



MANN FLOW CONTROLS

Plug Valves

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PB DESIGN

Pressure balanced Plug Valve were developed about 20 years ago. With the most typical applications found in natural gas, upstream hydrocarbon and slurries, this well-established design has proven its suitability on a range of demanding applications when zero leakage or bubble tight shut-off and reliability of operation are of prime importance.

Basic design advantages such as metal-to-metal seats and a wide seating area, along with competitive pricing, have made plug valves the product of choice when the valve is operated in a difficult or dirty service and/or needs to be opened against full differential pressure. The robust metal-to-metal seats ensure long valve life in any service, even in presence of solid particles in the line media.





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PLUG BALANCING

All PB valves are protected against the possibility of seizure due to taper locking. Taper locking is a phenomenon common to conventional type plug valves, caused by an imbalance of forces acting on the plug due to line pressure finding its way into the chamber at the larger end of the plug. As shown by the arrows in Fig. a, the resultant force tends to push the plug into the taper, potentially jamming it in its tapered bore. The plug can remain locked even when line pressure is subsequently reduced.

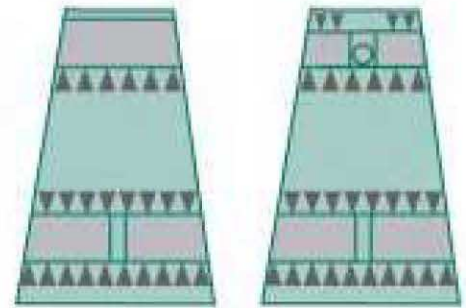


Fig. a

Fig. b

PB FEATURES EXPLAINED

In an attempt to combat taper locking, conventional plug valves utilise the pressure of the plug sealant, acting on the upper face of the plug, to react against the upwards force. This required frequent sealant injection maintains a smooth valve operation.

PRESSURE BALANCING

PB valves incorporate pressure balanced plugs as standard, as shown in Fig. b. The passages top and bottom with a check valve at the smaller end of the plug allow the line pressure itself to balance the forces acting on the plug, preventing any possibility of taper locking - thus maintaining trouble-free operation without the need for frequent sealant injection.

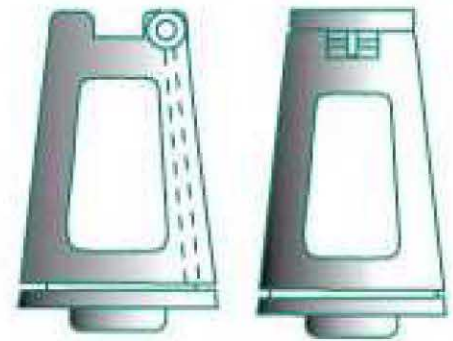


Fig. c

Fig. d

PROTECTED PRESSURE BALANCING

For increased reliability in service where there is a possibility of foreign particles in the media, we can incorporate as an option, the protected pressure balance system (Fig. c). This design ensures that the balancing holes are not exposed to the line media in the plug port, providing added security compared with normal pressure balancing.

PLUG BALANCING SPRING

This design (Fig. d) preloads the plug to prevent taper locking during pressure and/or temperature transients. Available as an option, this also enables total flexibility in piping configuration, regardless of valve orientation.



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Plug Valves

PB is our proprietary PTFE based anti-friction treatment. All PB plugs and stems are PB treated to ensure our valves have the lowest possible torques over the longest possible lifetime.

PB is a treatment of the metal surface that reduces coefficient of friction while maintaining a true metal-to-metal contact, and we can apply it to every material combination. PB has extreme durability, as can be seen in the photograph illustrating the difference after 20,000 cycles between a conventional anti-friction treatment, compared with our PB treatment.



FIRE SAFETY

Valves are designed to perform well when subjected to a fire, not only a standard defined fire but also the varying temperatures and durations likely in a real plant fire. The design is inherently fire-safe as it is free from plastic materials or elastomers. The plug seats are metal-to-metal, the cover seal is metal-to-metal or graphite and the stem seal is graphite. Additionally, PB will ensure operability even after exposure to fire test conditions. It has been fire tested and will meet all published fire test standards worldwide, including ISO 10497 and API 6FA.



EMISSION CONTROL

Industry standards are tightening the requirements on emissions levels permitted from pressurized equipment. Valves are ahead of the game and are designed and tested to meet the most stringent fugitive emission requirements. Our adjustable gland design, combined with high performance graphite stem packing materials, ensures low emissions over extensive temperature and mechanical cycling, even without the use of O-rings or PTFE seals.



Plug Valves

WHY SELECT A PLUG VALVE?

Robust **metal-to-metal seats** cope well with the solid impurities that can run at high velocities in close proximity to the integral seating surfaces, particularly when the valve is opened against a high differential pressure. Plug valves are the preferred choice for bypass and equalisation on main gas pipelines by most major gas transportation companies. (Fig. e)

Robust metal-to-metal seats have also high resistance to solids objects and **lack of gap/cavity** between plug and body ensure that particles do not become trapped between plug and body thus avoiding damage to the seats while closing the valve. (Fig. f)

Large seating area further enhances the PB resistance to erosion. The wide area maximizes the effectiveness of sealant, so that if the valve starts passing it can quickly be solved by injecting Serck Audco Sealant, restoring the valve's **bubble tight shut-off** capabilities without the need of valve overhaul. Sealant can be injected with the valve in any position and also under pressure, making the valve **in-line maintainable**. (Fig. g)

When the valve is open, unlike in other valve designs, the **seats are well protected** from the line media. This ensures that even if the valve is left open for long periods of time, its seating areas will not get damaged, thus ensuring good sealing and **long valve life**. (Fig. h)



Fig. e



Fig. f



Fig. g

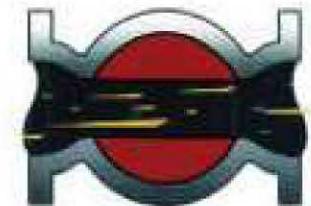


Fig. h

Benefit	How it is achieved
<ul style="list-style-type: none"> • Certainty of zero leakage sealing down the line, even with damaged metal-seat 	<ul style="list-style-type: none"> • Precise seat mating procedures • Effective sealant injection system combined with wide seating areas
<ul style="list-style-type: none"> • Certainty of operation with low and consistent torque which periods of time is stable over long • Minimal maintenance regime 	<ul style="list-style-type: none"> • Pressure balanced plug as standard • Super LoMu Anti Friction Treatment on plug and stem • Precise factory set plug loading
<ul style="list-style-type: none"> • Full in line maintainability even under full pressure and shut down without any need of 	<ul style="list-style-type: none"> • Provision for sealant injection for the seats • Provision for stem packing re-injection
<ul style="list-style-type: none"> • Assured sealing to atmosphere 	<ul style="list-style-type: none"> • Independent stem sealing design that can meet stringent requirements fugitive emissions • All pressure seals in fire safe metal or graphite



MANN FLOW CONTROLS

Plug Valves

Valves are available in Regular, Short or Venturi Pattern, in accordance with API 6D, API 599 and BS 5353. The different patterns vary in regard to face-to-face dimension and port area for a given size of valve.

RANGE

Regular Pattern valves have the largest port area and the same face-to-face dimension as ball valves. Short Pattern valves have a reduced port area as a consequence of their compact face-to-face dimensions, which match those of gate valves, and are used on low pressure classes. Venturi Pattern valves have a reduced port area and a flow path approximating a Venturi shape to aid pressure recovery. They tend to be used in larger size valves.

The table shows our current production range with a coloured indication of the usually selected patterns. For many size/ pressure class combinations, more than one pattern is available as indicated in the cells.

Face-to-face and end-to-end dimensions conform to ANSI B16.10 and BS 2080.

MFC can make special configurations/sizes/classes and our actual range is wider than shown below, so for valves not shown in the table please contact MFC with specific requirements.

API 6D	in	12	3/4	1	1.12	2	3	4	6	8	10	12	14	16	18	20	24	26	28	30	36	42	
Dimensions	mm	15	20	25	40	50	75	100	150	200	250	300	350	400	450	500	600	650	700	750	900	1050	
PN20-ANSI 1150		S/R	S/R	S/R	S/R	S/R	S/R	S/R	S/R	S/R	S/R	S/R	S/R	V	V	V	V	V	V	V	V	V	V
PN50-ANSI 300		S/R	S/R	S/R	S/R	S/R	S/R	S/R	R/V	R/V	R/V	R/V	R/V	V	V	V	V	V	V	V	V	V	V
PN100-ANSI 600		R	R	R	R	R	R	R	R/V	R/V	R/V	R/V	R/V	R/V	R/V	R/V	R/V	R/V	R/V	R/V	R/V	R/V	R/V
PN150-ANSI 900		R	R	R	R	R	R	R	R	R	R/V	R/V	R/V	V	V	V	V	V	V	V	V	V	V
PN250-ANSI 11500		R	R	R	R	R	R	R	R	R/V	R/V	R/V	R/V	V	V	V	V	V	V	V	V	V	V
PN400-ANSI 2500		R	R	R	R	R	R	R	R	R	R	R	R										
API 2000																							
API 3000																							
API 5000																							
API 10000																							
API 6A	in																						
Dimensions	mm																						

Most Common Pattern
Short
Regular
Venturi
API 6A

Refer to individual cells for all available patterns



MANN FLOW CONTROLS

Plug Valves

MFC Valves also manufactures the PB pressure balanced Plug Valve in special configurations such as:



Other particular configurations can be produced upon request to suit particular application.

MATERIALS

MFC has extensive experience in manufacturing our PB in a wide range of materials to comply with any particular application or project specification. Below are few samples of the most common material combinations:

Service	Body / Cover	Plug	Stem/ Eq Ring	Cover Bolting
Sweet Natural Gas and most non-aggressive services	Carbon Steel ASTM A216	ASTM A216WCB/WCC + Case Hardening	Alloy Steel ASTM A322 4140	ASTMA193B7 + ASTM A194 2H (57M/2HM H NACE)
Soar Services (ISO 15156 -N ACE)	WCB/WCC	ASTM A216WCB/WCC + ENP		
Abrasive Services		17-4PH Martensitic	17-4PH Martensitic	bolting is required)
API 6A	60K Carbon Steel ASTM A487 Gr 4	Stainless Steel ASTM A747 Gr Cb7Cu1	Stainless Steel ASTM A564 Ty 630	
Low Temperature Services	Low Temp. Carbon Steel ASTM A352 LCBLCC	ASTM A352 LCBLCC - ENP	ASTM A322 4140	ASTM 320 L7 + ASTM A194 Y
Corrosive Services	Austenitic Stainless Steel ASTM A351 CF3WCFFM	ASTM A351 CF3WCFFM + ENP	ASTM A564 Ty 630	ASTM A193 B8M + ASTM A194 BM
Corrosive and Abrasive Services	Duplex / Super Duplex Stainless Steel ASTM A690 4A/5A	ASTM A690 4A/5A + ENP	ASTM A182 F51/F55	UNS S32760
Highly Corrosive Services	ASTM A216 WCB/WCC + Inconel 625 Overlay	ASTM A216 WCB/WCC + Inconel 625 Overlay + ENP	Inconel 718	ASTM A193 B7 + ASTM
Highly Abrasive Services	ASTM A216 WCB/WCC + Stellite Hard Facing	ASTM A216 WCB/WCC+ Stellite Hard Facing	ASTM A322 4140	A194 2H

Notes: Other Material combinations are available

Anti Friction Treatment (AFT) is always applied on plugs and stem to reduce friction For small or flat parts, equivalent forged or plate grade is also widely used in lieu of castings



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Plug valves are ideally suited to applications where the line media is abrasive or corrosive, even with standard materials. For very aggressive services, the internal surfaces of the valves can be hard faced or overlaid with a selection of alloys specially identified and tested by **MFC** Valves. The choice of materials and surface treatments depends on the nature of the service. Hard facing and overlay can be applied to internal parts in four levels of increasing coverage:

- On the seating surfaces of plug and body only
- On the all surface of the body and plug tapers
- On the all surface of the body and plug tapers plus the body and plug flow bore
- On all wetted parts

The result is superior technical performance and dramatically extended valve life at an affordable cost. We recommend that customers consider hard facing or overlay for severe applications, such as: sand entrained oil and gas production, water injection, high temperature catalyst conveying, slurry handling and transportation etc.

For very highly abrasive services, hard faced valves are also available in full bore construction.



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Valves meet the requirements of API 6D, API 599, BS5353 and ANSI B16.34 as standard. Valves to meet API 6A are also available, typical industry standards that we are often asked to comply with are listed in the below table. Other standards can be considered against specific request.

THE SEARCH FOR QUALITY

The name Valves is synonymous with quality assured products throughout the petrochemical and process industries. This reputation has been achieved over the years by careful attention to all aspects of quality control and assurance.

QUALITY ASSURANCE, INSPECTION & TESTING

With AES, quality is present at every stage to ensure that the range is manufactured to a consistently high standard. All suppliers are assessed to ensure they meet our rigorous standards. Goods Received Inspection maintains performance records and vendor ratings. By using the latest technology such as CNC machining and CMM inspection, the machining accuracy on the MFC product range is outstanding. Stringent control of all processes including hard facing and PB Treatment ensures a uniformly high-quality, low-friction product. All manufacturing and assembly processes are monitored to ensure the product is right the first time with trouble-free installation, commissioning and a very long life. Standards and Quality Assurance Exhaustive testing at component and final product stages ensure that every valve meets the required performance levels. The Customer Inspection Department handles all materials witnessed by the customer or third party inspectors. All tests are substantiated as a minimum by EN 10204 3.1 certificates on pressure tests, NDTs and pressure containing parts mechanical and chemical tests.

API 6D (ISO 14313)	Specification for pipeline valves
API 6A (ISO 10423)	Specification for wellhead equipment
API 599	Metal plug valves - flanged, threaded and welding ends
BS 5353	Specification for steel plug valves
ASME B16.34	Valves - flanged, threaded and welding end
BS EN14141	Valves for natural gas transportation in pipelines. Performance requirements and tests
ISO 15849-1/2	Industrial valves. Measurement, test and qualification procedures for fugitive emissions
ASME B16.10	Face-to-face and end-to-end dimensions of valves
BS EN 12627	Face-to-face, center-to-face, end-to-end, and center-to-end dimensions of flanged and butt welding end steel valves for the petroleum, petrochemical and allied industries
BS EN 558 (formerly BS 2080)	
ASME B16.5	Pipe flanges and flanged fittings
BS EN 12266-1	Industrial valves. Testing of valves. Pressure tests, test procedures and acceptance criteria.
BS EN 12266-2 API 598	
ISC 10497	Testing of valves. Fire type-testing requirements
API IFA	Specification for fire test for valves
BS EN ISO 15156 (formerly NACE MR0175)	Sulphide stress cracking resistant metallic material for oilfield equipment
BS EN ISO 9001	Quality assurance approval standard
97/23/EC	Pressure equipment directive



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All AES valves are hydrostatically tested on body and seats at the following pressures before dispatch: Even though API6D generally allows a seat leakage rate while testing metal seated valves, it shall be noted that for lubricated plug valves (such as the MFC) in accordance with API6D no seat leakage is allowed (ISO 5Z08 class A).

Each relevant standard defines the minimum length of time for which each test pressure is to be maintained and also the testing operations sequence, AES are tested as a minimum to API 6D, whose test durations are longer than API 598 and BS EN 12266-1

Valve Size		API 6D	
Mm	In	Shell Test (min)	Seat Test (min)
≤ 50	≤ 2	2	2
65 - 100	CN	2	2
150	6	5	5
200 - 250	8-90	5	5
300	12	15	5
350 - 450	14-18	15	5
>500	≥20	30	5

Other test durations can be accommodated to satisfy a particular order specification, optional special tests are also available such as

- Low pressure air test
- High pressure gas test
- Fugitive emission testing
- Pressure Testing
- Low and high temperature testing
- PR2 for API-6A
- High temp

Valve Rating	Maximum C.W.P.		Body Test		Seat Test	
	Bar	Psi	Bar	Psi	Bar	Psi
FN20-ANSI150	19.5	285	29.3	427.5	21.5	313.5
PN50 - ANSI 300	51.1	740	78.7	1110	56.3	814
PN100 - ANSI 600	102.1	1480	153.2	2220	112.4	1628
ANSI 800	138	2000	207	3000	151.8	2200
PN150-ANSI 900	153.2	2220	220.8	3330	168.6	2442
PN250 - ANSI1500	255.3	3705	383	5558	280.9	4075.5
PN420 - ANSI 2500	425.5	6170	638.3	9255	468.1	6787
API 2000	138	2000	276	4000	138	2000
API 3000	207	3000	414	6000	207	3000
API 5000	345	5000	517	7500	345	5000
API10000	690	10000	1035	15000	690	10000

- Up to 20,000 PSI in 6A type



MANN FLOW CONTROLS

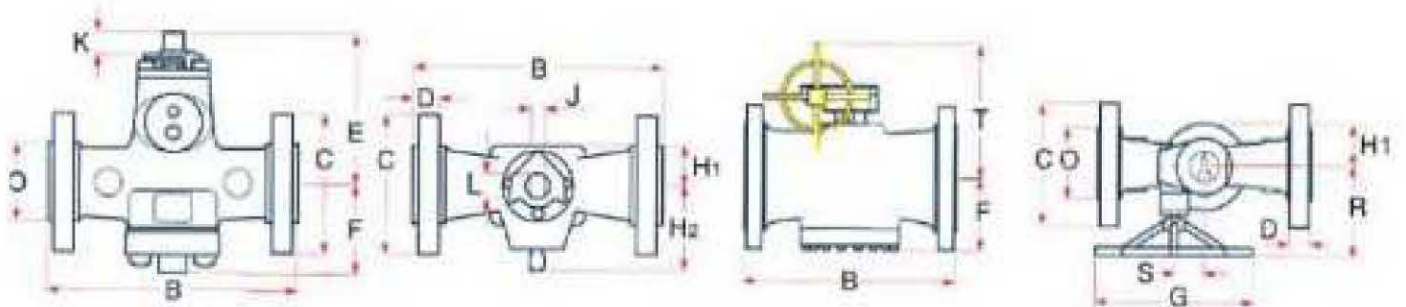
Plug Valves

CLASS 150 SHORT PATTERN

Flanged Class 150RF
50-100 mm (2-6")

Flanged Class 150RF
150-300 mm (6-12")

	50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")
B	Face-to-face RF	178	203	229	267	292	330
C	Flange diameter	153	191	229	280	343	407
D	Total flange thickness RF	16	19	24	25.4	28.5	30.5
E	CL to top of stem	158	195	205	250	300	420
F	CL to bottom of body/cap	121	161	179	209	225	255
G	Hand wheel diameter	--	--	--	--	600	700
H1	Body width from CL	58	84	93	105	120	145
H2	Body width from CL	111	120	134	134	--	--
J	Stem Across Flats	19	25.3	25.3	28.5	--	--
K	Depth of flats without stop plate	25	26	26	34	--	--
K	Depth of flats without stop plate	32	34	34	42	--	--
L	Stem diameter	27	35	35	41		
Ø	Raised face diameter RF	92	127	157.2	216	270	324
R	CL to face of hand wheel	--	--	--	--	390	461
S	CL valve to CL operating spindle	--	--	--	--	105	148
T	CL to top of hand wheel	--	--	--	--	625	715
U	CL to end of fitted wrench	494	684	684	933	--	--
	Weight (approx) kg	19	33	52	80	162	245
	Wrench Number	B4	B5S	B5S	B7	--	--

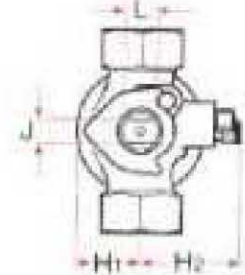
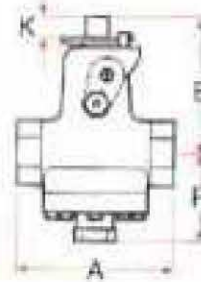
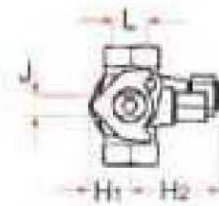
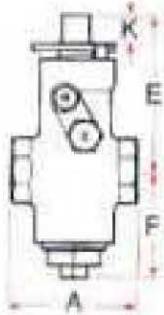




MANN FLOW CONTROLS

Plug Valves

CLASS 150 REGULAR PATTERN



Screwed BSP Tpr

Screwed API

Socket Weld End

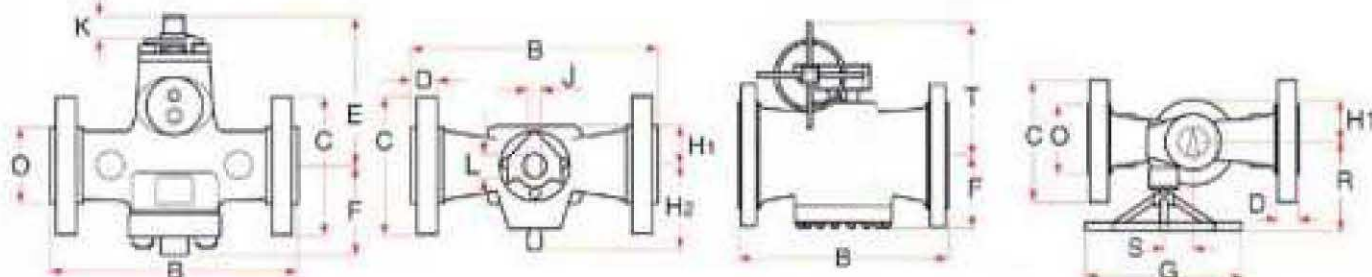
		15 (1/2")	20 (3/4")	25 (1")	40 (1 1/2")	50 (2")
A	End-to-end Screwed / SWE	89	133	133	229	229
E	CL to bottom of stem / injector	120	127	154	154	174
F	CL to bottom of body/ cap	76	97	97	110	133
H1	Body width from CL	31	38	42	57	72.5
H2	Body width from CL	68	76	76	106	106
J	Stem across flats	13	17	17	19	25.3
K	Depth of flats with stop plate	18	24	24	26	26
K	Depth of flats without stop plate	25	30	30	35	35
L	Stem diameter	19	22.2	22.2	35	35
U	CL to end of fitted wrench	230	318	318	685	685
Z	ID socket	21.7	27.5	34.1	49	61.2
ZA	Depth of socket	10	13	13	13	16
	Weight (approx) kg	2.5	6.8	6.8	22	24.5
	Wrench number	B8	B9	B9	B5S	B5S



MANN FLOW CONTROLS

Plug Valves

CLASS 150 REGULAR PATTERN



Flanged Class 150RF

Flanged Class 150RF

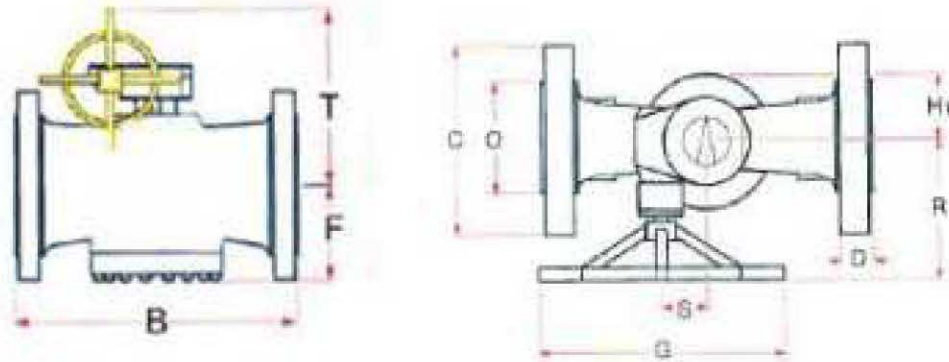
		50 (2")	60 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")
B	Face-to-face RF	203	241	305	394	457	533	610
C	Flange diameter	153	191	229	280	343	407	483
D	Total flange thickness RF	16	19	24	25.4	28.5	30.5	32
E	CL to top of stem	158	195	205	258	365	485	544
F	CL to bottom of body/cap	121	166	185	191	295	285	405
G	Hand wheel diameter	--	--	--	--	600	700	700
H1	Body width from CL	58	85	93	105	150	145	178
H2	Body width from CL	100	120	133	133	--	--	--
J	Stem across flats	19	25.3	25.3	28.6	--	--	--
K	Depth of flats without stop plate	25	26	26	34	--	--	--
K	Depth of flats without stop plate	32	34	34	42	--	--	--
L	Stem diameter	27	35	35	41			
O	Raised face diameter RF	92	127	157	216	270	324	381
R	CL to face of hand wheel	--	--	--	--	390	461	461
S	CL valve to CL operating spindle	--	--	--	--	105	148	148
T	CL to top of hand wheel	--	--	--	--	590	760	820
U	CL to end of fitted wrench	494	684	684	933	--	--	--
	Weight (approx) kg	22	38	60	92	225	282	415
	Wrench Number	B4	B5S	B5S	B7	--	--	--



MANN FLOW CONTROLS

Plug Valves

CLASS 150 VENTURI PATTERN



Flanged Class 150RF

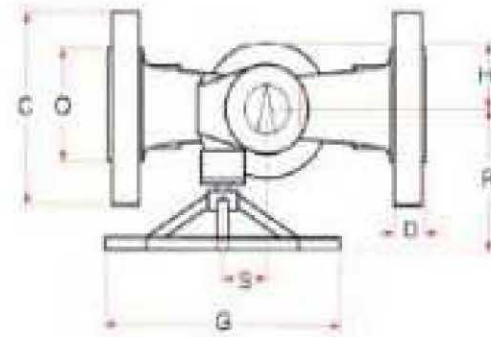
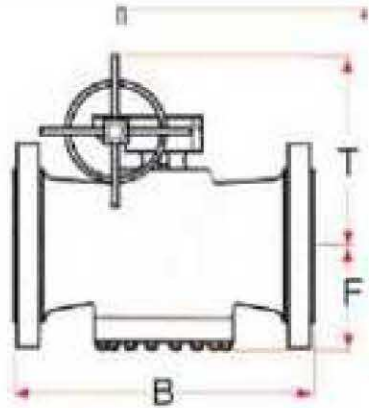
		250 (10")	300 (12")	350 (14")	400 (16")	450 (18")	500 (20")	600 (24")	750 (30")	900 (36")
B	Face-to-face RF	533	610	686	762	864	914	1067	1295	1524
C	Flange diameter	406	483	534	597	635	698.5	813	985	1168.4
D	Total flange thickness RF	30.2	31.8	35.1	36.5	39.6	42.9	48	75	90.5
F	CL to bottom of body/cap	282	403	400	392	395	497.5	485.5	672	897
G	Hand wheel diameter	700	700	700	500	800	700	650	650	762
H1	Body width from CL	148	178	214	214	239	270	264	400	508
O	Raised face diameter RJ	324	381	413	470	533	584	693	857	1022
R3	CL to face of hand wheel	422	422	545	501	564	557	580	620	631
S	CL valve to CL operating spindle	148	148	57.5	138	63	28	29	215	235
T	CL to top of hand wheel	738	837	800	672	833	898.5	868	1141	1132
	Weight (approx) kg	280	415	560	630	900	1180	1270	4015	Refer to SAV



MANN FLOW CONTROLS

Plug Valves

CLASS 300 REGULAR PATTERN



Flanged Class 300RF

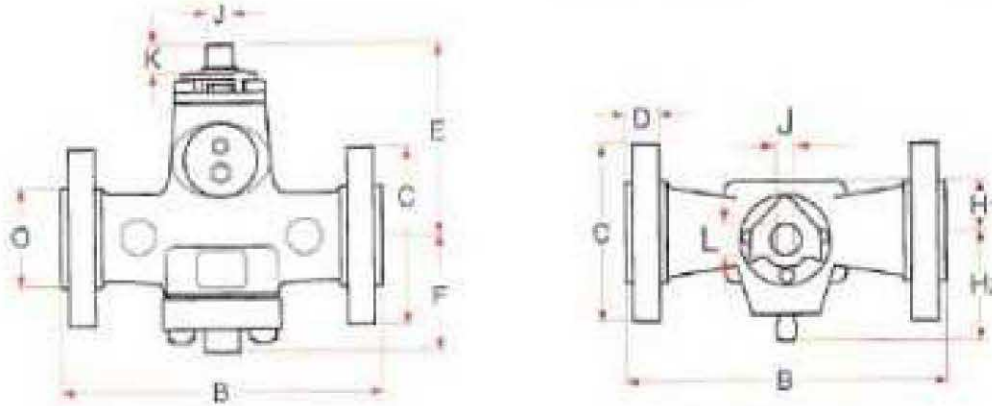
		150 (6")	200 (8")	250 (10")	300 (12")
B	Face-to-face RF	403	502	588.5	711.2
C	Flange diameter	318	381	445	521
D	Total flange thickness RF	36.5	41.1	47.8	50.8
F	CL to bottom of body/cap	240	260	340	370
G	Hand wheel diameter	600	600	700	787
H	Body width from CL	115	146.5	178	191
O	Raised face diameter RF	92	127	157	216
R	CL to face of hand wheel	390	422	461	576
S	CL valve to CL operating spindle	105	148	148	195
T	CL to top of hand wheel	580	640	770	850
	Weight (approx) kg	150	282	385	550



MANN FLOW CONTROLS

Plug Valves

CLASS 300 SHORT PATTERN



Flanged Class 300RF

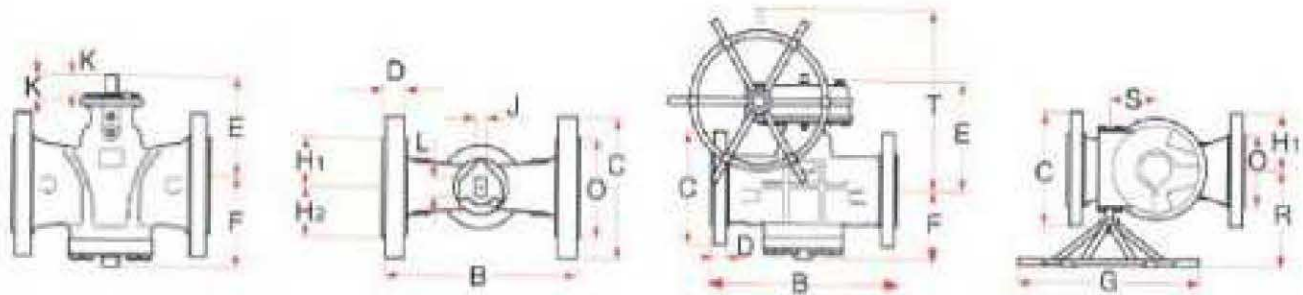
		40 (1 1/2")	50 (2")	80 (3")	100 (4")
B	Face-to-face RF	190	216	283	305
C	Flange diameter	156	165	210	254
D	Total flange thickness RF	20.6	22.2	28.6	31.8
E	CL to top of stem	155	160	194	210
F	CL to bottom of body/cap	110	125	153	110
H1	Body width from CL	57	58	85	93
H2	Body width from CL	109	110	120	134
J	Stem across flats	19	19	25.3	25.3
K	Depth of flats with stop plate	25	25	26	26
K	Depth of flats without stop plate	32	32	34	34
L	Stem diameter	27	27	35	35
O	Raised face diameter RF	73.2	92	127	157
U	CL to end of fitted wrench	494	494	684	684
	Weight (approx) kg	20	24	45	64
	Wrench number	B4	B4	B5S	B5S



MANN FLOW CONTROLS

Plug Valves

CLASS 300 VENTURI PATTERN



Flanged Class 300RF

Flanged Class 300RF

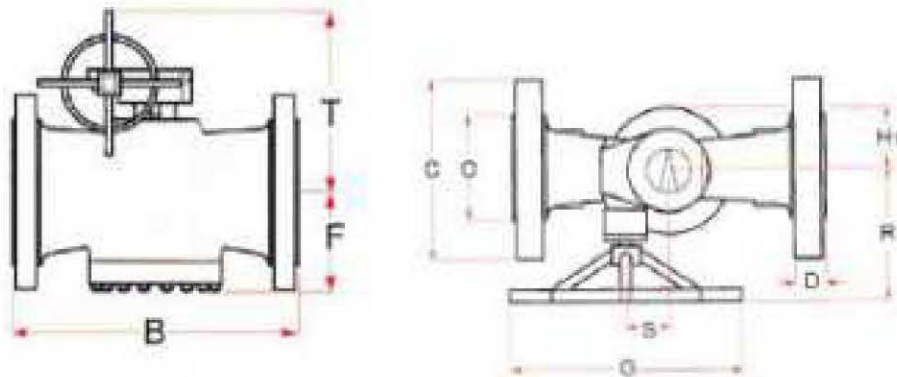
		150	150	200	250	300
		(6")	(6")	(8")	(10")	(12")
U	Face-to-face RF	403	403	419.1	457	502
C	Flange diameter	318	318	381	444	521
D	Total flange thickness RF	36.5	36.5	41.1	47.6	50.8
E	CL to top of stem	238	304	335	450	495
F	CL to bottom of body/cap	177	180	210	300	330
G	Hand wheel diameter		600	600	600	700
H1	Body width from CL	85	85	115	145	189
H2	Body width from CL	131.8	-	-	-	-
J	Stem across flats	25.32	-	-	-	-
K	Depth of flats with stop plate	42	-	-	-	-
K	Depth of flats without stop plate	34	-	-	-	-
L	Stem diameter	41	-	-	-	-
O	Raised face diameter RF	216	216	270	324	381
R	CL to face of hand wheel		390	390	425	461
S	CL valve to CL of operator spindle		104.8	104.8	148	148
T	CL to top of hand wheel		540	570	680	770
U	CL to end of fitted wrench	933	-	-	-	-
	Weight (approx) kg	101	121	192	305	508
	Wrench number	B7	-	-	-	-



MANN FLOW CONTROLS

Plug Valves

CLASS 300 VENTURI PATTERN



Flanged Class 300RF

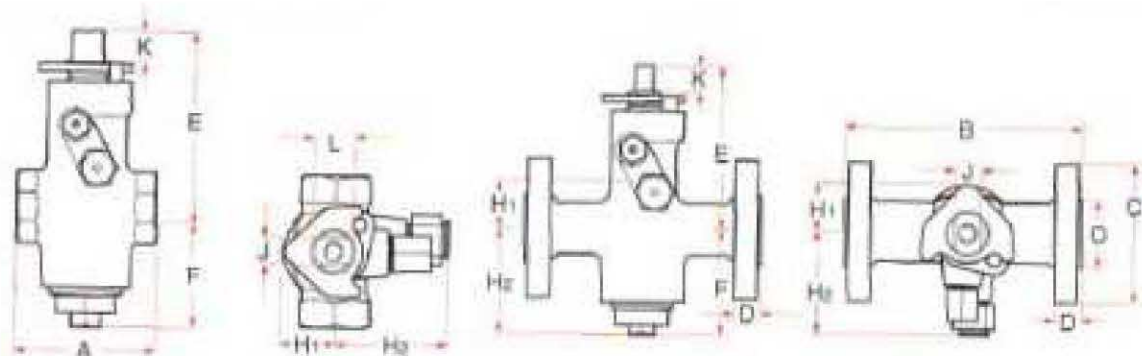
		350 (14")	400 (16")	450 (18")	500 (20")	600 (24")	750 (30")	900 (36")
B	Face-to-face RF	762	838	914	991	1143	1397	1727
C	Flange diameter	584	648	711	775	914	1092	1270
D	Total flange thickness RF	54.1	57.2	60.3	63.5	70	92	104.6
F	CL to bottom of body/cap	395	400	415	520	500	672	837
G	Hand wheel diameter	787	775	775	700	700	700	610
H1	Body width from CL	230	215	243	270	265	400	498
G	Raised face diameter RF	413	470	533	584	692	857	1022
R	CL to face of hand wheel	690	542	557	381	581	620	652
S	CL valve to CL of operator spindle	22.7	63	25.5	51	51	215	305
T	CL to top of hand wheel	835	825	900	915	895	1166	1305
	Weight (approx) kg	750	902	1097	1525	2060	Refer to SAV	9000



MANN FLOW CONTROLS

Plug Valves

CLASS 600 REGULAR PATTERN



		15 (1/2")	20 (3/4")	25 (1")	40 (1 1/2")	40 (1 1/2")	50 (2")	50 (2")
A	End-to-end screw weld amount	89	133	133	228	—	229	
B	End-to-end butt weld	—	—	—	—	—	292	—
B	face-to-face RF	165.1	190.5	216		241.3		262
B	Face-to-face RJ	163.5	190.5	216	—	241.3		295
C	Flange diameter	95.5	117.5	124	—	156		165
D	Total flange thickness RF	20.7	22.2	23.9	—	29.4	—	31.8
D	Total flange thickness RJ	19.8	22.2	23.9	—	29.4	—	33.32
E	CL to top of stem	120	127	140	135	135		175
F	CL to bottom of body/cap	90	97	97	105	105	—	121.5
H1	Body width from CL	29	41.5	41.5	57	57	56	66.5
H2	Body width from CL	66.5	76	76	105	104	106	110.8
J	Stem across flats	13	17	17	19	19	19	19
K	Depth of flats with stop plate	19	24	24	25	25	25	25
K	Depth of flats without	24	29	29	32	32	32	32
L	Stem diameter	19	22.2	22.2	27	27	27	27
O	Raised face diameter RF	35	42.9	50.8	73.2	73.2	92	92
O	Raised face diameter RJ	60.8	63.5	69.8	90.4	90.4	108	108
U	CL to end of fitted wrench	230	318	318	494	494	495	495
Z	ID of socket SWE	21.7	27.4	34.1	49	—	61.2	
ZA	Depth of socket SWE	10	13	13	13	—	16	
	Weight (approx) kg	2.5(SC/SW) 5.3(FL)	6.8(SC/SW) 9.0(FL)	9.8(SC/SW) 10(FL)	22(SC/SW)	19.5(FL)	24.5(SC) 21 (BW)	21.3(FL)
	Wrench Number	B8	B9	B9	B4	B4	B4	B4

Screwed BSP Tpr

Flanged Class 600RF

Screwed API

Flanged Class 600RJ

Butt Weld End

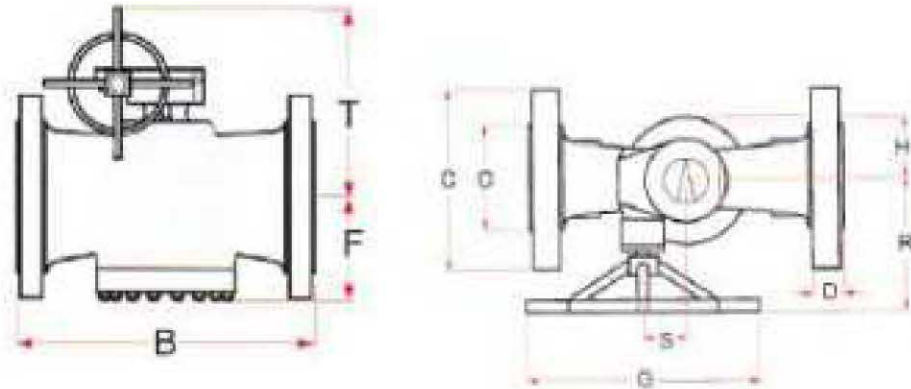
Socket Weld End



MANN FLOW CONTROLS

Plug Valves

CLASS 300 VENTURI PATTERN



Flanged Class 300RF

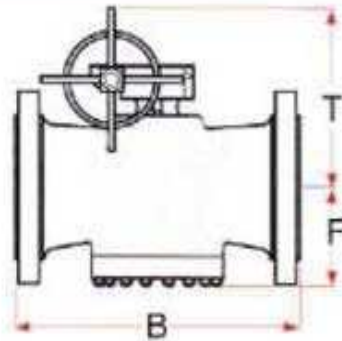
		80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")
B	End-to-end butt weld valves	356	432	559	660	787	838
B	Face-to-face RF	356	432	559	660	787	838
B	Face-to-face RJ	359	435	562	663.5	791	841
C	Flange diameter	210	273	356	419	508	559
D	Total flange thickness RF	38.2	44.5	54	62	70	73
D	Total flange thickness RJ	39.7	46	55.7	63.6	71.4	74.4
E	CL to top of stem	210	232				
F	CL to bottom of body/ cap	148	165	202	263	313	386.5
G	Hand wheel diameter			600	700	775	700
H1	Body width from CL	85	93	125	155	184	205
H2	Body width from CL	100	112				
J	Stem across flats	25.3	25.3				
K	Depth of flats with stop	26	26				
K	Depth of flats without stop plate	34	34				
L	Stem diameter	35	35				
O	Raised face diameter RF	127	157	216	270	324	381
O	Raised face diameter RJ	146	175	241	302	356	413
R	CL to face of hand wheel			383	421	520.5	514
S	CL valve to CL operating spindle			150	150	63	25
T	CL to top of hand wheel			702	774	834	836
U	CL to end of fitted wrench	922	922				
	Weight (approx) kg	41 (BW) 52 (FL)	62 (BW) 80 (FL)	168 (BW) 200 (FL)	330 (BW) 457 (FL)	540 (BW) 650 (FL)	740 (BW) 810 (FL)
	Wrench Number	B5S	B5L	-	-	-	-



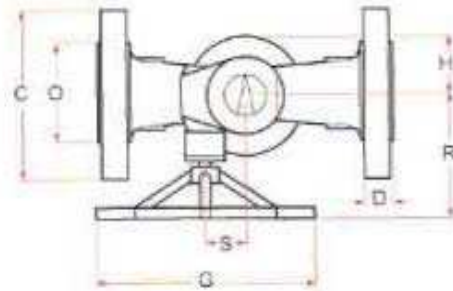
MANN FLOW CONTROLS

Plug Valves

CLASS 600 VENTURI PATTERN



Flanged Class 600RF



Flanged Class 600RJ

Butt Weld End *)

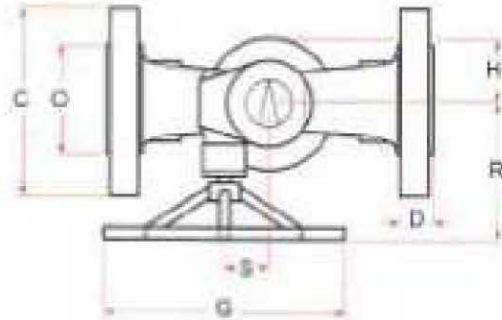
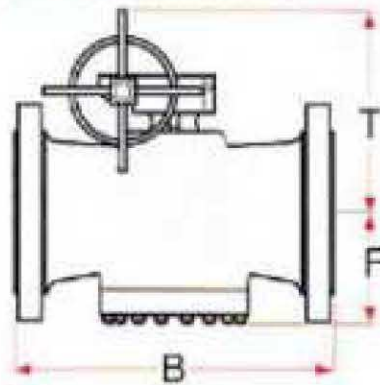
		150 (6")	200 (8")	250 (10")	300 (12")
B	End-to-end butt weld valves	559	660	787	838
B	face-to-face RF	559	660	787	838
B	Face-to-face RJ	562	664	791	841
C	Fbng diameter	356	419	508	559
D	Total flange thickness RF	54.2	62	70	73
D	Total flange thickness RJ	55.7	63.5	71.5	74.5
F	CL to bottom of body/cap	178	203	261	340
G	Hand wheel diameter	600	60	600	650
H1	Body width from CL	96	150	159	195
O	Raised face diameter RF	216	270	324	381
O	Raised face diameter RJ	241	301.8	356	413
R	CL to face of hand wheel	350	382	382	583
S	CL valve to CL operating spindle	105	148	148	58
T	CL to top of hand wheel	546	685	700	792
	Weight (approx) kg	127(BW) 160(FL)	180(BW) 244(FL)	452 (FL)	455(BW) 633(FL)



MANN FLOW CONTROLS

Plug Valves

CLASS 600 VENTURI PATTERN



Flanged Class 600RF

Flanged Class 600RJ

Butt Weld End

Flanged Class 600RF

Flanged Class 600RJ

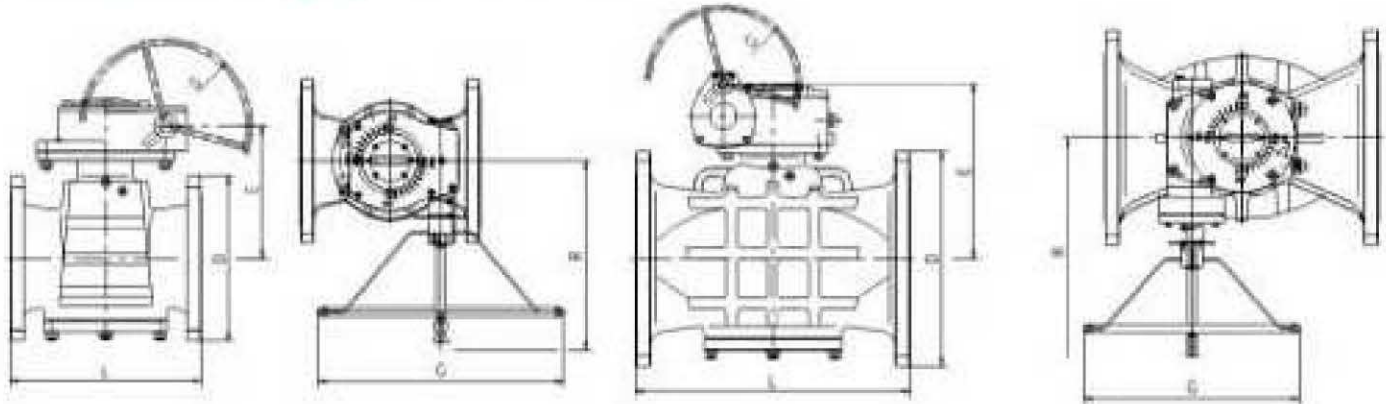
		350 (14")	400 (16")	450 (18")	500 (20")	600 (24")	650 (26")	750 (30")	900 (36")
B	End-to-end butt weld valves	889	990.6	1092	1194	1397	1448	1651	2083
B	face-to-face RF	889	990.6	1092	1194	1397	1448	1651	2083
B	Face-to-face RJ	892	994	1095	1200	1407	1461	1664	2099
C	Flange diameter	603	688	743	813	940	1016	1130	1315
D	Total flange thickness RF	78.5	82.6	89	95.4	108	114.4	120.7	131.4
D	Total flange thickness RJ	78	84.2	90.5	98.5	112.8	120.8	127	139.3
F	CL to bottom of body/cap	388	417	451	485	512	689	689	858
G	Hand wheel diameter	650	700	700	800	800	800	800	1000
H1	Body width from CL	207	221	305	325	365	460	506	700
O	Raised face diameter RF	413	470	533.4	584.2	692.2	749.3	857.3	1022.3
O	Raised face diameter RJ	457.2	508	574.5	635	749.3	810	917.5	1092.2
R	CL to face of hand wheel	583	512	630	610	610	610	610	820
S	CL valve to CL operating	57.5	25.5	215	230	230	230	230	340
T	CL to top of hand wheel	817	877	915	1076	1114	1304	1304	1584
	Weight (approx) kg	880	1260	1673	2380	3140	4900	6350	9720



MANN FLOW CONTROLS

Plug Valves

PRESSURE BALANCED CLASS 300 REGULAR PATTERN



NPS	DN	L			D	E	G	R	Weight (kg)		
		RF	RJ	BW							
6"	150	403	419	457	320	252	350	336	152		
8"	200	419	435	521	380	268	460	500	178		
10"	250	457	473	559	445	312	600	500	280		
12"	300	502	518	635	520	332	600	500	460		
14"	350	762	778	762	585	480	600	645	760		
16"	400	838	854	838	650	510	600	645	906		
18"	450	914	930	914	710	550	600	645	1140		
20"	500	991	1010	991	775	575	600	645	1380		
22"	550	1092	1114	1092	840	-	-	-	-		
24"	600	1143	1165	1143	915	645	600	753	2060		
26"	650	1245	1270	1245	970	-	-	-	-		
28"	700	1346	1372	1346	1035	-	-	-	-		
30"	750	1397	1422	1397	1090	-	-	-	-		
32"	800	1524	1553	1524	1150	-	-	-	-		
34"	850	1626	1654	1626	1205	-	-	-	-		
36"	900	1727	1756	1727	1270	-	-	-	-		