KOFLOW

PLUG VALVE

Figure Coding System for Plug Valves

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Nominal Diameter Symbols

A××in value is used to ASME, D×××mm value is used to DIN, and G××mm value being for GB.

② Valve Type Symbols

X—Plug Valve

③ Symbol for Actuation Methods (For handle or lever drive, this code can be omitted.)

3—Manual Operator; 6—Pneumatic; 6S—Pneumatic Spring Return; 9—Electric

④ Valve Connection/Ends Symbol

RF—Raised Face Flange; FF—Fully Flat Face Flange; MFM—Male and Female Flange; TG—Tongued and Grooved Flange;
RJ—Ring Junction Flange; BW—Butt Welding; SW—Socket Welding; NPT—Threaded Connection

⑤ Structure Type Symbols

Stuffing Airproof:
3—straight way (flow bore); 4_T—T Type 3-way; 4_L—L Type 3-way; 5—4-way
Pressure balance type lubricated:
7—straight way (flow bore); 8_T—T Type 3-way; 8_L—L Type 3-way;
Other type:
7_L—Lift type; 7_E—Eccentric structure 7_D—Double flush structure； 7_C—Double isolation structure

⑥Nominal Pressure Symbols

1—PN16 class150 ; 2—PN25; 3—class300; 4—PN40 class400 ; 6—PN64 class600
9—class900; 10—PN100; 15—class1500; 16—PN160; 20—PN200; 25—class2500;

⑦ Body Material Symbols

C—WCB; C5—C5; C6—WC6; C9—WC9; BL—LCB; CL—LCC
8—CF8; 8M—CF8M; 3—CF3; 3M—CF3M; ML—MONEL

⑧ Symbols of Sealing Surfaces and Lined Material

F—PTFE; F3—PCTFE; F46—FEP; PA—PFA;
H—Cr13 Series Stainless Steel; Y—Stellite; R—Austenitic Stainless Steel; M—MONEL alloy

Given demonstration: A8″ X3RF31CF denotes API 8″ x 150Lb sleeve type plug valves, worm gear actuated, RF, straight way with body material of WCB and lined material of F4.

Technical Specifications of Plug Valve

Technical Specifications	API Serials	GB Serials
Design Specifications	API6D、API599、BS5353	GB/T19672
Pressure and Temperature Class	ASME B16.34	GB/T9124
Face-to-face	ASME B16.10	GB/T12221、GB/T15188.1
Flange Type and Dimensions	ASME B16.5 、ASME B16.47	GB/T9113 、JB/T79
Butt-welding connection	ASME B16.25	GB/T12224
Socket-welded connection	ASME B16.11	/
Threaded-welding connection	ASME B16.1.20	/
Inspection and Test	API598 、API6D	JB/T9092、GB/T13927

SUMMARIZATION OF PLUG VALVE

Summarization

Plug valve is a circumrotating valve with its closure part as a plug, which turns 90° with its through bore connecting to or apart from the same of the body to realize opening or closing. The figure of the valve plug can be made as column or taper.

Of the column plug valve, the flow bore gets rectangle in general, and that of the taper type plug valve, the flow bore is of trapezium. The figures mentioned have made the structure of plug valves legerity, however, certain loss is at the same time generated.

The plug valve is mostly suitable for cutting off, turning on and distributing the flow medium. Sometime it can also be used for throttling based upon suitable medium and the erosion resistance property of the sealing surfaces. Due to the friction action between the sealing surfaces of the plug valve,whereas contact with flow medium can be completely avoided as the valve is fully opened.In this respect, the plug valve can also be used for the medium with suspend grains.

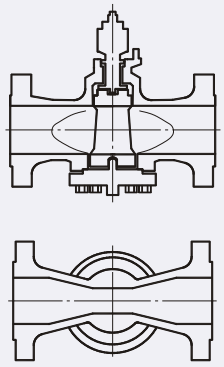
One of the important characteristics of the plug valve is that it is prone to fitting multi-center structure, so that one single plug valve can be designed with two, three, and even four different flow bores. In this way, the design of the pipeline system can be simplified, and both valve quantity and piping fittings can be reduced. The plug valves are widely used in the applications of oil field exploitation, transportation, and refinery facility, while being extensively used for such general industries as petrochemical, chemistry, gas, nature gas, liquefied oil gas, and warming & traffics.

Lined plug valves without lubricant are used for applications of petrochemical and chemistry industries, especially being used for the medium that is not allowed to be with lubricants.

Straight Way Flow Bore Patterns

The straight way flow bore of plug valves manufactured by Shanghai KOFLOW Machinery Co., Ltd. are of many patterns, there are venturi pattern, standard pattern with straight bore, short pattern, regular pattern and standard camber pattern with straight bore, among which the principal difference is the face-to-face dimensions, diameter and the plug figure.

VENTURI Pattern: The face-to-face dimensions of these valves are designed according to Britain and American standards to ensure inter-replacing of valves among different standards. The plug bore of these valves are of reduced bore area, however, the center line position of the plug valves does not change, which generates in the valve body a Venturi action to increase the loss of flow velocity with big percent. The result generated by this action is a corresponding low pressure drop. In this respect, the plug valves can be used in general pipelines, especially used for big sized pipelines to reduce application cost.

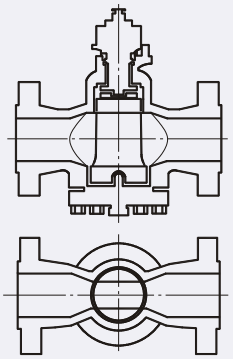


Venturi pattern

SUMMARIZATION OF PLUG VALVE

Straight Way Flow Bore Patterns

Standard Plug Valves with straight bore: The face-to-face dimensions of these valves are designed according to Britain and American standards to ensure farthest inter-replacing of valves among different types of valves. The figure of plug bore looks like a rectangle structure. There is an area echoing to the valve ends, which is with lowest pressure drop. The conversion from body end to the rectangle end-face is even, it will not appear the condition of sudden change of shape or part. Otherwise, the flow medium in the pipeline would generate sudden shake-up of flow velocity or direction.

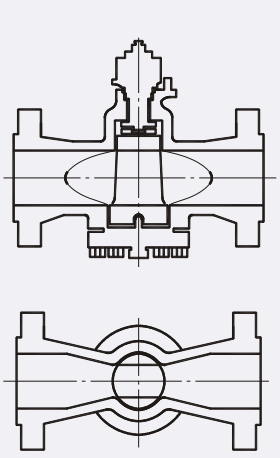


Standard plug valves With straight bore

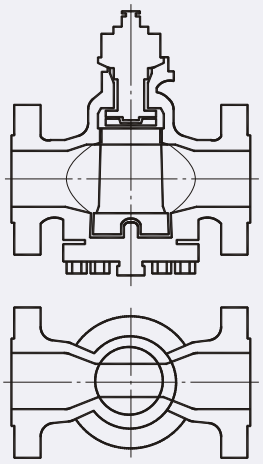
Short Pattern: The face-to-face dimensions of these plug valves equal to that of the gate valves designed according to ASME B16.10 CLASS125、150、250 and 300 Lb (NPS1 1/2~NPS12. In order to obtain correspondingly short face-to-face dimension, the diameter of the plug is reduced one with a small cone of rectangle.

Regular Pattern: These valves are designed according to Britain and American standards to ensure farthest inter-replacing of valves among different types of valves and different types of connection ends. There is a rectangle figure of the plug bore being with a tiny cone figure on its side face, where there is an area bigger than that of Venturi. The conversion from body end to the rectangle end-face is even, it will not appear the condition of sudden change of shape or part. Otherwise, the flow medium in the pipeline would generate sudden shake-up of flow velocity or direction. The flow bore area of the regular pattern plug valves is bigger than that of Venturi (reduced bore).

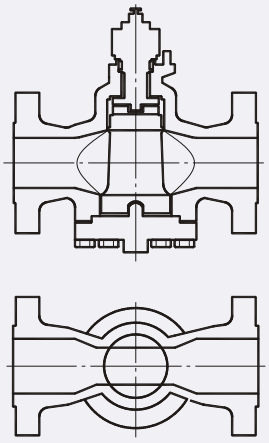
Standard Camber Plug Valves with Straight Bore: The diameter of these valves equals to the inside diameter of pipes. The design of the plug valve is mainly for the purpose that some scraping tools or other tools can get through the valve body, and that the valve can be used for some special occasions. The face-to-face dimensions of the plug valve are longer than that of standard pattern one, however, meeting the requirement of Britain and American standards. These plug valves are especially suitable for use in the slurry occasions of sewage disposal factory and for the branches of steam tubes.



Regular Pattern



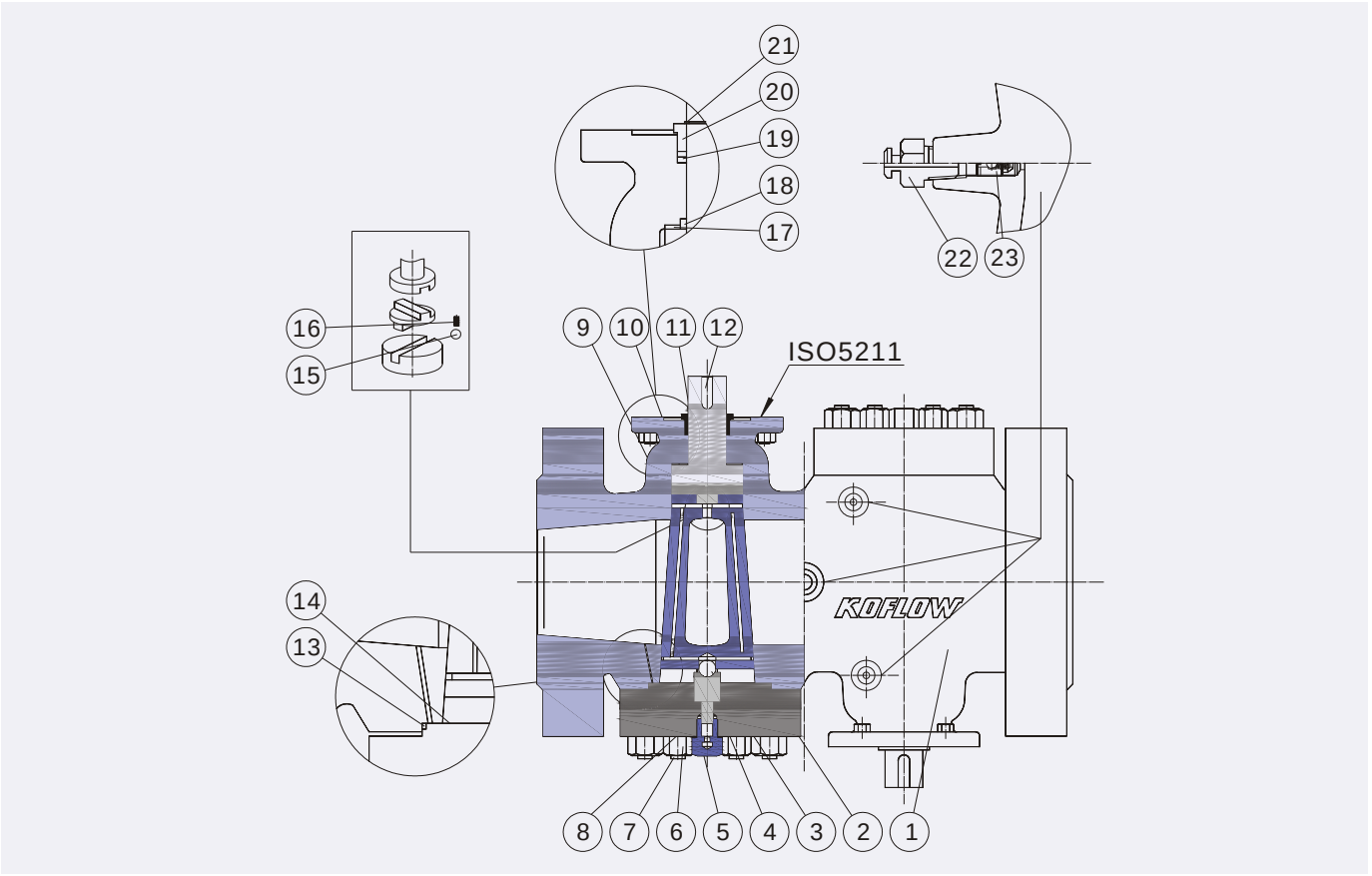
Short Pattern



Standard Camber Plug Valves with Straight Bore

DOUBLE ISOLATION PLUG VALVE

Structure Drawing



Materials List

No.	Part Name	Materials	Optional Materials
1	Body	Cast Steel	SS、Monel
2	Cover	Carbon Steel	SS、Monel
3	Ball	SS	
4	Bolt	/	SS
5	Bolt	/	SS
6	Nut	/	SS
7	Bolt	/	SS
8	Rivet Ring	SS	SS、Monel
9	Disc	SS	SS、Monel
10	Reach	Carbon Steel	SS、Monel
11	Stem	SS	316、Monel
12	Key	Carbon Steel	
13	Seal Ring	SS+ Graphite	SS+ Graphite
14	Membrane	SS	
15	Ball	SS	
16	Spring	INCONEL750	
17	Gasket	Cu+PTFE	SS+PTFE
18	Fire Ring	SS+ Graphite	
19	Packing	SS+ Graphite	
20	Packing Bushing	SS	316、Monel
21	Lock Ring	SS	
22	Injection Valve	Carbon Steel	SS、Monel
23	Check Valve	Carbon Steel	SS、Monel

DOUBLE ISOLATION PLUG VALVE

Description of Structure

Double isolation plug valves are suitable and designed for special occasions where strict cutting-off tightness is required. The design features very compact in structure, less in occupied space, and light in weight. In addition, the strongpoint of the design is that its leakage point is less than that of the general cutting off valve plus releasing valve. Under most conditions, the designed face-to-face dimensions of the valve equals to that of the general single plug valve or ball valve.

Double isolation plug valves are designed based on the structure of standard pressure balance plug valves, of which the operation and maintenance method sounds the same.

One more new strongpoint of the plug valve is that a protection connecting orifice (between two plugs) is added to prevent cavitation inside, which is called specialized pressure relieving orifice. As the operation goes normally, the orifice is closed by the pressure of bottom cover that is fixed by bolts and nuts against the membrane direction.

Once the overpressure appears when both of two plugs are on the closing position, the plug valve would be caused by the heat stress easily and therefore the pressure against the bottom cover would deform the bolts (drawing and extending) to open the relieving valve, and the pressure would be discharged to the pipeline, where the pressure would be within little time released to the atmosphere, and then the deformation degree of the bottom cover bolts would exceed allowed value defined by ASME/API specifications within very little time. When the pressure decreases, the bolt restores to the bottom cover, and then the said connection orifice closes.

The discharging connector would be equipped correspondingly according to customers' requirement, which is allowed to get through to the sealing entrance of the valve itself inspected. Any leakage through the first plug can be inspected. Regarding with the specific connection method for the relieving connector, customers are welcome to contact with our company.

Operation Methods

There are a lot of actuators to be equipped for double isolation plug valves.

1.Both plugs are with levers.

2.One plug is with lever, and the other is with hand wheel.

3.Both plugs are with hand wheels.

4.Pneumatic, hydro, or electric actuators are available. (being optional for one plug or two plugs)

Except for the above mentioned contents, the gear box is also able to be equipped with various collocations.

A)Vertical hand wheel

B)Horizontal hand wheel

C)Altered/mixed vertical hand wheel

D)altered/mixed horizontal hand wheel

E)Hand wheel at side of the plug valve, or the hand wheel with same direction of that of the valve.

The variety of the combination ensures that the plug valves manufactured by us can be matched within existing limited space. Customers must remind us of what they prefer for the collocation requirement. When requiring gear operators,our standard collocation is two pieces of vertical hand wheels.

DOUBLE ISOLATION PLUG VALVE

Technical Performance Specification

Design Standard		API599, API 6D, BS5353					
Pressure-Temperature Rating		API609, ASME B16.34					
Face-Face		API609, ISO5752, ASME B16.10, API 6D					
Flange Ends		ASME B16.5					
Inspection &Test		API598, API 6D					
Norminal Pressure（MPa）		CLASS150	CLASS300	CLASS600	CLASS900	CLASS1500	CLASS2500
Test Pressure	Shell Test	2.93	7.58	15.3	23.0	38.3	63.8
	High Pressure Seal Teat	2.07	5.52	11.03	16.8	28.0	46.8
	Low Pressure Seal Teat	0.6					
Applicable Temperature		Different raw material for different work temperature					
Applicable Medium		Water、oil、gas and other causticity medium (Different raw material for different medium)					

Note: The value of testing pressure in the list is defined as per WCB pressure temperature rating.

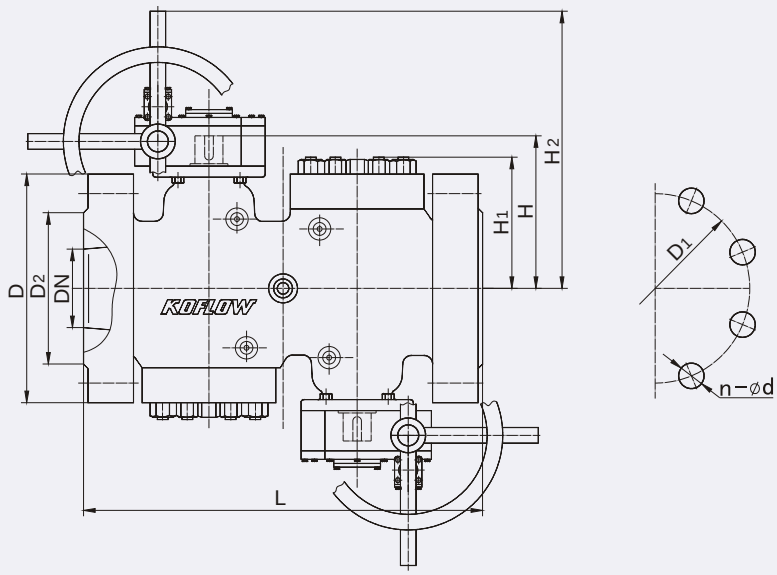
Products Range for Double Isolation Plug Valves

尺寸 Size	Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500	尺寸 Size
50	◆	◆	◆	◆	◆	◆	2
80	◆	◆	◆	◆	◆	◆	3
100	◆	◆	◆	◆	◆	◆	4
150	◆	◆	◆	◆	◆	◆	6
200	◆	◆	◆	◆	◆	◆	8
250	◆	◆	◆	◆	◆	◆	10
300	◆	◆	◆	◆	◆	◆	12
350	◆	◆	◆	◆	◆	—	14
400	◆	◆	◆	◆	◆	—	16
450	◆	◆	◆	◆	—	—	18
500	◆	◆	◆	◆	—	—	20
600	◆	◆	◆	◆	—	—	24

Note: —means no .

DOUBLE ISOLATION PLUG VALVE

CLASS 150~2500



Main Outline Sizes

CLASS 150

Nominal Diameter		Standard Value							Reference Value				
DN (mm)	NPS (inch)	L	D	D_1	D_2	f	b	Z-d	H	H_1	H_2	Torque NM	W(kg)
		CLASS150											RF
50	2	292	152	120.5	92	2	16	4-ϕ19	194	113	250	17	45
80	3	381	190	152.5	127	2	19	4-ϕ19	239	180	358	42	105
100	4	432	229	190.5	157	2	24	8-ϕ19	255	190	435	129	190
150	6	610	279	241.5	216	2	26	8-ϕ22	315	200	480	600	380
200	8	660	345	298.5	270	2	29	8-ϕ22	424	290	610	950	472
250	10	787	405	362	324	2	31	12-ϕ25	483	320	675	1355	725
300	12	838	485	432	381	2	32	12-ϕ25	483	370	625	1780	930
350	14	889	535	476	413	2	35	12-ϕ29	491	414	800	1900	1115
400	16	991	600	540	470	2	37	16-ϕ29	530	400	850	2500	1425
450	18	1092	635	578	533	2	40	16-ϕ32	659	446	900	/	1955
500	20	1194	700	635	584	2	43	20-ϕ32	678	465	950	/	2540
600	24	1397	815	749.5	692	2	48	20-ϕ35	690	485	1100	3500	3265

CLASS 300

Nominal Diameter		Standard Value							Reference Value				
DN (mm)	NPS (inch)	L	D	D_1	D_2	f	b	Z-d	H	H_1	H_2	Torque NM	W(kg)
		CLASS300											RF
50	2	292	165	127	92	2	23	8-ϕ19	194	11 3	250	43	48
80	3	381	210	168.5	127	2	29	8-ϕ22	239	180	358	108	110
100	4	432	254	200	157	2	32	8-ϕ22	255	190	435	339	200
150	6	610	318	270	216	2	37	12-ϕ22	315	205	480	850	400
200	8	660	381	330	270	2	42	12-ϕ25	424	290	685	1225	495
250	10	787	445	387.5	324	2	48	16-ϕ29	483	320	745	1900	760
300	12	838	521	451	381	2	51	16-ϕ32	483	375	625	2200	975
350	14	889	584	514.5	413	2	54	20-ϕ32	530	414	670	2930	1170
400	16	991	650	571.5	470	2	58	20-ϕ35	491	400	690	3200	1495
450	18	1092	710	628.5	533	2	61	24-ϕ35	659	446	800	5100	2055
500	20	1194	775	686	584	2	64	24-ϕ35	/	/	950	/	2670
600	24	1397	915	813	692	2	70	24-ϕ41	690	485	1100	6400	3430

DOUBLE ISOLATION PLUG VALVE

Main Outline Sizes — CLASS 600

Nominal Diameter		Standard Value							Reference Value				
DN (mm)	NPS (inch)	L	D	D_1	D_2	f	b	Z-d	H	H_1	H_2	Torque NM	W(kg) RF
		CLASS600											
50	2	292	165	127	92	6.4	26	8-ϕ19	194	113	250	87	50
80	3	381	210	168	127	6.4	32	8-ϕ22	239	180	358	217	116
100	4	432	273	216	157	6.4	38	8-ϕ25	255	190	435	678	210
150	6	610	355	292	216	6.4	48	12-ϕ29	315	210	480	1100	420
200	8	660	420	349.2	270	6.4	56	12-ϕ32	424	290	685	2000	620
250	10	787	510	431.8	324	6.4	64	16-ϕ35	483	332	745	2575	800
300	12	838	560	489	381	6.4	67	20-ϕ35	483	375	625	4000	1090
350	14	889	605	527	413	6.4	70	20-ϕ39	530	414	670	2930	1260
400	16	991	685	603.2	470	6.4	77	20-ϕ42	491	41	690	4500	1630
450	18	1092	745	654	533	6.4	83	20-ϕ45	659	446	800	8900	2160
500	20	1194	815	723.9	584	6.4	89	24-ϕ45	/	/	950	/	2800
600	24	1397	940	838.2	692	6.4	102	24-ϕ51	690	485	1100	12200	3600

CLASS 900

Nominal Diameter		Standard Value							Reference Value				
DN (mm)	NPS (inch)	L	D	D_1	D_2	f	b	Z-d	H	H_1	H_2	Torque NM	W(kg) RF
		CLASS900											
50	2	368	215	165.1	92	6.4	38.5	8-ϕ26	214	113	290	130	96
80	3	381	240	190.5	127	6.4	38.5	8-ϕ26	239	180	350	325	130
100	4	457	290	235	157	6.4	44.5	8-ϕ32	255	190	435	705	250
150	6	610	380	317.5	216	6.4	56	12-ϕ32	315	219	480	1500	530
200	8	737	470	393.7	270	6.4	63.5	12-ϕ39	527	291	700	2711	800
250	10	838	545	469.9	324	6.4	70	16-ϕ39	483	340	620	4470	1125
300	12	965	610	533.4	381	6.4	79.5	20-ϕ39	/	/	700	4300	1680
350	14	1029	640	558.8	413	6.4	86	20-ϕ42	/	/	750	/	1845
400	16	1130	705	616	470	6.4	89	20-ϕ45	/	/	825	5200	2355
450	18	1219	785	685.8	533	6.4	102	20-ϕ51	/	/	900	/	3240
500	20	1321	855	749.3	584	6.4	108	20-ϕ55	/	/	1000	/	4200
600	24	1549	1040	901.7	692	6.4	140	20-ϕ68	/	/	1150	/	5500

CLASS 1500

Nominal Diameter		Standard Value							Reference Value				
DN (mm)	NPS (inch)	L	D	D_1	D_2	f	b	Z-d	H	H_1	H_2	Torque NM	W(kg) RF
		CLASS1500											
50	2	368	215	165.1	92	6.4	38.5	8-ϕ26	214	113	290	217	136
80	3	470	265	203.2	127	6.4	48	8-ϕ32	239	180	350	542	240
100	4	546	310	241.3	157	6.4	54	8-ϕ35	255	190	435	745	320
150	6	705	395	317.5	216	6.4	83	12-ϕ39	336	227	530	3000	520
200	8	832	485	393.7	270	6.4	92	12-ϕ45	527	290	580	4900	975
250	10	991	585	482.6	324	6.4	108	12-ϕ51	500	360	620	6800	1460
300	12	1130	675	571.5	381	6.4	124	16-ϕ55	/	/	700	6000	2340
350	14	1257	750	635	413	6.4	133.5	16-ϕ60	/	/	825	/	3200
400	16	1384	825	704.8	470	6.4	146.5	16-ϕ68	/	/	1000	6900	4500

CLASS 2500

Nominal Diameter		Standard Value							Reference Value				
DN (mm)	NPS (inch)	L	D	D_1	D_2	f	b	Z-d	H	H_1	H_2	Torque NM	W(kg) RF
		CLASS2500											
50	2	451	235	171.4	92	6.4	51	8-ϕ29	214	113	290	362	148
80	3	578	305	228.6	127	6.4	67	8-ϕ35	239	180	350	1500	300
100	4	673	355	273	157	6.4	76.5	8-ϕ42	255	190	435	1247	460
150	6	914	485	368.3	216	6.4	108	8-ϕ55	336	227	530	6600	1000
200	8	1022	550	438.2	270	6.4	127	12-ϕ55	527	290	580	8900	1675
250	10	1270	675	593.8	324	6.4	165.5	12-ϕ67	500	360	620	/	1800
300	12	1422	760	619.1	381	6.4	184.5	12-ϕ74	/	/	700	9000	3740