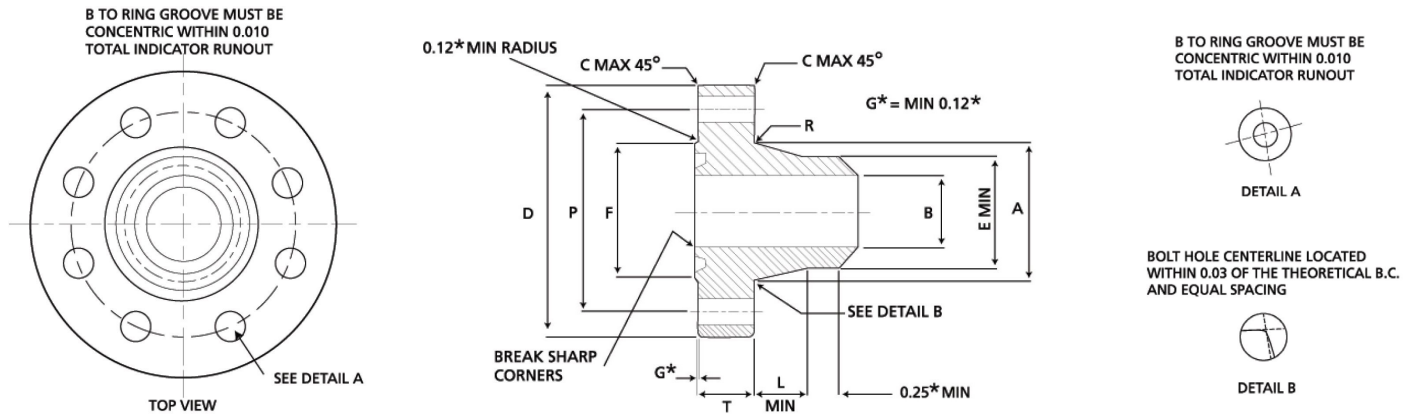
Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Large Diameter of Hub	Small Diameter of Hub	Length of Hub	Radius of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Holes Tolerance (see note)	Minimum Length of Stud Bolts	Ring Number
	B	D	D	C	F	T	A	E	L	R	P						BX
<b>15,000 psi</b>																	
1 13/16	1.84	8.19	±0.06	0.12	4.19	1.78	3.84	2.81	1.88	0.38	6.31	8	7/8	1.00	+06	5.50	151
2 1/16	2.09	8.75	±0.06	0.12	4.50	2.00	4.38	3.25	2.12	0.38	6.88	8	7/8	1.00	+06	6.00	152
2 9/16	2.59	10.00	±0.06	0.12	5.25	2.25	5.06	3.94	2.25	0.38	7.88	8	1	1.12	+06	6.75	153
3 1/16	3.09	11.31	±0.06	0.12	6.06	2.53	6.06	4.81	2.50	0.38	9.06	8	1 1/8	1.25	+06	7.50	154
4 1/16	4.09	14.19	±0.06	0.12	7.62	3.09	7.69	6.25	2.88	0.38	11.44	8	1 3/8	1.50	+06	9.25	155
5 1/8	5.16	16.50	±0.06	0.12	8.88	3.88	9.62	7.88	3.22	0.62	13.50	12	1 1/2	1.62	+09	11.50	169
7 1/16	7.09	19.88	±0.12	0.25	12.00	4.69	12.81	10.88	2.62	0.62	16.88	16	1 1/2	1.62	+09	12.75	156
9	9.03	25.50	±0.12	0.25	15.00	5.75	17.00	13.75	4.88	0.62	21.75	16	1 7/8	2.00	+09	15.75	157
11	11.03	32.00	±0.12	0.25	17.88	7.38	23.00	16.81	9.28	0.62	28.00	20	2	2.12	+09	19.25	158
13 5/8	13.66	34.88	±0.12	0.25	21.31	8.06	23.44	20.81	4.50	1.00	30.38	20	2 1/4	2.38	+09	21.25	159
18 3/4	16.78	45.75	±0.12	0.25	28.44	10.06	32.00	28.75	6.12	1.00	40.00	20	3	3.12	+12	26.75	164
<b>20,000 psi</b>																	
1 13/19	1.84	10.12	±0.06	0.12	4.62	2.50	5.25	4.31	1.94	0.38	8.00	8	1	1.12	+06	7.50	151
2 1/16	2.09	11.31	±0.06	0.12	5.19	2.81	6.06	5.00	2.06	0.38	9.06	8	1 1/8	1.25	+06	8.25	152
2 9/16	2.59	12.81	±0.06	0.12	5.94	3.12	6.81	5.69	2.31	0.38	10.31	8	1 1/4	1.38	+06	9.25	153
3 1/16	3.09	14.06	±0.06	0.12	6.75	3.38	7.56	6.31	2.50	0.38	11.31	8	1 3/8	1.50	+06	10.00	154
4 1/16	4.09	17.56	±0.06	0.12	8.62	4.19	9.56	8.12	2.88	0.38	14.06	8	1 3/4	1.88	+09	12.25	155
7 1/16	7.09	25.81	±0.12	0.25	13.88	6.50	15.19	13.31	3.81	0.62	21.81	16	2	2.12	+09	17.50	156
9	9.03	31.69	±0.12	0.25	17.38	8.06	18.94	16.88	4.25	1.00	27.00	16	2 1/2	2.62	+09	22.38	157
11	11.03	34.75	±0.12	0.25	19.88	8.81	22.31	20.00	4.06	1.00	29.50	16	2 3/4	2.88	+09	23.75	158
13 5/8	13.66	45.75	±0.12	0.25	24.19	11.50	27.31	24.75	5.25	1.00	40.00	20	3	3.12	+12	30.00	159

General Note: Dimensions are in inches. Minimum Bolt Hole Tolerance is -0.02".



# API 6A FLANGES

## Type 6BX Welding Neck Flanges for 10,000, 15,000 and 20,000 psi Rated Working Pressure



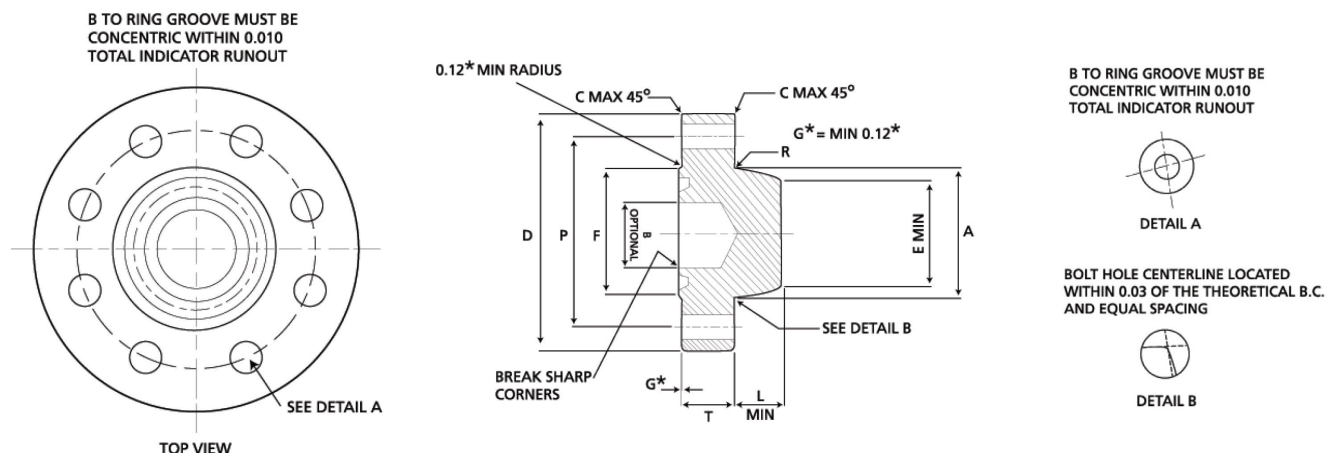
### Hub and Bore Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Large Diameter of Hub	Small Diameter of Hub	Length of Hub	Radius of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Holes Tolerance (see note)	Minimum Length of Stud Bolts	Ring Number
	B	D	D	C	F	T	A	E	L	R	P						BX
<b>10,000 psi</b>																	
1 13/16	1.84	7.38	±0.06	0.12	4.12	1.66	3.50	2.56	1.91	0.38	5.75	8	3/4	0.88	+0.06	5.00	151
2 1/16	2.09	7.88	±0.06	0.12	4.38	1.73	3.94	2.94	2.03	0.38	6.25	8	3/4	0.88	+0.06	5.25	152
2 9/16	2.59	9.12	±0.06	0.12	5.19	2.02	4.75	3.62	2.25	0.38	7.25	8	7/8	1.00	+0.06	6.00	153
3 1/16	3.09	10.62	±0.06	0.12	6.00	2.30	5.59	4.34	2.50	0.38	8.50	8	1	1.12	+0.06	6.75	154
4 1/16	4.09	12.44	±0.06	0.12	7.28	2.77	7.19	5.75	2.88	0.38	10.19	8	1 1/8	1.25	+0.06	8.00	155
5 1/8	5.16	14.06	±0.06	0.12	8.69	3.13	8.81	7.19	3.19	0.38	11.81	12	1 1/8	1.25	+0.06	8.75	169
7 1/16	7.09	18.88	±0.12	0.25	11.88	4.06	11.88	10.00	3.75	0.62	15.88	12	1 1/2	1.62	+0.09	11.25	156
9	9.03	21.75	±0.12	0.25	14.12	4.88	14.75	12.88	3.69	0.62	18.75	16	1 1/2	1.62	+0.09	13.00	157
11	11.03	25.75	±0.12	0.25	16.88	5.56	17.75	15.75	4.06	0.62	22.25	16	1 3/4	1.88	+0.09	15.00	158
13 5/8	13.66	30.25	±0.12	0.25	20.38	6.62	21.75	19.50	4.50	0.62	26.50	20	1 7/8	2.00	+0.09	17.25	159
16 3/4	16.78	34.31	±0.12	0.25	22.69	6.62	25.81	23.69	3.00	0.75	30.56	24	1 7/8	2.00	+0.09	17.50	162
<b>15,000 psi</b>																	
1 13/16	1.84	8.19	±0.06	0.12	4.19	1.78	3.84	2.81	1.88	0.38	6.31	8	7/8	1.00	+0.06	5.50	151
2 1/16	2.09	8.75	±0.06	0.12	4.50	2.00	4.38	3.25	2.12	0.38	6.88	8	7/8	1.00	+0.06	6.00	152
2 9/16	2.59	10.00	±0.06	0.12	5.25	2.25	5.06	3.94	2.25	0.38	7.88	8	1	1.12	+0.06	6.75	153
3 1/16	3.09	11.31	±0.06	0.12	6.06	2.53	6.06	4.81	2.50	0.38	9.06	8	1 1/8	1.25	+0.06	7.50	154
4 1/16	4.09	14.19	±0.06	0.12	7.62	3.09	7.69	6.25	2.88	0.38	11.44	8	1 3/8	1.50	+0.06	9.25	155
5 1/8	5.16	16.50	±0.06	0.12	8.88	3.88	9.62	7.88	3.22	0.62	13.50	12	1 1/2	1.62	+0.09	11.50	169
7 1/16	7.09	19.88	±0.12	0.25	12.00	4.69	12.81	10.88	3.62	0.62	16.88	16	1 1/2	1.62	+0.09	12.75	156
<b>20,000 psi</b>																	
1 13/16	1.84	10.12	±0.06	0.12	4.62	2.50	5.25	4.31	1.94	0.38	8.00	8	1	1.12	+0.06	7.50	151
2 1/16	2.09	11.31	±0.06	0.12	5.19	2.81	6.06	5.00	2.06	0.38	9.06	8	1 1/8	1.25	+0.06	8.25	152
2 9/16	2.59	12.81	±0.06	0.12	5.94	3.12	6.81	5.69	2.31	0.38	10.31	8	1 1/4	1.38	+0.06	9.25	153
3 1/16	3.09	14.06	±0.06	0.12	6.75	3.38	7.56	6.31	2.50	0.38	11.31	8	1 3/8	1.50	+0.06	10.00	154
4 1/16	4.09	17.56	±0.06	0.12	8.62	4.19	9.56	8.12	2.88	0.38	14.06	8	1 3/4	1.88	+0.09	12.25	155
7 1/16	7.09	25.81	±0.12	0.25	13.88	6.50	15.19	13.31	3.81	0.62	21.81	16	2	2.12	+0.09	17.50	156

General Note: Dimensions are in inches. Minimum Bolt Hole Tolerance is -0.02".

# API 6A FLANGES

## Type 6BX Blind and Test Flanges for 10,000, 15,000, and 20,000 psi Rated Working Pressure



### Hub and Bore Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Large Diameter of Hub	Small Diameter of Hub	Length of Hub	Radius of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Holes Tolerance (see note)	Minimum Length of Stud Bolts	Ring Number
	B	D	D	C	F	T	A	E	L	R	P						BX
<b>10,000 psi</b>																	
1 13/16	1.84	7.38	±0.06	0.12	4.12	1.66	3.50	2.56	1.91	0.38	5.75	8	3/4	0.88	+06	5.00	151
2 1/16	2.09	7.88	±0.06	0.12	4.38	1.73	3.94	2.94	2.03	0.38	6.25	8	3/4	0.88	+06	5.25	152
2 9/16	2.59	9.12	±0.06	0.12	5.19	2.02	4.75	3.62	2.25	0.38	7.25	8	7/8	1.00	+06	6.00	153
3 1/16	3.09	10.62	±0.06	0.12	6.00	2.30	5.59	4.34	2.50	0.38	8.50	8	1	1.12	+06	6.75	154
4 1/16	4.09	12.44	±0.06	0.12	7.28	2.77	7.19	5.75	2.88	0.38	10.19	8	1 1/8	1.25	+06	8.00	155
5 1/8	5.16	14.06	±0.06	0.12	8.69	3.13	8.81	7.19	3.19	0.38	11.81	12	1 1/8	1.25	+06	8.75	169
7 1/16	7.09	18.88	±0.12	0.25	11.88	4.06	11.88	10.00	3.75	0.62	15.88	12	1 1/2	1.62	+09	11.25	156
9	9.03	21.75	±0.12	0.25	14.12	4.88	14.75	12.88	3.69	0.62	18.75	16	1 1/2	1.62	+09	13.00	157
11	11.03	25.75	±0.12	0.25	16.88	5.56	17.75	15.75	4.06	0.62	22.25	16	1 3/4	1.88	+09	15.00	158
13 5/8	13.66	30.25	±0.12	0.25	20.38	6.62	21.75	19.50	4.50	0.62	26.50	20	1 7/8	2.00	+09	17.25	159
16 3/4	16.78	34.31	±0.12	0.25	22.69	6.62	25.81	23.69	3.00	0.75	30.56	24	1 7/8	2.00	+09	17.50	162
<b>15,000 psi</b>																	
1 13/16	1.84	8.19	±0.06	0.12	4.19	1.78	3.84	2.81	1.88	0.38	6.31	8	7/8	1.00	+06	5.50	151
2 1/16	2.09	8.75	±0.06	0.12	4.50	2.00	4.38	3.25	2.12	0.38	6.88	8	7/8	1.00	+06	6.00	152
2 9/16	2.59	10.00	±0.06	0.12	5.25	2.25	5.06	3.94	2.25	0.38	7.88	8	1	1.12	+06	6.75	153
3 1/16	3.09	11.31	±0.06	0.12	6.06	2.53	6.06	4.81	2.50	0.38	9.06	8	1 1/8	1.25	+06	7.50	154
4 1/16	4.09	14.19	±0.06	0.12	7.62	3.09	7.69	6.25	2.88	0.38	11.44	8	1 3/8	1.50	+06	9.25	155
5 1/8	5.16	16.50	±0.06	0.12	8.88	3.88	9.62	7.88	3.22	0.62	13.50	12	1 1/2	1.62	+09	11.50	169
7 1/16	7.09	19.88	±0.12	0.25	12.00	4.69	12.81	10.88	3.62	0.62	16.88	16	1 1/2	1.62	+09	12.75	156
<b>20,000 psi</b>																	
1 13/16	1.84	10.12	±0.06	0.12	4.62	2.50	5.25	4.31	1.94	0.38	8.00	8	1	1.12	+06	7.50	151
2 1/16	2.09	11.31	±0.06	0.12	5.19	2.81	6.06	5.00	2.06	0.38	9.06	8	1 1/8	1.25	+06	8.25	152
2 9/16	2.59	12.81	±0.06	0.12	5.94	3.12	6.81	5.69	2.31	0.38	10.31	8	1 1/4	1.38	+06	9.25	153
3 1/16	3.09	14.06	±0.06	0.12	6.75	3.38	7.56	6.31	2.50	0.38	11.31	8	1 3/8	1.50	+06	10.00	154
4 1/16	4.09	17.56	±0.06	0.12	8.62	4.19	9.56	8.12	2.88	0.38	14.06	8	1 3/4	1.88	+09	12.25	155
7 1/16	7.09	25.81	±0.12	0.25	13.88	6.50	15.19	13.31	3.81	0.62	21.81	16	2	2.12	+09	17.50	156

# API 6A Crosses and Tees

## API 6A CROSSES AND TEES

Flange Studded Crosses & Tees and Flanged Crosses & Tees are designed and manufactured in accordance with the following specifications:

- API 6A** Specification for Wellhead and Christmas Tree Equipment
- ANSI B31.3** Chemical Plant and Petroleum Refinery Piping
- ASME VIII** Boiler and Pressure Vessel Code
- NACE MR-01-75** Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment

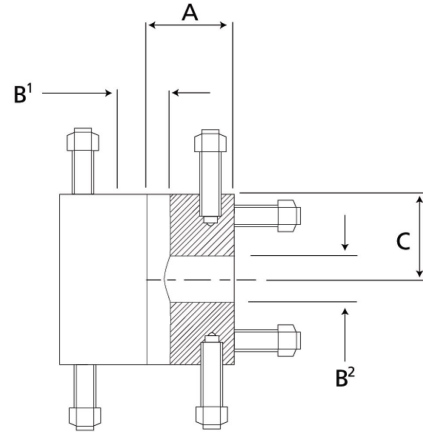
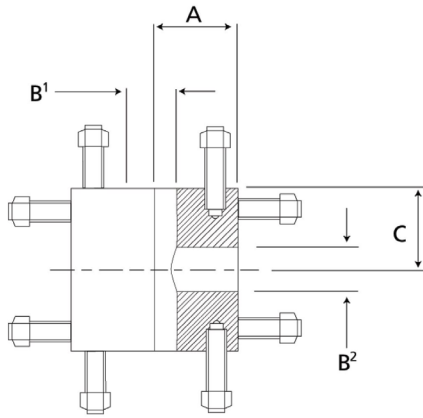
Flanged Studded Crosses & Tees and Flanged Crosses & Tees are available either Equal or with Reducing configuration, for use with the following pressure ratings:

Max Working Pressure	5,000 psi	10,000 psi	15,000 psi	20,000 psi
Test Pressure	7,500 psi	15,000 psi	22,500 psi	30,000 psi
Product Specification Levels	1, 2, 3 & 4	1, 2, 3 & 4	1, 2, 3 & 4	1, 2, 3 & 4
API Temperature Rating	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)
Min. Yield	60,000 psi	60,000 psi	75,000 psi	75,000 psi
Min. Tensile	85,000 psi	85,000 psi	95,000 psi	95,000 psi
Material	API 60K	API 60K	API 75K	API 75K

General Note: Please contact FET for any special material or dimensional requirements Max. working pressure stated are suitable for temperatures up to 121°C. De-rating of max. working pressure will occur as the opening temperature increases above 121°C. Consult FET for further details.

# API 6A CROSSES AND TEES

## API Flange Studded Crosses and Tees



Rated Working Pressure (psi)	Nominal Size and Bore		Center to Face, Vertical Run C	Center to Face, Horizontal Run A
	Vertical B1	Horizontal B2		
	+0.03,-0	+0.03,-0		
5,000	2 1/16	2 1/16	4.500	4.50
	2 9/16	2 1/16	4.50	5.00
	2 9/16	2 9/16	5.00	5.00
	3 1/8	2 1/16	4.50	5.50
	3 1/8	2 9/16	5.50	5.50
	3 1/8	3 1/8	5.50	5.50
	4 1/16	2 1/16	4.50	6.50
	4 1/16	2 9/16	5.00	6.50
	4 1/16	3 1/8	5.50	6.50
	4 1/16	4 1/16	6.50	6.50
10,000	1 13/16	1 13/16	4.38	4.38
	2 1/16	1 13/16	4.38	4.38
	2 1/16	2 1/16	4.38	4.38
	2 9/16	1 13/16	4.50	5.12
	2 9/16	2 1/16	4.50	5.12
	2 9/16	2 9/16	5.12	5.12
	3 1/16	1 13/16	4.50	5.88
	3 1/16	2 1/16	4.50	5.88
	3 1/16	2 9/16	5.12	5.88
	3 1/16	3 1/16	5.88	5.88
	4 1/16	1 13/16	4.50	6.88
	4 1/16	2 9/16	4.50	6.88
	4 1/16	2 9/16	5.12	6.88
	4 1/16	3 1/16	5.88	6.88
4 1/16	4 1/16	6.88	6.88	
15,000	1 13/16	1 13/16	5.00	5.00
	2 1/16	1 13/16	5.00	5.00

General Note: Dimensions are in inches.

Rated Working Pressure (psi)	Nominal Size and Bore		Center to Face, Vertical Run C	Center to Face, Horizontal Run A
	Vertical B1	Horizontal B2		
	+0.03,-0	+0.03,-0		
15,000	2 1/16	2 1/16	5.00	5.00
	2 9/16	1 13/16	5.50	5.50
	2 9/16	2 1/16	5.50	5.50
	2 9/16	2 9/16	5.50	5.50
	3 1/16	1 13/16	6.31	6.31
	3 1/16	2 1/16	6.31	6.31
	3 1/16	2 9/16	6.31	6.31
	3 1/16	3 1/16	6.31	6.31
	4 1/16	1 13/16	7.62	7.62
	4 1/16	2 1/16	7.62	7.62
	4 1/16	2 9/16	7.62	7.62
	4 1/16	3 1/16	7.62	7.62
	4 1/16	4 1/16	7.62	7.62
	20,000	1 13/16	1 13/16	6.47
2 1/16		1 13/16	6.47	6.47
2 1/16		2 1/16	6.47	6.47
2 9/16		1 13/16	7.28	7.28
2 9/16		2 1/16	7.28	7.28
2 9/16		2 9/16	7.28	7.28
3 1/16		1 13/16	7.97	7.97
3 1/16		2 1/16	7.97	7.97
3 1/16		2 9/16	7.97	7.97
3 1/16		3 1/16	7.97	7.97
4 1/16		1 13/16	9.91	9.91
4 1/16		2 1/16	9.91	9.91
4 1/16		2 9/16	9.91	9.91
4 1/16		3 1/16	9.91	9.91
4 1/16	4 1/16	9.91	9.91	

General Note: Dimensions are in inches.

# Hammer Lug Unions

# HAMMER LUG UNIONS

Hammer Lug Unions are designed and manufactured in accordance with the following specifications:

API 6A	Specification for Wellhead and Christmas Tree Equipment
NACE MR-01-75	Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment
ASME VIII	Boiler and Pressure Vessel Code
ANSI B31.3	Chemical Plant and Petroleum Refinery Piping

Flanged Studded Crosses & Tees and Flanged Crosses & Tees are available either Equal or with Reducing configuration, for use with the following pressure ratings:

Figure no.:	602	1002/1004*	1003	1502	2202
<b>Standard Service</b>					
Max. Working Pressure	6,000 psi	10,000 psi	10,000 psi	15,000 psi	N/A
Max. Test Pressure	9,000 psi	15,000 psi	15,000 psi	22,500 psi	N/A
Color Code	SUBS-ORANGE NUT-BLACK	SUBS-BLUE NUT-RED	SUBS-GREEN NUT-BLACK	SUBS-RED NUT-BLUE	N/A
<b>Sour Service</b>					
Max. Working Pressure	6,000 psi	7,500 psi	7,500 psi	10,000 psi	15,000 psi
Max. Test Pressure	9,000 psi	11,250 psi	11,250 psi	15,000 psi	22,500 psi
Color Code	SUBS-GREEN NUT-GREEN	SUBS-GREEN NUT-GREEN	SUBS-GREEN NUT-GREEN	SUBS-GREEN NUT-GREEN	SUBS-GREEN NUT-GREEN

General Note: Please contact FET for any special material or dimensional requirements. Sizes 5" to 12" Fig 400-2500 PSI MWP, 3750 PSI MTP.

\*Note: 1002 5" & 6" unions available in both O-Ring (1002) and Lipseal design (sometimes referred to as 1004). Special sizes & configurations are available in 1502 & 1002/1004, please contact FET. 5" and 6" Fig 1002 Unions down-rated to 5,000 psi WTP (10,000psi TP) for Sour Gas Service, and 7,500 psi WP (11,250 TP) for Standard Service.

# HAMMER LUG UNIONS

Figure 602 Union

Nominal Pipe Size	W. Nut Radius	D. Outside Diameter	L1. End to End Threaded	L2. End to End Butt Weld*	B. Max. Inside Diameter	Weight
(in.) (mm.)	(mm.)	(mm.)	(mm.)	(mm.)	(mm.)	(kg.)
1	25	55	33	90	28	1.59
1 1/4	32	82	42	124	36	4.54
1 1/2	40	82	48	124	43	4.10
2	50	95	60	133	52	5.90
2 1/2	65	108	73	156	65	8.20
3	80	114	89	159	81	10.45
4	100	132	114	210	106	15.00

\* SCH 160

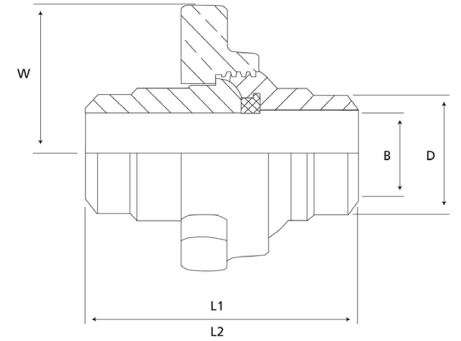


Fig. 602 Union

Figure 1002/1004 Union

Nominal Pipe Size	W. Nut Radius	D. Outside Diameter	L1. End to End Threaded	L2. End to End Butt Weld*	L3. End to End Butt Weld**	B. Max. Inside Diameter	Weight
(in.) (mm.)	(mm.)	(mm.)	(mm.)	(mm.)	(mm.)	(mm.)	(kg.)
1	25	60	33	90	90	28	1.60
1 1/4	32	81	42	124	-	36	4.30
1 1/2	40	81	48	124	119	43	4.00
2	50	95	60	133	127	52	6.00
2 1/2	65	108	73	156	156	65	7.95
3	80	125	89	159	138	77	10.00
4	100	133	114	210	140	102	17.95
5	125	156	141	-	152	-	25.00
6	150	178	168	-	159	-	36.00

\* SCH 160 \*\* SCH XXS

Outside Diameter D based upon Nominal Pipe Sizes.

Referred to as lipseal or sometimes referred to as 1004. These figures are approximate only. Please consult RB Pipetech for exact dimensions and specifications.

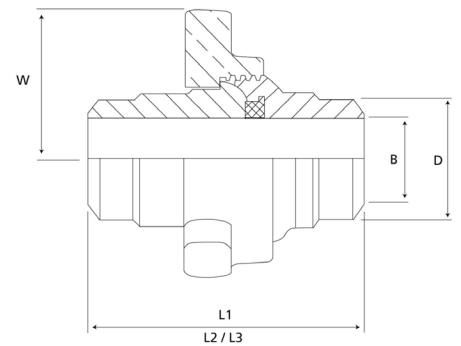


Fig. 1004 Union

Figure 1002/1004 Union

Nominal Pipe Size	W. Nut Radius	D. Outside Diameter	L1. End to End Threaded	L2. End to End Butt Weld*	L3. End to End Butt Weld**	B. Max. Inside Diameter	Weight
(in.) (mm.)	(mm.)	(mm.)	(mm.)	(mm.)	(mm.)	(mm.)	(kg.)
5	125	156	141	-	152	-	25.00
6	150	178	168	-	159	-	36.00

\* SCH 160 \*\* SCH XXS

Outside Diameter D based upon Nominal Pipe Sizes.

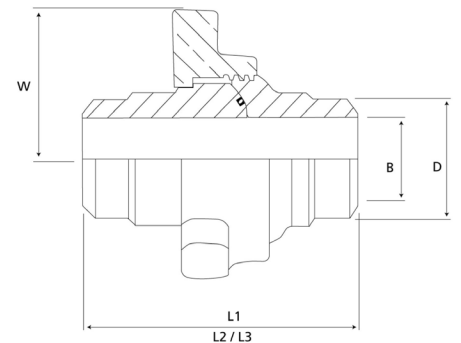


Fig. 1002 (5" & 6" only) O-Ring



# HAMMER LUG UNIONS

**Figure 1003 Union**

Nominal Pipe Size	W. Nut Radius	D. Outside Diameter	L1. End to End Threaded	L2. End to End Butt Weld*	L3. End to End Butt Weld**	B. Max. Inside Diameter	Weight
(in.)	(mm.)	(mm.)	(mm.)	(mm.)	(mm.)	(mm.)	(kg.)
2	50	95	121	117	121	50	5.40
3	80	124	232	225	232	81	20.00
4	100	146	278	271	278	101	33.00
5	125	146	—	273	278	—	33.00

\*SCH 160 \*\* SCH XXS  
 Outside Diameter D based upon Nominal Pipe Sizes.

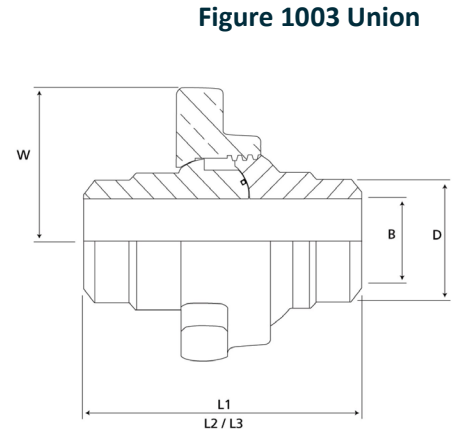


Fig. 1003 Union

**Figure 1502 Union**

Nominal Pipe Size	W. Nut Radius	D. Outside Diameter	L1. End to End Threaded	L2. End to End Butt Weld**	B. Max. Inside Diameter	Weight
(in.)	(mm.)	(mm.)	(mm.)	(mm.)	(mm.)	(kg.)
1	25	73	110	110	28	3.60
1 1/2	40	93	137	137	43	5.40
2	50	99	178	159	51	8.70
2 1/2	65	106	184	—	65	10.00
3	80	114	194	130	77	13.00
4	100	150	216	216	103	34.00
5	125	165	—	—	101	50.00
6	150	185	—	250	124	73.00

\*\* SCH XXS  
 Special sizes available from FET.  
 These figures are approximate only. Please consult FET for exact dimensions and specifications  
 Outside diameter D based upon Nominal Pipe Sizes.

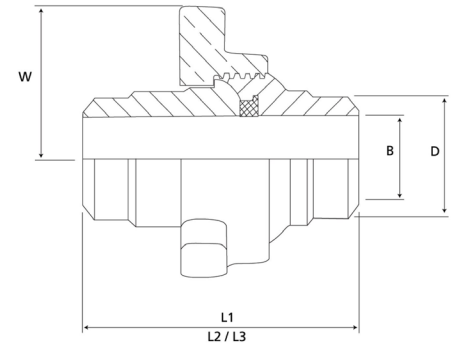


Fig. 1502 Union

**Figure 2202 Union**

Nominal Pipe Size	W. Nut Radius	D. Outside Diameter	L1. End to End Threaded	Weight
(in.)	(mm.)	(mm.)	(mm.)	(kg.)
2	50	95	188	12.00
2 1/2	65	115	243	19.00
3	80	159	267	25.00

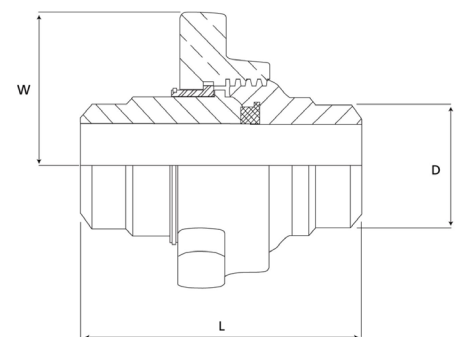


Fig. 2202 Union

# Hubs and Clamps

## API 16A

## HUBS AND CLAMPS

### API 16A

Hubs and Clamps are designed and manufactured in accordance with the following specifications:

<b>API 16A</b>	Specification for Drill Through Equipment
<b>API 6A</b>	Specification for Wellhead and Christmas Tree Equipment
<b>NACE MR-01-75</b>	Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment
<b>ASME VIII</b>	Boiler and Pressure Vessel Code
<b>ANSI B31.3</b>	Chemical Plant and Petroleum Refinery Piping

Hubs are available as Weld Neck, Integral & Blinds and are available in the following materials and pressure ratings:

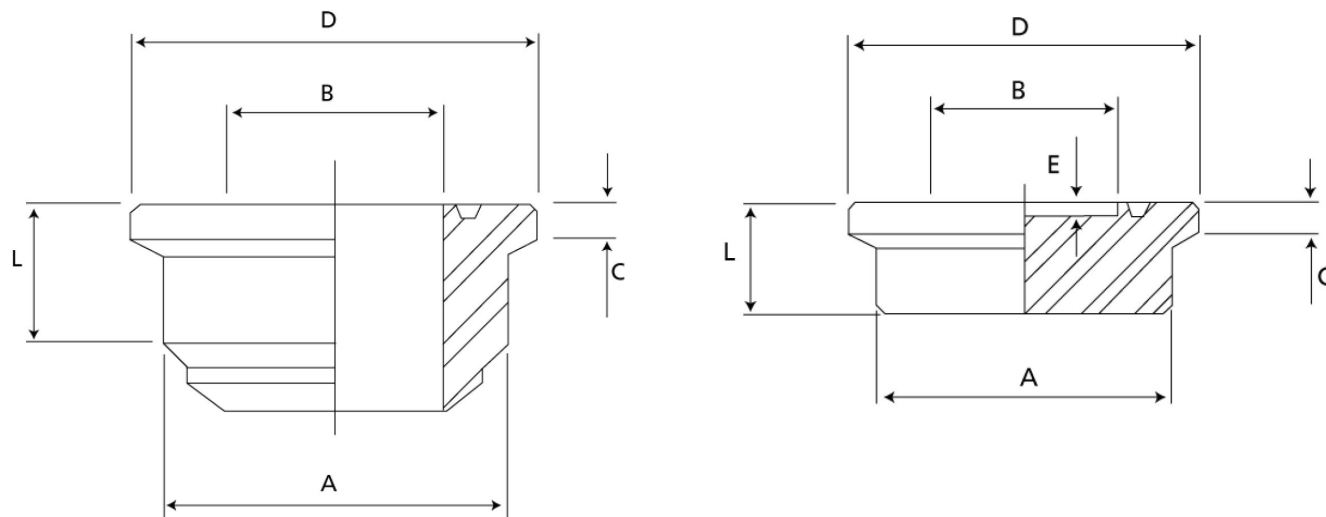
Max. Working Pressure	5,000 psi	10,000 psi	15,000 psi	20,000 psi
Test Pressure	7,500 psi	15,000 psi	22,500 psi	30,000 psi
Product Specification Levels	1, 2, 3 & 4	1, 2, 3 & 4	1, 2, 3 & 4	1, 2, 3 & 4
API Temperature Rating	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)
Min. Yield	60,000 psi	60,000 psi	75,000 psi	75,000 psi
Min. Tensile	85,000 psi	85,000 psi	95,000 psi	95,000 psi
Material	API 75K	API 75K	API 75K	API 75K

General Note: Please contact FET for any special material or dimensional requirements Max. Working Pressures stated are suitable for temperatures up to 121° C. De-rating of max. working pressure will occur as the operating temperature increases above 121°C. Consult FET for further details.

# HUBS AND CLAMPS

API 16A

API Type 16BX Integral Hub Connections for 5,000 psi Rated Working Pressure



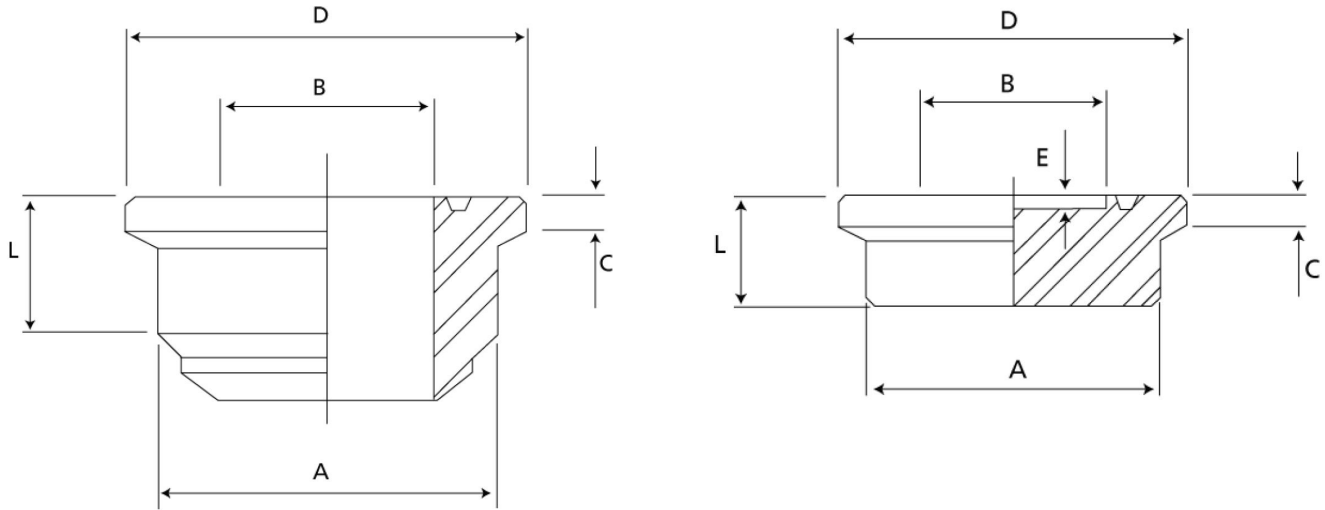
Nominal Size and Bore B	Outside Diameter D	Total Thickness C	Large Diameter of Neck A	Neck Length for Clamp Clearance L	Ring Gasket Number	Clamp Number
<b>5,000 psi</b>						
2 1/16	5.031	1.166	3.656	2.22	BX-152	1
2 9/16	5.781	1.166	4.406	2.27	BX-153	2
3 1/8	6.312	1.166	4.938	2.36	BX-154	4
4 1/16	7.625	1.197	6.250	2.38	BX-155	5
7 1/16	13.250	1.622	11.625	3.38	BX-156	6
9	13.250	1.622	11.625	3.38	BX-157	8
11	16.250	1.654	14.625	4.13	BX-158	10
13 5/8	20.625	1.871	19.000	4.88	BX-160	13
16 3/4	25.625	1.778	24.000	5.50	BX-162	19
21 1/4	31.250	3.630	27.875	6.75	BX-165	27

General Note: Dimensions are in inches.  
Dimension 'E' Counterbore is optional.

# HUBS AND CLAMPS

## API 16A

### API Type 16BX Integral Hub Connections for 10,000 psi Rated Working Pressure



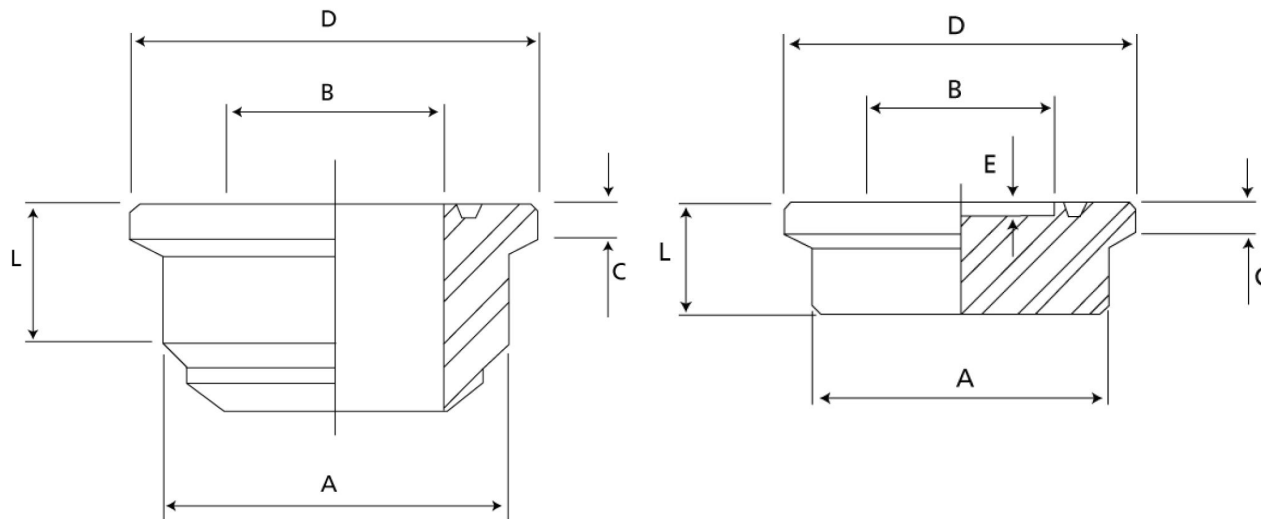
Nominal Size and Bore B	Outside Diameter D	Total Thickness C	Large Diameter of Neck A	Neck Length for Clamp Clearance L	Ring Gasket Number	Clamp Number
<b>10,000 psi</b>						
1 13/16	5.031	1.166	3.656	2.22	BX-151	1
2 1/16	5.781	1.166	4.406	2.27	BX-152	2
2 9/16	6.312	1.166	4.938	2.36	BX-153	4
3 1/16	7.625	1.197	6.250	2.38	BX-154	5
4 1/16	8.437	1.310	6.812	2.82	BX-155	6
7 1/16	16.250	1.653	14.625	4.13	BX-156	10
9	16.250	1.653	14.625	4.13	BX-157	10
11	20.625	2.035	18.625	4.75	BX-158	22
13 5/8	22.250	2.309	20.625	5.31	BX-159	15
16 3/4	28.000	3.005	25.000	6.17	BX-162	28
18 3/4	31.250	3.630	27.875	6.75	BX-164	27
21 1/4	34.000	4.005	30.500	8.22	BX-166	26

General Note: Dimensions are in inches.  
Dimension 'E' Counterbore is optional.

# HUBS AND CLAMPS

API 16A

API Type 16BX Integral Hub Connections for 15,000 psi Rated Working Pressure



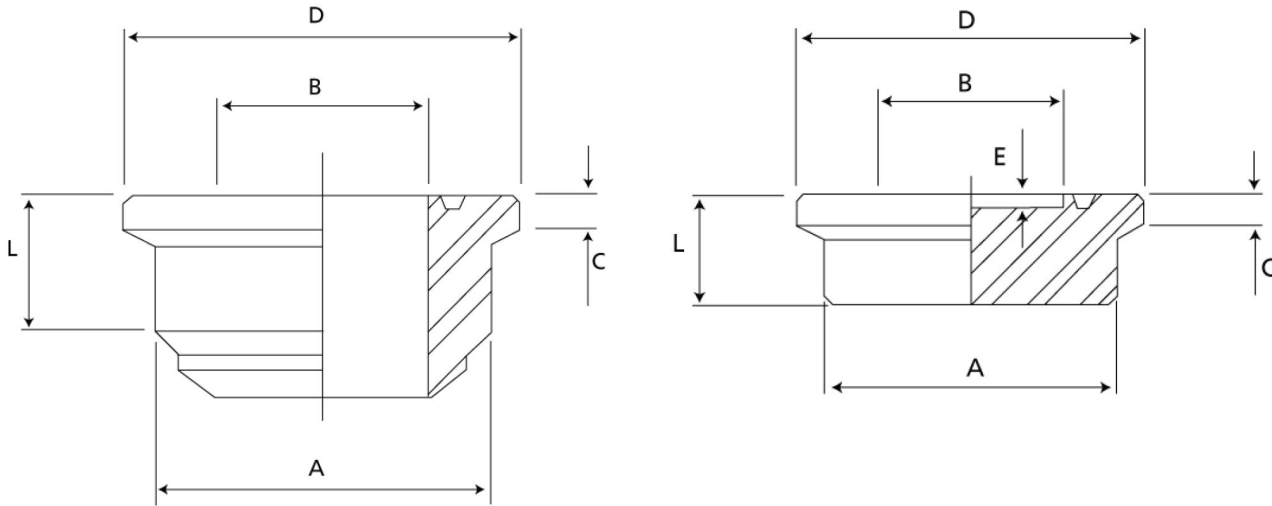
Nominal Size and Bore B	Outside Diameter D	Total Thickness C	Large Diameter of Neck A	Neck Length for Clamp Clearance L	Ring Gasket Number	Clamp Number
<b>15,000 psi</b>						
1 13/16	5.781	1.166	4.406	2.27	BX-151	2
2 1/16	6.125	1.622	4.500	3.22	BX-152	3
2 9/16	6.125	1.622	4.500	3.22	BX-153	3
3 1/16	8.437	1.310	6.812	2.82	BX-154	6
4 1/16	13.250	1.622	11.625	3.38	BX-155	8
7 1/16	20.626	2.035	18.625	4.75	BX-156	22
11	22.250	2.309	20.625	5.31	BX-158	15
13 5/8	28.000	3.005	25.000	6.17	BX-159	28
18 3/4	34.000	4.005	30.500	8.22	BX-164	26

General Note: Dimensions are in inches.  
Dimension 'E' Counterbore is optional.

# HUBS AND CLAMPS

API 16A

API Type 16BX Integral Hub Connections for 20,000 psi Rated Working Pressure



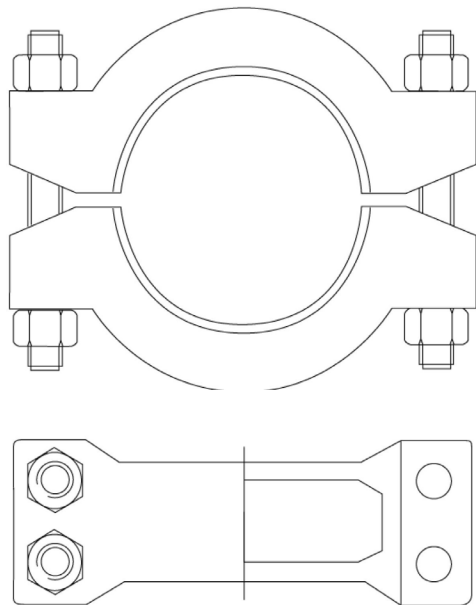
Nominal Size and Bore B	Outside Diameter D	Total Thickness C	Large Diameter of Neck A	Neck Length for Clamp Clearance L	Ring Gasket Number	Clamp Number
<b>20,000 psi</b>						
1 13/16	6.125	1.622	4.500	3.22	BX-151	3
2 1/16	6.125	1.622	4.500	3.22	BX-152	3
2 9/16	8.437	1.310	6.812	2.82	BX-153	6
3 1/16	13.250	1.622	11.625	3.38	BX-154	8
4 1/16	16.250	1.653	14.625	4.13	BX-155	10
7 1/16	22.250	2.308	20.625	5.31	BX-156	15
11	27.997	3.005	25.000	6.17	BX-158	28

General Note: Dimensions are in inches.  
Dimension 'E' Counterbore is optional.

# HUBS AND CLAMPS

## API 16A

### Clamps for API Type 16B and 16BX Hub Connections



#### HUB

Clamp Number	API Designated Size	Working Pressure (psi)	Clamp Number	API Designated Size	Working Pressure (psi)
1	1 13/16	10,000	18	21 1/4	2,000
	2 1/16	5,000	19	16 3/4	5,000
2	1 13/16	15,000	22	7 1/16	15,000
	2 1/16	10,000		11	10,000
	2 9/16	5,000	25	7 1/16	2,000
3	1 13/16	20,000	26	16 3/4	15,000
	2 1/16	15,000		21 1/4	10,000
	2 1/16	20,000	27	18 3/4	10,000
	2 9/16	15,000		21 1/4	5,000
4	2 9/16	10,000	28	11	20,000
	3 1/8	5,000		13 5/8	15,000
5	3 1/16	10,000		16 3/4	10,000
	4 1/16	5,000			
6	2 9/16	20,000			
	3 1/16	15,000			
	4 1/16	10,000			
8	3 1/16	20,000			
	4 1/16	15,000			
	7 1/16	5,000			
	9	5,000			
9	11	3,000			
10	4 1/16	20,000			
	7 1/16	10,000			
	9	10,000			
	11	5,000			
11	13 5/8	3,000			
12	16 3/4	2,000			
13	13 5/8	5,000			
14	16 3/4	3,000			
15	7 1/16	20,000			
	11	15,000			
	13 5/8	10,000			



## HUBS AND CLAMPS

### API 16A

#### RX & BX RTJ Ring Numbers for API Specification 16A Equipment

Ring Number	API Designated Size	Rated Working Pressure (psi)	Clamp Number	API Designated Size	Working Pressure (psi)
Type 16BX Integral Hub Connections:			BX 156	7 1/16	15,000
BX 156	7 1/16	5,000	BX 158	11	15,000
BX 157	9	5,000	BX 159	13 5/8	15,000
BX 158	11	5,000	BX 164	18 3/4	15,000
BX 160	13 5/8	5,000	BX 156	7 1/16	20,000
BX 162	16 3/4	5,000	BX 158	11	20,000
BX 165	21 1/4	5,000			
BX 156	7 1/16	10,000			
BX 157	9	10,000			
BX 158	11	10,000			
BX 159	13 5/8	10,000			
BX 162	16 3/4	10,000			
BX 164	18 3/4	10,000			
BX 166	21 1/4	10,000			

# Hubs and Clamps

## Pipeline Hubs and Clamps

## HUBS AND CLAMPS

### Pipeline Hubs and Clamps

Hubs and Clamps are designed and manufactured in accordance with the following specifications:

- API 16A** Specification for Drill Through Equipment
- API 6A** Specification for Wellhead and Christmas Tree Equipment
- NACE MR-01-75** Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment
- ASME VIII** Boiler and Pressure Vessel Code
- ANSI B31.3** Chemical Plant and Petroleum Refinery Piping

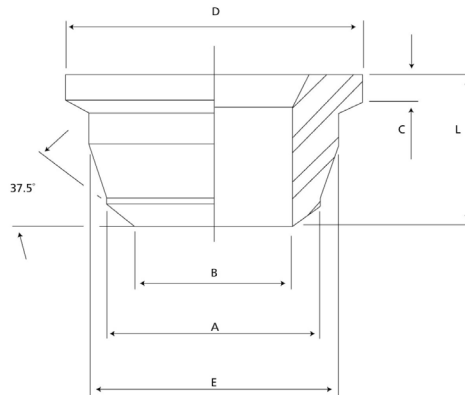
Hubs are available as Weld Neck, Integral & Blinds and are available in the following materials and pressure ratings:

	Hubs		Clamps	Seal Rings
	A350 LF2 MOD	AISI 4130	AISI 4140	AISI 4130
Min. Tensile	70,000 psi	90,000 psi	100,000 psi	100,000 psi
Min. Yield	52,000 psi	60,000 psi	75,000 psi	75,000 psi
Hardness (Max.)	197 BHN	235 BHN	22 HRC	22 HRC
Impact Values	50/40 JOULES	40/32 JOULES	42/32 JOULES	27/20 JOULES
Impact Test Temperature	-46 DEG C	-46 DEG C	-46 DEG C	-46 DEG C
Temper Temperature	650 DEG C	650 DEG C	620 DEG C	N/A

General Note: Please contact FET for any special material or dimensional requirements.

# HUBS AND CLAMPS

## Pipeline Hubs and Clamps Butt Weld Hubs Standard Clamp Series

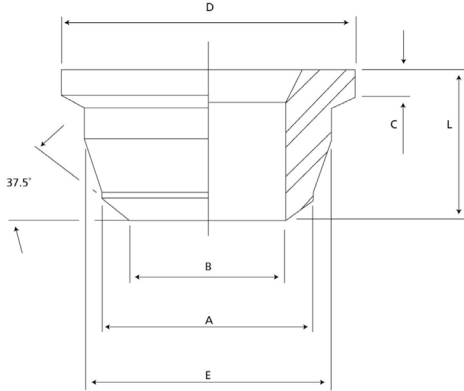


N.P.S.	O. Dia A	(DN)	Pipe Schedule	Typical Designation Hub/S. Ring	Pipe Inside Diameter B		Hub Outside Diameter D		Hub Length L		Hub Backface Diameter E		Lip Thickness C		BW Hub Weight	
					in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	lb.	kg.
1 1/2"	(DN 40)	Std 40 40S	1-1/2in/14	1.610	40.9	3.125	79.4	2.375	60.3	2.375	60.3	0.473	11.1	1.6	0.7	
1.900	(48.3)	XS 80 80S	1-1/2in/13	1.500	38.1	3.125	79.4	2.375	60.3	2.375	60.3	0.500	12.7	1.9	0.8	
		160	1-1/2in/13	1.338	34.0	3.125	79.4	2.375	60.3	2.375	60.3	0.500	12.7	2.0	0.9	
		XXS	1-1/2in/11	1.100	27.9	3.125	79.4	2.375	60.3	2.375	60.3	0.500	12.7	2.4	1.1	
2"	(DN 50)	Std 40 40S	2in/20	2.067	52.5	3.625	92.1	2.750	69.9	2.875	73.0	0.473	11.1	2.2	1.0	
2.375	(60.3)	XS 80 80S	2in/20	1.939	49.3	3.625	92.1	2.750	69.9	2.875	73.0	0.473	11.1	2.5	1.1	
		160	2in/16	1.689	42.9	3.625	92.1	2.750	69.9	2.875	73.0	0.473	11.1	3.0	1.4	
		XXS	2in/14	1.503	38.2	3.625	92.1	2.750	69.9	2.875	73.0	0.473	11.1	3.4	1.5	
3"	(DN75)	Std 40 40S	3in/27	3.068	77.9	5.000	127.0	3.250	82.6	4.000	101.6	0.500	12.7	4.7	2.1	
3.500	(88.9)	XS 80 80S	3in/27	2.900	73.7	5.000	127.0	3.250	82.6	4.000	101.6	0.500	12.7	5.2	2.4	
		160	3in/26	2.624	66.6	5.000	127.0	3.250	82.6	4.000	101.6	0.500	12.7	6.3	2.9	
		XXS	3in/23	2.300	58.4	5.000	127.0	3.250	82.6	4.000	101.6	0.500	12.7	7.4	3.3	
4"	(DN100)	Std 40 40S	4in/40	4.026	102.3	6.000	152.4	3.625	92.1	5.000	127.0	0.500	12.7	6.7	3.1	
1.050	(114.3)	XS 80 80S	4in/40	3.826	97.2	6.000	152.4	3.625	92.1	5.000	127.0	0.500	12.7	7.7	3.5	
		160	4in/34	3.438	87.3	6.000	152.4	3.625	92.1	5.000	127.0	0.500	12.7	10.0	4.5	
		XXS	4in/31	3.152	80.1	6.000	152.4	3.625	92.1	5.000	127.0	0.500	12.7	11.5	5.2	
5"	(DN125)	Std 40 40S	5in/52	5.047	128.2	7.500	190.5	4.375	111.1	6.500	165.1	0.625	15.9	13.3	6.0	
5.563	(141.3)	XS 80 80S	5in/52	4.813	122.3	7.500	190.5	4.375	111.1	6.500	165.1	0.625	15.9	14.8	6.7	
		160	5in/46	4.313	109.6	7.500	190.5	4.375	111.1	6.500	165.1	0.625	15.9	19.2	8.7	
		XXS	5in/40	4.063	103.2	7.500	190.5	4.375	111.1	6.500	165.1	0.625	15.9	21.9	9.9	
6"	(DN150)	Std 40 40S	6in/62	6.065	154.1	9.250	235.0	4.625	117.5	7.750	196.9	0.750	19.1	20.4	9.2	
6.625	(168.3)	XS 80 80S	6in/56	5.761	146.3	9.250	235.0	4.625	117.5	7.750	196.9	0.812	20.6	24.9	11.3	
		120	6in/54	5.501	139.7	9.250	235.0	4.625	117.5	7.750	196.9	0.812	20.6	27.7	12.6	
		160	6in/52	5.189	131.8	9.250	235.0	4.625	117.5	7.750	196.9	0.812	20.6	30.7	13.9	
		XXS	6in/52	4.897	124.4	9.250	235.0	4.625	117.5	7.750	169.9	0.812	20.6	32.7	14.8	
8"	(DN200)	Std 40 40S	8in/82	7.981	202.7	11.500	292.1	5.375	136.5	10.000	254.0	0.750	19.1	33.0	15.0	
8.625	(219.1)	XS 80 80S	8in/76	7.625	193.7	11.500	292.1	5.375	136.5	10.000	254.0	0.750	19.1	40.3	18.3	
		100	8in/76	7.439	189.0	11.500	292.1	5.375	136.5	10.000	254.0	0.750	19.1	42.4	19.2	
		120	8in/72	7.189	182.6	11.500	292.1	5.375	136.5	10.000	254.0	0.750	19.1	47.8	21.7	
		140	8in/72	7.001	177.8	11.500	292.1	5.375	136.5	10.000	254.0	0.750	19.1	49.9	22.6	
		XXS	8in/67	6.875	174.6	11.500	292.1	5.375	136.5	10.000	254.0	0.750	19.1	52.9	24.0	
		160	8in/67	6.813	173.1	11.500	292.1	5.375	136.5	10.000	254.0	0.750	19.1	53.6	24.3	

# HUBS AND CLAMPS

## Pipeline Hubs and Clamps

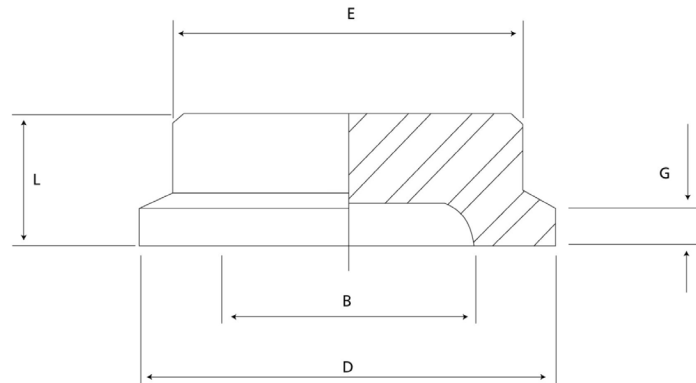
### Butt Weld Hubs Heavy Duty Clamp Series (Non-Standard)



N.P.S. O. Dia A	(DN)	Pipe Schedule	Typical Designation Hub/S. Ring	Pipe Inside Diameter B		Hub Outside Diameter D		Hub Length L		Hub Backface Diameter E		Lip Thickness C		BW Hub Weight	
				in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	lb.	kg.
2"	(DN50)	Std 40 40S	H2in/20	2.067	52.5	4.750	120.7	3.250	82.6	3.750	95.3	0.625	15.9	6.2	2.8
2.375	(60.3)	XS 80 80S	H2in/20	1.939	49.3	4.750	120.7	3.250	82.6	3.750	95.3	0.625	15.9	6.5	2.9
		160	H2in/16	1.689	42.9	4.750	120.7	3.250	82.6	3.750	95.3	0.625	15.9	7.1	3.2
		XXS	H2in/14	1.503	38.2	4.750	120.7	3.250	82.6	3.750	95.3	0.625	15.9	7.5	3.4
3"	(DN75)	Std 40 40S	H3in/27	3.068	77.9	5.500	139.7	3.500	88.9	4.500	114.3	0.625	15.9	7.3	3.3
3.500	(88.9)	XS 80 80S	H3in/27	2.900	73.7	5.500	139.7	3.500	88.9	4.500	114.3	0.625	15.9	8.0	3.6
		160	H3in/25	2.624	66.6	5.500	139.7	3.500	88.9	4.500	114.3	0.625	15.9	9.2	4.2
		XXS	H3in/23	2.300	58.4	5.500	139.7	3.500	88.9	4.500	114.3	0.625	15.9	10.3	4.7
4"	(DN100)	Std 40 40S	H4in/40	4.026	102.3	6.750	171.5	4.000	101.6	5.750	146.1	0.625	15.9	11.9	5.4
4.500	(114.3)	XS 80 80S	H4in/40	3.826	97.2	6.750	171.5	4.000	101.6	5.750	146.1	0.625	15.9	13.0	5.9
		160	H4in/34	3.438	87.3	6.750	171.5	4.000	101.6	5.750	146.1	0.625	15.9	15.5	7.0
		XXS	H4in/31	3.152	80.1	6.750	171.5	4.000	101.6	5.750	146.1	0.625	15.9	17.2	7.8
8"	(DN200)	Std 40 40S	H8in/82	7.981	202.7	11.500	292.1	5.000	127.0	9.500	241.3	1.000	25.4	31.6	14.3
8.625	(219.1)	XS 80 80S	H8in/76	7.625	193.7	11.500	292.1	5.000	127.0	9.500	241.3	1.000	25.4	38.3	17.4
		100	H8in/76	7.439	189.0	11.500	292.1	5.000	127.0	9.500	241.3	1.000	25.4	40.3	18.3
		120	H8in/72	7.189	182.6	11.500	292.1	5.000	127.0	9.500	241.3	1.000	25.4	45.4	20.6
		140	H8in/72	7.001	177.8	11.500	292.1	5.000	127.0	9.500	241.3	1.000	25.4	47.2	21.4
		XXS	H8in/67	6.875	174.6	11.500	292.1	5.000	127.0	9.500	241.3	1.000	25.4	50.1	22.7
		160	H8in/67	6.813	173.1	11.500	292.1	5.000	127.0	9.500	241.3	1.000	25.4	50.7	23.0

# HUBS AND CLAMPS

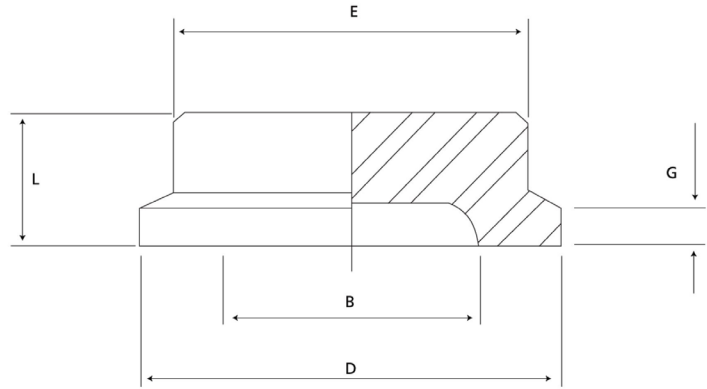
## Pipeline Hubs and Clamps Blind Hubs Standard Clamp Series



N.P.S. O. Dia A in.	(DN) mm.	Pipe Schedule	Typical Designation Hub/S. Ring	Pipe Inside Diameter B		Hub Outside Diameter D		Hub Length L		Hub Backface Diameter E		Lip Thickness C		BW Hub Weight	
				in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	lb.	kg.
1 1/2"	(DN40)	Std 40 40S	1 1/2in/14	1.610	40.9	3.125	79.4	1.625	41.3	2.375	60.3	0.437	11.1	2.4	1.1
1.900	(43)	XS 80 80S	1 1/2in/13	1.500	38.1	3.125	79.4	1.625	41.3	2.375	60.3	0.500	12.7	2.5	1.1
		160	1 1/2in/13	1.338	34.0	3.125	79.4	1.625	41.3	2.375	60.3	0.500	12.7	2.5	1.1
		XXS	1 1/2in/11	1.100	27.9	3.125	79.4	1.625	41.3	2.375	60.3	0.500	12.7	2.5	1.1
2"	(DN50)	Std 40 40S	2in/20	2.067	52.5	3.625	92.1	1.750	44.5	2.875	73.0	0.437	11.1	3.7	1.7
2.375	(60.3)	XS 80 80S	2in/20	1.939	49.3	3.625	92.1	1.750	44.5	2.875	73.0	0.437	11.1	3.7	1.7
		160	2in/16	1.689	42.9	3.625	92.1	1.750	44.5	2.875	73.0	0.437	11.1	3.7	1.7
		XXS	2in/14	1.503	38.2	3.625	92.1	1.750	44.5	2.875	73.0	0.437	11.1	3.7	1.7
3"	(DN75)	Std 40 40S	3in/27	3.068	77.9	5.000	127.0	1.875	47.6	4.000	101.6	0.500	12.7	7.7	3.5
3.500	88.9	XS 80 80S	3in/27	2.900	73.7	5.000	127.0	1.875	47.6	4.000	101.6	0.500	12.7	7.7	3.5
		160	3in/25	2.624	66.6	5.000	127.0	1.875	47.6	4.000	101.6	0.500	12.7	7.7	3.5
		XXS	3in/23	2.300	58.4	5.000	127.0	1.875	47.6	4.000	101.6	0.500	12.7	7.7	3.5
4"	(DN100)	Std 40 40S	4in/40	4.026	102.3	6.000	152.4	2.125	54.0	5.000	127.0	0.500	12.7	13.0	5.9
4.500	(114.3)	XS 80 80S	4in/40	3.826	97.2	6.000	152.4	2.125	54.0	5.000	127.0	0.500	12.7	13.0	5.9
		160	4in/34	3.438	87.3	6.000	152.4	2.125	54.0	5.000	127.0	0.500	12.7	13.0	5.9
		XXS	4in/31	3.152	80.1	6.000	152.4	2.125	54.0	5.000	127.0	0.500	12.7	13.0	5.9
5"	(DN125)	Std 40 40S	5in/52	5.047	128.2	7.500	190.5	2.750	69.9	6.500	165.1	0.625	15.9	27.8	12.6
5.563	(141.3)	XS 80 80S	5in/52	4.813	122.3	7.500	190.5	2.750	69.9	6.500	165.1	0.625	15.9	27.8	12.6
		160	5in/46	4.313	109.6	7.500	190.5	2.750	69.9	6.500	165.1	0.625	15.9	27.8	12.6
		XXS	5in/40	0.599	103.2	7.500	190.5	2.750	69.9	6.500	165.1	0.625	15.9	27.8	12.6
6"	(DN150)	Std 40 40S	6in/62	1.610	154.1	9.250	235.0	2.875	73.0	7.750	196.9	0.750	19.1	42.6	19.3
6.625	(168.3)	XS 80 80S	6in/56	1.500	146.3	9.250	235.0	2.875	73.0	7.750	196.9	0.812	20.6	43.0	19.5
		120	6in/54	5.501	139.7	9.250	235.0	2.875	73.0	7.750	196.9	0.812	20.6	43.0	19.5
		160	6in/52	5.189	131.8	9.250	235.0	2.875	73.0	7.750	196.9	0.812	20.6	43.0	19.5
		XXS	6in/52	4.897	124.4	9.250	235.0	2.875	73.0	7.750	196.9	0.812	20.6	43.0	19.5
8"	(DN200)	Std 40 40S	8in/82	7.981	202.7	11.500	292.1	3.188	81.0	10.000	254.0	0.750	19.1	76.2	34.6
8.625	(168.3)	XS 80 80S	8in/76	7.625	193.7	11.500	292.1	3.188	81.0	10.000	254.0	0.750	19.1	76.2	34.6
		100	8in/76	7.439	189.0	11.500	292.1	3.188	81.0	10.000	254.0	0.750	19.1	76.2	34.6
		120	8in/72	7.189	182.6	11.500	292.1	3.188	81.0	10.000	254.0	0.750	19.1	76.2	34.6
		140	8in/72	7.001	177.8	11.500	292.1	3.188	81.0	10.000	254.0	0.750	19.1	76.2	34.6
		XXS	8in/67	6.875	174.6	11.500	292.1	3.188	81.0	10.000	254.0	0.750	19.1	76.2	34.6
		160	8in/67	6.813	173.1	11.500	292.1	3.188	81.0	10.000	254.0	0.750	19.1	76.2	34.6

# HUBS AND CLAMPS

## Pipeline Hubs and Clamps Blind Hubs Heavy Duty Clamp Series

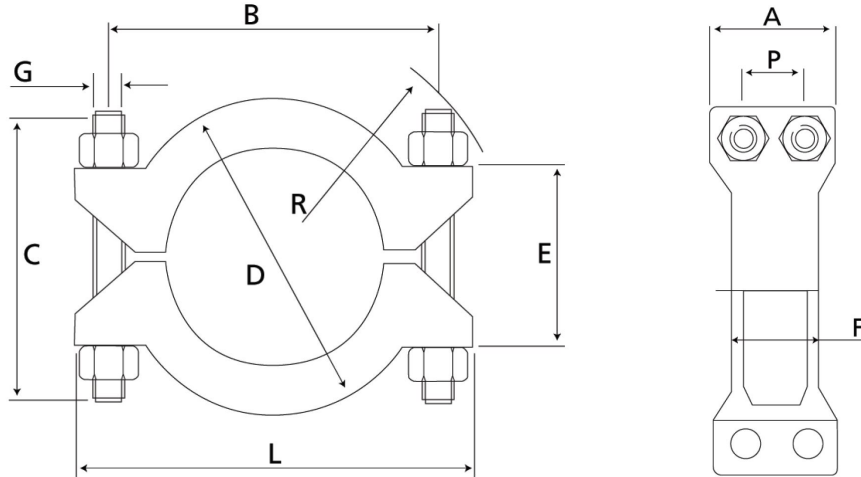


N.P.S. O. Dia A in.	(DN) mm.	Pipe Schedule	Typical Designation Hub/S. Ring	Pipe Inside Diameter B		Hub Outside Diameter D		Hub Length L		Hub Backface Diameter E		Lip Thickness C		BW Hub Weight	
				in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	lb.	kg.
2"	(DN50)	Std 40 40S	H2in/20	2.067	52.5	4.750 120.7	2.500	63.5	3.750	95.3	0.625	15.9	9.0	4.1	
		XS 80 80S	H2in/20	1.939	49.3	4.750	120.7	2.500	63.5	3.750	95.3	0.625	15.9	9.0	4.1
		160	H2in/16	1.689	42.9	4.750	120.7	2.500	63.5	3.750	95.3	0.625	15.9	9.0	4.1
		XXS	H2in/14	1.503	38.2	4.750	120.7	2.500	63.5	3.750	95.3	0.625	15.9	9.0	4.1
3"	(DN75)	Std 40 40S	H3in/27	3.068	77.9	5.500	139.7	2.625	66.7	4.500	144.3	0.625	15.9	13.2	6.0
3.5"	(88.9)	XS 80 80S	H3in/27	2.900	73.7	5.500	139.7	2.625	66.7	4.500	144.3	0.625	15.9	13.2	6.0
		160	H3in/25	2.624	66.6	5.500	139.7	2.625	66.7	4.500	144.3	0.625	15.9	13.2	6.0
		XXS	H3in/23	2.300	58.4	5.500	139.7	2.625	66.7	4.500	144.3	0.625	15.9	13.2	6.0
4"	(DN100)	Std 40 40S	H4in/40	4.026	102.3	6.750	171.5	3.250	82.6	5.750	146.1	0.625	15.9	25.6	11.6
4.5"	(114.3)	XS 80 80S	H4in/40	3.826	97.2	6.750	171.5	3.250	82.6	5.750	146.1	0.625	15.9	25.6	11.6
		160	H4in/34	3.483	87.3	6.750	171.5	3.250	82.6	5.750	146.1	0.625	15.9	25.6	11.6
		XXS	H4in/31	3.152	80.1	6.750	171.5	3.250	82.6	5.750	146.1	0.625	15.9	25.6	11.6
8"	(DN200)	Std 40 40S	H8in/82	7.981	202.7	11.500	292.1	3.500	88.9	9.500	241.3	1.000	25.4	79.5	36.1
8.625"	(219.1)	XS 80 80S	H8in/76	7.625	193.7	11.500	292.1	3.500	88.9	9.500	241.3	1.000	25.4	79.5	36.1
		100	H8in/76	7.439	189.0	11.500	292.1	3.500	88.9	9.500	241.3	1.000	25.4	79.5	36.1
		120	H8in/72	7.189	182.6	11.500	292.1	3.500	88.9	9.500	241.3	1.000	25.4	79.5	36.1
		140	H8in/72	7.001	177.8	11.500	292.1	3.500	88.9	9.500	241.3	1.000	25.4	79.5	36.1
		XXS	H8in/67	6.875	174.6	11.500	292.1	3.500	88.9	9.500	241.3	1.000	25.4	79.5	36.1
		160	H8in/67	6.813	173.1	11.500	292.1	3.500	88.9	9.500	241.3	1.000	25.4	79.5	36.1
10"	(DN250)	Std 40 40S	H10in/102	10.020	254.5	13.625	346.1	3.188	81.0	11.625	295.3	1.250	31.8	109.8	49.8

# HUBS AND CLAMPS

## Pipeline Hubs and Clamps

### Clamps



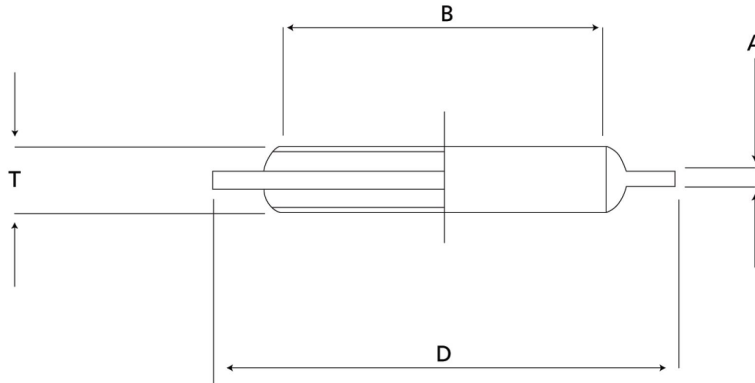
Clamp Bolts Coating	Bolt Centers B		Clamps OD D		Overall Length L		Clamp Width F		Lug Separation E		Clamp Clearance R		Bolt Diameter G		Bolt Length C		Bolt Lug Width A		Bolt Pitch P		Clamp Weight	
	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.
<b>Standard Series Clamp Size</b>																						
1"	3.25	83	2.81	71	4.25	108	1.38	35	2.13	54	2.63	67	0.500	13	3.50	89	2.25	57	1.25	32	4.2	1.9
1 1/2"	5.00	127	4.50	114	6.50	165	2.00	51	3.25	83	4.00	102	0.625	16	5.00	127	3.13	79	1.63	41	9.9	4.5
2"	5.75	146	5.50	140	7.50	191	2.00	51	3.63	92	4.50	114	0.750	19	5.25	133	3.38	86	1.81	46	13.2	6.0
3"	7.50	191	6.88	175	9.25	235	2.38	60	4.50	114	5.25	133	0.750	19	6.50	165	3.38	86	1.81	46	23.6	10.7
4"	8.50	216	8.25	210	10.50	267	2.38	60	5.25	133	6.00	152	0.875	22	7.50	191	4.00	102	2.06	52	28.7	13.0
5"	10.25	260	9.88	251	12.38	314	3.13	79	6.13	156	7.25	184	1.000	25	8.00	203	4.50	114	2.31	59	41.0	18.6
6"	12.63	321	12.0	305	15.25	387	3.75	95	6.63	168	8.75	222	1.125	29	10.00	254	5.25	133	2.44	62	70.3	31.9
8"	15.25	387	14.5	386	18.5	470	3.75	95	7.5	191	9.88	251	1.250	32	10.50	267	5.75	146	2.88	73	110	50.0
<b>Heavy Duty Series Clamp Size</b>																						
2"	7.25	184	6.88	175	9.00	229	2.88	73	5.00	127	5.63	143	0.875	22	7.50	191	3.75	95	2.00	51	24.3	11.0
3"	8.00	203	7.75	197	10.00	254	3.00	76	5.25	133	6.13	156	0.875	22	7.50	191	4.00	102	2.06	52	33.1	15.0
4"	9.56	243	9.00	229	11.75	298	3.00	76	5.75	146	7.00	178	1.000	25	8.00	203	4.38	111	2.31	59	39.9	18.1
8"	16.00	406	14.75	375	18.63	473	4.50	114	7.00	178	10.75	273	1.375	35	11.00	279	5.88	149	3.13	79	138	62.6
10"	18.25	464	17.63	448	22.50	572	5.50	140	10.00	254	12.75	324	1.625	41	14.25	362	7.25	184	3.63	92	243	110.0
12"	21.00	533	20.38	518	25.00	635	5.75	146	10.63	270	14.25	362	1.750	44	17.00	432	7.50	191	3.75	95	320	145.0
14"	24.75	629	23.00	584	29.25	743	6.13	156	12.25	311	16.25	413	1.875	48	16.50	419	8.25	210	4.25	108	430	195.0
16"	29.25	743	27.19	691	34.25	870	7.63	194	13.50	343	19.13	486	2.250	57	22.00	559	9.63	244	5.00	127	683	310.0



# HUBS AND CLAMPS

## Pipeline Hubs and Clamps

### Seal Rings



Seal Ring Size	Outside Diameter D		Inside Diameter B		Rib Thickness A		Overall Thickness T		Seal rings Weight	
	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.
4	1.000	25.4	0.500	12.7	0.125	3.2	0.375	9.5	0.03	0.01
5	1.094	27.8	0.625	15.9	0.125	3.2	0.375	9.5	0.03	0.01
7	1.375	34.9	0.906	23	0.125	3.2	0.375	9.5	0.04	0.02
11	1.750	44.5	1.125	28.6	0.125	3.2	0.375	9.5	0.06	0.03
13	2.375	60.3	1.500	38.1	0.125	3.2	0.375	9.5	0.11	0.05
14	2.625	66.7	1.609	40.9	0.250	6.4	0.563	14.3	0.28	0.13
16	2.750	69.9	1.868	47.4	0.250	6.4	0.625	15.9	0.28	0.13
20	3.250	82.6	2.063	52.4	0.250	6.4	0.750	19.1	0.45	0.2
23	3.500	88.9	2.375	60.3	0.250	6.4	0.750	19.1	0.48	0.22
25	4.000	102	2.672	67.9	0.250	6.4	0.750	19.1	0.62	0.28
27	4.250	108	3.063	77.8	0.250	6.4	0.750	19.1	0.62	0.28
31	4.500	114	3.250	82.6	0.250	6.4	0.750	19.1	0.69	0.31
34	5.000	127	3.688	93.7	0.250	6.4	0.750	19.1	0.80	0.36
40	5.500	140	4.063	103	0.250	6.4	1.000	25.4	1.13	0.51
42	6.375	162	4.188	106	0.250	6.4	1.000	25.4	1.68	0.76
46	6.250	159	4.750	121	0.250	6.4	1.000	25.4	1.34	0.61
52	6.625	168	5.313	135	0.250	6.4	1.000	25.4	1.33	0.60
54	6.812	173	5.500	140	0.250	6.4	1.000	25.4	1.57	0.71
56	7.500	191	5.750	146	0.250	6.4	1.000	25.4	1.82	0.83
62	7.875	200	6.065	154	0.375	9.5	1.375	34.9	3.13	1.42
64	8.625	219	6.500	165	0.375	9.5	1.375	34.9	3.80	1.72
67	8.750	222	6.875	175	0.375	9.5	1.375	34.9	8.61	1.64

# API 6A Gate Valves

## API 6A GATE VALVES

Gate Valves are designed and manufactured in accordance with the following specifications:

- API 6A** Specification for Wellhead and Christmas Tree Equipment
- NACE MR-01-75** Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment

Gate Valves are available in manual or remote operation for use in the following pressure ratings and services:

### PRESSURE & TEMPERATURE RATINGS

Max. Working Pressure	5,000 psi	10,000 psi	15,000 psi	20,000 psi
Test Pressure	7,500 psi	15,000 psi	22,500 psi	30,000 psi
Product Specification Levels	1, 2, 3 & 4	1, 2, 3 & 4	1, 2, 3 & 4	1, 2, 3 & 4
Product Rating	1 & 2	1 & 2	1 & 2	1 & 2
API Temperature Rating	L (-46 DEG C) TO X (+180 DEG C)	L (-46 DEG C) TO X (+180 DEG C)	L (-46 DEG C) TO X (+180 DEG C)	L (-46 DEG C) TO X (+180 DEG C)

### MATERIAL REQUIREMENTS

Material Class	Body, Bonnet, End And Outlet Connections	Pressure Controlling Parts E.g. Stems
AA-General Service	Carbon Or Low Alloy Steel	Carbon Or Low Alloy Steel
BB-General Service	Carbon Or Low Alloy Steel	Stainless Steel
CC-General Service	Stainless Steel	Stainless Steel
DD-Sour Service**	Carbon Or Low Alloy Steel*	Carbon Or Low Alloy Steel*
EE-Sour Service**	Carbon Or Low Alloy Steel*	Stainless Steel*
FF-Sour Service**	Stainless Steel*	Stainless Steel*
HH-Sour Service**	Corrosion Resistant Alloys*	Corrosion Resistant Alloys*

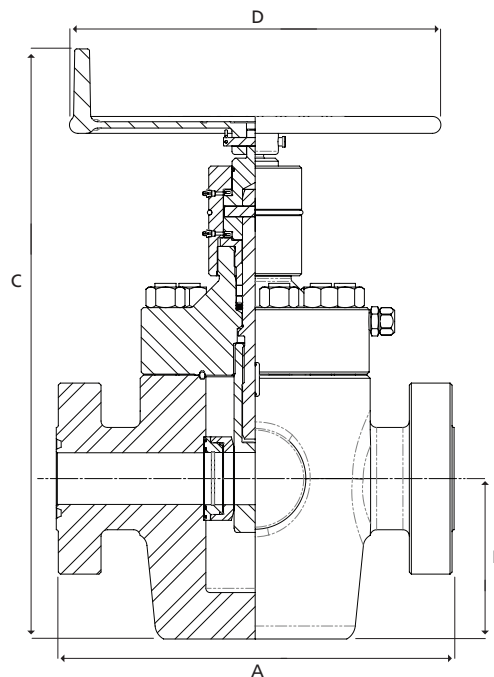
\*\*As defined in NACE MR-01-75

\*In accordance with NACE MR-01-75

General Note: Please contact FET for any special material or dimensional requirements. Max. working pressure stated are suitable for temperatures up to 121°C. De-rating of max. working pressure will occur as the operating temperature increases above 121°C. Consult FET for further details.

# API 6A GATE VALVES

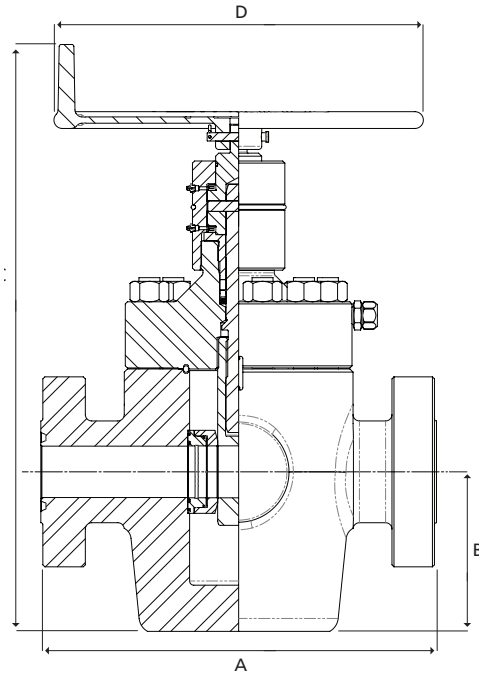
## Manual Gate Valves



Valve Size	API Ring Gasket	End to End 'A'	Bottom to Top 'C'	Center to Bottom 'B'	Handwheel Diameter 'D'	Number of Turns ( $\pm 1/4$ )	Weight (kg)
2 1/16-5K	R-24	14.63	25.63	5.63	14.00	12	210
2 9/16-5K	R-27	16.62	30.25	7.25	18.00	17 1/2	118
3 1/8-5K	R-35	18.63	29.00	7.25	18.00	18	356
4 1/16-5K	R-39	21.62	36.81	9.25	18.00	24 3/4	227
5 1/8-5K	R-44	28.62	43.37	11.44	22.00	29 3/8	364
6 1/8-5K	R-46	29.00	49.21	13.96	22.00	29 1/4	409
6 3/8-5K	R-46	29.00	49.21	13.96	22.00	29 1/4	409

# API 6A GATE VALVES

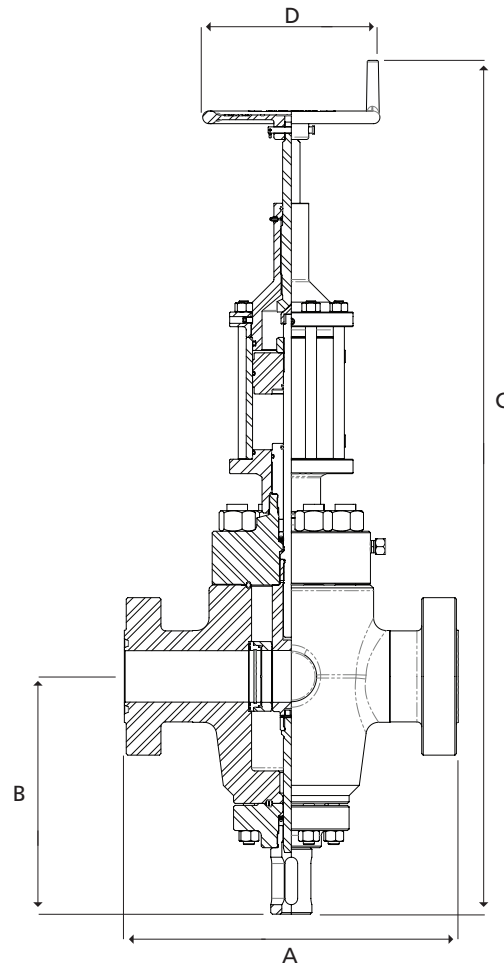
## Manual Gate Valves



Valve Size	API Ring Gasket	End to End 'A'	Bottom to Top 'C'	Center to Bottom 'B'	Handwheel Diameter 'D'	Number of Turns ( $\pm 1/4$ )	Weight (kg)
1 13/16-10K	BX-151	18.25	29.75	7.00	14.00	12 1/2	173
2 1/16-10K	BX-152	20.50	26.00	5.88	18.00	12	280
2 9/16-10K	BX-153	22.25	32.81	8.25	22.00	17 1/2	227
3 1/16-10K	BX-154	24.38	31.00	9.38	18.00	18	567
4 1/16-10K	BX-155	26.38	36.50	11.75	24.00	23	665
5 1/8-10K	BX-169	29.00	41.00	12.56	28.00	37	1500
5 1/6-10K	BX-169	29.00	44.81	11.56	22.00	23 1/2	682
6 1/8-10K	BX-156	35.00	54.43	14.62	22.00	36 1/4	795
6 3/8-10K	BX-156	35.00	54.43	14.62	22.00	36 1/4	795
1 13/16-15K	BX-151	18.00	30.75	7.00	14.00	12 1/2	182
2 1/16-15K	BX-152	19.00	27.00	6.88	18.00	12	360
2 9/16-15K	BX-153	21.00	37.72	11.35	18.00	16 1/4	268
3 1/16-15K	BX-154	23.56	35.00	9.50	22.00	18	690
4 1/16-15K	BX-155	29.00	48.00	20.50	28.00	23	1375
2 9/16-20K	BX-153	26.50	39.68	11.31	22.00	21	568

## API 6A GATE VALVES

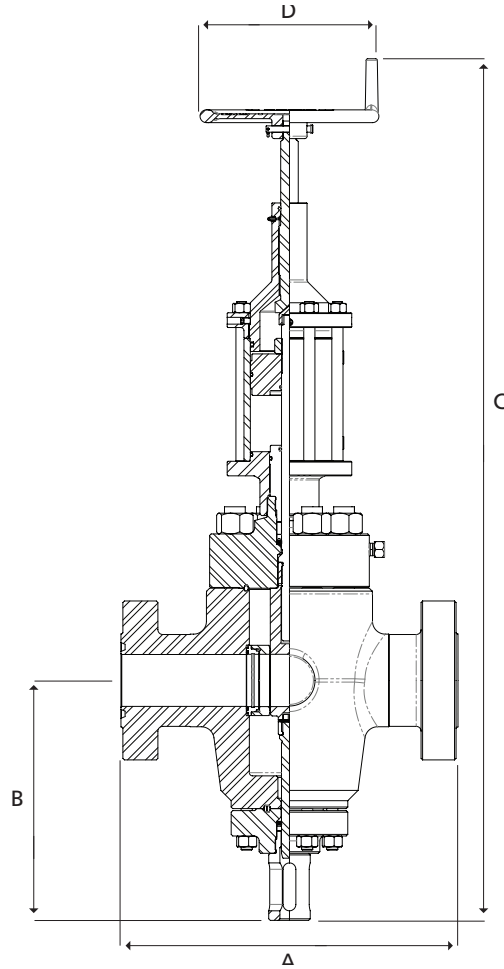
### Hydraulic Gate Valves



Valve Size	API Ring Gasket	End to End 'A'	Bottom to Top 'C'	Center to Bottom 'B'	Handwheel Diameter 'D'	Number of Turns ( $\pm 1/4$ )	Weight (kg)
2 1/16-5K	R-24	14.62	44.12	13.00	14.00	14 13/16	118
2 9/16-5K	R-27	16.62	52.75	14.00	18.00	19 1/2	145
3 1/8-5K	R-35	18.62	53.44	15.94	18.00	22 1/2	227
4 1/16-5K	R-39	21.62	63.06	19.06	18.00	19 1/4	273
5 1/8-5K	R-44	28.62	97.65	22.77	22.00	35 1/4	423

# API 6A GATE VALVES

## Hydraulic Gate Valves



Valve Size	API Ring Gasket	End to End 'A'	Bottom to Top 'C'	Center to Bottom 'B'	Handwheel Diameter 'D'	Number of Turns ( $\pm 1/4$ )	Weight (kg)
1 13/16-10K	BX-151	18.25	41.00	11.00	14.00	12 1/2	227
2 1/16-10K	BX-152	20.50	47.34	13.47	18.00	15 3/4	250
2 9/16-10K	BX-153	22.25	52.75	14.00	18.00	19 1/2	282
3 1/16-10K	BX-154	24.38	51.56	12.81	22.00	22 1/2	295
4 1/16-10K	BX-155	26.38	60.96	16.03	22.00	29 1/4	705
5 1/6-10K	BX-169	29.00	97.65	22.77	22.00	35 1/4	795
1 13/16-15K	BX-151	18.00	41.00	11.00	18.00	12 1/2	227
2 1/16-15K	BX-152	19.00	47.34	13.47	18.00	15 3/4	250
2 1/16-15K	BX-153	21.00	53.53	14.41	18.00	19 1/2	295
3 1/16-15K	BX-154	23.56	60.52	17.65	22.00	23 1/4	591
4 1/16-15K	BX-155	29.00	65.11	20.18	22.00	29 1/4	750
2 9/16-20K	BX-153	26.50	55.87	16.00	22.00	21	636

# API 5,000 lb Mud Gate Valves



## API 5,000 LB MUD GATE VALVES

Mud Gate Valves are designed and manufactured in accordance with the following specifications:

- API 6A** Specification for Wellhead and Christmas Tree Equipment
- NACE MR-01-75** Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment

Mud Gate Valves are available for use in the following pressure ratings and services:

### PRESSURE & TEMPERATURE RATINGS

Working Pressure	5,000 psi
Test Pressure	7,500 psi
API Temperature Rating	P (-29 DEG C) TO U (+121 DEG C)

### MATERIAL REQUIREMENTS

Material Class	Body, Bonnet, End And Outlet Connections	Pressure Controlling Parts E.g. Stems
AA-General Service	Carbon Or Low Alloy Steel	Carbon Or Low Alloy Steel
BB-General Service	Carbon Or Low Alloy Steel	Stainless Steel
DD-Sour Service**	Carbon Or Low Alloy Steel*	Carbon Or Low Alloy Steel*
EE-Sour Service**	Carbon Or Low Alloy Steel*	Stainless Steel*

\*\*As defined in NACE MR-01-75

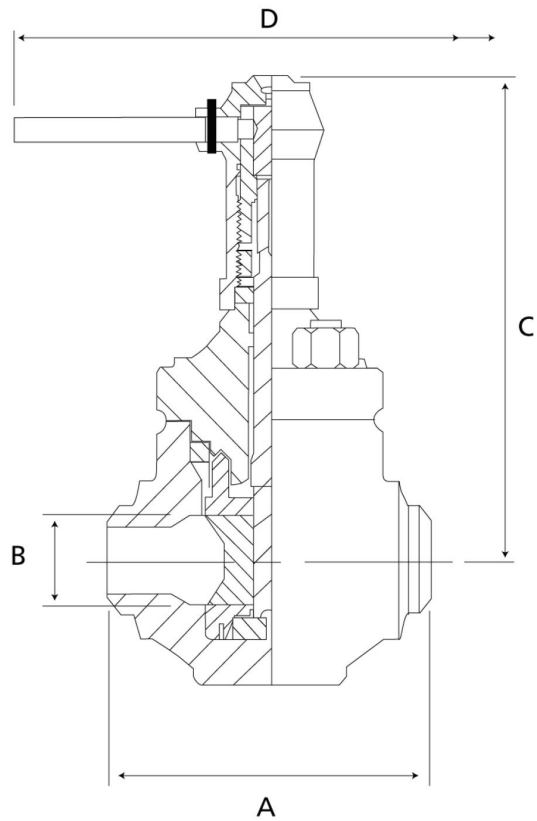
\*In accordance with NACE MR-01-75

General Note: Please contact FET for any special material or dimensional requirements.

# API 5,000 LB MUD GATE VALVES

## Butt Weld End Valves

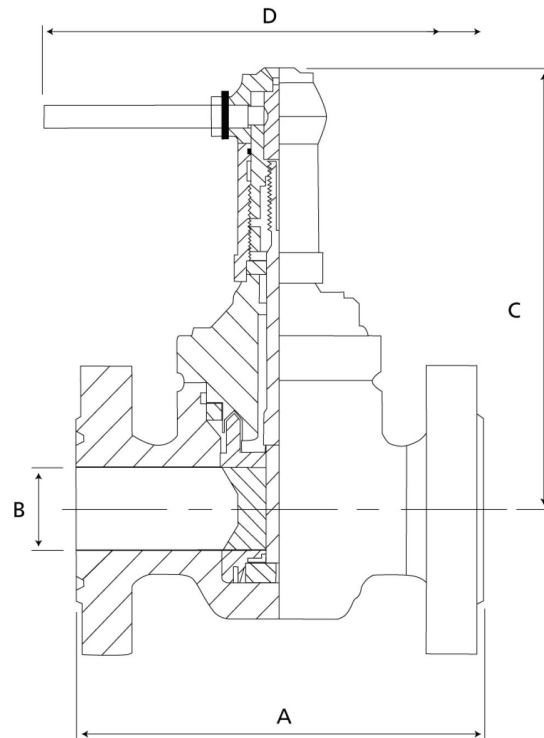
Size (in)	2	3	4	5x4	6x4
A (End to End)	229	279	330	330	330
B (Seat Bore)	51	76	102	102	102
C (Open)	330	457	626	626	626
D (Handle Diameter)	356	482	584	584	584
Weight (kg)	28	64	95	95	100



## API Flanged End Valves

Size (in)	2	3	4	5x4	6x4
A (End to End)	308	397	457	737	N/A
B (Seat Bore)	51	76	102	102	N/A
C (Open)	330	457	626	626	N/A
D (Handle Diameter)	356	482	584	584	N/A
Weight (kg)	50	110	150	150	N/A

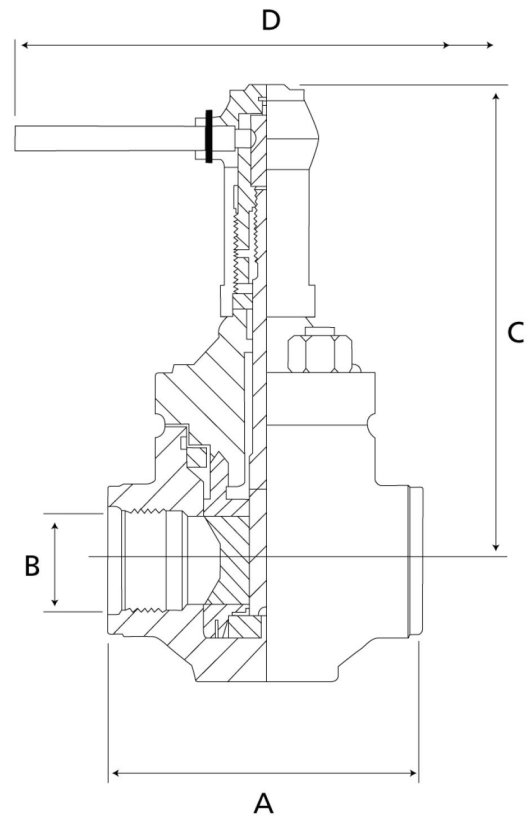
General Note: Dimensions are in mm



# API 5,000 LB MUD GATE VALVES

## Screwed End Valves

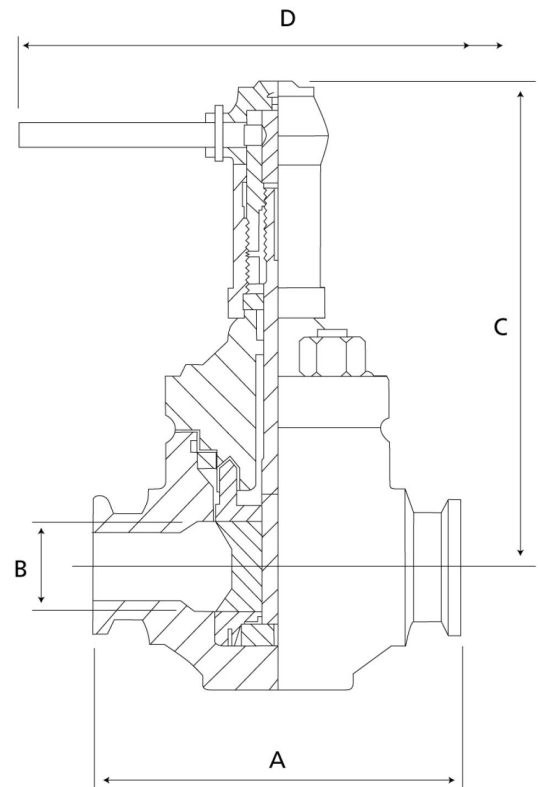
Size (in)	2	3	4	5x4	6x4
A (End to End)	229	279	330	330	N/A
B (Seat Bore)	51	76	102	102	N/A
C (Open)	330	457	626	626	N/A
D (Handle Diameter)	356	486	584	584	N/A
Weight (kg)	28	64	95	95	N/A



## Hub End Valves

Size (in)	2	3	4	5x4	6x4
A (End to End)	368	445	514	552	565
B (Seat Bore)	51	76	102	102	102
C (Open)	330	457	626	626	626
D (Handle Diameter)	356	486	584	584	584
Weight (kg)	30	54	115	120	130

General Note: Dimensions are in mm



# **API 7,500 lb Mud Gate Valves Rubber Seated**

# API 7,500 LB MUD GATE VALVES

## API 7,500 lb Rubber Seated Mud Gate Valves

Gate Valves are designed and manufactured in accordance with the following specifications:

- API 6A** Specification for Wellhead and Christmas Tree Equipment
- NACE MR-01-75** Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment

Gate Valves are available in either rubber or metal seated designs depending upon actual service conditions. Contact FET for further details.

### PRESSURE & TEMPERATURE RATINGS

#### RUBBER SEATED MUD GATE VALVES

Working Pressure	7,500 psi
Test Pressure	11,250 psi
API Temperature Rating	P (-29 DEG C) TO U (+121 DEG C)

### MATERIAL REQUIREMENTS

Material Class	Body, Bonnet, End And Outlet Connections	Pressure Controlling Parts E.g. Stems
AA-General Service	Carbon Or Low Alloy Steel	Carbon Or Low Alloy Steel
BB-General Service	Carbon Or Low Alloy Steel	Stainless Steel
DD-Sour Service**	Carbon Or Low Alloy Steel*	Carbon Or Low Alloy Steel*
EE-Sour Service**	Carbon Or Low Alloy Steel*	Stainless Steel*

\*\*As defined in NACE MR-01-75

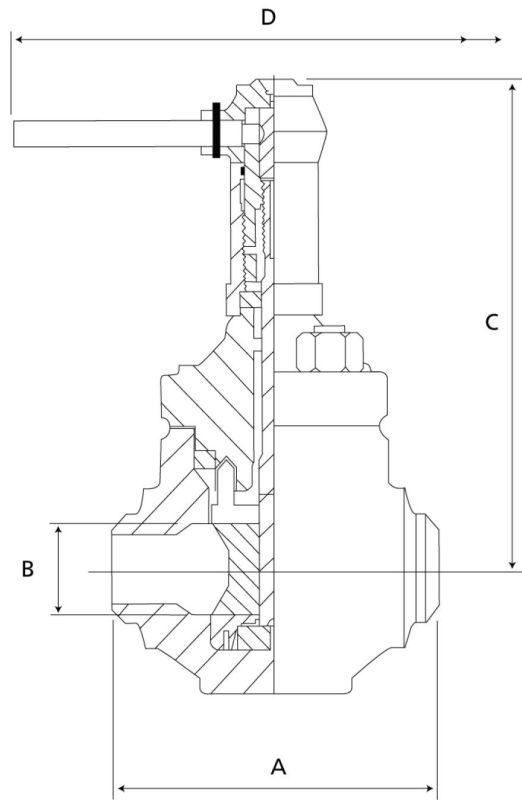
\*In accordance with NACE MR-01-75

General Note: Please contact FET for any special material or dimensional requirements.

# API 7,500 LB MUD GATE VALVES

## Butt Weld End Valves

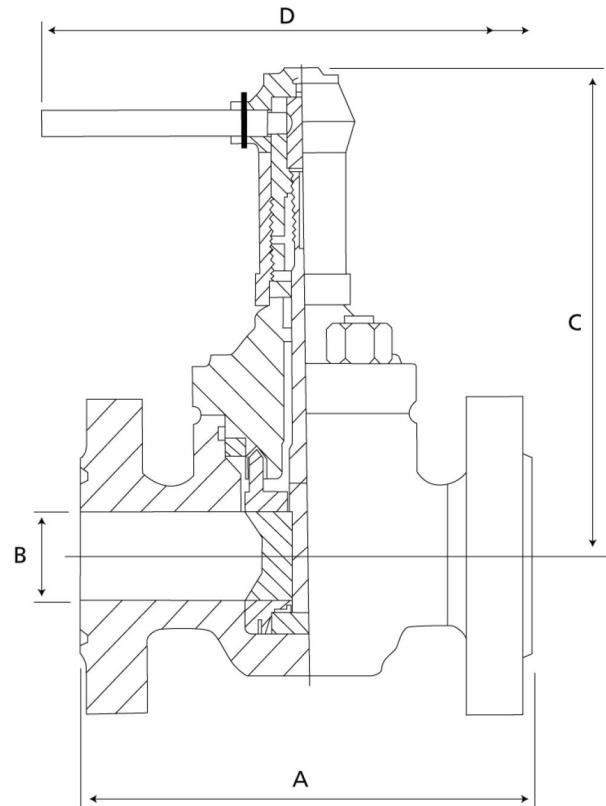
Size (in)	2x3	3	4	5x4	6x5
A (End to End)	279	279	330	330	457
B (Seat Bore)	51(76)	76	102	102	130
C (Open)	457	457	625	625	806
D (Handle Diameter)	383	482	584	584	610
Weight (kg)	95	95	100	100	243



## 10,000 lb Flanged End Valves

Size (in)	2 1/16	3 1/16	4 1/16	5 1/8	6x5
A (End to End)	467	619	670	737	457
B (Seat Bore)	51(76)	76	102	130	130
C (Open)	457	457	625	806	806
D (Handle Diameter)	483	482	584	610	610
Weight (kg)	140	150	221	360	243

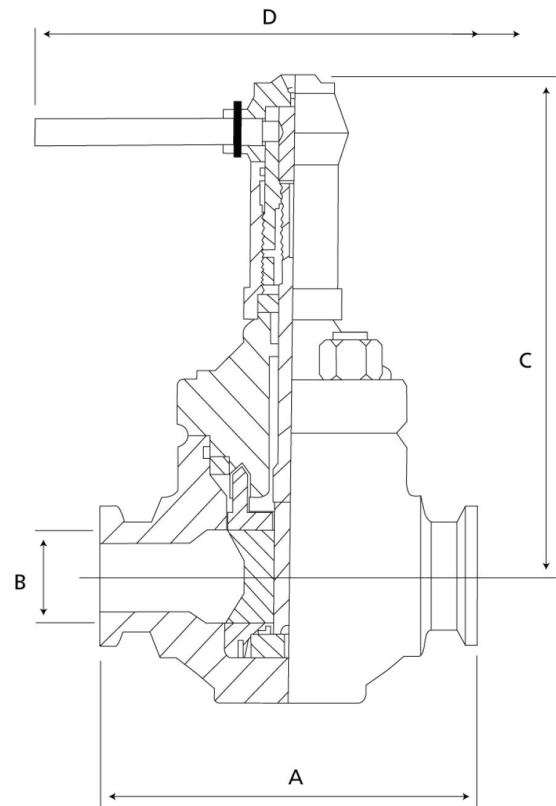
General Note: Dimensions are in mm



# API 7,500 LB MUD GATE VALVES

## Hub End Valves

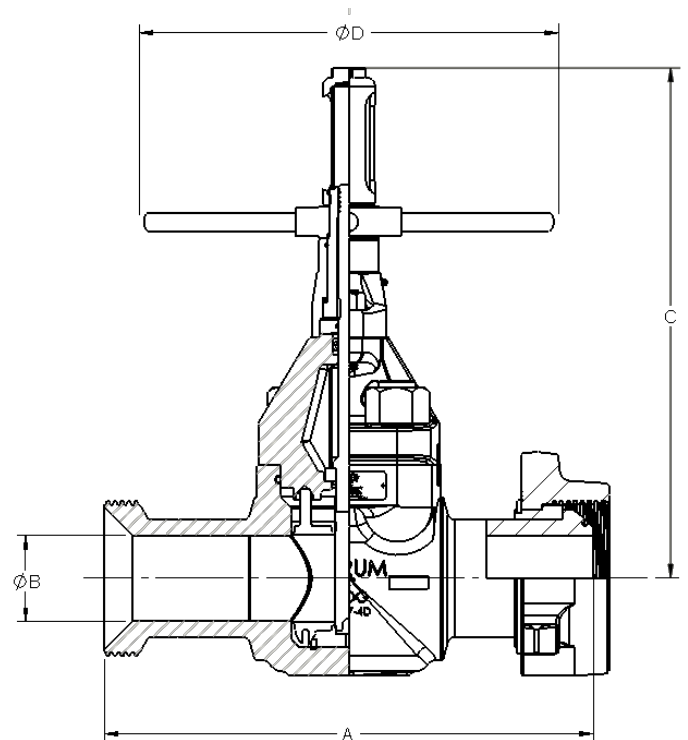
Size (in)	2x3	3	4	5x4	6x5
A (End to End)	425	451	521	559	581
B (Seat Bore)	51(76)	76	102	102	132
C (Open)	457	457	625	625	805
D (Handle Diameter)	483	482	584	584	610
Weight (kg)	99	102	110	120	275



## Integral HLU Valves

Size (in)	3x2 (FIG 1502)	4 (FIG 1002)	5x4 (FIG 1002)	5x4 (FIG 1502)
A (End to End)	454	490	591	654
B (Seat Bore)	38	80	103	103
C (Open)	412	614	614	614
D (Handle Diameter)	457	558	559	559
Weight (kg)	78	138	154	169

General Note: Dimensions are in mm



# **API 6A Plug Valves Phoenix Global**



## API 6A PLUG VALVES – PHOINIX GLOBAL

Plug Valves are designed and manufactured in accordance with the following specifications:

- API 6A** Specification for Wellhead and Christmas Tree Equipment
- NACE MR–01–75** Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment

Plug Valves are available in either lever, gearbox or remote operation for use in the following pressure ratings and services:

### PRESSURE & TEMPERATURE RATINGS

Max. Working Pressure	5,000 psi	10,000 psi	15,000 psi
Test Pressure	7,500 psi	15,000 psi	22,500 psi
Product Specification Levels	1, 2, 3	1, 2, 3	1, 2, 3
API Temperature Rating	P (-29 DEG C) TO U (+121 DEG C)	P (-29 DEG C) TO U (+121 DEG C)	P (-29 DEG C) TO U (+121 DEG C)

### MATERIAL REQUIREMENTS

Material Class	Body, Bonnet, End And Outlet Connections	Pressure Controlling Parts E.g. Stems
AA–General Service	Carbon Or Low Alloy Steel	Carbon Or Low Alloy Steel
BB–General Service	Carbon Or Low Alloy Steel	Stainless Steel
CC–General Service	Stainless Steel	Stainless Steel
DD–Sour Service**	Carbon Or Low Alloy Steel*	Carbon Or Low Alloy Steel*
EE–Sour Service**	Carbon Or Low Alloy Steel*	Stainless Steel*
FF–Sour Service**	Stainless Steel*	Stainless Steel*

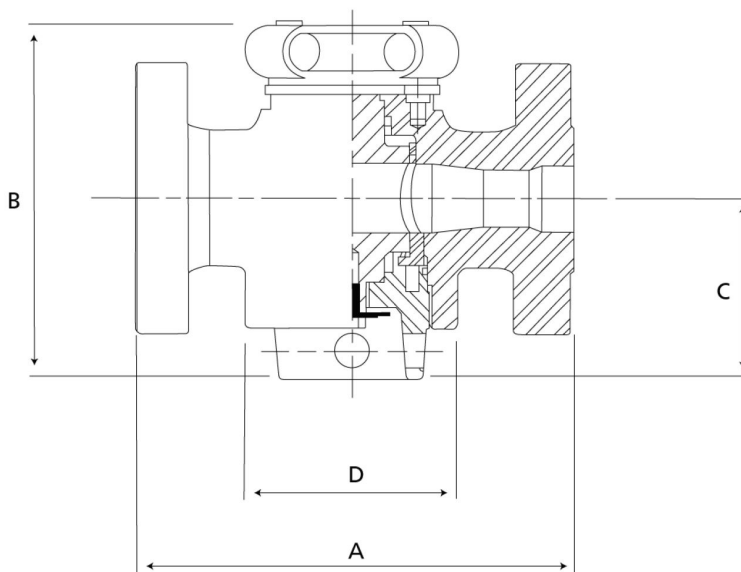
\*\*As defined in NACE MR–01–75

\*In accordance with NACE MR–01–75

General Note: Please contact FET for any special material or dimensional requirements.

# API 6A PLUG VALVES – PHOINIX GLOBAL

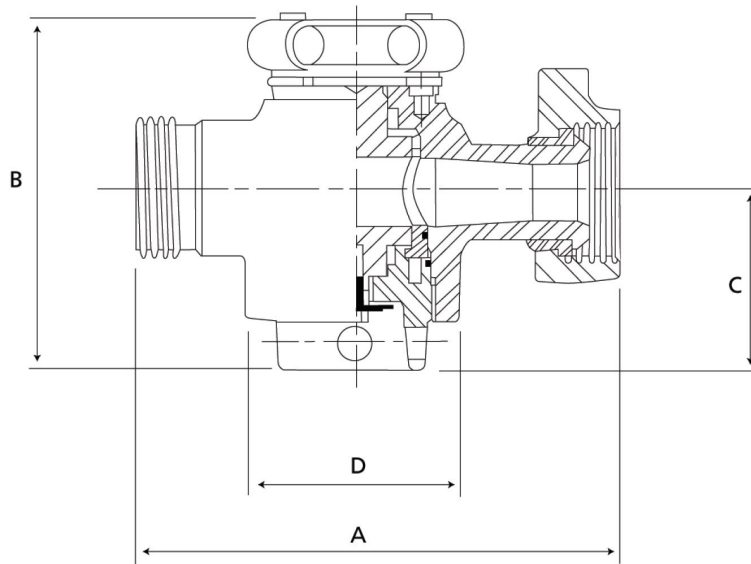
## API Flanged Ends



Size	WP psi	Weight (kg)	A (mm)	B (mm)	C (mm)	D (mm)
1" x 1 13/16" Flange	10,000	47.6	342.9	235.0	115.9	187.3
	15,000	50.8	342.9	235.0	115.9	208.0
1" x 2 1/16" Flange	10,000	51.7	342.9	235.0	115.9	200.0
	15,000	51.7	342.9	235.0	115.9	222.3
1.31" x 1 13/16" Flange	15,000	53.5	342.9	257.2	136.5	222.3
1.31" x 2 1/16" Flange	15,000	55.34	342.9	257.2	136.5	181.0
1.75" x 1 13/16" Flange	10,000	53.5	342.9	273.1	142.9	187.3
	15,000	53.5	342.9	273.1	142.9	208.0
2" x 2 1/16" Flange	10,000	51.7	342.9	269.9	139.7	200.0
	15,000	51.7	342.9	269.9	139.7	200.0
2.5" x 2 9/16" Flange	5,000	127	619.1	311.2	165.1	241.3
	10,000	127	619.1	311.2	165.1	241.3
	15,000*	127	619.1	311.2	165.1	241.3
3" x 3 1/8" Flange	5,000	144	619.1	330.2	206.4	266.7
3" x 3 1/16" Flange	10,000*	152	619.1	431.8	206.4	269.9
	15,000*	152	619.1	431.8	206.4	278.3
3" x 4 1/16" Flange	10,000	154	619.1	330.2	206.4	241.3
	15,000	154	619.1	431.8	206.4	241.3

# API 6A PLUG VALVES – PHOINIX GLOBAL

## Hammer Lug Union Ends (Male & Female)



Size	WP psi	Weight (kg)	A (mm)	B (mm)	C (mm)	D (mm)
38" x 2" 1502 Union	15,000	29	268.3	235.0	115.9	136.5
1" x 2" 1502 Union	10,000	24	268.3	235.0	115.9	136.5
	15,000	24	268.3	235.0	115.9	136.5
1.31" x 2" 1502 Union	15,000	45	352.4	257.2	136.5	181.0
1.31" x 2" 2202 Union	15,000	45	355.6	257.2	136.5	181.0
1.75" x 2" 1502 Union	10,000	45	352.4	273.1	142.9	181.0
	15,000	45	352.4	273.1	142.9	181.0
2" x 2" 1502 Union	10,000	44	352.4	269.9	139.7	181.0
	15,000	44	352.4	269.9	139.7	181.0
2.5" x 3" 1502 Union	10,000	89	431.8	311.2	165.1	241.3
	15,000*	89	431.8	311.2	165.1	241.3
3" x 3" 1502 Union	10,000*	87	431.8	330.2	206.4	241.3
	15,000*	87	431.8	431.8	206.4	241.3

# API 6A Drilling Manifolds

## API 6A DRILLING MANIFOLDS

FET supplies Choke & Kill, Mud Standpipe, Cement and Mud Pump Room Manifolds designed in accordance with the following specifications, where applicable, or to meet client requirements, and are supplied fully certified by independent third party authorities:

<b>ABS CDS</b>	Classification of Drilling Systems
<b>API 6A</b>	Specification for Wellhead and Christmas Tree Equipment
<b>API 16C</b>	Specification for Choke & Kill Systems
<b>API S53</b>	Recommended Practice for Blow Out Prevention Systems for Drilling Wells
<b>DNVGL-OS-E101</b>	Drilling Facilities
<b>NACE MR-01-75</b>	Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment

Drilling Manifolds are available for use in the following pressure ratings and services:

### PRESSURE & TEMPERATURE RATINGS

Max. Working Pressure	5,000 psi	7,500 psi	10,000 psi	15,000 psi	20,000 psi
Test Pressure	7,500 psi	11,250 psi	15,000 psi	22,500 psi	30,000 psi
Product Specification Levels	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
Product Rating	1 & 2	1 & 2	1 & 2	1 & 2	1 & 2
API Temperature Rating	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)

### MATERIAL REQUIREMENTS

Material Class	Body, Bonnet, End And Outlet Connections	Pressure Controlling Parts E.g. Stems
AA-General Service	Carbon Or Low Alloy Steel	Carbon Or Low Alloy Steel
BB-General Service	Carbon Or Low Alloy Steel	Stainless Steel
DD-Sour Service**	Carbon Or Low Alloy Steel*	Carbon Or Low Alloy Steel*
EE-Sour Service**	Carbon Or Low Alloy Steel*	Stainless Steel*

\*As defined in NACE MR-01-75

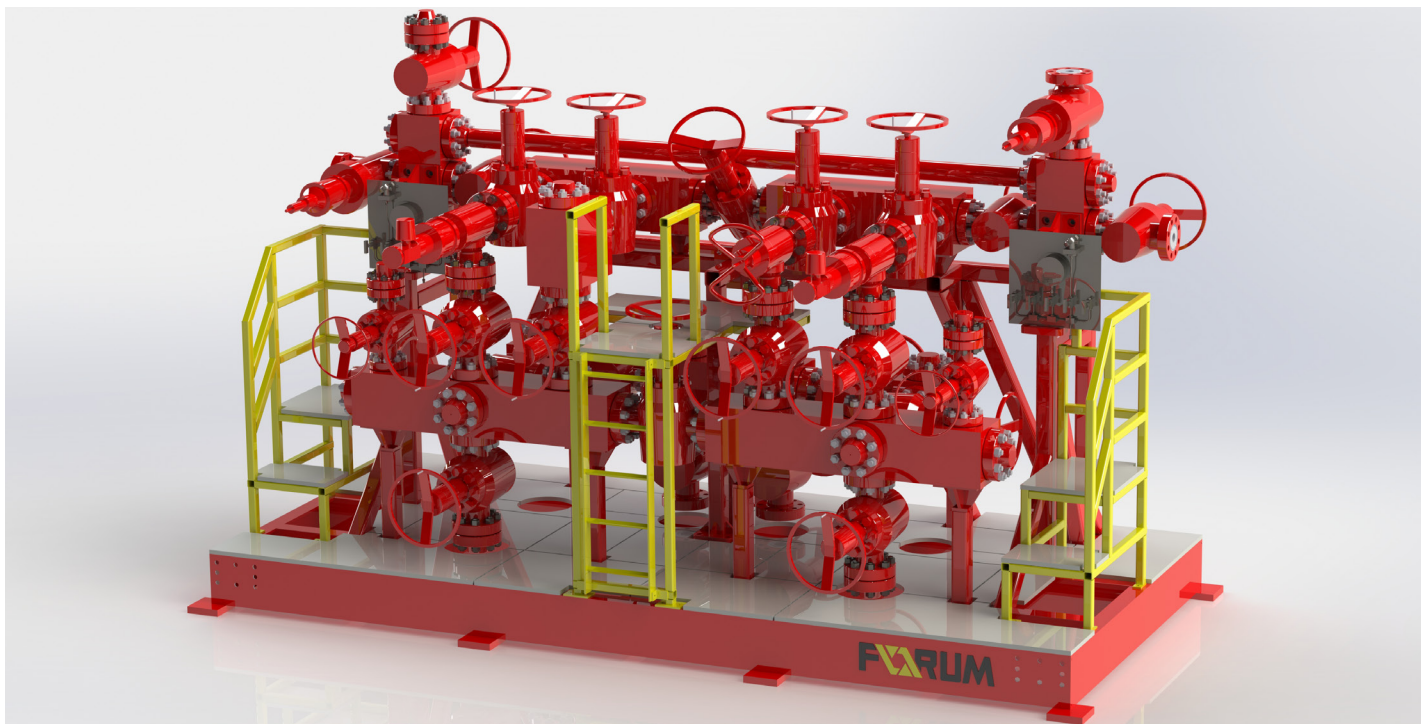
\*In accordance with NACE MR-01-75

General Note: Please contact FET for any special material or dimensional requirements. Max. working pressure stated are suitable for temperatures up to 121°C. De-rating of max. working pressure will occur as the operating temperature increases above 121°C. Consult FET for further details.

## API 6A DRILLING MANIFOLDS

### Choke and Kill Manifold

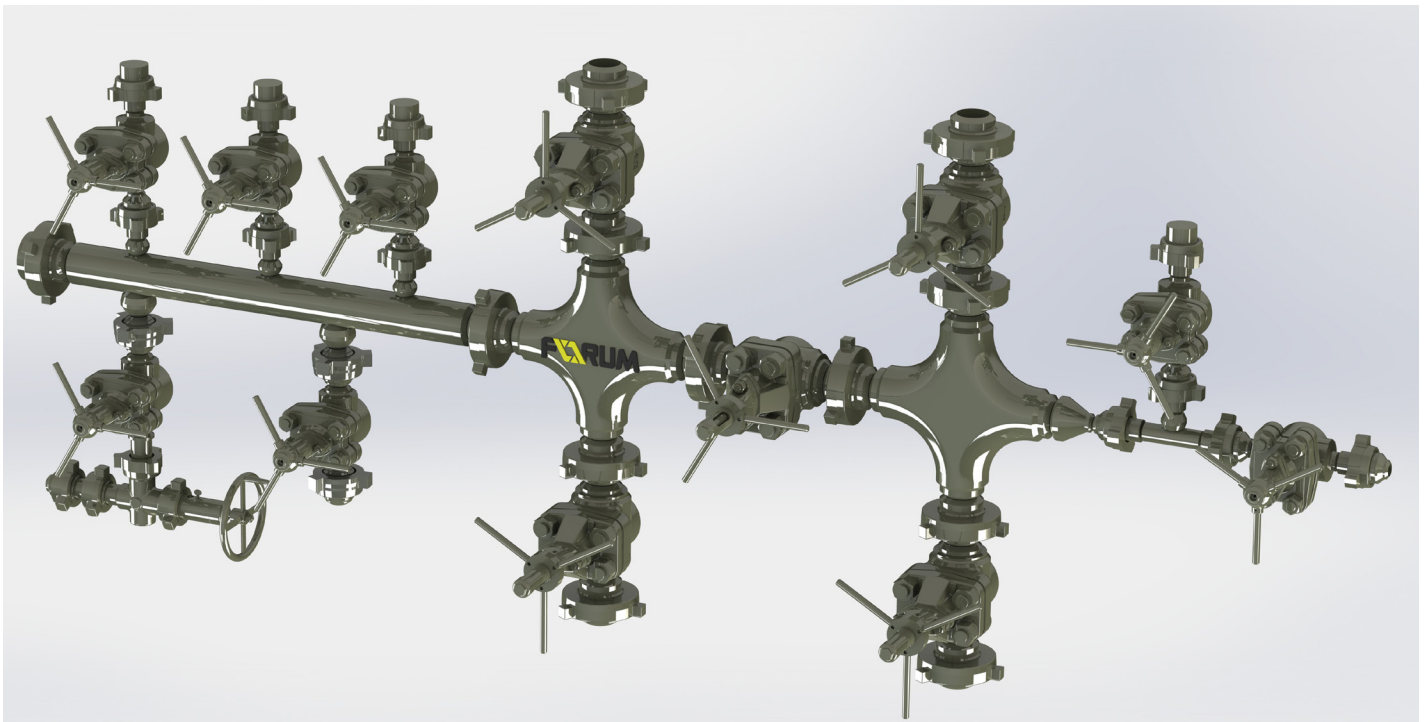
- 2.1/16" - 4.1/16" Flanged Systems
- Utilises FET XL API 6A Gate valves
- 5,000psi, 10,000psi & 15,000psi
- Land, Jack Up, Semi and drillship application
- Modular, Skid mounted and pre commissioned
- API 6A, API STD 53, API 16C
- Third Party - ABS CDS, DNVGL-OS E101



## API 6A DRILLING MANIFOLDS

### Mud Manifold

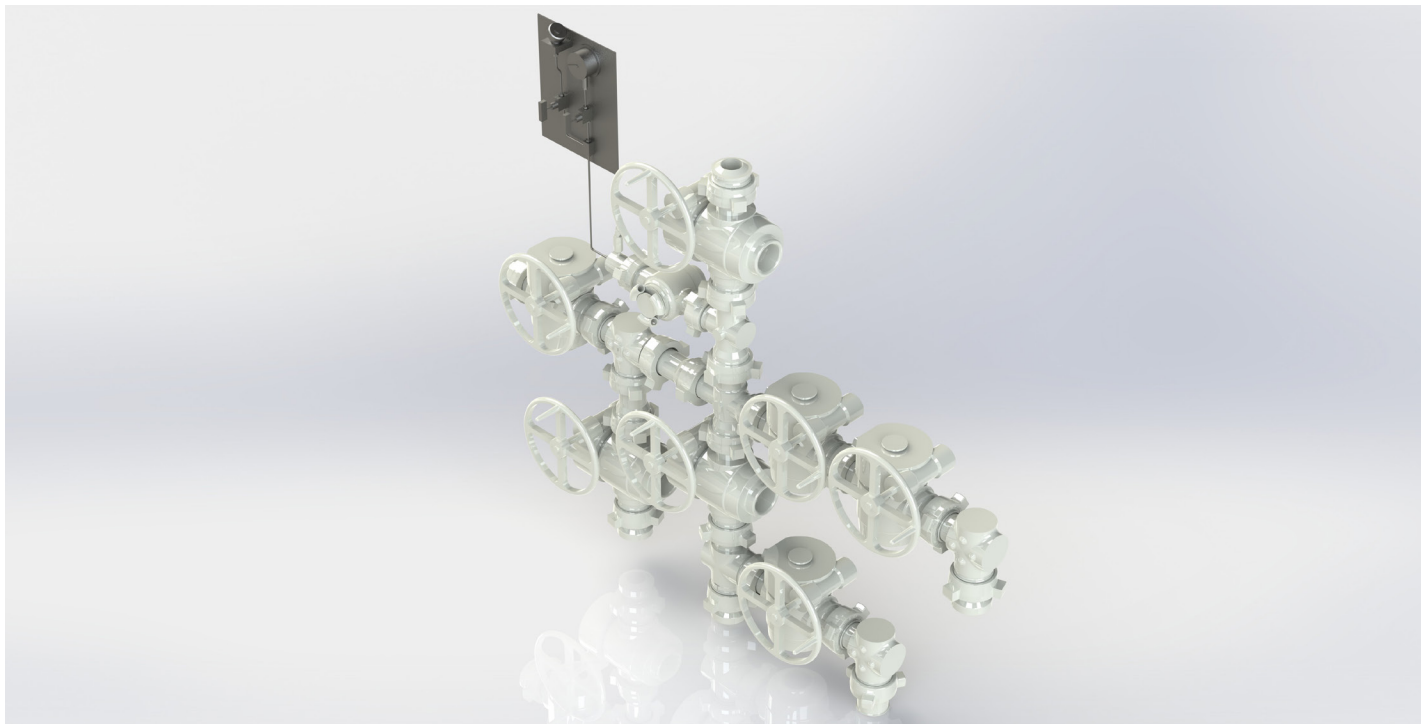
- 2" - 5" ID Systems
- Utilises FET Baker SPD Mud Gate valves
- 5,000psi & 7,500psi
- Land, Jack Up, Semi and drillship application
- Modular, Skid mounted and pre commissioned
- Butt Welded, Hammer Lug or Flanged
- Third Party - ABS CDS, DNVGL-OS E101



## API 6A DRILLING MANIFOLDS

### Cement Manifold

- 2" - 3" Systems
- Utilises FET Phoenix API 6A Plug valves
- 10,000psi & 15,000psi
- Land, Jack Up, Semi and drillship application
- Modular, Skid mounted and pre commissioned
- Hammer Lug or Flanged
- Third Party - ABS CDS, DNVGL-OS E101

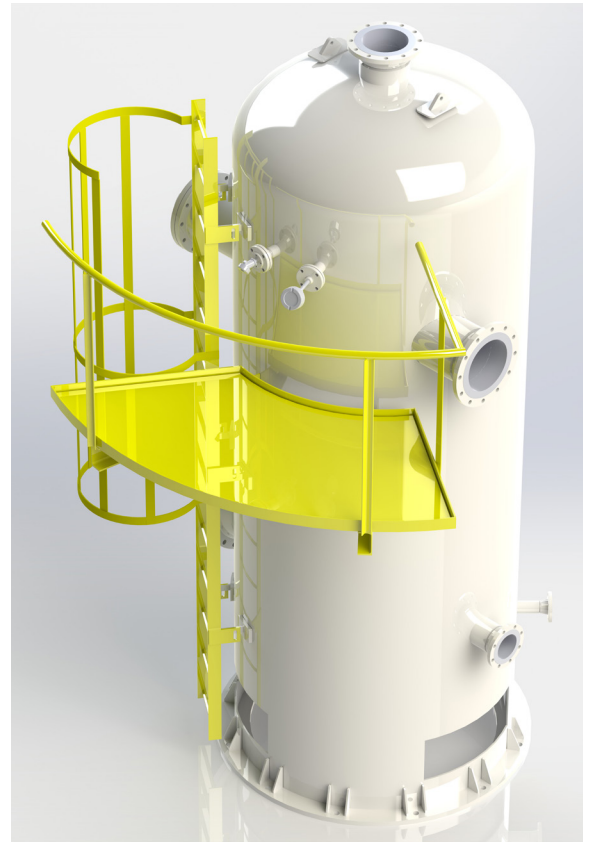




## API 6A DRILLING MANIFOLDS

### Mud Gas Separators

- Various design Sizes and capacities bespoke to client requirements
- Separation capacity calculation
- Liquid Seal or Dip tube can be supplied
- Customized Access platforms & ladders
- Pressure and Temperature monitoring instrumentation
- Land, Jack Up, Semi and drillship application
- ASME VIII or PD5500
- Third Party - ABS CDS, DNVGL-OS E101



### Choke Control Consoles

- Design and built to client requirements
- Local and Remote, Analogue or Digital Displays
- HPHT monitoring
- Land, Jack Up, Semi and drillship application
- API 16C and Third Party - ABS CDS, DNVGL-OS E101



# Technical Appendix

# TECHNICAL APPENDIX

## SI Units to US/UK Conversion Table

Quantity	SI Units		US or UK Units		Conversion	
	Name	Symbol	Name	Symbol	SI or US or UK	US or UK to SI
Pressure Strength	megapascal or newton per square millimetre	MPa or N/mm <sup>2</sup>	pound force per square inch	lbf/in <sup>2</sup>	MPa or 1 N/mm <sup>2</sup> = 145 lbf/in <sup>2</sup> or psi	1 lbf/in <sup>2</sup> or 1psi = 0,0069 MPa or NM/mm <sup>2</sup>
	bar or decanewton per square centimetre	b or daN/cm <sup>2</sup>	pound force per square inch	lbf/in <sup>2</sup> or psi	1 b or 1da N/cm <sup>2</sup> = 14,5 lbf/in <sup>2</sup> or psi	1 lbf/in <sup>2</sup> or 1psi = 0,069 b or daN/cm <sup>2</sup>
	decanewton per square millimetre	daN/mm <sup>2</sup>	pound force per square inch	lbf/in <sup>2</sup> or psi	1 daN/mm <sup>2</sup> =1450 psi	1 lbf/in <sup>2</sup> or 1psi = 0,00069 b daN/mm <sup>2</sup>
	megapascal	MPa	short ton per square inch	sh ton/in <sup>2</sup>	1 MPa=0,0725 sh tn/in <sup>2</sup>	1 sh tn/in <sup>2</sup> =13,79 MPa
	megapascal	MPa	long ton per square inch	UK ton/in <sup>2</sup>	1 MPa=0,0647 sh tn/in <sup>2</sup>	1 UK ton/in <sup>2</sup> =15,44 MPa
Moment of a couple	newton metre	N.m	pound force-foot	lbf ft	1 N.m=0,073756 lbf ft	1 lbf ft=1,3558 N.m
	decanewton metre	da N.m	pound force-foot	lbf ft	1 da N.m=7,3756 lbf ft	1 lbf ft=0,1356 da N.m
Length	millimetre	mm	inch	in	1 mm=0,03937 in	1 in=25,4 mm
	metre	m	foot	ft	1 m=3,281 ft	1 ft=0,3048 m
	metre	m	yard	yd	1 m=1,0936 yd	1 yd=0,9144 m
	kilometre	km	mile	mi	1 km=0,6214 mi	1 mi=1,609 km
Area	square millimetre	mm <sup>2</sup>	square inch	in <sup>2</sup>	1 mm <sup>2</sup> =0,00155 in <sup>2</sup>	1 in <sup>2</sup> =645,2 mm <sup>2</sup>
	square metre	m <sup>2</sup>	square foot	ft <sup>2</sup>	1 m <sup>2</sup> =10,7643 ft <sup>2</sup>	1 ft <sup>2</sup> =0,0929 m <sup>2</sup>
	square metre	m <sup>2</sup>	square yard	yd <sup>2</sup>	1 m <sup>2</sup> =1,1959 yd <sup>2</sup>	1 yd <sup>2</sup> =0,8361 m <sup>2</sup>
	square kilometre	km <sup>2</sup>	square mile	mi <sup>2</sup>	1 km <sup>2</sup> =0,3861 mi <sup>2</sup>	1 mi <sup>2</sup> =2,59 km <sup>2</sup>
Volume	cubic centimetre	cm <sup>3</sup>	cubic inch	in <sup>3</sup>	1 cm <sup>3</sup> =0,061 in <sup>3</sup>	1 in <sup>3</sup> =16,39 cm <sup>3</sup>
	cubic decim.-litre	dm <sup>3</sup> -l	cubic foot	ft <sup>3</sup>	1 dm <sup>3</sup> =1l=0,0353 ft <sup>3</sup>	1 ft <sup>3</sup> =28,32 l ou/or dm <sup>3</sup>
	cubic metre	m <sup>3</sup>	cubic yard	yd <sup>3</sup>	1 m <sup>3</sup> =1,307 yd <sup>3</sup>	1 yd <sup>3</sup> =0,765 m <sup>3</sup>
	litre	l	US gallon	US gal	1l=0,2642 US gal	1 US gal=3,785 l
	litre	l	UK gallon	UK gal	1l=0,2200 UK gal	1 UK gal=4,546 l
Mass	gram	g	ounce	oz	1g=0,0353 oz	1oz=28,35 g
	kilogram	kg	pound	lb	1kg=2,204 lb	1lb=0,4536 kg
	tonne	t	short ton	sh tn	1t=1,1023 sh tn	1sh tn=0,9072 t
	tonne	t	long ton	UK ton	1t=0,9842 UK ton	1UK ton=1,0160 t

# TECHNICAL APPENDIX

## Pressure Conversion

lbf/in2 psi	bar	lbf/in2 psi	bar	lbf/in2 psi	bar	lbf/in2 psi	bar	lbf/in2 psi	bar
1	0.0689	37	2.5511	73	5.0332	109	7.52	145	10.00
2	0.1379	38	2.6200	74	5.1021	110	7.58	146	10.07
3	0.2068	39	2.6890	75	5.1711	111	7.65	147	10.14
4	0.2758	40	2.7579	76	5.2400	112	7.72	148	10.20
5	0.3447	41	2.8269	77	5.3090	113	7.79	149	10.27
6	0.4137	42	2.8959	78	5.3779	114	7.86	150	10.34
7	0.4826	43	2.9647	79	5.4469	115	7.93	155	10.69
8	0.5516	44	3.0337	80	5.5158	116	8.00	160	11.03
9	0.6205	45	3.1026	81	5.5848	117	8.07	165	11.38
10	0.6895	46	3.1716	82	5.6537	118	8.14	170	11.72
11	0.7584	47	3.2405	83	5.7227	119	8.20	175	12.07
12	0.8274	48	3.3095	84	5.7916	120	8.27	180	12.41
13	0.8963	49	3.3784	85	5.8605	121	8.34	185	12.76
14	0.9653	50	3.4474	86	5.9295	122	8.41	190	13.10
15	1.0342	51	3.5163	87	5.9984	123	8.48	195	13.44
16	1.1032	52	3.5853	88	6.0674	124	8.55	200	13.79
17	1.1721	53	3.6542	89	6.1363	125	8.62	205	14.13
18	1.2411	54	3.6542	90	6.2053	126	8.69	210	14.48
19	1.3100	55	3.7921	91	6.2742	127	8.76	215	14.82
20	1.3790	56	3.8611	92	6.3422	128	8.83	220	15.17
21	1.4479	57	3.9300	93	6.4121	129	8.89	225	15.52
22	1.5168	58	3.9990	94	6.4811	130	8.96	230	15.86
23	1.5858	59	4.0679	95	6.5500	131	9.03	235	16.20
24	1.6547	60	4.1369	96	6.6190	132	9.10	240	16.55
25	1.7237	61	4.2058	97	6.6879	133	9.17	245	16.89
26	1.7926	62	4.2748	98	6.7569	134	9.24	250	17.24
27	1.8616	63	4.3437	99	6.8258	135	9.31	255	17.58
28	1.9305	64	4.4126	100	6.8948	136	9.38	260	17.93
29	1.9995	65	4.4816	101	6.9637	137	9.45	265	18.27
30	2.0684	66	4.5505	102	7.0327	138	9.51	270	18.62
31	2.1374	67	4.6195	103	7.1016	139	9.58	275	18.96
32	2.2063	68	4.6884	104	7.1706	140	9.65	280	19.31
33	2.2753	69	4.7574	105	7.2395	141	9.72	285	19.65
34	2.3442	70	4.8263	106	7.31	142	9.79	290	19.99
35	2.4132	71	7.8953	107	7.38	143	9.86	295	20.34
36	2.4821	72	4.9642	108	7.45	144	9.93	300	20.68

## TECHNICAL APPENDIX

### Pressure Conversion (continued)

lbf/in <sup>2</sup> psi	bar	lbf/in <sup>2</sup> psi	bar	lbf/in <sup>2</sup> psi	bar	lbf/in <sup>2</sup> psi	bar
310	21.37	670	46.20	1030	71.02	1390	95.87
320	22.06	680	46.88	1040	71.71	1400	96.56
330	22.75	690	47.57	1050	72.40	1410	97.24
340	23.44	700	48.26	1060	73.11	1420	97.94
350	24.13	710	48.95	1070	73.80	1430	98.63
360	24.82	720	49.64	1080	74.49	1440	99.32
370	25.51	730	50.33	1090	75.18	1450	100.0
380	26.20	740	51.02	1100	75.87	1460	100.7
390	26.89	750	51.71	1110	76.56	1470	101.4
400	27.58	760	52.40	1120	77.25	1480	102.1
410	28.27	770	53.09	1130	77.94	1490	102.8
420	28.96	780	53.78	1140	78.62	1500	103.4
430	29.65	790	54.47	1150	79.31	1600	110.4
440	30.34	800	55.16	1160	80.00	1700	117.2
450	31.03	810	55.85	1170	80.70	1800	124.1
460	31.72	820	56.54	1180	81.38	1900	131.0
470	32.41	830	57.23	1190	82.07	2000	137.9
480	33.09	840	57.92	1200	82.76	2500	172.4
490	33.78	850	58.60	1210	83.45	3000	206.9
500	34.47	860	59.30	1220	84.14	5000	344.8
510	35.16	870	59.98	1230	84.83	10000	690.0
520	35.85	880	60.67	1240	85.52	15000	1035.0
530	36.54	890	61.36	1250	86.21	20000	1397.0
540	37.23	900	62.05	1260	86.90		
550	37.92	910	62.74	1270	87.59		
560	38.61	920	63.43	1280	88.28		
570	39.30	930	64.12	1290	88.97		
580	39.99	940	64.81	1300	89.66		
590	40.68	950	65.50	1310	90.35		
600	41.37	960	66.19	1320	91.04		
610	42.06	970	66.88	1330	91.73		
620	42.75	980	67.57	1340	92.42		
630	43.44	990	68.28	1350	93.11		
640	44.13	1000	68.95	1360	93.80		
650	44.82	1010	69.64	1370	94.49		
660	45.50	1020	70.33	1380	95.19		

# TECHNICAL APPENDIX

## Hardness Comparison Table

Brinell 10mm Ball 3000 kg Load	Vickers 120 kg	Rockwell	
		C Scale 120° Cone 150 kg Load	B Scale 1/16" Ba II 100 kg Load
130	130	–	72
135	135	–	75
140	141	–	77
141	142	–	78
143	144	–	79
145	146	–	79
147	147	–	80
150	149	–	81
152	150	–	82
154	152	–	82
156	154	1	83
160	159	2	84
163	162	3	85
165	165	4	86
167	168	5	87
170	171	6	87
175	174	7	88
180	177	9	89
183	183	10	90
185	184	11	91
187	186	12	91
191	190	13	92
196	197	14	92
200	199	15	93
203	201	16	94
206	209	17	94
211	213	18	95
217	217	19	96
224	238	20	97
229	243	21	98
237	235	22	99
240	240	23	99
245	246	24	100
249	250	25	101

Brinell 10mm Ball 3000 kg Load	Vickers 120 kg	Rockwell	
		C Scale 120° Cone 150 kg Load	B Scale 1/16" Ba II 100 kg Load
255	255	26	102
258	258	27	102
261	261	28	103
269	272	29	104
276	278	30	105
285	285	31	105
293	291	32	106
301	305	33	107
311	312	34	108
323	320	35	109
331	335	36	109
341	344	37	110
346	352	37	110
351	361	38	111
362	380	39	111
370	385	40	112
375	390	41	113
388	401	42	114
401	423	43	114
415	435	44	115
427	460	45	115
444	474	46	116
451	489	47	117
461	502	48	117
477	534	49	118
495	551	51	119
502	565	52	119
514	587	53	120
529	606	54	–
545	639	55	–
552	649	56	–
576	694	57	–
590	727	59	–
601	746	60	–

## TECHNICAL APPENDIX

### Hardness Comparison Table (continued)

Brinell 10mm Ball 3000 kg Load	Vickers 120 kg	Rockwell	
		C Scale 120° Cone 150 kg Load	B Scale 1/16" Ba II 100 kg Load
614	775	61	–
626	803	62	–
652	867	63	–
668	905	64	–
682	940	65	–
712	1021	66	–
725	1060	67	–
745	1114	68	–
760	1170	70	–
780	1220	71	–
800	–	72	–

General Note: There is no recognized body to provide comparisons between hardness, consequently the values shown in the table are provided for guidance only.

# TECHNICAL APPENDIX

## Temperature Conversion

$^{\circ}\text{F to }^{\circ}\text{C} = 5/9 (^{\circ}\text{F} - 32)$        $^{\circ}\text{C to }^{\circ}\text{F} = (^{\circ}\text{C} \times 9/5) + 32$

$^{\circ}\text{C} \longleftarrow ^{\circ}\text{F}$		$^{\circ}\text{C} \longleftarrow ^{\circ}\text{F}$		$^{\circ}\text{C} \longleftarrow ^{\circ}\text{F}$		$^{\circ}\text{C} \longleftarrow ^{\circ}\text{F}$					
	$^{\circ}\text{C} \longrightarrow ^{\circ}\text{F}$		$^{\circ}\text{C} \longrightarrow ^{\circ}\text{F}$		$^{\circ}\text{C} \longrightarrow ^{\circ}\text{F}$		$^{\circ}\text{C} \longrightarrow ^{\circ}\text{F}$				
-73.3	-100	-148.0	-11.1	12	53.6	8.3	47	116.6	27.8	82	179.6
-67.8	-90	-130.0	-10.6	13	55.4	8.9	48	118.4	28.3	83	181.4
-62.2	-80	-112.0	-10.0	14	57.2	9.5	49	120.2	28.9	84	183.2
-56.7	-70	-94.0	-9.5	15	59.0	10.0	50	122.0	29.4	85	185.0
-51.1	-60	-76.0	-8.9	16	60.8	10.6	51	123.8	30.0	86	186.8
-45.6	-50	-58.0	-8.3	17	62.6	11.1	52	125.6	30.6	87	188.6
-42.8	-45	-49.0	-7.8	18	64.4	11.7	53	127.4	31.1	88	190.4
-40.0	-40	-40.0	-7.2	19	66.2	12.2	54	128.2	31.7	89	192.2
-37.2	-35	-31.0	-6.7	20	68.0	12.8	55	131.0	32.2	90	194.0
-34.5	-30	-22.0	-6.1	21	69.8	13.3	56	132.8	32.8	91	195.8
-31.7	-25	-13.0	-5.6	22	71.6	13.9	57	134.6	33.3	92	197.6
-28.9	-20	-4.0	-5.0	23	73.4	14.4	58	136.4	33.9	93	199.4
-26.1	-15	5.0	-4.5	25	75.2	15.0	59	138.2	34.4	94	201.2
-23.2	-10	14.0	-3.9	25	77.0	15.6	60	140.0	35.0	95	203.0
-22.7	-9	15.8	-3.4	26	78.8	16.1	61	141.8	35.6	96	204.8
-22.2	-8	17.6	-2.8	27	80.6	16.7	62	143.6	36.1	97	206.6
-21.6	-7	19.4	-2.3	28	82.4	17.2	63	145.4	36.7	98	208.4
-21.1	-6	21.2	-1.7	29	84.2	17.8	64	147.2	37.2	99	210.2
-20.5	-5	23.0	-1.1	30	86.0	18.3	65	149.0	37.8	100	212.0
-20.0	-4	24.8	-0.6	31	87.8	18.9	66	150.8	38.3	101	213.8
-19.4	-3	26.6	0.0	32	89.6	19.4	67	152.6	38.9	102	215.6
-18.9	-2	28.4	0.6	33	91.4	20.0	68	154.4	39.4	103	217.4
-18.3	-1	30.2	1.1	34	93.2	20.6	69	156.2	40.0	104	219.2
-17.8	0	32.0	1.7	35	95.0	21.1	70	158.0	40.6	105	221.0
-17.2	1	33.8	2.3	36	96.8	21.6	71	159.8	41.1	106	222.8
-16.7	2	35.6	2.8	37	98.6	22.2	72	161.6	41.7	107	224.6
-16.1	3	37.4	3.4	38	100.4	22.7	73	163.4	42.2	108	226.4
-15.6	4	39.2	3.9	39	102.2	23.3	74	165.2	42.8	109	228.2
-15.0	5	41.0	4.5	40	104.0	23.9	75	167.0	43.3	110	230.0
-14.4	6	42.8	5.0	41	105.8	24.4	76	168.8	43.9	111	231.8
-13.9	7	44.6	5.6	42	107.6	25.0	77	170.6	44.4	112	233.6
-13.3	8	46.4	6.1	43	109.4	25.6	78	172.4	45.0	113	235.4
-12.8	9	48.2	6.7	44	111.2	26.1	79	174.2	45.6	114	237.2
-12.2	10	50.0	7.2	45	113.0	26.7	80	176.0	46.1	115	239.0
-11.7	11	51.8	7.8	46	114.8	27.2	81	177.8	46.7	116	240



# TECHNICAL APPENDIX

## Temperature Conversion (continued)

°F to °C=5/9 (°F -32)      °C to °F=(°C x 9/5)+32

°C ← °F		°C ← °F		°C ← °F		°C ← °F					
	°C → °F		°C → °F		°C → °F		°C → °F				
47.2	117	242.6	71.0	160	320.0	168.4	335	635.0	271.1	520	968.0
47.8	118	244.4	73.8	165	329.0	171.1	340	644.0	276.6	530	986.0
48.3	119	246.2	76.6	170	338.0	173.9	345	653.0	282.1	540	1004.0
48.9	120	248.0	79.3	175	347.0	176.7	350	662.0	287.7	550	1022.0
49.4	121	249.8	82.1	180	356.0	179.5	355	671.0	293.3	560	1040.0
50.0	122	251.6	85.0	185	365.0	182.2	360	680.0	298.8	570	1058.0
50.6	123	253.4	87.8	190	374.0	185.0	365	689.0	304.4	580	1076.0
51.1	124	255.2	90.5	195	383.0	187.8	370	698.0	310.0	590	1094.0
51.7	125	257.0	93.3	200	392.0	190.6	375	707.0	315.5	600	1112.0
52.2	126	258.8	96.1	205	401.0	193.4	380	716.0	321.1	610	1130.0
52.8	127	260.6	98.8	210	410.0	196.1	385	725.0	326.6	620	1148.0
53.3	128	262.4	101.6	215	419.0	198.9	390	734.0	332.2	630	1166.0
53.9	129	264.2	104.4	220	428.0	201.7	395	743.0	337.7	640	1184.0
54.4	130	266.0	107.2	225	437.0	204.4	400	752.0	343.3	650	1202.0
55.0	131	267.8	110.0	230	446.0	207.2	405	761.0	348.8	660	1220.0
55.5	132	269.6	112.7	235	455.0	210.0	410	770.0	354.4	670	1238.0
56.1	133	271.4	115.5	240	464.0	212.8	415	779.0	360.0	680	1256.0
56.6	134	273.2	118.2	245	473.0	215.6	420	788.0	365.5	690	1274.0
57.2	135	275.0	121.0	250	482.0	218.4	425	797.0	371.1	700	1292.0
57.7	136	276.8	123.8	255	491.0	221.1	430	806.0	376.6	710	1310.0
58.3	137	278.6	126.6	260	500.0	223.9	435	815.0	382.2	720	1328.0
58.8	138	280.4	129.4	265	509.0	226.7	440	824.0	387.7	730	1346.0
59.4	139	282.2	123.2	270	518.0	229.4	445	833.0	393.3	740	1364.0
60.0	140	284.0	135.0	275	527.0	232.2	450	842.0	398.8	750	1382.0
60.5	141	285.8	137.7	280	536.0	235.0	455	851.0	404.4	760	1400.0
61.1	142	287.6	140.5	285	545.0	237.8	460	860.0	410.0	770	1418.0
61.6	143	289.4	143.3	290	554.0	240.6	465	869.0	415.5	780	1436.0
62.2	144	291.2	146.1	295	563.0	243.4	470	878.0			
62.7	145	293.0	148.9	300	572.0	246.1	475	887.0			
63.3	146	294.8	151.7	305	581.0	248.9	480	896.0			
63.8	147	296.6	154.5	310	590.0	251.7	485	905.0			
64.4	148	298.4	157.2	315	599.0	254.4	490	914.0			
65.0	149	300.2	160.0	320	608.0	257.2	495	923.0			
65.5	150	302.0	162.8	325	617.0	260.0	500	932.0			
68.3	155	311.0	165.6	330	626.0	265.5	510	950.0			

## FET DRILLING

Moving beyond conventional limitations, we understand what you're up against. To keep your rig drilling and on schedule, FET offers some of the industry's most robust, reliable and innovative products and equipment.

We are known for our pipe handling expertise, along with our complete line of high-quality, high-safety tubular handling equipment, including customizable catwalks for workover, offshore and land rigs to meet any specification. You can rely on FET to complete your drilling or well intervention package with confidence.

We provide OEM-approved specialized bearings, seals, power-transmission components, pumps and valves, as well as an extensive line of ruggedly accurate instrumentation, including monitoring systems, pressure gauges, tachometer systems and torque and weight indicators.

Need something special? FET can design, fabricate and deliver drilling and pipeline equipment anywhere in the world, providing all necessary CAD and engineering support and certification.

Repair, refurbishment and field services. FET offers expert maintenance and field repair services internationally, along with spare parts. As an API/ISO 29001-certified repair and overhaul operation, we meet or exceed all OEM standards.

In addition to our own high-quality product lines and custom manufacturing capabilities, we are an authorized sales and service dealer for many well-known products.



Wrangler™ Catwalk

## Drilling Sales Headquarters

10344 Sam Houston Park Drive, Suite 300  
Houston, TX 77064  
USA  
Tel: 713 351 7900



## Regional Offices

Peregrine Road, Westhill  
Aberdeenshire, AB32 6JL  
Tel: +44 1224 744000

Oilfields Supply Center  
Building B-20/21  
Jebel Ali Free Zone Dubai UAE  
Tel: 971 4 883 5266

#106, 3903 - 75 Ave  
Leduc, Alberta T9E 0K3  
Canada  
Tel: 780 980 0345

## OUR CORE VALUES

### No One Gets Hurt

The safety of our employees and customers is our first priority coupled with a healthy respect for the environment.

### Integrity

In everything we do, in every interaction, both internally and externally, we strive to operate with the utmost integrity and mutual respect.

### Customer Focused


Our products enhance our customer's performance and we listen to their needs and work with them to solve their challenges.


### Good Place To Work

We are committed to creating a workplace that fosters innovation, teamwork and pride. Every team member is integral to our success and is treated equally and fairly.

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#### FET Sales

 10344 Sam Houston Park Drive, Suite 300  
Houston, TX 77064

 +1 713-351-7900

 [f-e-t.com/drilling](https://f-e-t.com/drilling)

 [ForumDP.Sales@f-e-t.com](mailto:ForumDP.Sales@f-e-t.com)