FORGED STEEL PRESSURE SEAL PARALLEL SLIDE GATE VALVES 3/4" - 4"

ASME B16.34 Standard & Special Class

VALVES LTD

INDEX & PRODUCT REVIEW

Forged Steel Pressure Seal Parallel Slide Gate Valve

Features of the Forged Steel Parallel Slide Gate Valve:

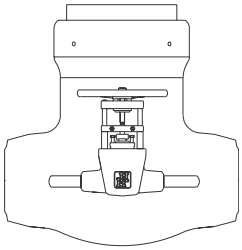
- Designed to ASME B16.34 Standard and Special Class
- Pressure Classes 1690, 2850 & 4500
- Pressure Seal Design
- Butt Weld End & Socket Weld End connections
- Forged carbon steel construction:
  ASTM A105N, ASTM A182 Gr. F22 & ASTM A182 Gr. F91
- Rising stem, outside screw and pillar design
- Stellite faced seats, discs & backseat
- Preformed expanded graphite gland packing and pressure seal ring
- Positive stem stop
- Non-rising handwheel
- Open and shut indication on pillars
- Size Range - 3/4" to 4"

BY-PASS, EQUALISING BY-PASS AND CONTROL

Parallel Slide Gate Valves when used as By-pass and Equalising By-pass Valves

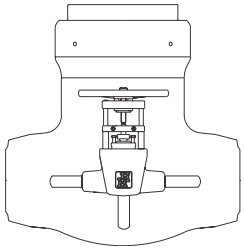
By-pass Valve

If required, the HH Valves design of small-bore parallel slide gate valves complete with all necessary pipe-work, matching the conditions of the main valve, can be fitted at the factory.
A by-pass valve is normally fitted to equalise the pressure on either side of the closed main valve, subsequently reducing the load on the handwheel or actuator prior to opening.
It can also be used to warm up the downstream pipe-work to reduce the thermal shock before opening the main valve.



Equalising By-pass Valve

An equalising by-pass valve can be fitted to overcome the possibility of inter-gate pressure locking.
This system uses a by-pass arrangement as described above but with an additional connection by means of a small bore pipe between the main valve inter-gate chamber and the by-pass valve.
Therefore, when the main valve is closed and the by-pass valve is opened the inter-gate pressure is evacuated to the upstream and downstream sides of the main valve.
The valve in this instance will be bi-directional.

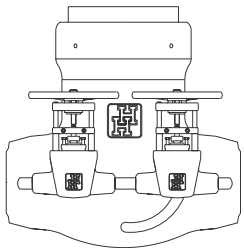


Auto-Equalising By-pass Valve

Under certain conditions the equalising by-pass valve can also experience inter-gate pressure locking when it has been left in the closed position instead of being open.
To prevent this, HH Valves can supply the valve with an auto-equalising feature by fixing the valve discs together to ensure they can only ever achieve single block (seat/disc) sealing. This allows the valve to seal on either seat but never seal on both seats at the same time.
The main valve inter-gate pressure is therefore automatically equalised to the higher-pressure upstream side of the valve at all times, ensuring the inter-gate pressure in the by-pass valve is always the same as that of the main valve and the upstream pipeline.

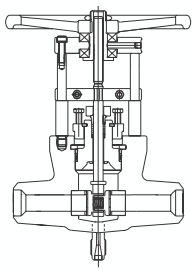
Inter-gate Pressure Build-up for Valves on Steam Service

Thermal expansion can create pressure locking when a fluid, at ambient temperature, is trapped in the inter-gate cavity of the valve body.
When the plant is on start-up and the valve when in the closed position sees heat, excessive pressure can be generated in the inter-gate space, even increasing the pressure beyond the valve rating.
This is noticeable by difficulty in opening the valve or by tripping of the actuator owing to the excessive load when starting the opening sequence.
The solution to this problem is to fit the equalising devices as described above.



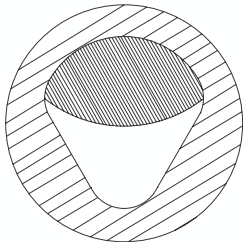
Pressure Build-up for Valves on Feed Water Service

Hydraulic pressure build-up can occur on high pressure feed water service when the valve is being closed.
When the stem is moved from the open to the closed position it displaces water.
Until the valve is almost closed the displaced water passes down the pipeline but once the valve discs cover the seat bore any further travel cannot displace the water and pressure builds up in the inter-gate space.
Again, the solution to this problem is to fit the equalising devices as described above.
HH Valves can supply equalising devices for new plant and also for plant in service during shutdown periods to replace existing equalising valves.
Equalising valves can be supplied with prepared butt-weld pipe ends, socket weld ends or stub pipe connections to receive existing equalising pipe.



Vee-port Seated Valves for Regulating Duty

For start-up and regulating duty a vee-port seated valve with full-faced discs can be supplied.
The vee-port seat is fitted to the outlet side of the valve and is designed to regulate flow at intermediate positions rather than any specific control curve.
This type of valve can also be used for boiler and system cleaning applications owing to the extremely high velocities that can be achieved using the vee-port configuration.
The seats and discs are hard faced with stellite or equivalent.
For extreme conditions HH Valves can supply spray coated tungsten carbide hard facing.



ASME B16.34 1690 and 2850 Standard & Special Class Pressure/Temperature Ratings

Class 1690 Imperial Units

Fig No	End Conn	ASTM Body Material	ASME B16.34 Class	Working Pressure in psig Temperature in °F -20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	975	1000	1025	1050	1075	1100	1150	1200
5096	BWE	A105N	1690 Standard	4173	3803	3696	3571	3374	3082	3025	3002	2839	2320	1509	-	-	-	-	-	-	-	-	-	-
5096XR	BWE	A105N	1690 Special	4225	4225	4225	4225	4225	4016	3938	3909	3549	2896	1882*	-	-	-	-	-	-	-	-	-	-
R5096	BWE	A182 F22	1690 Standard	4225	4225	4102	3977	3746	3408	3313	3199	2996	2861	2744	2530	2124	1797	1469	1227	985	802	619	-	-
R5096XR	BWE	A182 F22	1690 Special	4225	4225	4175	4079	4056	4056	4033	4006	3887	3790	3621	3380	2654	2246	1836	1534	1233	1003	772	-	-
U5096	BWE	A182 F91	1690 Standard	4225	4225	4102	3977	3746	3408	3313	3199	2996	2861	2744	2530	2175	2112	2050	2039	2028	1864	1701	1256	811
U5096XR	BWE	A182 F91	1690 Special	4225	4225	4225	4225	4225	4225	4225	4130	4106	4056	3814	3380	2658	2514	2371	2371	2371	2247	2124	1571	1014

Class 1690 Metric Units

Fig No	End Conn	ASTM Body Material	ASME B16.34 Class	Working Pressure in barg Temperature in °C -29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650
5096	BWE	A105N	1690 Standard	287.6	282.1	261.3	254.7	246.9	235.1	218.1	211.2	208.2	205.4	194.3	162.1	113	-	-	-	-	-	-		
5096XR	BWE	A105N	1690 Special	291.4	291.4	291.4	291.4	291.4	291.4	281.0	275.1	271.1	266.1	242.9	202.5	141.0	-	-	-	-	-	-		
R5096	BWE	A182 F22	1690 Standard	291.4	291.4	290.3	282.6	274.9	261.1	241.5	232.8	226.6	218.6	206.2	197.8	190.5	178.3	156.5	122.1	86.6	59.4	38.9		
R5096XR	BWE	A182 F22	1690 Special	291.4	291.4	291.0	287.8	287.4	280.0	279.7	279.2	277.7	271.2	267.8	261.8	251.6	237.4	201.1	152.6	108.3	74.3	48.5		
U5096	BWE	A182 F91	1690 Special	291.4	291.4	290.3	282.6	274.9	261.1	241.5	232.8	226.6	218.6	206.2	197.8	190.5	178.3	158.8	145.3	140.7	132.2	109.9	82.3	55.9
U5096XR	BWE	A182 F91	1690 Special	291.4	291.4	291.4	291.4	291.4	291.4	291.4	291.4	289.7	284.5	283.0	279.8	265.6	240.8	201.1	172.6	163.5	157.7	137.3	102.9	69.9

Class 2850 Imperial Units

Fig No	End Conn	ASTM Body Material	ASME B16.34 Class	Working Pressure in psig Temperature in °F -20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	975	1000	1025	1050	1075	1100	1150	1200
5099	BWE	A105N	2850 Standard	7035	6412	6236	6019	5688	5199	5102	5061	4788	3910	2542*	-	-	-	-	-	-	-	-	-	-
5099XR	BWE	A105N	2850 Special	7125	7125	7125	7125	7125	6771	6641	6589	5985	4885	3175*	-	-	-	-	-	-	-	-	-	-
R5099	BWE	A182 F22	2850 Standard	7125	7125	6920	6703	6314	5745	5591	5392	5050	4822	4628	4269	3586	3030	2475	2067	1660	1351	1043		
R5099XR	BWE	A182 F22	2850 Special	7125	7125	7045	6880	6840	6840	6800	6760	6555	6391	6106	5700	4479	3787	3095	2585	2076	1670	1304		
U5099	BWE	A182 F91	2850 Standard	7125	7125	6920	6703	6314	5745	5591	5392	5049	4821	4628	4269	3671	3562	3453	3436	3420	3143	2867	2116	1368
U5099XR	BWE	A182 F91	2850 Special	7125	7125	7125	7125	7125	7125	7125	6965	6920	6840	6435	5700	4479	4237	3996	3996	3996	3790	3584	2645	1710

Class 2850 Metric Units

Fig No	End Conn	ASTM Body Material	ASME B16.34 Class	Working Pressure in barg Temperature in °C -29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650
5099	BWE	A105N	2850 Standard	484.8	475.6	440.6	429.6	416.2	396.3	367.9	356.3	351.1	346.3	327.7	273.2	190.3	-	-	-	-	-	-		
5099XR	BWE	A105N	2850 Special	491.4	491.4	491.4	491.4	491.4	491.4	473.8	463.9	457.1	448.6	409.7	341.5	237.8	-	-	-	-	-	-		
R5099	BWE	A182 F22	2850 Standard	491.4	491.4	489.6	476.8	463.4	440.2	407.1	393.1	382.2	368.5	347.5	333.4	321.2	300.8	264.2	205.9	145.9	100	65.4		
R5099XR	BWE	A182 F22	2850 Special	491.4	491.4	490.7	485.6	475.4	472.2	471.7	470.8	468.3	464.8	451.8	441.4	424.2	400.4	339.1	257.4	182.5	124.1	81.8		
U5099	BWE	A182 F91	2850 Standard	491.4	491.4	489.6	476.8	463.4	440.2	407.1	393.1	382.2	368.5	347.5	333.4	321.2	300.8	267.9	245.0	237.1	222.8	185.2	138.7	94.3
U5099XR	BWE	A182 F91	2850 Special	491.4	491.4	491.4	491.4	491.4	491.4	491.4	491.4	488.6	479.8	476.9	471.9	448.1	406.2	339.1	290.8	275.5	265.8	231.6	167.9	117.9

High Pressure Forged Steel Pressure Seal Parallel Slide Gate Valve

ASME B16.34 4500 Standard & Special Class Pressure/Temperature Ratings

Class 4500 Imperial Units

Fig No	End Conn	ASTM Body Material	ASME B16.34 Class	-20 to 100	200	300	400	500	600	Working Pressure in psig 650	700	750	800	Temperature in °F 850	900	950	975	1000	1025	1050	1075	1100	1150	1200
5090	BWE	A105N	4500 Standard	11110	10120	9845	9505	8980	8210	8055	7990	7560	6170	4010*										
5090XR	BWE	A105N	4500 Special	11250	11250	11250	11250	11250	10690	10485	10405	9450	7715	5015*										
R5090	BWE	A182 F22	4500 Standard	11250	11250	10925	10585	9965	9070	8825	8515	7970	7610	7305	6740	5665	4788	3910	3268	2625	2135	1645		
R5090XR	BWE	A182 F22	4500 Special	11250	11250	11120	10865	10800	10800	10735	10670	10350	10095	9645	9000	7070	6126	4885	4083	3280	2668	2055		
U5090	BWE	A182 F91	4500 Standard	11250	11250	10925	10585	9965	9070	8825	8515	7970	7610	7305	6740	5795	5622	5450	5425	5400	4962	4525	3345	2160
U5090XR	BWE	A182 F91	4500 Special	11250	11250	11250	11250	11250	11250	11250	10995	10930	10800	10160	9000	7070	6690	6310	6310	6310	5982	5655	4180	2700

Class 4500 Metric Units

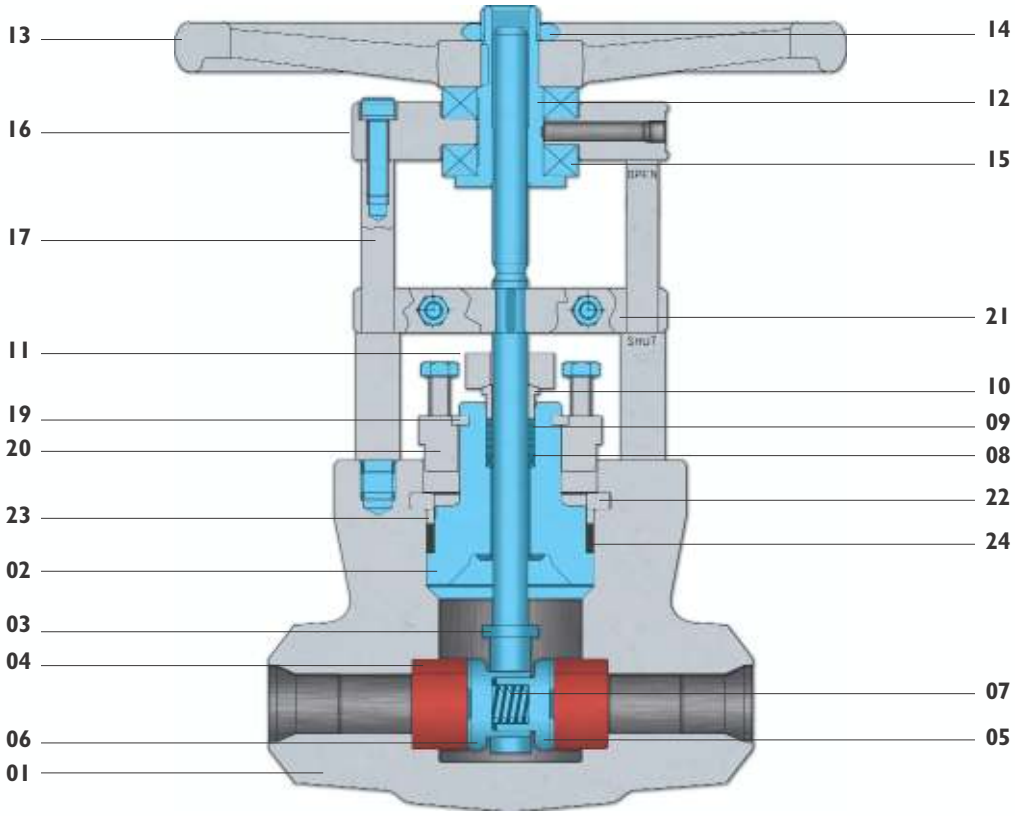
Fig No	End Conn	ASTM Body Material	ASME B16.34 Class	-29 to 38	50	100	150	200	250	Working Pressure in barg 300	325	350	375	Temperature in °C 400	425	450	475	500	525	550	575	600	625	650
5090	BWE	A105N	4500 Standard	766	751	695.5	678.3	657.2	625.7	580.9	562.4	554.3	546.7	517.4	431.2	300.3								
5090XR	BWE	A105N	4500 Special	775.7	775.7	775.7	775.7	775.7	775.7	747.9	732.2	721.6	708.2	646.8	539.1	375.6								
R5090	BWE	A182 F22	4500 Standard	775.7	775.7	773	752.8	731.7	694.8	642.6	619.6	603.3	581.8	548.5	526.2	507	474.8	417.3	325.3	230.6	158	103.2		
R5090XR	BWE	A182 F22	4500 Special	775.7	775.7	774.6	766.3	750.5	745.4	744.6	743.1	739.1	732.6	712.9	697.1	670.0	632.1	535.4	406.1	288.1	197.4	129.0		
U5090	BWE	A182 F91	4500 Standard	775.7	775.7	773.0	752.8	731.7	694.8	642.6	619.6	603.3	581.8	548.5	526.2	507.0	474.8	423.0	386.7	377.3	351.8	292.5	219.2	148.9
U5090XR	BWE	A182 F91	4500 Special	775.7	775.7	775.7	775.7	775.7	775.7	775.7	775.7	771.4	757.4	753.2	745.2	707.6	641.3	535.4	459.2	459.2	419.7	365.5	248.4	186.1

* A105N material is permissible, but not recommended, for prolonged use above 800°F (425°C)
A182 F22 material is not to be used above 1100°F (595°C)

For intermediate ratings use linear interpolation

MATERIAL & PARTS SPECIFICATION

Fig Nos. 5096 Butt Weld Ends & 5046 Socket Weld Ends, Class 1690

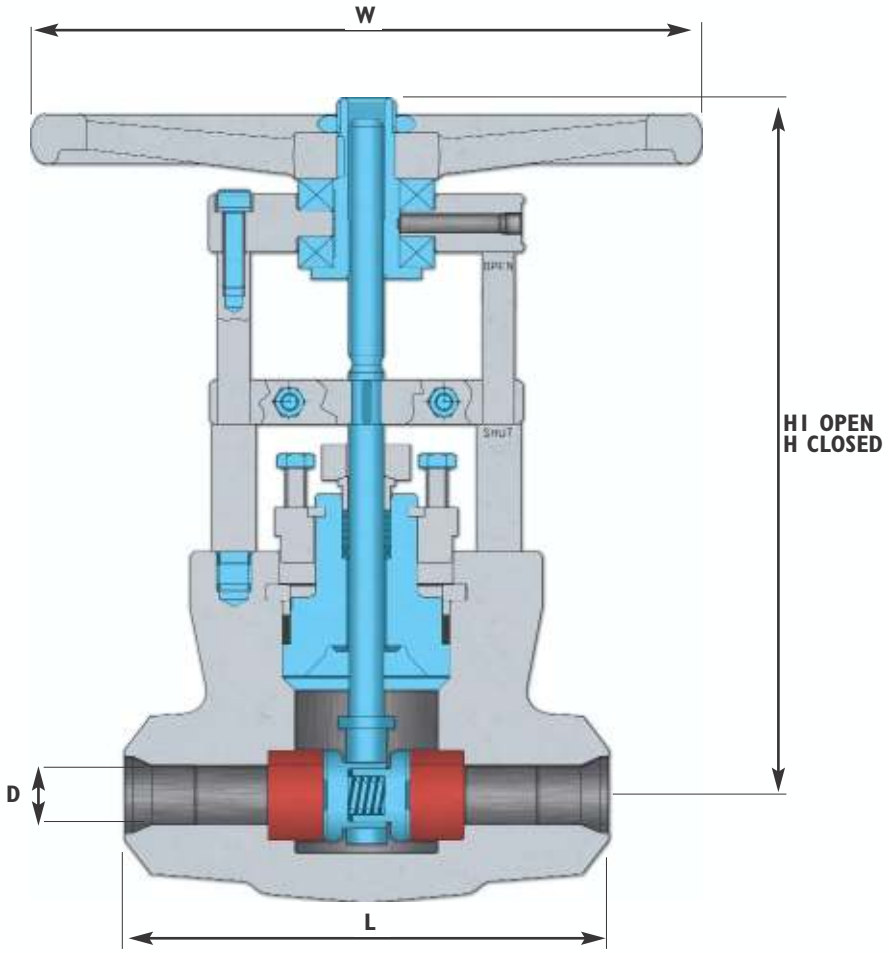


Materials of Construction

Part No	Part Description	Fig. No. 5096 Carbon Steel Specification	Fig. No. R5096 Alloy Steel Specification	Fig. No. U5096 Alloy Steel Specification
1	Body	ASTM A105N †	ASTM A182 Gr. F22	ASTM A182 Gr. F91
2	Bonnet	ASTM A105N † Hardfaced	ASTM A182 Gr. F22 Hardfaced	ASTM A182 Gr. F91 Hardfaced
3	Stem	ASTM A565 - XM 32	ASTM A565 - XM 32	ASTM A565 - XM 32
4	Seat Ring	ASTM A108 C1020 Hardfaced	ASTM A182 Gr. F22 Hardfaced	ASTM A182 Gr. F91 Hardfaced
5	Male Disc	ASTM A182 Gr. F347 Hardfaced	ASTM A182 Gr. F347 Hardfaced	ASTM A182 Gr. F91 Hardfaced
6	Female Disc	ASTM A182 Gr. F347 Hardfaced	ASTM A182 Gr. F347 Hardfaced	ASTM A182 Gr. F91 Hardfaced
7	Spring	Inconel X-750	Nimonic 90	Nimonic 90
8	Junk Ring	ASTM A108 C1020	ASTM A182 Gr. F22	ASTM A182 Gr. F91
9	Gland Packing	Flexible Graphite Rings with Braided Filament Ring Top & Bottom		
10	Gland Follower	ASTM B150 Gr. 630	ASTM B150 Gr. 630	ASTM B150 Gr. 630
11	Gland Flange	ASTM A108 C1020	ASTM A108 C1020	ASTM A108 C1020
12	Yoke Sleeve	ASTM B150 Gr. 630	ASTM B150 Gr. 630	ASTM B150 Gr. 630
13	Handwheel	Malleable Iron or Steel	Malleable Iron or Steel	Malleable Iron or Steel
14	Handwheel Nut	Carbon Steel	Carbon Steel	Carbon Steel
15	Thrust Bearing	Steel	Steel	Steel
16	Bridge	ASTM A516 Gr. 60	ASTM A516 Gr. 60	ASTM A516 Gr. 60
17	Stepped Pillar	ASTM A108 C1020	ASTM A108 C1020	ASTM A108 C1020
18	Plain Pillar	ASTM A108 C1020	ASTM A108 C1020	ASTM A108 C1020
19	Split Ring	ASTM A276 Gr. 410	ASTM A276 Gr. 410	ASTM A276 Gr. 410
20	Bonnet Collar	ASTM A105 or equivalent	ASTM A105 or Equivalent	ASTM A105 or Equivalent
21	Stem Stop	ASTM A108 C1020	ASTM A108 C1020	ASTM A108 C1020
22	Segment Ring	ASTM A565 - XM 32	ASTM A565 - XM 32	ASTM A565 - XM 32
23	Distance Piece	ASTM A565 - XM 32	ASTM A565 - XM 32	ASTM A565 - XM 32
24	Pressure Seal	Expanded Graphite	Expanded Graphite	Expanded Graphite

† 0.25% Carbon max.
Hardfacing is Stellite or equivalent
Item 18 - Plain Pillar - not shown in above view

Fig Nos. 5096 Butt Weld Ends & 5046 Socket Weld Ends, Class 1690



ASME Class 1690 Valve Dimensions

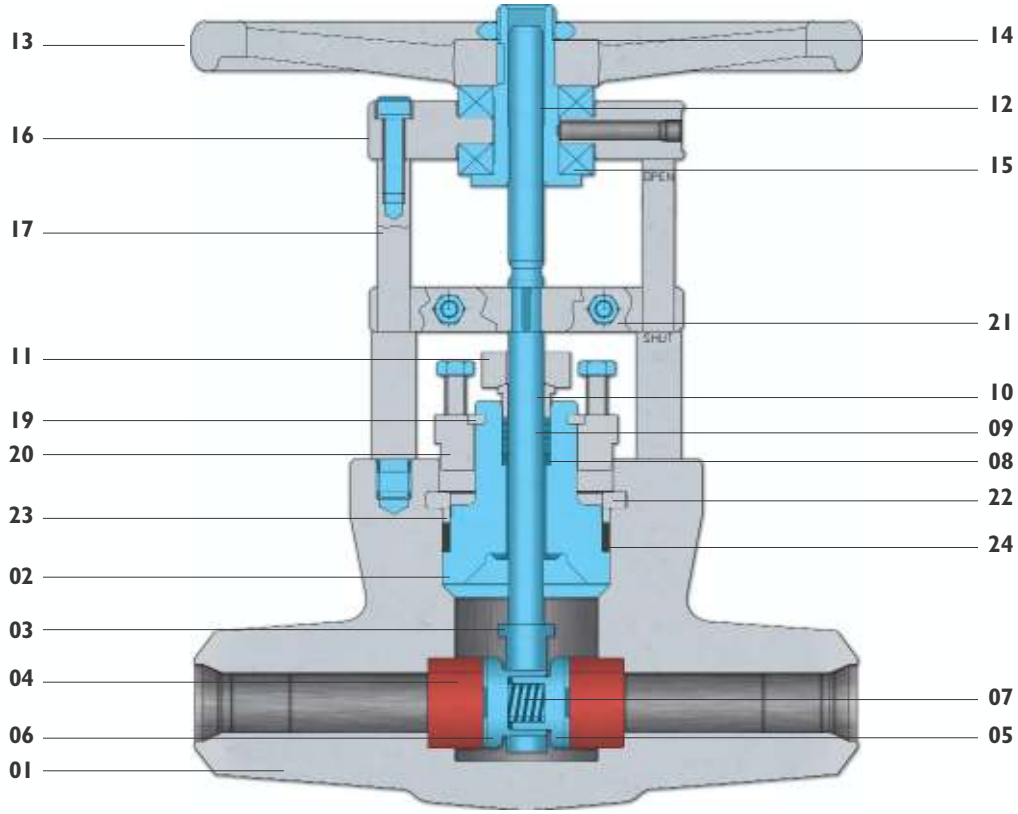
Size ins mm	Fig No	Weight lbs kgs	Length L	Valve Bore D	Pipe Bore Sch 160	Height H (closed)	Height H1 (open)	H/W Dia W	Stem Details	No. of Turns (To open)
¾"	5096	40	9 1/8	0.59	0.612	12.48	13.19	12	5/8"ACME x 8 TPI	9
20		18	232	15	15.5	317	335	305		
1"	5096	40	9 1/8	0.75	0.815	12.48	13.27	12	5/8"ACME x 8 TPI	9 1/2
25		18	232	19	20.7	317	337	305		
1¼"	5096	40	9 1/8	1.06	1.160	12.48	13.35	12	5/8"ACME x 8 TPI	10
32		18	232	27	29.5	317	339	305		
1½"	5096	55	11	1.06	1.388	12.48	13.35	12	5/8"ACME x 8 TPI	10
40		25	279	27	35.3	317	339	305		
2"	5096	55	11	1.06	1.687	12.48	13.35	12	5/8"ACME x 8 TPI	10
50		25	279	27	42.8	317	339	305		
2½"	5096	79	10	1.30	2.125	12.48	13.62	12	5/8"ACME x 8 TPI	12
65		36	254	33	54.0	317	346	305		
3"	5096	106	12	1.89	2.624	14.76	16.85	12	5/8"ACME x 8 TPI	17 1/2
80		48	305	48	66.6	375	428	305		
4"	5096	225	16	2.44	3.438	19.84	22.05	15 3/4	3/4"ACME x 6 TPI	17
100		102	406	62	87.3	504	560	400		

End-to-End dimension 'L' is our standard but other lengths can be accommodated
Butt weld end pipe bore schedule 160 is our standard for a class 1690 but other schedules can be accommodated
Further information is available upon request

With socket weld option the basic figure number becomes 5046

MATERIAL & PARTS SPECIFICATION

Fig Nos. 5099 Butt Weld Ends & 5049 Socket Weld Ends, Class 2850

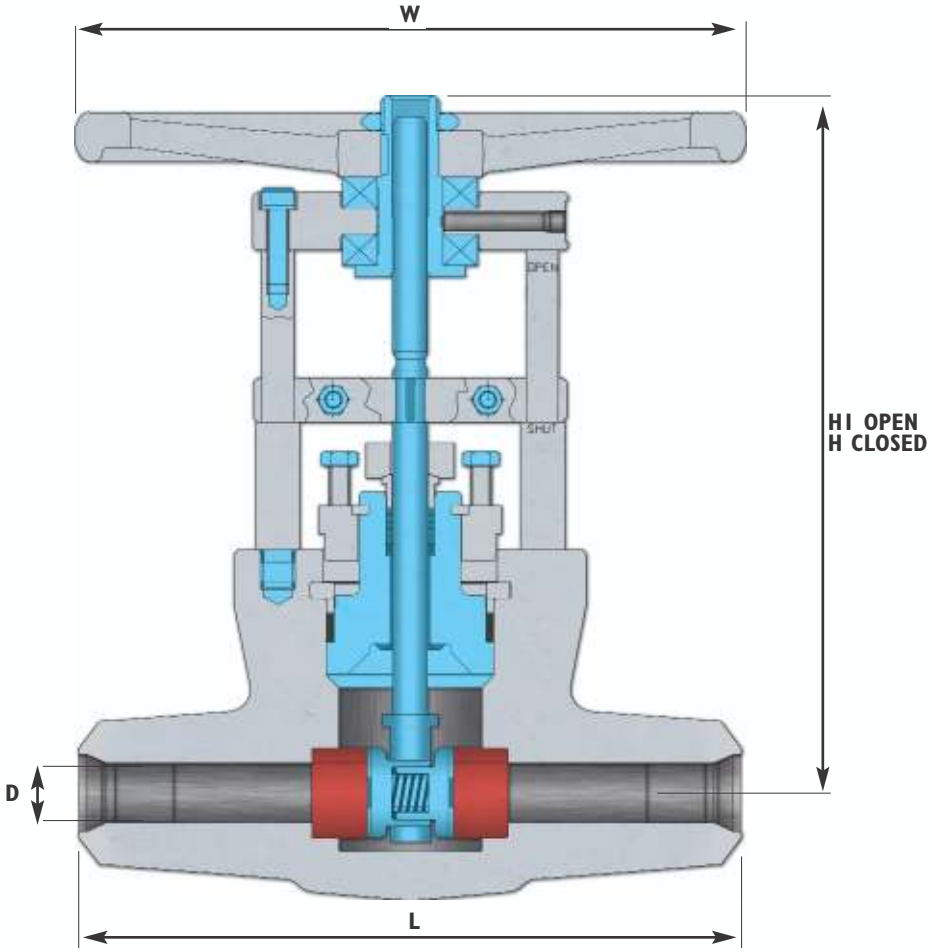


Materials of Construction

Part No	Part Description	Fig. No. 5099 Carbon Steel Specification	Fig. No. R5099 Alloy Steel Specification	Fig. No. U5099 Alloy Steel Specification
1	Body	ASTM A105N †	ASTM A182 Gr. F22	ASTM A182 Gr. F91
2	Bonnet	ASTM A105N † Hardfaced	ASTM A182 Gr. F22 Hardfaced	ASTM A182 Gr. F91 Hardfaced
3	Stem	ASTM A565 - XM 32	ASTM A565 - XM 32	ASTM A565 - XM 32
4	Seat Ring	ASTM A108 C1020 Hardfaced	ASTM A182 Gr. F22 Hardfaced	ASTM A182 Gr. F91 Hardfaced
5	Male Disc	ASTM A182 Gr. F347 Hardfaced	ASTM A182 Gr. F347 Hardfaced	ASTM A182 Gr. F91 Hardfaced
6	Female Disc	ASTM A182 Gr. F347 Hardfaced	ASTM A182 Gr. F347 Hardfaced	ASTM A182 Gr. F91 Hardfaced
7	Spring	Inconel X-750	Nimonic 90	Nimonic 90
8	Junk Ring	ASTM A108 C1020	ASTM A182 Gr. F22	ASTM A182 Gr. F91
9	Gland Packing	Flexible Graphite Rings with Braided Filament Ring Top & Bottom		
10	Gland Follower	ASTM B150 Gr. 630	ASTM B150 Gr. 630	ASTM B150 Gr. 630
11	Gland Flange	ASTM A108 C1020	ASTM A108 C1020	ASTM A108 C1020
12	Yoke Sleeve	ASTM B150 Gr. 630	ASTM B150 Gr. 630	ASTM B150 Gr. 630
13	Handwheel	Malleable Iron or Steel	Malleable Iron or Steel	Malleable Iron or Steel
14	Handwheel Nut	Carbon Steel	Carbon Steel	Carbon Steel
15	Thrust Bearing	Steel	Steel	Steel
16	Bridge	ASTM A516 Gr. 60	ASTM A516 Gr. 60	ASTM A516 Gr. 60
17	Stepped Pillar	ASTM A108 C1020	ASTM A108 C1020	ASTM A108 C1020
18	Plain Pillar	ASTM A108 C1020	ASTM A108 C1020	ASTM A108 C1020
19	Split Ring	ASTM A276 Gr. 410	ASTM A276 Gr. 410	ASTM A276 Gr. 410
20	Bonnet Collar	ASTM A105 or equivalent	ASTM A105 or Equivalent	ASTM A105 or Equivalent
21	Stem Stop	ASTM A108 C1020	ASTM A108 C1020	ASTM A108 C1020
22	Segment Ring	ASTM A565 - XM 32	ASTM A565 - XM 32	ASTM A565 - XM 32
23	Distance Piece	ASTM A565 - XM 32	ASTM A565 - XM 32	ASTM A565 - XM 32
24	Pressure Seal	Expanded Graphite	Expanded Graphite	Expanded Graphite

† 0.25% Carbon max.
Hardfacing is Stellite or equivalent
Item 18 - Plain Pillar - not shown in above view

Fig Nos. 5099 Butt Weld Ends & 5049 Socket Weld Ends, Class 2850



ASME Class 2850 Valve Dimensions

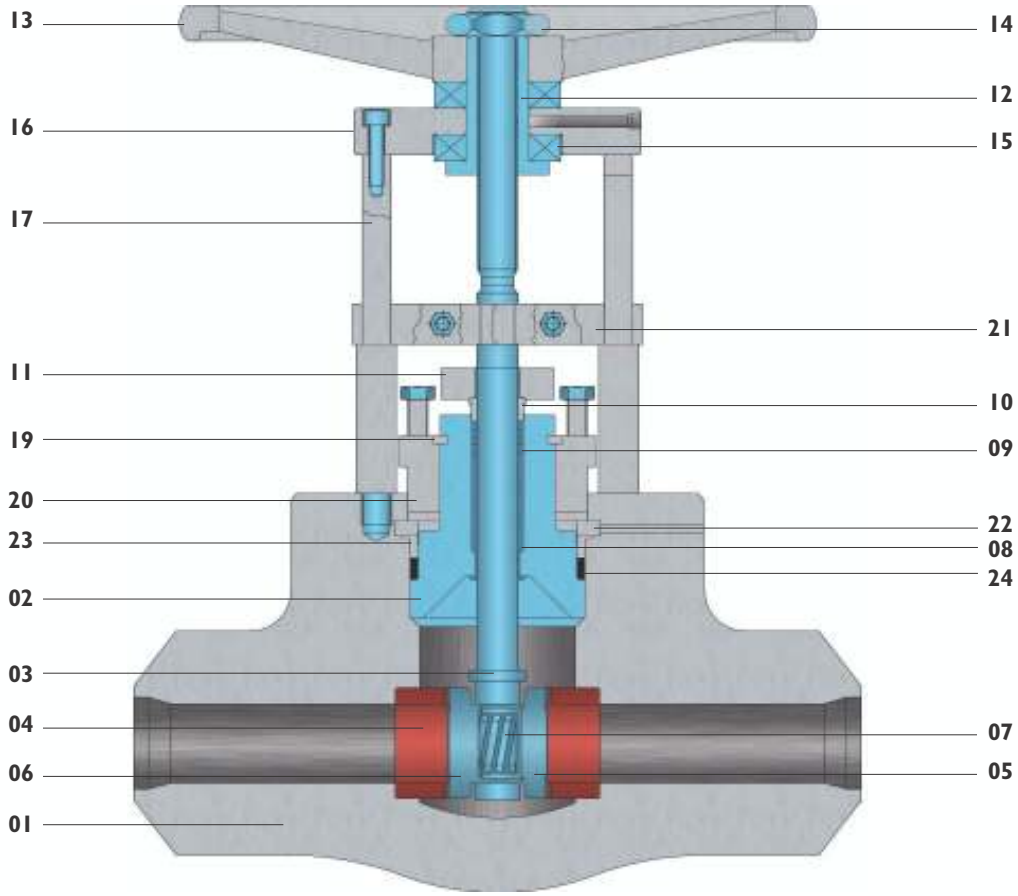
Size ins mm	Fig No	Weight lbs kgs	Length L	Valve Bore D	Pipe Bore Sch XXS	Height H (closed)	Height H1 (open)	H/W Dia W	Stem Details	No. of Turns (To open)
¾"	5099	40	9 1/8	0.59	0.434*	12.48	13.19	12	5/8"ACME x 8 TPI	9
20		18	232	15	11.02*	317	335	305		
1"	5099	40	9 1/8	0.59	0.599	12.48	13.27	12	5/8"ACME x 8 TPI	9 1/2
25		18	232	15	15.2	317	337	305		
1¼"	5099	40	9 1/8	0.75	0.896	12.48	13.35	12	5/8"ACME x 8 TPI	10
32		18	232	19	22.8	317	339	305		
1½"	5099	55	11	1.06	1.100	12.48	13.35	12	5/8"ACME x 8 TPI	10
40		25	279	27	27.9	317	339	305		
2"	5099	55	11	1.06	1.503	12.48	13.35	12	5/8"ACME x 8 TPI	10
50		25	279	27	38.2	317	339	305		
2½"	5099	88	13	1.06	1.771	12.24	13.35	12	5/8"ACME x 8 TPI	10
65		40	330	27	45.0	311	339	305		
3"	5099	115	14 1/2	1.61	2.300	14.76	16.61	12	5/8"ACME x 8 TPI	15 1/2
80		52	368	41	58.4	374	422	305		
4"	5099	243	18	1.97	3.152	19.84	19.72	15 3/4	3/4"ACME x 6 TPI	14
100		110	457	50	80.1	461	501	400		

End-to-End dimension 'L' is our standard but other lengths can be accommodated
Butt weld end pipe bore schedule XXS is our standard for a class 2850 but other schedules can be accommodated
* ¾" size class 2850 is not available with schedule XXS butt weld ends
Further information is available upon request

With socket weld option the basic figure number becomes 5049

MATERIAL & PARTS SPECIFICATION

Fig Nos. 5090 Butt Weld Ends & 5040 Socket Weld Ends, Class 4500



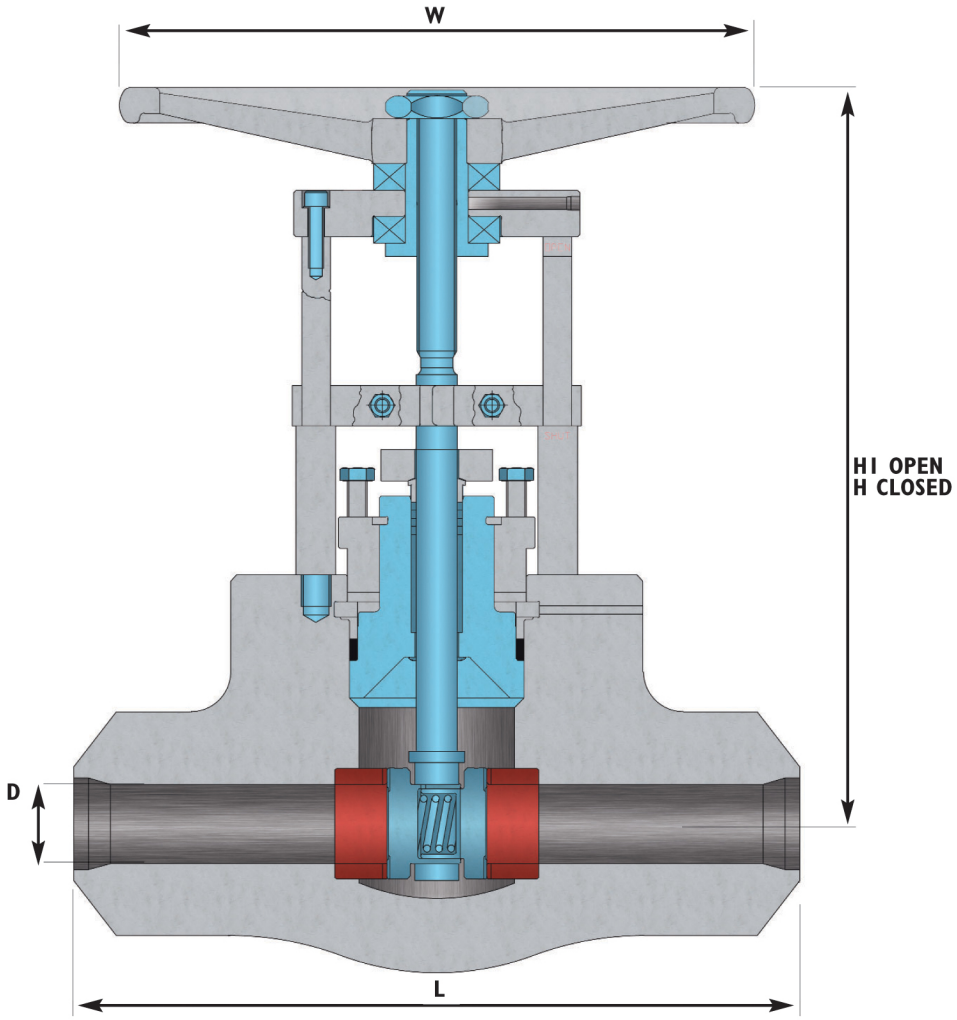
Materials of Construction

Part No	Part Description	Fig. No. 5090 Carbon Steel Specification	Fig. No. R5090 Alloy Steel Specification	Fig. No. U5090 Alloy Steel Specification
1	Body	ASTM A105N †	ASTM A182 Gr. F22	ASTM A182 Gr. F91
2	Bonnet	ASTM A105N † Hardfaced	ASTM A182 Gr. F22 Hardfaced	ASTM A182 Gr. F91 Hardfaced
3	Stem	ASTM A565 - XM 32	ASTM A565 - XM 32	ASTM A565 - XM 32
4	Seat Ring	ASTM A108 C1020 Hardfaced	ASTM A182 Gr. F22 Hardfaced	ASTM A182 Gr. F91 Hardfaced
5	Male Disc	ASTM A182 Gr. F347 Hardfaced	ASTM A182 Gr. F347 Hardfaced	ASTM A182 Gr. F91 Hardfaced
6	Female Disc	ASTM A182 Gr. F347 Hardfaced	ASTM A182 Gr. F347 Hardfaced	ASTM A182 Gr. F91 Hardfaced
7	Spring	Inconel X-750	Nimonic 90	Nimonic 90
8	Junk Ring	ASTM A108 C1020	ASTM A182 Gr. F22	ASTM A182 Gr. F91
9	Gland Packing	Flexible Graphite Rings with Braided Filament Ring Top & Bottom		
10	Gland Follower	ASTM B150 Gr. 630	ASTM B150 Gr. 630	ASTM B150 Gr. 630
11	Gland Flange	ASTM A108 C1020	ASTM A108 C1020	ASTM A108 C1020
12	Yoke Sleeve	ASTM B150 Gr. 630	ASTM B150 Gr. 630	ASTM B150 Gr. 630
13	Handwheel	Malleable Iron or Steel	Malleable Iron or Steel	Malleable Iron or Steel
14	Handwheel Nut	Carbon Steel	Carbon Steel	Carbon Steel
15	Thrust Bearing	Steel	Steel	Steel
16	Bridge	ASTM A516 Gr. 60	ASTM A516 Gr. 60	ASTM A516 Gr. 60
17	Stepped Pillar	ASTM A108 C1020	ASTM A108 C1020	ASTM A108 C1020
18	Plain Pillar	ASTM A108 C1020	ASTM A108 C1020	ASTM A108 C1020
19	Split Ring	ASTM A276 Gr. 410	ASTM A276 Gr. 410	ASTM A276 Gr. 410
20	Bonnet Collar	ASTM A105 or equivalent	ASTM A105 or Equivalent	ASTM A105 or Equivalent
21	Stem Stop	ASTM A108 C1020	ASTM A108 C1020	ASTM A108 C1020
22	Segment Ring	ASTM A565 - XM 32	ASTM A565 - XM 32	ASTM A565 - XM 32
23	Distance Piece	ASTM A565 - XM 32	ASTM A565 - XM 32	ASTM A565 - XM 32
24	Pressure Seal	Expanded Graphite	Expanded Graphite	Expanded Graphite

† 0.25% Carbon max.
Hardfacing is Stellite or equivalent
Item 18 - Plain Pillar - not shown in above view

VALVE DIMENSIONS

Fig Nos. 5090 Butt Weld Ends & 5040 Socket Weld Ends, Class 4500



ASME Class 4500 Valve Dimensions

Size ins mm	Fig No	Weight lbs kgs	Length L	Valve Bore D	Pipe Bore Sch XXS	Height H (closed)	Height H1 (open)	H/W Dia W	Stem Details	No. of Turns (To open)
¼"	5090	40	9 1/8	0.59	0.434	12.1/2	13.1/5	12	5/8"ACME x 8 TPI	9
20		18	232	15	11.02	317	335	305		
1"	5090	40	9 1/8	0.59	0.599	12.1/2	13.1/4	12	5/8"ACME x 8 TPI	9
25		18	232	15	15.21	317	337	305		
1¼"	5090	40	9 1/8	0.75	0.896	12.1/2	13.1/3	12	5/8"ACME x 8 TPI	9
32		18	232	19	22.76	317	339	305		
1½"	5090	55	12	1.06	1.1	12.1/2	13.1/3	12	5/8"ACME x 8 TPI	10
40		25	305	27	27.90	317	339	305		
2"	5090	55	12	1.06	1.503	12.1/2	13.1/3	12	5/8"ACME x 8 TPI	10
50		25	305	27	38.18	317	339	305		
2½"	5090	88	18	1.73	1.771	18.1/4	20.1/2	12	1.1/8"ACME x 5 TPI	11
65		40	457	44	45.00	464	520	305		
3"	5090	115	18	1.73	2.300	18.1/4	20.1/2	12	1.1/8"ACME x 5 TPI	11
80		52	457	44	58.40	464	520	305		
4"	5090	243	18	1.73	3.152	18.1/4	20.1/2	15 3/4	1.1/8"ACME x 5 TPI	11
100		110	457	44	80.10	464	520	400		

End-to-End dimension 'L' is our standard but other lengths can be accommodated
Butt weld end pipe bore schedule XXS is our standard for a class 4500 but other schedules can be accommodated
* ¼" size class 4500 is not available with schedule XXS butt weld ends
Further information is available upon request

With socket weld option the basic figure number becomes 5040

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April 2006