

# Block & Bleed Valves



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## Introduction

**PANAM** Block & Bleed and Double Block & Bleed Valves have been specifically designed to provide a compact, rigid, lighter, safer and lower cost Solution than conventional piping methods used for the installation of gauges, transmitters and other critical equipment. Where Positive Isolation is required to protect personal and equipment, **PANAM** Block & Bleed and Double Block & Bleed Valves are an excellent alternative to multi valve systems that are threaded or welded. Lowest possible install cost as well as the advantage of reduced weight and minimizing potential leak paths provides the highest possible system integrity. The reduced height of the installation reduces the risk of damage through vibration. zero Leakage Valves in a Block Bleed Block configuration will deliver absolute isolation.

**PANAM** is a leader in the field of Block & Bleed and Double Block & Bleed Valves. A company that has built its reputation on inspired development, precision engineering and high quality all with an emphasis on customer service that exceeds the expectations of industries worldwide.

**PANAM** offers an unrivaled range of standard products from stock, together with the latest in modern manufacturing capability and has the capacity to handle specific requirements and exotic materials.

**PANAM** new manufacturing facility has given added technical ability and resources to rapidly develop custom products for the most demanding or unusual applications.

- API ISO 9001:2008 Certified
- API ISO TS 29001 Certified
- API Spec Q1 Certified
- API 6A Certified
- API 6D Certified
- API 600 Certified
- API 602 Certified
- MFG. Facility Approved by ABS Ind.
- ASTM F1387-99
- Leak Test Approved by TUV
- CE Marking



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## Application & Installation

### Solutions

**PANAM** instrumentation products provide a wide range of solutions for Double Block & Bleed Valves.

**PANAM** Double Block and Bleed Valves are made from one piece forged bodies which provides excellent flexibility including a choice of end connections, body style, ball and globe valve configuration instruments.

#### 1) The Original Double Block and Bleed

3 Valves with a tee in the centre, 7 joints typically welded and x-rayed. This Double Block and Bleed can be welded directly to the process pipe or to a flange in applications where it is anticipated to require replacement due to aggressive process conditions. The assembly can be remade in a welding shop and taken to the field and replaced.

#### 2) Double Block & Bleed made with 2 Valves

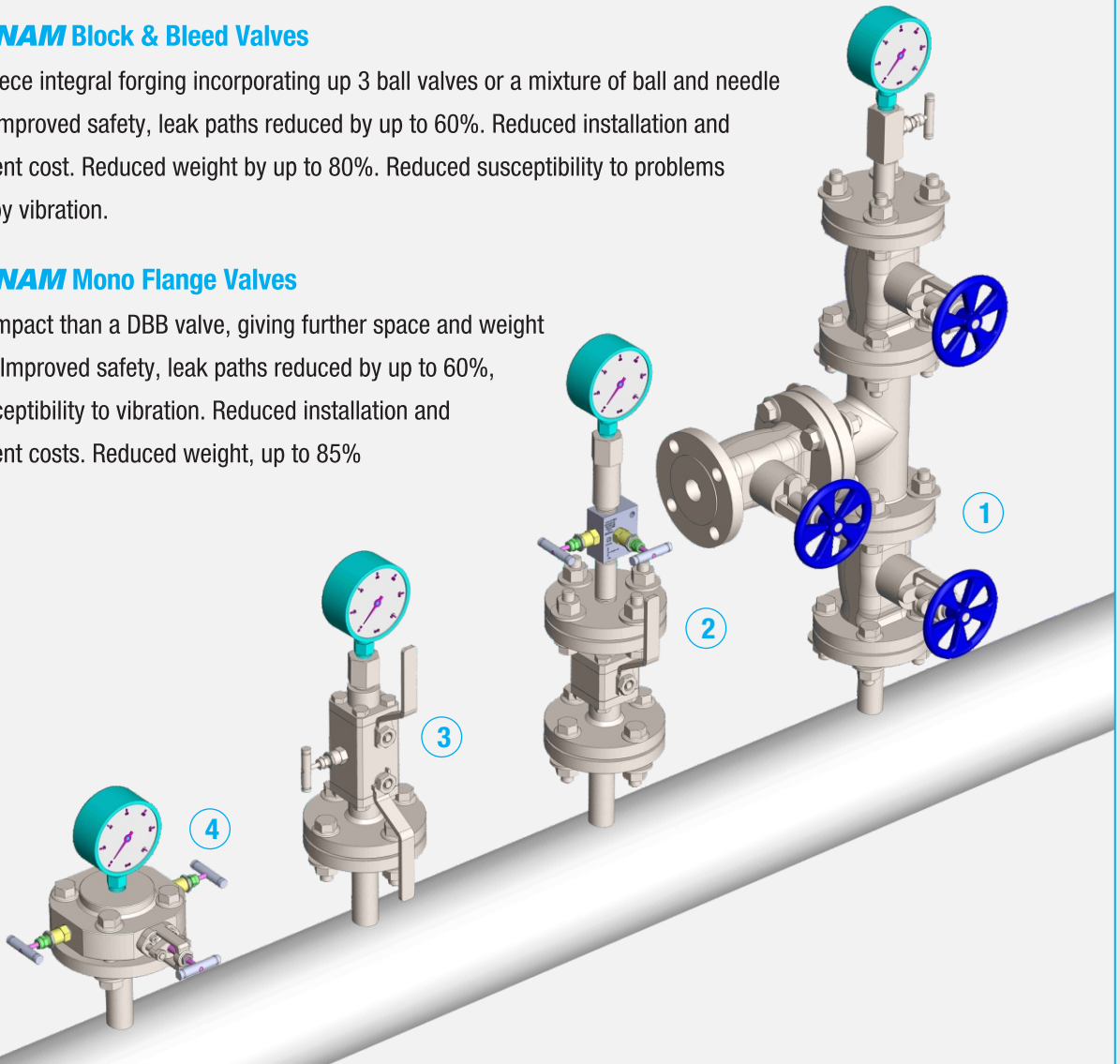
A welded flange, connected to a primary ANSI class isolating valve. The primary valve will be connected to a secondary instrument valve. A pressure gauge or transmitter will then be installed downstream of the instrument valve.

#### 3) PANAM Block & Bleed Valves

A One-piece integral forging incorporating up 3 ball valves or a mixture of ball and needle design. Improved safety, leak paths reduced by up to 60%. Reduced installation and component cost. Reduced weight by up to 80%. Reduced susceptibility to problems caused by vibration.

#### 4) PANAM Mono Flange Valves

More compact than a DBB valve, giving further space and weight savings. Improved safety, leak paths reduced by up to 60%, less susceptibility to vibration. Reduced installation and component costs. Reduced weight, up to 85%



## Features & Benefits

### Fire-Safe Test Approved

Double Block & Bleed valves are designed in accordance with API 607 & API SPEC 6FA.

### Double Body Gasket (Optional)

Double Block & Bleed valves are equipped with two body gaskets. The first body gasket is in soft material and the second in graphite, this combination assures the best seal characteristic in whatever corrosive service as well as giving a fire safe design.

### Anti-Static Device

In order to prevent static electricity from creating a dangerous conditions, static conduction spring is set between the stem and the ball.

### Anti Blow-Out Proof Stem

The stem is designed with internal T-Type shoulder to provide blow -out proof operations. The design assures that the stem can not be blown out of the valve in the case of the packing being removed while the valve is under pressure.

### Controlled Stem & Stuffing Box Finish

Stem and stuffing box finish machining is a key point of control. (Cold rolling implies may not meet NACE Rc22) The stem is furnished to a surface finish of  $Ra=0.4$ , which can reduce friction of stem movement and provides less wear on the stem seal. The stuffing box surface is finished to  $Ra= 1.6$  for better sealing performance.

### Solid Ball

The solid ball used provides straight through flow and real full-port performance characteristics.

### Longevity of life

Special consideration was devoted to enhanced life and operation of our valve throughout design, development, testing and manufacturing stages. Valve designs combined with the selection of advanced materials are such that long periods of inactivity should not affect the operations of the valves.

### Low Torque Opening and Closing

Seat designs, stem bearing system and stem seal arrangements ensure consistent minimal torque values

### Flow Capacity

Valve design allows for high flow capacity in liquid or gas services regardless of whether the media is clean or dirty. Full port valves allow for pigging and ensure maximum flow capacity. The high Cv makes Double Block & Bleeds Ideal for viscous service.

### Field Repairable

Simple user friendly design allows for quick and easy part replacement requiring minimal "Down Time".

### Locking Device (Optional)

Locking device is supplied as standard in order to prevent unauthorized opening / closing. Locking device can lock the valve in either the open or closed position and cannot be breached by removing the lever.

### Inspection and Testing

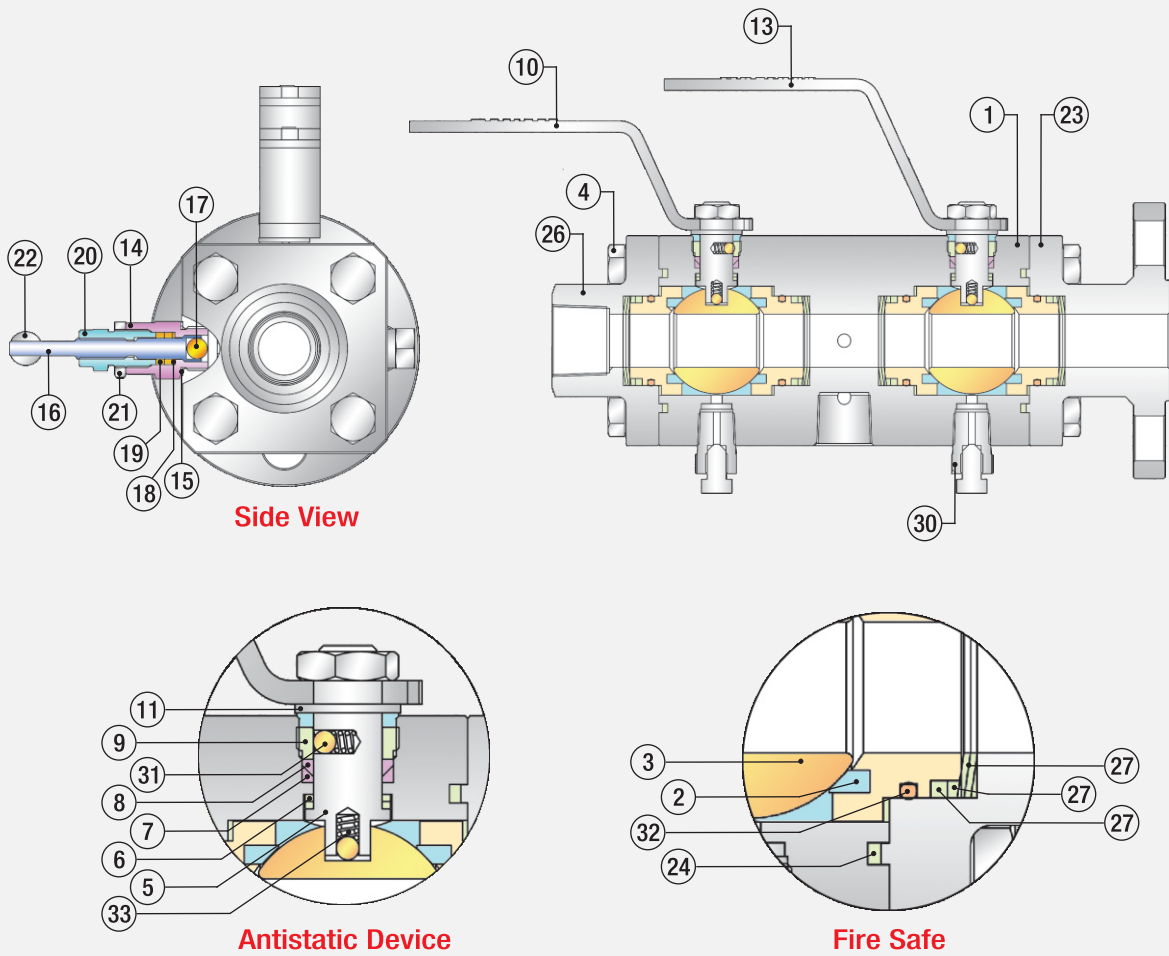
Every valve is subjected to different non-destructive testing, like dye penetrate test on butt weld ends and on all hard faced and cladding areas. Non-destructive test are also carried out on the critical areas as defined by ASME B16.34

Optional examinations like Radiographic, Magnetic Particles, Ultrasonic, Helium Leak Test etc.

Personnel performing NDT are trained and qualified to EN 473/ASNT-SNT-TC-1A. each valve is subject to a pressure test in accordance with the standard API 598 or BS 6755 Part 1. The rated pressure for the applicable pressure class is in accordance with ASME B16.34 / EN 1251 1/2.



## Material of Construction



Sr. No.	Part Name	Qty.
1	Body	1
2	Seat	4
3	Ball	2
4	Stud & Nut M10 x 1.5	8
5	Stem	2
6	Trust Washer	4
7	Packing	2
8	Packing	2
9	Lock Nut	2
10	Handle Isolate 2	1
11	Plain Washer	2
12	Seat cover	4
13	Handle Isolate 1	1
14	Gland Body	1
15	Gland Washer	1
16	Spindle	1
17	Ball Isolate Valve	1

Sr. No.	Part Name	Qty.
18	Packing Washer	1
19	Packing	2
20	Retainer	1
21	Lock Nut	1
22	Handle	1
23	Flange	1
24	Body Seat	2
25	Seat Seal	2
26	NPT Adaptor	1
27	Spring Washer	8
28	Seat Backup Ring	4
29	Stud & Nut M10 x 1.5	2
30	Bleed Plug	2
31	Antistatic Ball	4
32	Seat Oring	4
33	Static Spring	4

## Body & Trim Material

### Carbon Steel

A105N, A216 WCB, A216 WCC

### Low Temperature Carbon Steel

A350 Lf2, A352 LCB, A352 LCC

### Low Alloy Steel

ANSI 4140, A694 F65, A694 F52

A694 F60, A350 Lf3

API 6A 60K (A694 F60 Mod)

### Martensitic Stainless Steel

A182 F6A, A182 F6NM

A217 Ca15, A487 CA6NM

### Austenitic Stainless Steel

A182 F316, A182 F316L

A182 F316LN-Mod., A182 F347

A182 F44 (6% Mo)(UNS S31254), A182 FXM-19 (Nitronic 50)

A351 CF8M, A351 Cf3

A351 CF3M

### Precipitation Hardening Stainless Steel

A564 Gr 630 H1150M (UNS S17400)

### Duplex Stainless Steel

A181 F51 (UNS S31803)

A182 F53 (UNS S31750)

A182 F5S (UNS S 31760)

A890-4A (UNS S 31803)

A890-6A (UNS S32760)

### Nickel Alloys

Incoloy 825 (UNS N08825) Incoloy 925 (UNS N09925)

Inconel 625 (UNS N06625) Inconel 718 (UNS N07718)

Inconel 750 (UNS N07750)

Monel 400

Monel K500

## Seat Insert & Seals Materials Operating (Dynamic) Limits

Material	Temperature ° C		Pressure Class		Size	
	Min.	Max	Seat Insert	Seal	Seat Insert	Seal
Nylon SMX	-40	120	2500	N/A	64"	N/A
Lauramid (Nylon 12G)	-60	100	2500	N/A	64"	N/A
Devlon (Nylon 6)	-60	140	2500	N/A	64"	N/A
Peek	-60	220	2500	N/A	36"	N/A
PTFE Glass Filledx (25%)	-100	200	600	N/A	24"	N/A
PTEFE Carbon Filled (25%)	-100	180	300	N/A	24"	N/A
PCTFE	-196	150	2500	N/A	36"	N/A
HNBR-Therban	-40	150	600	2500	64"	64"
FKM A (Viton A)	-29	180	600	2500	64"	64"
FKM GLT (Viton GLT)	-40	180	600	2500	64"	64"
FKM AED	-29	180	600	2500	64"	64"
FTFE + Elgiloy Springs	-196	200	N/A	2500	N/A	36"

## Engineering Data

### Valve Testing

**PANAM** Valves are 100% Tested in accordance of API 6D requirement, prior to shipping

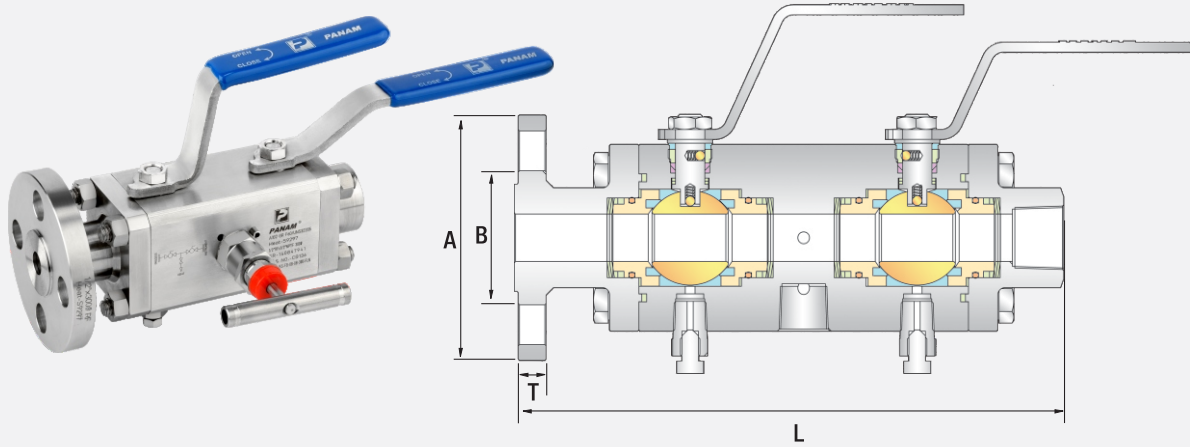
### Standard Performance Tests

- Visual & dimensional checking
- High pressure hydrostatic shell test
- High pressure hydrostatic seats test
- Low pressure air seats test
- Stem torque checking

### Rating & Test Pressure at Ambient Temperature

ASME CLASS	Rating			Shell Test			Shell Test			Shell Test		
	Psi	Bar	Kg/cm <sup>2</sup>	Psi	Bar	Kg/cm <sup>2</sup>	Psi	Bar	Kg/cm <sup>2</sup>	Psi	Bar	Kg/cm <sup>2</sup>
150	284,3	19,6	20,0	426,5	29,4	30,0	312,7	21,6	22,0	80,8	5,5	5,6
300	741,1	51,1	52,1	1111,7	76,7	78,2	815,2	56,2	57,3	80,8	5,5	5,6
600	1480,8	102,1	104,1	2221,2	153,2	156,2	1628,9	112,3	114,5	80,8	5,5	5,6
900	2222,0	153,2	156,2	3333,0	229,8	234,3	2444,2	168,5	171,8	80,8	5,5	5,6
1500	3702,8	255,3	260,2	5554,2	383,0	390,3	4073,1	280,8	286,2	80,8	5,5	5,6
2500	6171,4	425,5	433,7	9257,1	638,3	650,6	6788,5	468,1	477,1	80,8	5,5	5,6
API 3000	3000,0	206,8	210,8	4500,0	310,2	316,2	3300,0	227,5	231,9	80,8	5,5	5,6
API 5000	5000,0	344,7	351,4	7500,0	517,1	527,1	5500,0	379,2	386,5	80,8	5,5	5,6
API 10000	10000,0	689,5	702,9	15000,0	1034,3	1054,4	11000,0	758,5	773,2	80,8	5,5	5,6

## Dimensions (Flange x NPT)



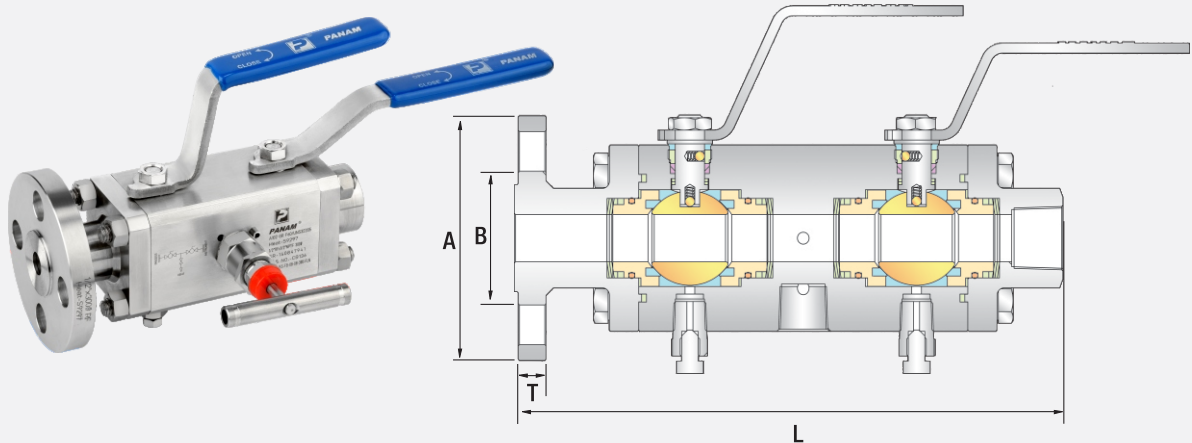
(10mm BORE)

SIZE (inch)	RATING (lb)	DIMENSION (mm)			
		DB-S1 L(RF)	A	B	T
1/2 15 NB	150	170	89	60.3	11.2
	300				14.2
	600	179	96	66.7	20.6
	900/1500	186	121	82.5	28.8
	2500		134	88.9	36.6
3/4 20 NB	150	175	99	69.8	12.7
	300				15.7
	600				22.1
	900/1500	179	130	88.9	31.8
	2500	186	140	95.2	38.2
1 25 NB	150	170	108	79.4	14.2
	300				17.5
	600	179	124	88.9	23.9
	900/1500	186	150	101.6	34.8
	2500		159	108.0	41.5
1-1/2 40 NB	150	170	127	98.4	17.5
	300	179		114.3	20.6
	600		156		27.0
	900/1500	186	178	124.0	38.2
	2500	200	203	146.1	50.9
2 50 NB	150	279	152	120.6	22.4
	300				24.0
	600	186	165	127.0	30.4
	900/1500	200	216	165.1	44.5
	2500	208	235	171.5	57.2

\*Dimensions are for reference only and are subject to change.



## Dimensions (Flange x NPT)

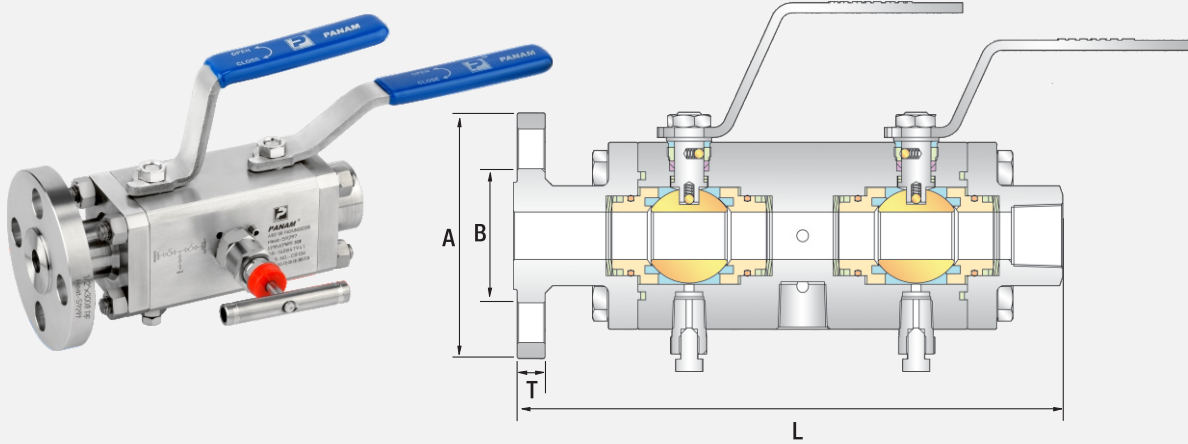


(14mm BORE)

SIZE (inch)	RATING (lb)	DIMENSION (mm)			
		DB - S1 L (RF)	A	B	T
3/4 20 NB	150	208	99	69.8	12.7
	300		118	82.5	15.7
	600	22.1			
	900/1500	31.8			
	2500	224	140	95.2	38.2
1 25 NB	150	208	108	79.4	14.2
	300		124	88.9	17.5
	600	23.9			
	900/1500	34.8			
	2500	227	159	108.0	41.5
1-1/2 40 NB	150	208	127	98.4	17.5
	300	218	156	114.3	20.6
	600				27.0
	900/1500	224	178	124.0	38.2
	2500	238	203	146.1	50.9
2 50 NB	150	218	152	120.6	22.4
	300		165	127.0	24.0
	600	30.4			
	900/1500	238			216
	2500	246	235	171.5	57.2

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## Dimensions (Flange x NPT)

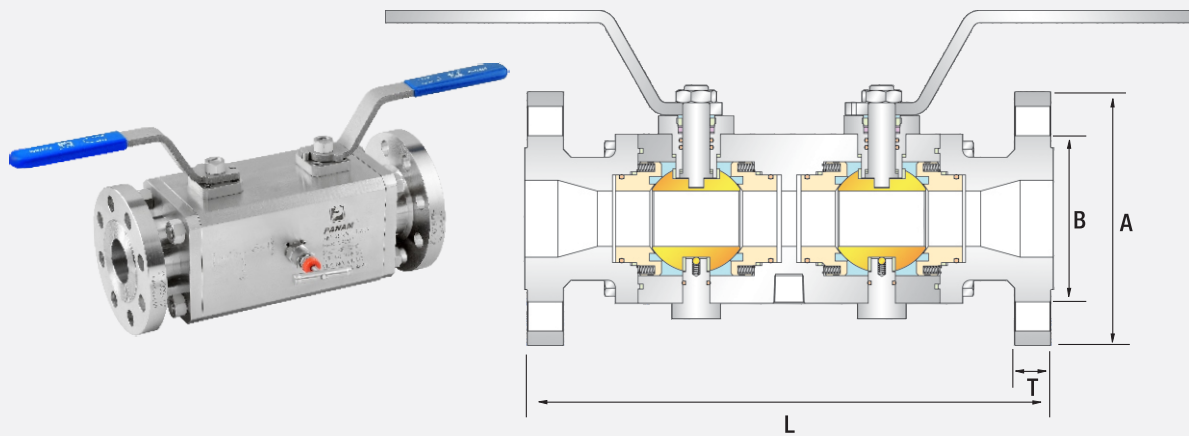


(20mm BORE)

SIZE (inch)	RATING (lb)	DIMENSION (mm)			
		DB - S1 L (RF)	A	B	T
1 25 NB	150	235	108	79.4	14.2
	300		124	88.9	17.5
	600	23.9			
	900/1500	251			101.6
	2500	159	108.0	41.5	
1-1/2 40 NB	150	235	127	98.4	17.5
	300	244	156	114.3	20.6
	600				27.0
	900/1500	251	178	124.0	38.2
	2500	265	203	146.1	50.9
2 50 NB	150	244	152	120.6	22.4
	300				165
	600	30.4			
	900/1500	265	216	165.1	
	2500	273	235	171.5	27.2

\*Dimensions are for reference only and are subject to change.

## Dimensions (Flange x Flange)

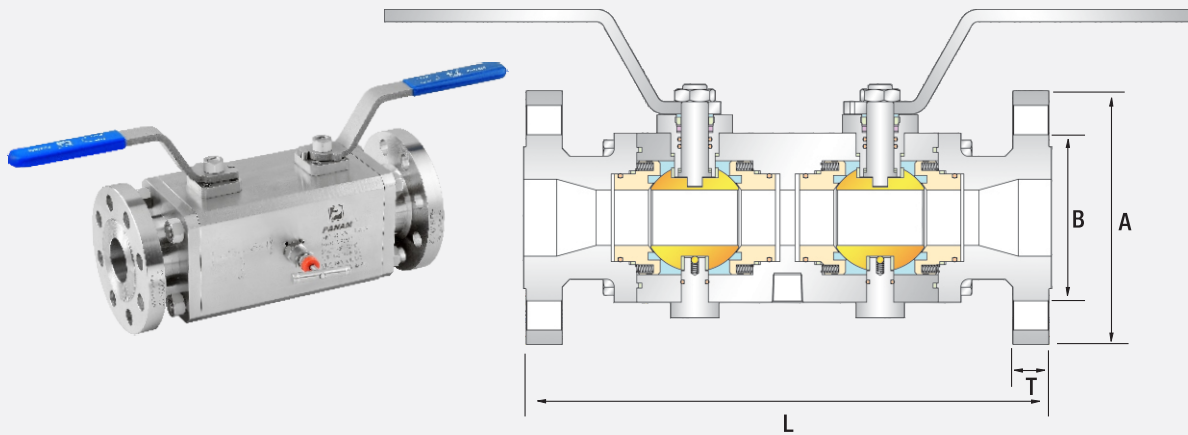


(10mm BORE)

SIZE (inch)	RATING (lb)	DB - S1 L (RF)	DIMENSION (mm)		
			A	B	T
1/2 15 NB	150	235	89	60.3	11.2
	300		96	66.7	14.2
	600	20.6			
	900/1500	254			121
	2500	267	134	88.9	36.6
3/4 20 NB	150	235	99	69.8	12.74
	300		118	82.5	15.7
	600	22.1			
	900/1500	254			130
	2500	267	140	95.2	38.2
1 25 NB	150	235	108	79.4	14.2
	300		124	88.9	17.5
	600	23.9			
	900/1500	254			150
	2500	267	159	108.0	41.5
1-1/2 40 NB	150	235	127	98.4	17.5
	300	254	156	114.3	20.6
	600				27.0
	900/1500	267	178	124.0	38.2
	2500	314	203	146.1	50.9
2 50 NB	150	254	152	120.6	22.4
	300		165	127.0	24.0
	600	30.4			
	900/1500	314			216
	2500	334	235	171.5	57.2

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## Dimensions (Flange x Flange)

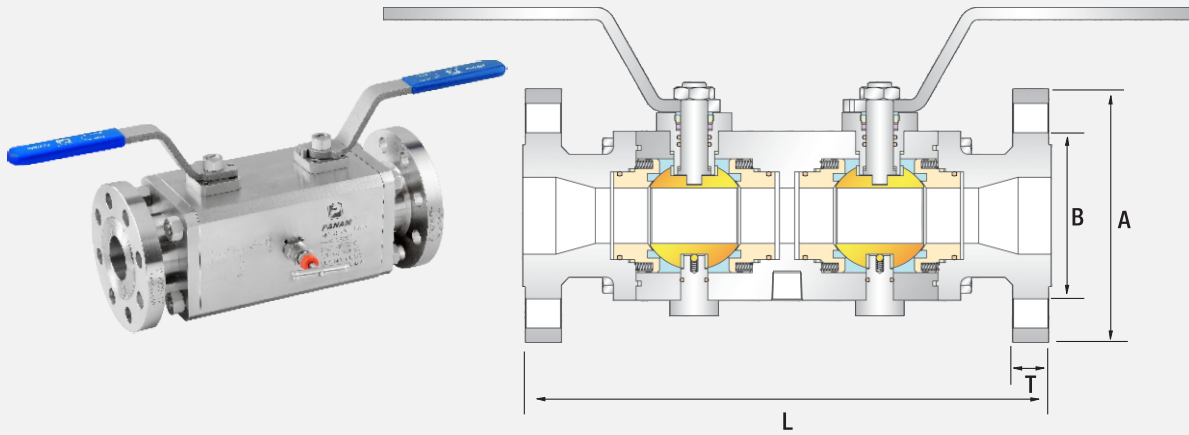


(14mm BORE)

SIZE (inch)	RATING (lb)	DIMENSION (mm)			
		DB - S1 L (RF)	A	B	T
3/4 20 NB	150	235	99	69.8	12.7
	300		118	82.5	15.7
	600	22.1			
	900/1500	254	130	88.9	31.8
	2500	267	140	95.2	38.2
1 25 NB	150	235	108	79.4	14.2
	300		124	88.9	17.5
	600	23.9			
	900/1500	267	150	101.6	34.8
	2500	273	159	108.0	41.5
1-1/2 40 NB	150	235	127	98.4	17.5
	300		156	114.3	20.6
	600	254			27.0
	900/1500	267	178	124.0	38.2
	2500	334	203	146.1	50.9
2 50 NB	150	254	152	120.6	22.4
	300		165	127.0	24.0
	600	267			30.4
	900/1500	334	216	165.1	44.5
	2500		235	171.5	57.2

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## Dimensions (Flange x Flange)

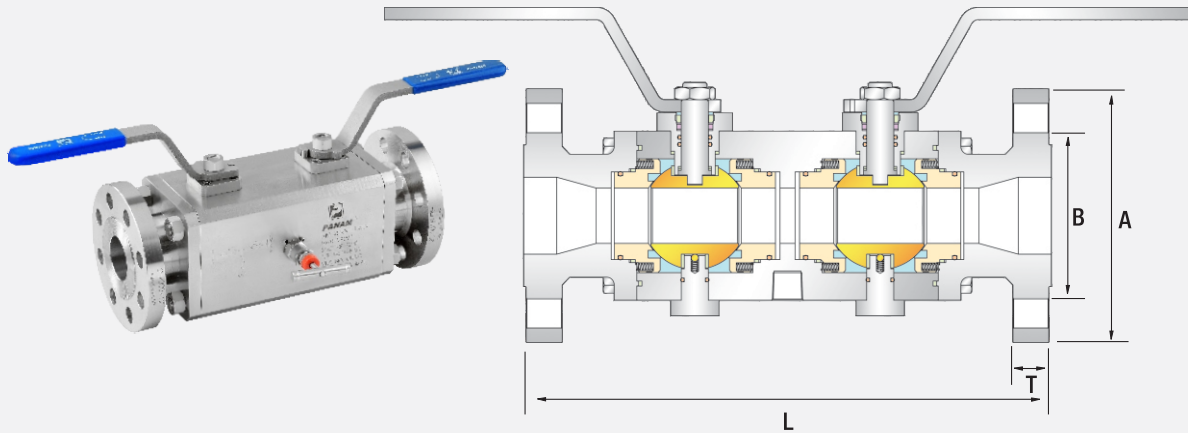


(20mm BORE)

SIZE (inch)	RATING (lb)	DB - S1 L (RF)	DIMENSION (mm)		
			A	B	T
1 25 NB	150	235	108	79.4	14.2
	300		124	88.9	17.5
	600	23.9			
	900/1500	24.8			
	2500	273	159	108.0	41.5
1-1/2 40 NB	150	235	127	98.4	17.5
	300	254	156	114.3	20.6
	600				27.0
	900/1500	268	178	124.0	38.2
	2500	334	203	146.1	50.9
2 50 NB	150	254	152	120.6	22.4
	300		165	127.0	24.0
	600	30.4			
	900/1500	216			165.1
	2500	334	235	171.5	57.2

\*Dimensions are for reference only and are subject to change.

## Dimensions (Flange x Flange)

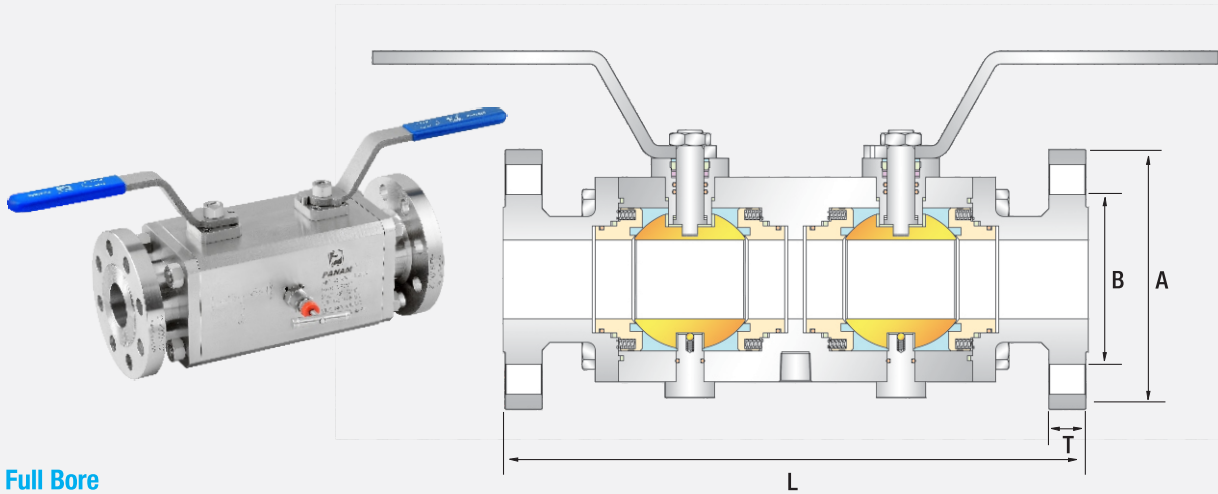


### Reduce Bore

SIZE (inch)	BORE (mm)	RATING (lb)	DIMENSION (mm)					
			RF FLANGE		RTJ FLANGE		A	T
			L	T	L	T		
1-1/2 40 NB	25.4	150	279	19.5	292	25.9	298	132
		300	285	22.6	--	--		
		600	301	30.8	301	30.8		
		900/1500	370	40.2	370	40.2		
		2500	396	52.9	399	54.4		
2 50 NB	38.1	150	364	21.1	377	27.5	325	147
		300	372	27.9	--	--		
		600	390	33.8	393	35.3		
		900/1500	415	46.5	418	48.0		
		2500	475	59.2	478	60.7		
3 75 NB	50.8	150	400	25.9	413	32.3	452	170
		300	410	30.9	--	--		
		600	428	40.2	431	41.7		
		900/1500	441	46.5	444	48.0		
		2500	500	56.2	503	57.7		

\*Dimensions are for reference only and are subject to change.

## Dimensions (Flange x Flange)



Full Bore

SIZE (inch)	BORE (mm)	RATING (lb)	DIMENSION (mm)					
			RF FLANGE		RTJ FLANGE		A	T
			L	T	L	T		
1 25 NB	25.4	150	272	16.2	285	22.6	298	132
		300	279	19.5	--	--		
		600	292	25.9	292	25.9		
		900/1500	364	36.8	364	36.8		
		2500	377	43.5	377	43.5		
1-1/2 40 NB	38.1	150	361	19.5	374	25.9	325	147
		300	367	22.6	--	--		
		600	381	30.8	384	30.8		
		900/1500	402	40.2	402	40.2		
		2500	463	52.9	466	54.4		
2 50 NB	50.8	150	390	21.1	403	27.5	452	170
		300	398	24.9	--	--		
		600	416	33.8	419	35.3		
		900/1500	481	46.5	484	48.0		

\*Dimensions are for reference only and are subject to change.

## Mono Flange Valves

**PANAM** Mono Flange valves are light weight Mono Flange isolation valves that incorporates an Outside Screw and Yoke bolted bonnet design primary isolate together with a heavy duty instrument Needle Valve bonnet assembly for the vent valve. The compact one piece design not only ensures that potential leakage paths are kept to an absolute minimum but offers significant weight and component cost savings when compared to other conventional installation solutions.

Mono Flange valves are designed to meet the requirements of piping class installations in accordance with ASME/ANSI standards that features all metal seating and metal to metal body / bonnet connections. Mono Flanges are manufactured in a full range of materials, flange types and ratings as well as having a choice of flange, screw or kidney flange outlets.

### Construction

Manufactured from a single piece forging or forged bar stock that incorporates the OS&Y valve head and outlet connection.

### Configuration

Block / Double Block / Block & Bleed /  
Double Block & Bleed

### Inlet

The flanged process connection can be made to suit any international size or rating including, but not restricted to :-

- \* ANSI B 16.5 Flanges from ½" to 4" in ratings from 150 to 2500 lbs in RF, FF, SRF and RTJ flange face styles.
- \* API Flanges up to 2.1/16", 3000, 5000 & 10,000 lbs
- \* Norsok L-100 Compact flange design

### Outlet

In Flange by Flange variants the outlet flange is identical to the inlet process flange as listed above. Alternatively the output can be:-

- \* Screwed female connections, (½" NPT standard)
- \* Kidney Flanges for direct connection onto transmitters
- \* Quick release compression fittings

### Bore Sizes

6mm (standard), 8mm can be provided depending upon the flange size and rating

### Fire Safe

Fire safe to BS 6755 Pt 2 / API 607

### NACE

All body & wetted parts materials comply with the requirements of NACE MR 0175 / En15156 or MR 0103 depending upon the environmental or application requirement

### Pressure Rating

Pressure rating up to 10,000 psi (690 barg)

### Temperature Rating

-54° C to 538° C (-65° F to 1000° F) depending upon the stem packing material and pressure rating

### OS&Y and Needle Valve Assemblies

OS&Y and Heavy duty needle valve bonnet assemblies incorporate a full range of features including:-

- \* Anti static, anti blow-out stems
- \* Non-rotating stem tips provide a true metal to metal valve

seat whereby the material of the stem tip is one grade harder than the body thus resisting over tightening, preventing wear and guaranteeing a 100% bubble tight seat closure, first time, every time.

### No Threads in the Process Stream

All needle valves bonnet assemblies incorporate 'soft' parent metal sealing rings that are located directly below the bonnet threads to ensure that no threads are directly in the process stream.

### Steam Packing

Fully adjustable, dynamically responsive multi ring gland sandwich, in either PTFE or Graphoil, resists all operating pressures and processes. Stem packing are all below the stem threads keeping the process away from the stem threads for longer life.

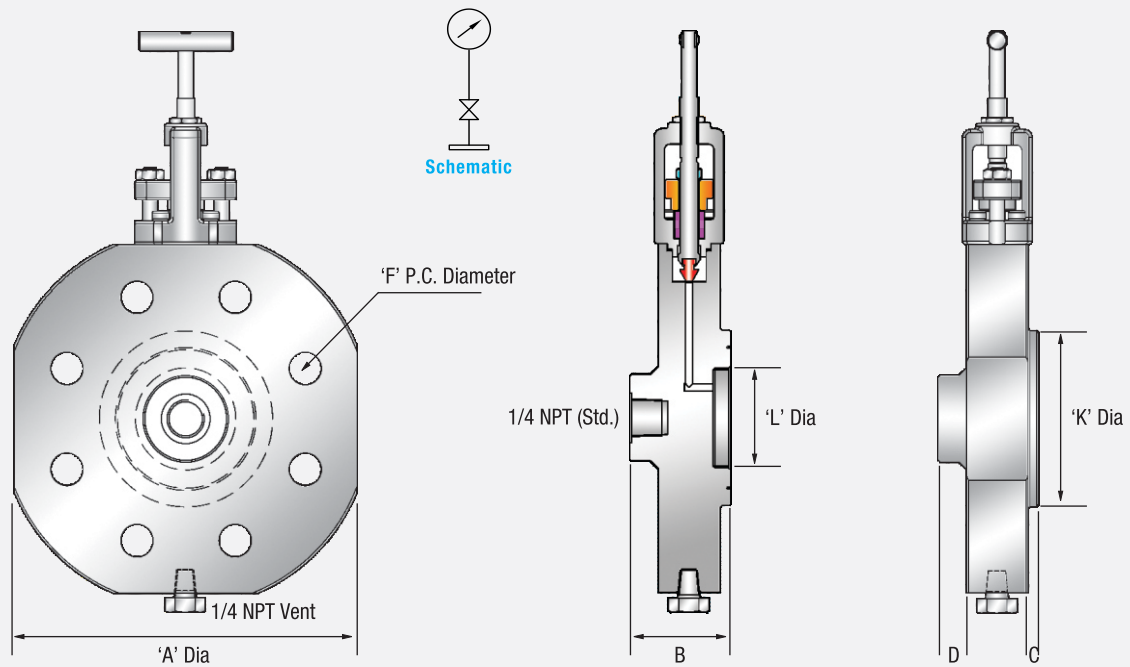
### Other Features

- \* Hydro static and gas pressure testing to BS 6755 Pt 1 or API 6A
- \* Material thickness as defined in ANSI / ASME B16.34
- \* Flange dimensions as defined in ANSI / ASME B16.5
- \* Heat code traceable material certification to EN 10204 3.1b
- \* Full range of testing, certification and documentation can be supplied including PMI and full range of NDE testing
- \* Pressure boundary designs calculated to ASME VIII Div 1
- \* Designed with 4:1 safety factor
- \* Optional locking and anti tamper bonnet assemblies



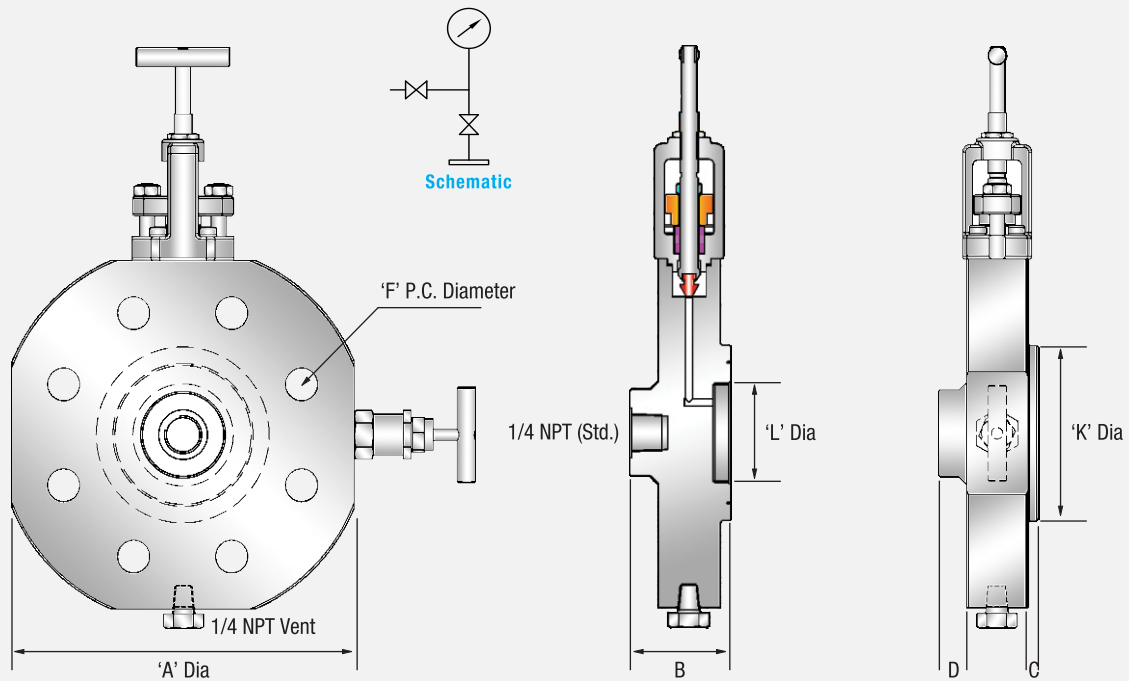


# Mono Flange - Dimensions



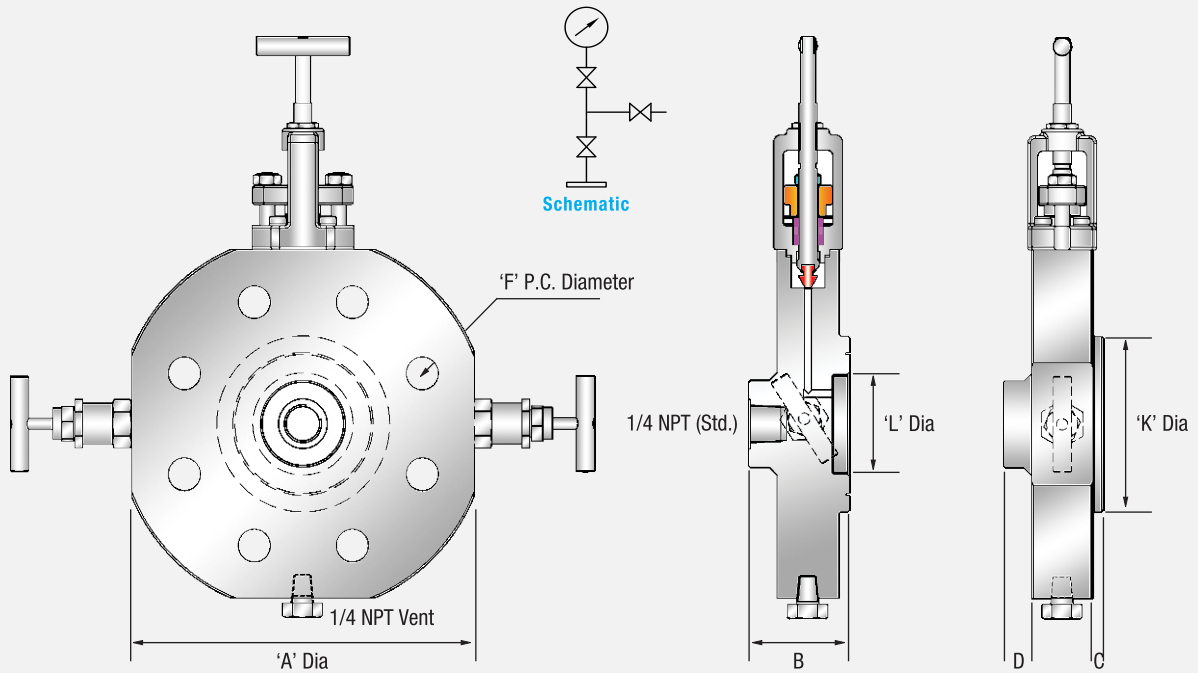
SIZE (inch)	RATING (lb)	DIMENSION(mm)										
		'A' Dia	B	C	D	F	'G' Dia	'H' PCD	'J' Dia	'K' Dia	'L' Dia	'L' Dia
1/2 (15 NB)	150	98	60	1.6	3.0	4	15.9	60.3	34.9	-	-	-
	300							66.7		50.8	34.13	1.6
	600	82.6		60.3	39.69		6.4					
	900/1500	121		6.4	15.5		22.2	82.6		65.1	42.86	6.4
	2500	133		8.5	88.9		65.1	42.86		6.4		
3/4 (20 NB)	150	98	60	1.6	3.0	4	15.9	69.8	42.9	-	-	-
	300	82.6						63.5		42.86	1.6	
	600	117		6.4	15.5		22.2	88.9		66.7	44.45	6.4
	900/1500	130		8.5	95.2		65.1	50.80		6.4		
	2500	140		6.4	8.5		22.2	95.2		65.1	50.80	6.4
1 (25 NB)	150	108	60	1.6	15.5	4	15.9	79.4	50.8	63.5	47.63	1.6
	300	88.9						69.8		50.80	6.4	
	600	124		6.4	8.5		25.4	101.6		71.4	50.80	6.4
	900/1500	159		6.0	107.9		73.0	6.4				
	2500	159		6.0	107.9		73.0	6.4				
1-1/2 (40 NB)	150	127	60	1.6	15.5	4	15.9	98.4	73.0	82.4	65.09	1.6
	300	114.3						90.5		68.26	6.4	
	600	123.8		92.1	68.26		6.4					
	900/1500	178		6.4	6.0		28.6	123.8		92.1	68.26	6.4
	2500	203		13.5	31.8		146.0	114.3		82.55	6.4	
2 (50 NB)	150	152	60	1.6	8.5	4	19.0	120.6	92.1	101.6	82.55	1.6
	300	127.0						108.0		82.55	6.4	
	600	165		6.4	12.0		25.4	165.1		123.8	95.25	6.4
	900/1500	216	80	6.4	19.5		28.4	171.4		133.4	101.60	6.4
	2500	235	7.0	28.4	171.4		133.4	101.60		6.4		

# Mono Flange - Dimensions



SIZE (inch)	RATING (lb)	DIMENSION(mm)										
		'A' Dia	B	C	D	F	'G' Dia	'H' PCD	'J' Dia	'K' Dia	'L' Dia	'L' Dia
1/2 (15 NB)	150	98	60	1.6	3.0	4	15.9	60.3	34.9	-	-	-
	300							66.7		50.8	34.13	1.6
	600			22.2	88.9		60.3	39.69		6.4		
	900/1500						121	15.5		65.1	42.86	
	2500						133	8.5		65.1	42.86	
3/4 (20 NB)	150	117	60	1.6	3.0	4	15.9	69.8	42.9	-	-	-
	300							82.6		63.5	42.86	1.6
	600			22.2	88.9		66.7	44.45		6.4		
	900/1500						130	8.5		65.1	50.80	
	2500						140	95.2		65.1	50.80	
1 (25 NB)	150	124	60	1.6	15.5	4	15.9	79.4	50.8	63.5	47.63	1.6
	300							88.9		69.8	50.80	6.4
	600			25.4	107.9		71.4	73.0		6.4		
	900/1500						159	8.5		71.4	73.0	
	2500						159	6.0		73.0	73.0	
1-1/2 (40 NB)	150	156	60	1.6	15.5	4	15.9	98.4	73.0	82.4	65.09	1.6
	300							114.3		90.5	68.26	6.4
	600			28.6	123.8		92.1	82.55		6.4		
	900/1500						178	6.0		114.3	82.55	
	2500						203	13.5		114.3	82.55	
2 (50 NB)	150	165	60	1.6	8.5	4	19.0	120.6	92.1	101.6	82.55	1.6
	300							127.0		108.0	82.55	6.4
	600			25.4	165.1		123.8	95.25		6.4		
	900/1500						216	19.5		133.4	101.60	
	2500						235	7.0		133.4	101.60	

# Mono Flange - Dimensions



SIZE (inch)	RATING (lb)	DIMENSION(mm)										
		'A' Dia	B	C	D	F	'G' Dia	'H' PCD	'J' Dia	'K' Dia	'L' Dia	'L' Dia
1/2 (15 NB)	150	98	60	1.6	3.0	4	15.9	60.3	34.9	-	-	-
	300									50.8	34.13	1.6
	600	66.7		60.3	39.69		6.4					
	900/1500	121		82.6	65.1		42.86					
	2500	133		88.9	65.1		42.86					
3/4 (20 NB)	150	98	60	1.6	3.0	4	15.9	69.8	42.9	-	-	-
	300	117								63.5	42.86	1.6
	600	82.6		66.7	44.45		6.4					
	900/1500	130		88.9	65.1		50.80					
	2500	140		95.2	65.1		50.80					
1 (25 NB)	150	108	60	1.6	15.5	4	15.9	79.4	50.8	63.5	47.63	1.6
	300	124								69.8	50.80	6.4
	600	88.9		71.4	73.0							
	900/1500	159		101.6	73.0							
	2500	159		107.9	73.0							
1-1/2 (40 NB)	150	127	60	1.6	15.5	4	15.9	98.4	73.0	82.4	65.09	1.6
	300	156								90.5	68.26	6.4
	600	123.8		92.1	82.55							
	900/1500	178		123.8	114.3							
	2500	203		146.0	114.3		82.55					
2 (50 NB)	150	152	60	1.6	8.5	4	19.0	120.6	92.1	101.6	82.55	1.6
	300	165								108.0	82.55	6.4
	600	127.0		108.0	82.55							
	900/1500	216	165.1	123.8	95.25							
	2500	235	171.4	133.4	101.60							



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