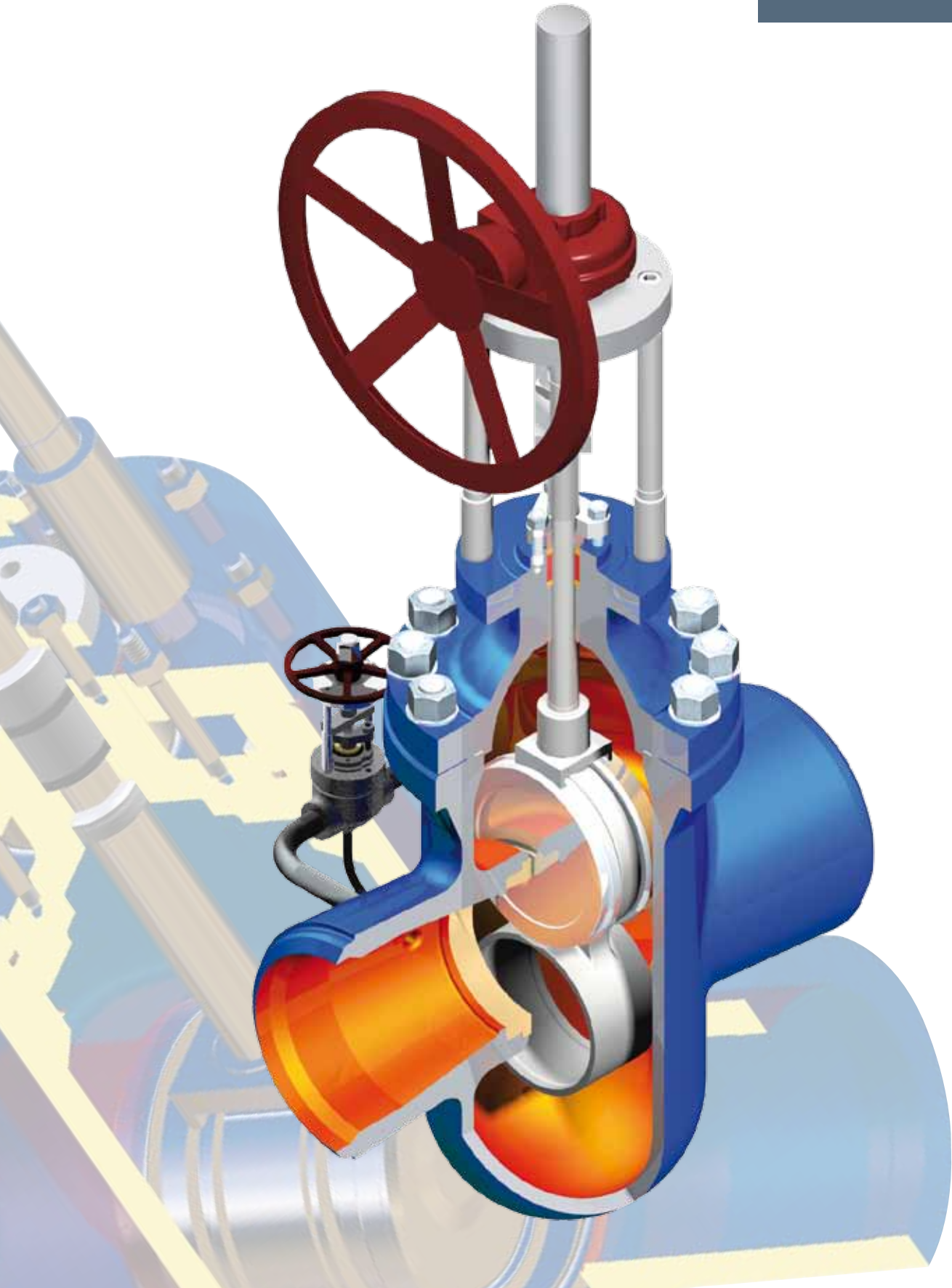


WEIR

Hopkinsons

**Gate, Globe &
Special Purpose
Valves**





Weir UK purpose built factory at Elland Weir International, South Korea

A proven track record

We have extensive references and a proven track record in the supply of valves across a number of key industries.

Our valves are industry renowned brands, each with an established reputation for quality engineering and reliability.

Valve testing

All pressure containing items are hydrostatically tested, seat leakage tested and functionally tested.

We can also perform gas, packing emission, cryogenic and advanced functional testing, as well as seismic testing for nuclear applications.

Material testing

- Non-destructive examination by radiography, ultrasonics, magnetic particle and liquid penetrant.
- Chemical analysis by computer controlled direct reading emission spectrometer.
- Mechanical testing for tensile properties at ambient and elevated temperatures, bend and hardness testing. Charpy testing at ambient, elevated and sub-zero temperatures.

Aftermarket solutions

Our valve aftermarket solutions are based on our engineering heritage, applying our OEM knowledge and expertise to maintenance strategies, life extension and upgrade projects.



ATWOOD & MORRILL™
Engineered Isolation & Check Valves
BATLEY VALVE®
High Performance Butterfly Valves
BDK™
Industrial Valves
BLAKEBOROUGH®
Control & Severe Service Valves
HOPKINSONS®
Parallel Slide Gate & Globe Valves
MAC VALVE®
Ball & Rotary Gate Valves
SARASIN-RSBD™
Pressure Safety Devices
SEBIM™
Nuclear Valves
TRICENTRIC®
Triple Offset Butterfly Valves
Portfolio of engineered service solutions and aftermarket support

Our world-wide reputation is based on engineering excellence applied to a comprehensive range of specialist products and effective customer support.

Quality assurance

Weir is qualified to industry standards and working practices including:

- ASME BPVC Section III (N and NPT Stamp)
- NQA-1 Quality system
- 10CFR50 App. B
- 10CFR21
- RCC-E
- RCC-M
- CSA Z299
- Performance testing and qualification to:
ASME QME-1
ASME B16.41
IEEE 323
IEEE 344
IEEE 382
- ISO 9001
- ISO 14001
- PED 97/23/CE
- API Q1 TO API LICENCES:
API 6D (6D-0182)
API 6A (64-0445)
- TUV-AD MERKBLATT WRD HPO
- OHSAS 18001
- ATEX 94/9/CE
- Lean manufacturing practices

CONTENTS	
Full Bore & Venturi Parallel Slide Gate Valves	5-46
High Performance Drain Valves	47-52
Globe Valves	53-56
Uniflow Valves	57-60
Feed Pump Leak Off Valves	61-64
Special Purpose Valves	65-66
Conversion Tables	67-68

Hopkinsons manufacture valves and boiler mountings for use on steam raising plant of any size and type.

Hopkinsons brand products, renowned for long and dependable service life, can be seen on installations ranging from shell boilers for heating and process steam up to the highest capacity units on electricity generating stations.

In the nuclear power industry, Hopkinsons has particular expertise in the design and production of safety related items such as fast operating main steam and main feed isolation valves. The company also produces valves for isolation, regulating, pressure relief, instrument and drain, and specific plant protection duties on the new generation of Combined Cycle Gas Turbine Power Stations.



Purpose built factory at Elland.

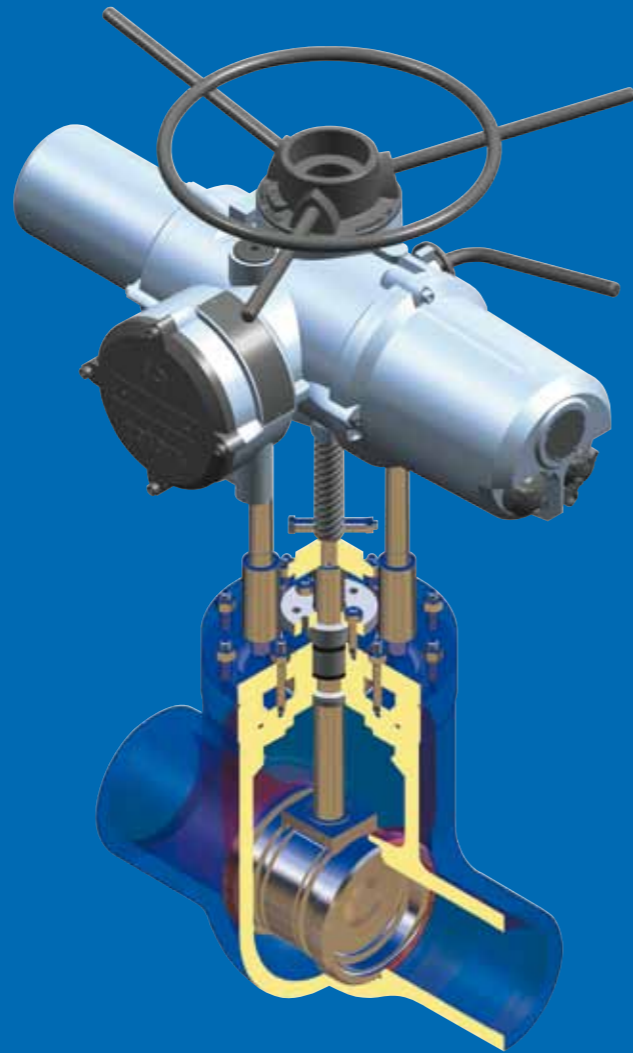


Storage.

Testing.

Valve testing facilities

All pressure containing items are hydrostatically tested, seat leakage tested and functionally tested. In addition, gas, packing emission, cryogenic and advanced functional testing can be arranged.



The Hopkinsons Full Bore & Venturi design of stop valve are our standard recommendation when a gate valve is required for steam or feedwater duty in the medium and high pressure ranges.

Main Applications

- General purpose stop valve
- Main steam and feedwater isolation
- Boiler circulating pump isolation
- The basic design is also incorporated in valves for other duties such as:
 - Feedwater heater protection
 - Feed pump leak-off
- Nuclear Applications (ASME Section III, Class 1, 2 & 3) (Described in other publications available on request)
- Regulating duty with V-ported seat

Special Features

Valves can be offered to incorporate features such as quick closure, live loaded gland, double stuffing box with lantern ring and bleed-off point, back seat, seal welded body/cover joint.

Main Advantages

- Fluid tightness achieved by fluid pressure - not from mechanical wedging action thus eliminating thermal binding*
- Complete flow isolation in either direction
- Minimum pressure drop
- Freedom from leakage independent of temperature or pressure changes
- Self-aligning fully supported discs
- Inherent self-cleaning action
- In-line maintenance

*Thermal Binding is associated with Wedge Gate Valves and occurs when a Wedge Gate Valve is closed at high temperature and is allowed to cool before attempting opening. Thermal binding cannot occur with a parallel slide gate valve.

Parallel Slide Gate Valves

Ratings:	ASME Class 150 to 4500
Sizes:	15 to 1200 mm 1/2 to 48 in
Temperature Ratings:	-29°C to 593°C -20°F to 1100°F
Materials:	Carbon Steel, Alloy Steel, Stainless Steel, Bronze.
End Connections:	Flanged, butt weld, socket weld.

Pressure/Temperature Ratings

Pressure/Temperature ratings are in accordance with ASME B16.34. Alternatively, valves can be supplied to other national standards. Details will be supplied on request.



Full bore parallel slide gate valves in low carbon steel for a nuclear power plant.



Volume production of gate valves for low/medium general purpose industrial duties.

Parallel Slide Action

Full Bore

The outstanding feature of the parallel slide design is that of maintaining fluid-tightness without the aid of wedging action. No mechanical stress is exerted between the discs, and there are no problems associated with cool-down of the fluid.

Specially designed non-corrodible springs ensure the discs maintain contact with the seats when the valve is not under pressure. When the valve is closed and the system pressurized, isolation is achieved by the pressure acting on the outlet disc against its seat face.

The sliding action of the discs during opening and closing removes any loose foreign matter from the seat faces. A Sliding stem stop guide provides external guidance and indication of disc position. When the stem guide comes to rest against the shoulders of the pillars, no further operating effort is necessary.

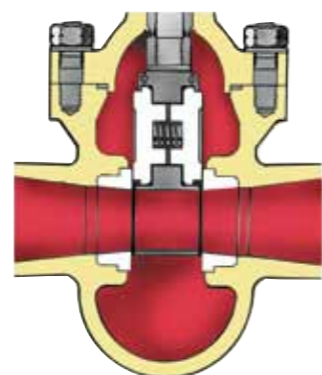
The Full Bore design is used when minimum pressure drop is paramount. The design is based on the seat bore having a diameter approximately equal to 90% of the bore of the connecting pipe.

Venturi Design

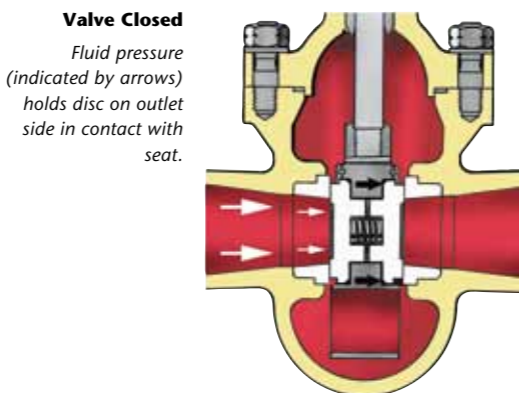
The Venturi design is used when a slightly higher pressure drop is acceptable. The well established principle of fluid flow through a Venturi is used in order to minimise pressure drop. Venturi valves incorporate the design feature of an eye follower. In the fully open position the eye follower bridges the gap between the seats thus giving a smooth flow path and completing the Venturi profile.

Valve Travel and components being smaller than a comparative Full Bore Valve results in a compact superstructure - an advantage where space is restricted.

A considerable saving in weight and actuator costs is also achievable due to the reduced seat size. A further advantage is that the design lends itself to steam purging operation without the need to introduce sacrificial valves.



Valve Open
Gives unobstructed flow. 'eye-piece' bridges gap to complete Venturi form passage and protect seat faces.



Valve Closed
Fluid pressure (indicated by arrows) holds disc on outlet side in contact with seat.

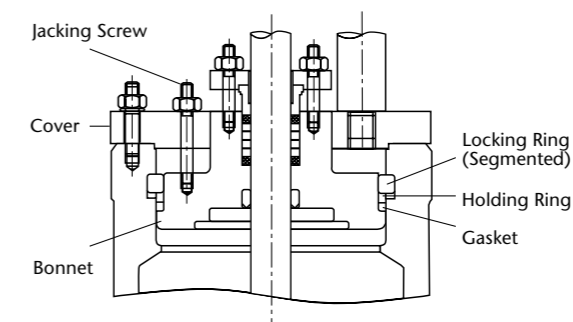
Bonnet Closures

Class 150 - 600

The bonnet to body closure joint is achieved by a bolted bonnet design incorporating an exfoliated graphite gasket for classes 150 and 300. Ideal for low pressure applications. Class 600 incorporates an exfoliated graphite filled spiral wound gasket. Ideal for medium pressure applications.

Class 1000 - 4500

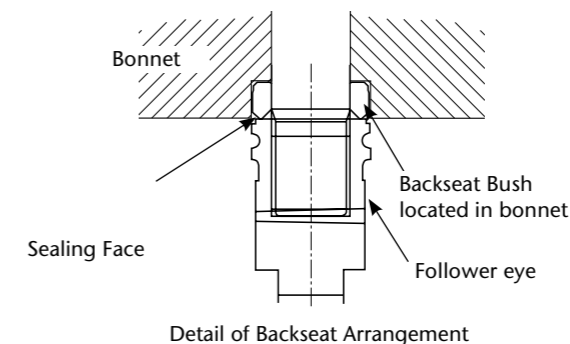
On class 1000 and above a pressure sealed bonnet is incorporated. Hydrostatic pressure acting on the bonnet activates a resilient gasket of exfoliated graphite and thus forms the bonnet seal. This is a very effective seal for high pressure valves.



Back Seats

Both Full Bore and Venturi design of valve incorporate a Back Seat. This feature can only be utilised when the valve is in the fully open position with the handwheel wound back until the Eye Follower contacts the mechanical Stop which incorporates the Back Seating facility.

The principle of Back Seating should only be utilised in the unlikely event of gland leakage to isolate the gland from the system pressure until such time that the plant is shut down and repairs may be carried out. Under no circumstances should Back Seating of a valve be carried out with the intention of repairing the faulty gland while the system is pressurized. Under normal operation the valve should only be opened to within 3mm of the Back Seat.



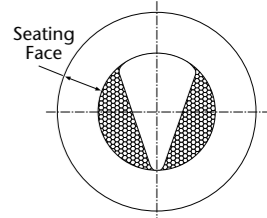
Detail of Backseat Arrangement

Gland Packings

High efficiency materials such as exfoliated graphite and carbon fibre are used for gland packings and sealing gaskets. Live loaded gland packing system designed for attention-free stem sealing is available as an extra.

Regulating Duties

Parallel slide gate valves can be supplied with V-ported outlet seat making them ideally suitable for regulating duties.



'V' Ported Seat

Stem Guide

On a Parallel slide valve, an external Stem Guide serves two important functions:-

- Stem anti-rotation device
- Visual indicator of disc position relative to Seat Bore.

To prevent damage to the stem guide and internal fittings of a parallel slide valve particularly on smaller size and those valves which are electrically or gear operated the concept of position seating to effect closure should always be adhered to. For example,

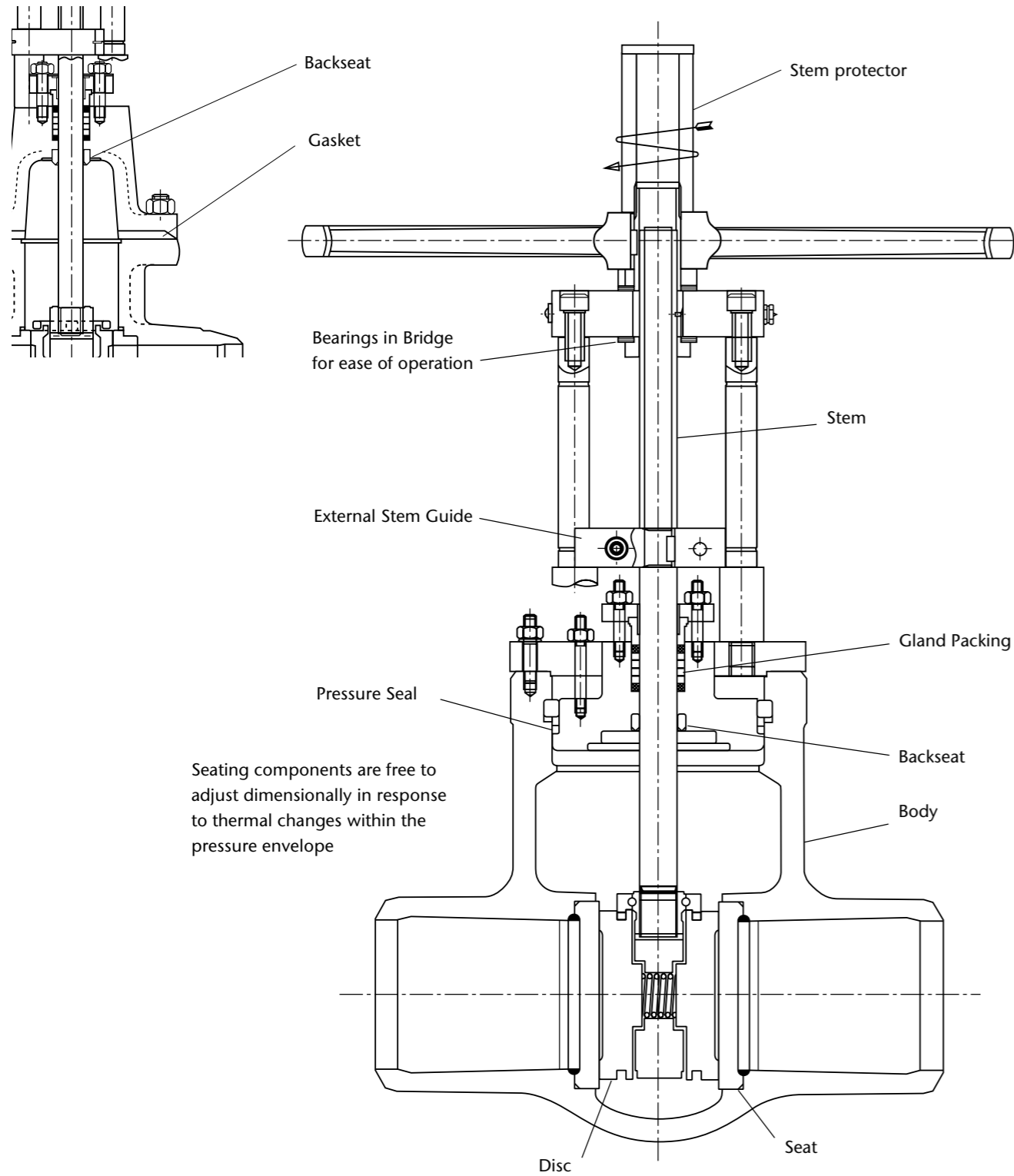
- When isolating a hand operated valve, once the discs have been moved to the closed position, the handwheel should be turned back to eliminate the backlash.
- Electrically operated valves should always be set to function on the 'LIMIT' switches and never on TORQUE otherwise extensive damage can be caused through overstressing of the valve components.

Disc and Seats

Disc and seats are of all metal design and suitable for a wide range of temperatures. Where sealing surfaces are produced by depositing hard faced materials a generous thickness is allowed. This allows for many re lapping operations during maintenance.

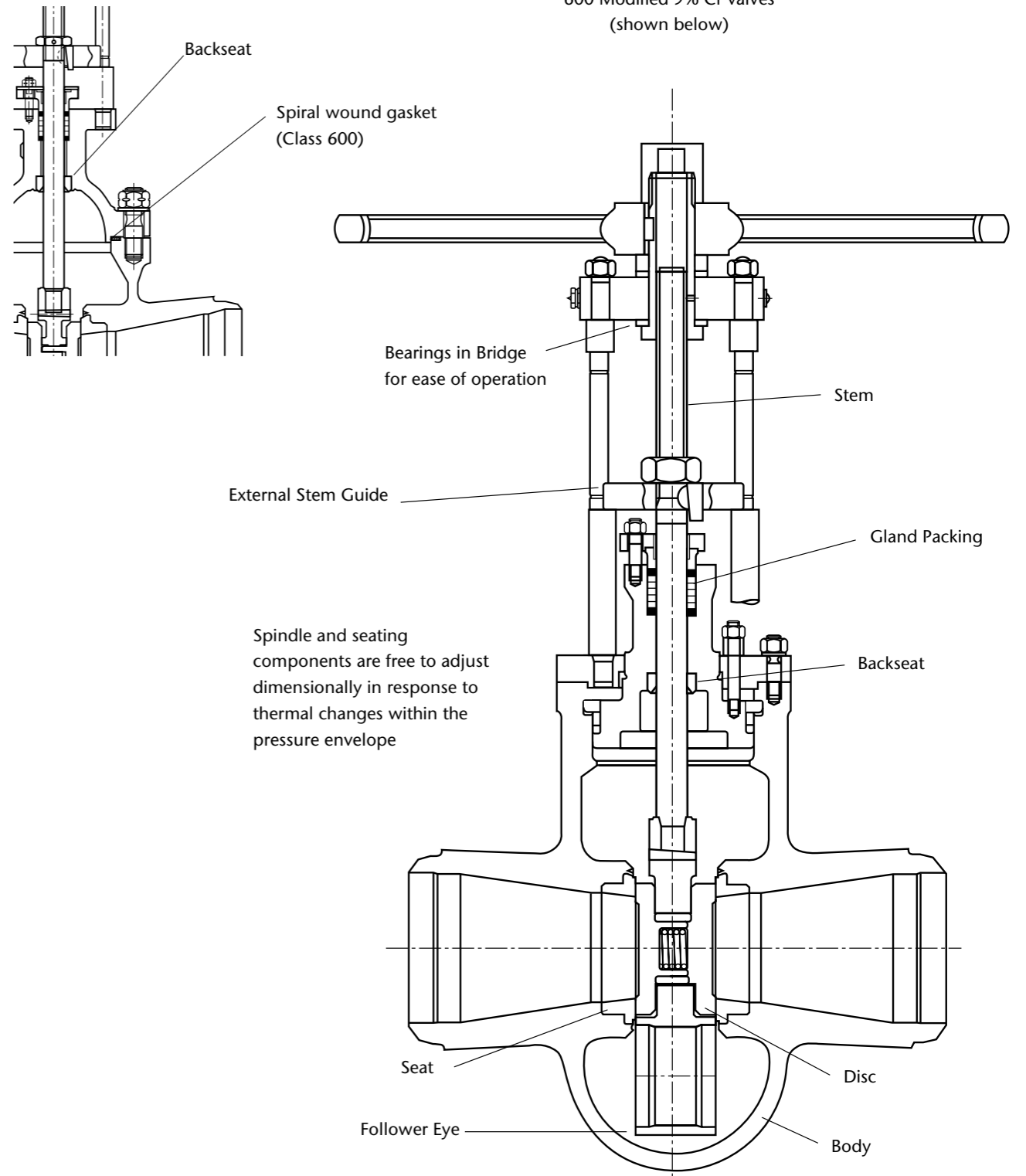
Bolted bonnet on Class 150 - 600
(Excluding Class 600 Modified 9% Cr
valves). Diagram shows 150 Class valve.

Pressure sealed bonnet on
Class 1000 and above.
Class 600 Modified 9% Cr valves.



Bonnet bolted (as shown)
on valves Class 600

Pressure sealed bonnet on
Class 1000 and above & Class
600 Modified 9% Cr valves
(shown below)



Bypass Valves

Bypass valves can be supplied along with associated piping as an integral unit to the main valve if required.

The Bypass valve is used to equalize pressure on either side of a closed main valve. It can also be used to warm up downstream pipe work with the main valve closed.

The Bypass valve is also often used as a means to overcome pressure locking. This is achieved by the fitting of an equalizing pipe between the main valve and the Bypass valve.

Pressure Locking

Pressure locking (or as sometimes referred to as intergate over pressurization) can occur with parallel slide valves. This is described in ASME B16.34 under paragraph 2.3.3. Fluid Thermal Expansion. Pressure locking occurs when a fluid at ambient temperature is trapped in the intergate cavity of the valve body. If heat, as associated with plant warm up is applied and the valve is in the closed position excessive pressure can be generated. The pressure is generated in the intergate cavity and can build up to a value in excess of the pressure rating of the valve.

If the valve is open or part open during warm up pressure locking cannot occur. If pressure locking is a possibility Hopkinsons can offer the following solutions.

- The provision of a small hole drilled in the up stream seat is an inexpensive means of preventing pressure locking. As the valve would be then uni-directional the inlet and outlet of the valve then have to be clearly marked with identifying plates and flow direction arrow.
- The fitting of an equalizing pipe connecting the intergate cavity to the highest pressure side of the valve body provides a simple and clearly visible means of preventing pressure lock. The disadvantage of such an arrangement is that it renders the valve uni-directional.
- The fitting of an equalizing pipe as previously described, but with the addition of an isolating globe valve prevents pressure locking with the added advantage of making the main valve bi-directional. During normal plant operation, the globe isolator would be closed and open during pipeline warm up or in any other circumstance where pressure locking might occur.

- Provision of an Equalizing Bypass Valve, which in addition to acting as a Bypass also provides a means of preventing pressure build up in the intergate cavity. During normal plant operation, the Equalizing Bypass would be closed and open during main valve closure, pipeline warm up, or in any other circumstance where pressure locking might occur.

Stem Insertion Pressure Build Up

When a parallel slide valve is used with water such as on high pressure feed applications it is possible to generate a pressure in excess of the line pressure in the body intergate cavity when the valve is being closed, resulting in a hydraulic lock.

As the stem is moved from the open position it displaces water as a hydraulic ram. For most of its travel the displaced water passes into the pipeline but when the disc overlaps the seat bore it can no longer do this. A situation can now arise when, during completion of the valve travel, excessive pressure builds up in the intergate cavity.

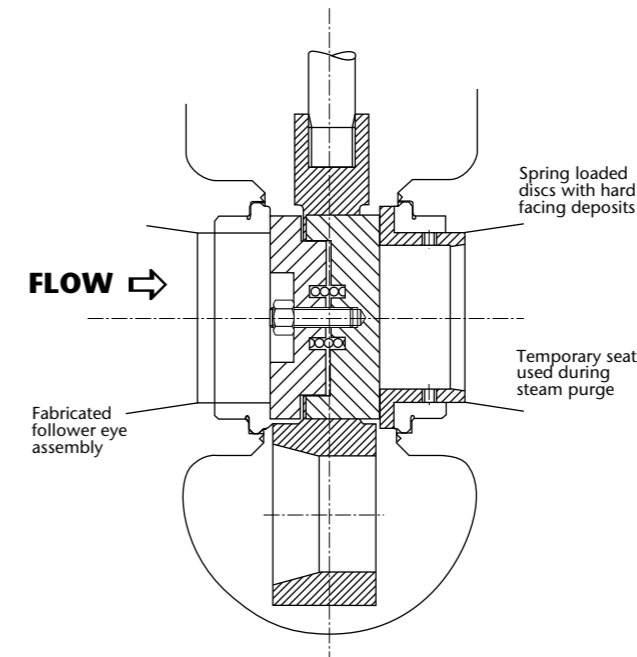
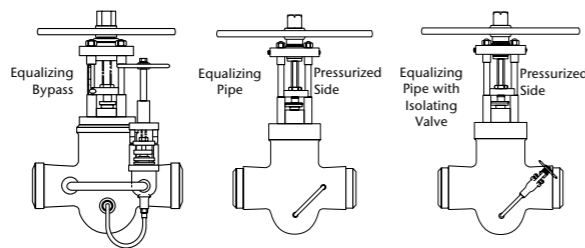
The solutions to this problem are identical to those used to prevent pressure locking.

Electric Actuator Operated Bypass

Separate actuators are provided when it is deemed necessary to power-operate the Bypass valve. The Bypass valve actuator can be provided with local or remote push buttons so that it is impossible to 'inch' the Bypass valve open for 'warming' purposes. The Bypass valve must be interlocked with the main valve to ensure the Bypass is fully open before the main valve can be opened electrically. A further interlock is provided to close the Bypass automatically when the main valve reaches the 'full open' position.

Interlocks on Hand – Operated Bypass and Drain Valve

Electrical interlocks can be provided on hand-operated Bypass and drain valves to ensure that the correct sequence of operation is followed before the main valve can be operated electrically.



Common practice during the commissioning of new boiler or after extensive repairs to existing installations is to install a sacrificial valve in place of the Main Steam Stop Valve before commencing steam purging operations. This procedure ensures that the main steam stop valve internals do not suffer any damage from the inevitable debris in the system but it is a time consuming and expensive operation to change and replace these two valves.

A unique advantage of the Venturi Parallel Slide Valve is that it lends itself perfectly to Steam Purging Operations without having to be removed from the Boiler. Instead the valve is fitted with a temporary set of internal components which incorporate downstream seat protection, whilst the eyelet in the follower eye ensures a smooth stream flow through the Intergate space in the open discharge position.

Modified spindle and actuator inserts enable critical operating times to be achieved during steam purge sequences. Following completion of purging operations, the temporary internals may be removed and refurbished, ready for use on the next unit or held in store for future purging requirements.

Modified 9% Chrome Material

A217-C12a Modified 9% Chrome is a cast ferritic steel much used as a valve body material in modern day power plant.

It finds important use on superheated, reheated and supercritical steam where its superior creep resistant properties and hot strength enables valves to be produced with thinner body walls compared with conventional materials.

Hopkinsons have been manufacturing valves in Modified 9% Chrome Steel since 1987 with the current range of valves specifically designed to meet Power Plant requirements of the future.

An installation reference list of Hopkinsons valves supplied in Modified 9% Chrome Steel is available on application.

Welding to Chrome Vanadium piping

When required valves can be supplied suitable for welding directly into existing Chrome Vanadium pipe lines.

Class 150 (ASME B16.34) Standard Class, Butt Weld and Flanged

Product No	ATSM Body Material		ASME Code B16.34	(For intermediate ratings use linear interpolation)																
	Forged	Cast		-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	
A21901W A21901	Forged	Cast	Std	19.6	19.2	17.7	15.8	13.8	12.1	10.2	9.3	8.4	7.4	6.5	5.5*	4.6*	3.7*	2.8*	1.4*	
	A105	A216 WCB																		

Class 300 (ASME B16.34) Standard Class, Butt Weld and Flanged

Product No	ATSM Body Material		ASME Code B16.34	Pressure in bar.g at Temp. °C (For intermediate ratings use linear interpolation)																
	Forged	Cast		-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	
A21903W A21903	Forged	Cast	Std	51.1	50.1	46.6	45.1	43.8	41.9	39.8	38.7	37.6	36.4	34.7	28.8*	23*	17.4*	11.8*	5.9*	
	A105	A216 WCB																		

Class 600 (ASME B16.34) Butt Weld & Flanged. NB. Flanged applies to standard class ONLY

Product No	ATSM Body Material		ASME Code B16.34	(For intermediate ratings use linear interpolation)																					
	Forged	Cast		-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575	600	625	650	
A21906W A23906W A21906 A23906	Forged	Cast	Std	103.4	103.4	103.3	102.1	101.1	101.1	101.1	100.2	97.8	94.2	86.8	71.9	57.5	43.6	29.4	14.8	-	-	-	-	-	-
	A105	A216 WCB		Spec	103.4	103.4	103.3	102.1	101.1	101.1	101.1	100.2	97.8	94.2	86.8	71.9	57.5	43.6	29.4	14.8	-	-	-	-	-
			Std	103.4	103.4	103.0	99.5	95.9	92.7	85.7	82.6	80.4	77.6	73.3	70.0	67.7	63.4	51.5	29.8	25.4	17.6	12.2	8.5	5.7	
				Spec	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4	102.8	101.0	100.6	99.3	94.4	85.5	64.3	37.2	31.8	22.0	15.3	10.6	7.1
	A182 -F22	A217 WC9	Std	103.4	103.4	103.0	100.3	97.2	92.7	85.7	82.6	80.4	77.6	73.3	70.0	67.7	63.4	56.5	36.9	31.3	21.1	13.8	8.8	5.7	
				Spec	103.4	103.4	103.2	101.9	100.4	100.0	99.6	99.2	98.4	97.5	97.5	94.4	85.5	71.5	46.1	39.1	26.3	17.2	11.2	7.1	

Class 600 (ASME B16.34) Standard Class Butt Weld

Product No	ATSM Body Material		ASME Code B16.34	Pressure in bar.g at Temp. °C (For intermediate ratings use linear interpolation)																				
	Forged	Cast		-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575	600	625	650
A21906W A23906W	Forged	Cast	Std	103.4	103.4	103.0	100.3	97.2	92.7	85.7	82.6	80.4	77.6	73.3	70.0	67.7	63.4	56.5	50.0	49.8	47.9	39.0	29.2	19.9
				Spec	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4	102.8	101.0	100.6	99.3	94.4	85.5	71.5	57.9	57.9	57.1	48.7	36.5

Class 900 (ASME B16.34) Butt Weld & Flanged. NB. Flanged applies to standard class ONLY

Product No	ATSM Body Material		ASME Code B16.34	(For intermediate ratings use linear interpolation)																					
	Forged	Cast		-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575	600	625	650	
A21909W A21909 A23909W A23909	Forged	Cast	Std	153.2	150.4	139.8	135.2	131.4	125.8	119.5	116.1	112.7	109.1	104.2	86.3	69.0	52.3	35.3	17.7	-	-	-	-	-	-
	A105	A216 WCB		Spec	155.1	155.1	154.9	153.1	151.7	151.6	150.3	146.7	141.3	130.2	107.9	86.3	65.4	44.1	22.2	-	-	-	-	-	-
			Std	155.1	155.1	154.4	149.2	143.9	139.0	128.6	124.0	120.7	116.5	109.8	105.1	101.4	95.1	77.2	44.7	38.1	26.4	18.3	12.8	8.5	
				Spec	155.1	155.1	155.1	155.1	155.1	155.1	155.1	155.1	154.3	151.5	150.6	148.9	141.4	128.2	96.5	55.8	47.7	33.0	22.9	16.0	10.6
	A182 -F22	A217 WC9	Std	155.1	155.1	154.6	150.6	145.8	139.0	128.6	124.0	120.7	116.5	109.8	105.1	101.4	95.1	84.7	55.3	46.9	31.6	20.7	13.4	8.5	
				Spec	155.1	155.1	154.9	152.9	150.7	149.9	149.3	148.8	147.6	146.3	146.3	141.4	128.2	107.1	69.1	58.6	39.5	25.8	16.7	10.6	

For limited class ratings sizes 1/2" - 2 1/2" refer to page 51.

* ASTM A105 Material temperature limitations: Use at Temperatures above 800°F/425°C is permissible but not recommended for prolonged use. Short excursions up to 900°F/482°C are permissible.

* We strongly recommend that a Parallel Slide Gate Valve 1" and under are not used for positive isolation at pressures less than a Δp of 20 bar. Likewise for a Parallel Slide Gate Valve above 1" we strongly recommend that they are not used for positive isolation less than a Δp of 5 bar.

(ASME B16.34) Butt Weld

Product No	ATSM Body Material		ASME Code B16.34	Pressure in bar.g at Temp. °C (For intermediate ratings use linear interpolation)																					
	Forged	Cast		-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575	600	625	650	
A21910W A23910W	Forged	Cast	Std	170.2	167.1	155.3	150.2	146.0	139.7	132.7	129.0	125.2	121.2	115.7	95.8	76.6	58.1	39.2	19.6	-	-	-	-	-	-
	A105	A216 WCB		Spec	172.3	172.3	172.1	170.1	168.5	168.4	167.0	163.0	157.0	144.6	119.8	95.8	72.6	49.0	24.6	-	-	-	-	-	-
			Std	172.3	172.3	171.5	165.7	159.8	154.4	142.9	137.7	134.1	129.4	122.0	116.7	112.6	105.6	85.7	49.6	42.3	29.3	-0.1	-0.1	-0.1	
				Spec	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	171.4	168.3	167.3	165.4	157.1	142.4	107.2	62.0	52.9	36.6	25.4	17.7
	A182 -F22	A217 WC9	Std	172.3	172.3	171.7	167.3	162.0	154.4	142.9	137.7	134.1	129.4	122.0	116.7	112.6	105.6	94.0	61.4	52.1	35.1	22.9	14.8	9.4	
				Spec	172.3	172.3	172.1	169.8	167.4	166.5	165.9	165.3	164.0	162.5	162.5	162.5	157.1	142.4	119.0	76.7	65.1	43.8	28.6	18.5	11.7

Class 1500 (ASME B16.34) Butt Weld & Socket

Product No	ATSM Body Material		ASME Code B16.34	Pressure in bar.g at Temp. °C (For intermediate ratings use linear interpolation)																					
	Forged	Cast		-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575	600	625	650	
A21910W A23910W	Forged	Cast	Std	255.3	250.6	233.0	225.4	219.0	209.7	199.1	193.6	187.8	181.8	173.6	143.8	115.0	87.2	58.8	29.5	-	-	-	-	-	-
	A105	A216 WCB		Spec	258.6	258.6	257.4	248.7	239.8	231.8	214.4	206.6	201.1	194.1	183.1	175.1	169.0	158.2	128.6	74.5	63.5	44.0	30.5	21.3	14.2
			Std	258.6	258.6	257.4	248.7	239.8	231.8	214.4	206.6	201.1	194.1	183.1	175.1	169.0	158.2	128.6	74.5	63.5	44.0	30.5	21.3	14.2	
				Spec	258.6	258.6	258.6	258.6	258.6	258.6	258.6	258.6	258.6	257.1	252.5	251.2	248.2	235.8	213.7	160.8	93.1	79.4	55.0	38.2	26.6
	A182 -F22	A217 WC9	Std	258.6	258.6	257.6	250.8	243.4	231.8	214.4	206.6	201.1	194.1	183.1	175.1	169.0	158.2	140.9	92.2	78.2	52.6	34.4	22.3	14.2	
				Spec	258.6	258.6	258.1	254.8	251.1	249.9	248.9	248.0	246.0	243.8	243.8	243.8	235.8	213.7	178.6	115.2	97.7	65.8	43.0	27.9	17.7

Class 1700 int. (ASME B16.34) Butt Weld

Product No	ATSM Body Material		ASME Code B16.34	Pressure in bar.g at Temp. °C (For intermediate ratings use linear interpolation)																					
	Forged	Cast		-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575	600	625	650	
A21917W A23917W	Forged	Cast	Std	289.3	283.9	264.0	255.4	248.2	237.6	225.6	219.4	212.8	206.0	196.7	162.9	130.3	98.8	66.6	33.4	-	-	-	-	-	-
	A105	A216 WCB		Spec	293.0	293.0	291.7	281.8	271.7	262.6	242.9	234.1	227.9	219.9	207.4	198.4	191.5	179.3	145.7	84.4	71.9	49.8	34.5	24.1	16.0
			Std	293.0	293.0	291.7	281.8	271.7	262.6	242.9	234.1	227.9	219.9	207.4	198.4	191.5	179.3	145.7	84.4	71.9	49.8	34.5	24.1	16.0	
				Spec	293.0	293.0	293.0	293.0	293.0	293.0	293.0	293.0	293.0	291.4	286.1	284.6	281.3	267.2	242.2	182.2	105.5	90.0	62.3	43.2	30.1
	A182 -F22	A217 WC9	Std	293.0	293.0	291.9	284.2	275.8	262.6	242.9	234.1	227.9	219.9	207.4	198.4	191.5	179.3	159.7	104.5	88.6	59.6	39.0	25.2	16.0	
				Spec	234.4	234.4	233.5	227.3	220.6	210.1	194.3	187.2	182.3	175.8	165.9	158.6	153.2	143.4	127.7	83.5	70.8	47.6	31.1	20.1	12.8

(ASME B16.34) Butt Weld. Modified 9% Chrome

Product No	ATSM Body Material		ASME Code B16.34	Pressure in bar.g at Temp. °C (For intermediate ratings use linear interpolation)																		
	Forged	Cast		-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575	600
A21921W		A216 C12A	Std	353.3	353.3	352.0	342.8	332.5	316.7	292.8	282.3	274.9	265.1	250.0								

Class 2500 (ASME B16.34) Butt Weld & Socket

Product No	ATSM Body Material		ASME Code B16.34	(For intermediate ratings use linear interpolation)																					
	Forged	Cast		-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575	600	625	650	
	A21925W A23925W	A105		A216 WCB	Std	425.5	417.5	388.3	375.6	365.0	349.5	331.8	322.6	313.0	303.1	289.3	239.7	191.7	145.3	97.9	49.2	-	-	-	-
			Spec	430.9	430.9	430.3	425.3	421.4	421.1	417.6	407.6	392.5	361.7	299.6	239.6	181.6	122.4	61.6	-	-	-	-	-	-	-
	-	A217 WC6	Std	430.9	430.9	429.0	414.5	399.6	386.2	357.1	344.3	335.3	323.2	304.9	291.6	281.8	263.9	214.4	124.1	105.9	73.4	50.9	35.5	23.6	
			Spec	430.9	430.9	430.9	430.9	430.9	430.9	430.9	428.6	420.9	418.3	413.7	393.1	356.3	268.0	155.1	132.4	91.7	63.6	44.4	29.5	-	
	A182-F22	A217 WC9	Std	430.9	430.9	429.4	418.2	405.4	386.2	357.1	344.3	335.3	323.2	304.9	291.6	281.8	263.9	235.0	153.7	130.3	87.7	57.4	37.2	23.6	
			Spec	430.9	430.9	430.2	424.6	418.5	416.5	414.8	413.3	410.0	406.3	406.3	393.1	356.3	297.5	192.1	162.8	109.7	71.7	46.5	29.5	-	

Class 3100 int. (ASME B16.34) Butt Weld & Socket

Product No	ATSM Body Material		ASME Code B16.34	Pressure in bar.g at Temp. °C (For intermediate ratings use linear interpolation)																					
	Forged	Cast		-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575	600	625	650	
	A21931W A23931W	A105		A216 WCB	Std	527.6	517.8	481.5	465.7	452.6	433.3	411.4	400.0	388.1	375.8	358.7	297.2	237.7	180.1	121.4	61.0	-	-	-	-
			Spec	534.3	534.3	533.5	527.3	522.5	522.1	517.8	505.4	486.7	448.4	371.5	297.1	225.1	151.8	76.3	-	-	-	-	-	-	-
	-	A217 WC6	Std	534.3	534.3	531.9	514.0	495.5	478.7	442.7	426.8	415.7	400.7	377.9	361.5	349.3	327.1	265.8	153.8	252.4	159.4	-0.1	-0.1	-0.1	-0.1
			Spec	534.3	534.3	534.3	534.3	534.3	534.3	534.3	534.3	531.4	521.8	518.7	512.9	487.4	441.8	332.3	192.3	164.1	113.7	78.8	55.0	36.6	-
	A182-F22	A217 WC9	Std	534.3	534.3	532.4	518.5	502.7	478.7	442.7	426.8	415.7	400.7	377.9	361.5	349.3	327.1	291.4	190.5	161.5	108.7	71.1	46.1	29.3	
			Spec	534.3	534.3	533.4	526.5	518.9	516.4	514.3	512.4	508.4	503.8	503.8	503.8	487.4	441.8	368.8	238.1	201.8	136.0	88.9	57.6	36.6	

Class 3600 (ASME B16.34) Butt Weld & Socket

Product No	ATSM Body Material		ASME Code B16.34	Pressure in bar.g at Temp. °C (For intermediate ratings use linear interpolation)																					
	Forged	Cast		-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575	600	625	650	
	A21936W	A182-F22		A217 WC9	Std	620.5	620.5	618.3	602.2	583.8	555.9	514.1	495.7	482.7	465.4	438.8	419.8	405.6	379.8	338.4	221.2	187.6	126.3	82.6	53.5
			Spec	620.0	620.0	619.0	611.0	603.0	600.0	597.0	595.0	590.0	585.0	585.0	585.0	566.0	513.0	428.2	276.5	234.4	158.0	103.2	66.9	42.4	

For limited class ratings sizes 1/2" - 2 1/2" refer to page 51.

* ASTM A105 Material temperature limitations: Use at Temperatures above 800°F/425°C is permissible but not recommended for prolonged use. Short excursions up to 900°F/482°C are permissible.

Class 150 (ASME B16.34) Standard Class, Butt Weld and Flanged

Product No	ATSM Body Material		ASME Code B16.34	Pressure in lbf/sq. in. at Temp. °F (For intermediate ratings use linear interpolation)															
	Forged	Cast		-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000		
	A21901W A21901	A105		A216 WCB	Std	285	260	230	200	170	140	125	110	95	80*	65*	50*	35*	20*

Class 300 (ASME B16.34) Standard Class, Butt Weld and Flanged

Product No	ATSM Body Material		ASME Code B16.34	(For intermediate ratings use linear interpolation)															
	Forged	Cast		-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000		
	A21903W A21903	A105		A216 WCB	Std	740	680	655	635	605	570	550	530	505	410*	320*	230*	135*	85*

Class 600 (ASME B16.34) Butt Weld & Flanged. NB. Flanged applies to standard class ONLY

Product No	ATSM Body Material		ASME Code B16.34	(For intermediate ratings use linear interpolation)																			
	Forged	Cast		-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000						
	A21906W A23906W A21906 W23906	A105		A216 WCB	Std	1480	1360	1310	1265	1205	1135	1100	1060	1015	825*	640*	460*	275*	170*	-	-	-	-
			Spec	1500	1500	1480	1465	1465	1465	1430	1380	1270	1030*	795*	575*	345*	215*	-	-	-	-	-	-
	-	A217	Std	1500	1500	1445	1385	1330	1210	1175	1135	1065	1015	975	900	640	430	290	190	130	80	-	-
			Spec	1500	1500	1500	1500	1500	1500	1500	1500	1465	1460	1440	1355	1175	795	540	360	240	165	105	-
	A182-F22	A217 WC9	Std	1500	1500	1455	1410	1330	1210	1175	1135	1065	1015	975	900	755	535	350	220	135	80	-	-
			Spec	1500	1500	1480	1455	1450	1440	1430	1415	1415	1415	1355	1200	945	670	435	275	170	105	-	-

Class 600 (ASME B16.34) Butt Weld Modified 9% Chrome

Product No	ATSM Body Material		ASME Code B16.34	(For intermediate ratings use linear interpolation)																				
	Forged	Cast		-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000							
	A21906W A23906W C12A	A105		A217	Std	1500	1500	1455	1410	1330	1210	1175	1135	1065	1015	975	900	775	725	720	605	445	290	-
			Spec	1500	1500	1500	1500	1500	1500	1500	1500	1500	1465	1460	1440	1355	1200	945	840	840	755	555	360	-

Class 900 (ASME B16.34) Butt Weld & Flanged. NB. Flanged applies to standard class ONLY

Product No	ATSM Body Material		ASME Code B16.34	(For intermediate ratings use linear interpolation)																			
	Forged	Cast		-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000						
	A21909W A23909W A21909 A23909 WC6	A105		A216 WCB	Std	2220	2035	1965	1900	1810	1705	1650	1590	1520	1235*	955*	690*	410*	255*	-	-	-	-
			Spec	2250	2250	2220	2200	2200	2200	2145	2075	1905	1545*	1195*	860*	515*	320*	-	-	-	-	-	-
	-	A217	Std	2250	2250	2165	2080	1995	1815	1765	1705	1595	1525	1460	1350	955	650	430	290	195	125	-	-
			Spec	2250	2250	2250	2250	2250	2250	2250	2250	2200	2185	2160	2030	1760	1195	810	540	360	245	155	-
	A182-F22	A217 WC9	Std	2250	2250	2185	2115	1995	1815	1765	1705	1595	1525	1460	1350	1160	800	525	330	205	125	-	-
			Spec	2250	2250	2220	2185	2175	2165	2145	2120	2120	2120	2030	1800	1415	1005	655	410	255	155	-	-

For limited class ratings sizes 1/2" - 2 1/2" refer to page 51.

* ASTM A105 Material temperature limitations: Use at Temperatures above 800°F/425°C is permissible but not recommended for prolonged use. Short excursions up to 900°F/482°C are permissible.

Class 1000 int. (ASME B16.34) Butt Weld

Table with columns: Product No, ATSM Body Material (Forged, Cast), ASME Code B16.34, and Pressure in lbf/sq. in. at Temp. °F (ranging from -20 to 1200). Includes data for A21910W and A21910W with ASME B16.34 code.

(ASME B16.34) Butt Weld & Socket

Table with columns: Product No, ATSM Body Material, ASME Code B16.34, and Pressure in lbf/sq. in. at Temp. °F (ranging from -20 to 1200). Includes data for A21915W and A21915W with ASME B16.34 code.

Class 1700 int. (ASME B16.34) Butt Weld

Table with columns: Product No, ATSM Body Material (Forged, Cast), ASME Code B16.34, and Pressure in lbf/sq. in. at Temp. °F (ranging from -20 to 1200). Includes data for A21917W and A21917S with ASME B16.34 code.

(ASME B16.34) Butt Weld. Modified 9% Chrome

Table with columns: Product No, ATSM Body Material (Forged, Cast), ASME Code B16.34, and Pressure in lbf/sq. in. at Temp. °F (ranging from -20 to 1200). Includes data for A21921W with ASME B16.34 code.

For limited class ratings sizes 1/2" - 2 1/2" refer to page 51.

* ASTM A105 Material temperature limitations: Use at Temperatures above 800°F/425°C is permissible but not recommended for prolonged use. Short excursions up to 900°F/482°C are permissible.

(ASME B16.34) Butt Weld & Socket

Table with columns: Product No, ATSM Body Material, ASME Code B16.34, and Pressure in lbf/sq. in. at Temp. °F (ranging from -20 to 1200). Includes data for A21925W and A21925W with ASME B16.34 code.

Class 3100 int. (ASME B16.34) Butt Weld & Socket

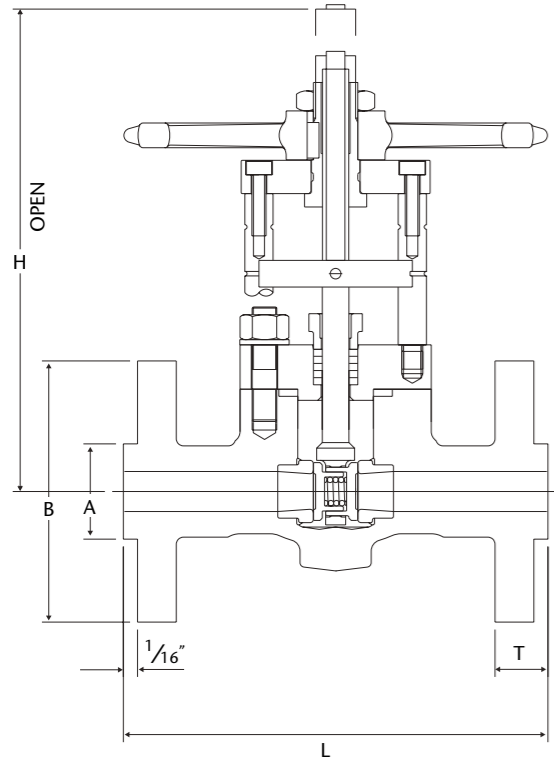
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Class 3600 (ASME B16.34) Butt Weld & Socket

Table with columns: Product No, ATSM Body Material (Forged, Cast), ASME Code B16.34, and Pressure in lbf/sq. in. at Temp. °F (ranging from -20 to 1200). Includes data for A21936W with ASME B16.34 code.

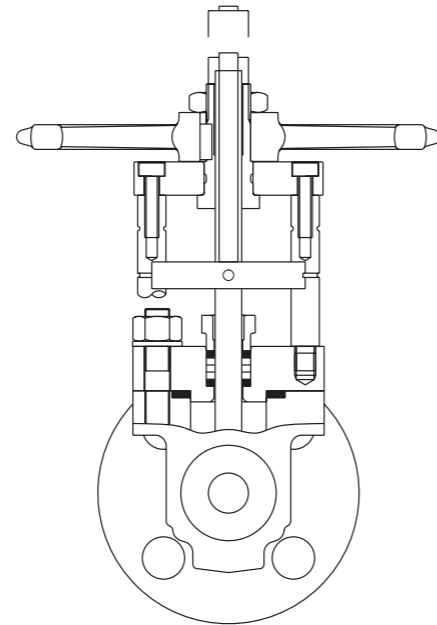
For limited class ratings sizes 1/2" - 2 1/2" refer to page 51.

* ASTM A105 Material temperature limitations: Use at Temperatures above 800°F/425°C is permissible but not recommended for prolonged use. Short excursions up to 900°F/482°C are permissible.



Materials

Description	
Body:	ASTM A105
Bonnet:	ASTM A105
Stem:	BS970 431 S29
Gasket:	Exfoliated graphite spiral wound
Seats:	Grade 6 stellite
Disc:	13% Cr Stainless Steel hardened
Gland Packing:	Exfoliated graphite and braided graphite fibre
Bonnet bolts:	ASTM-A193 Grade B7



Actual pillar locations

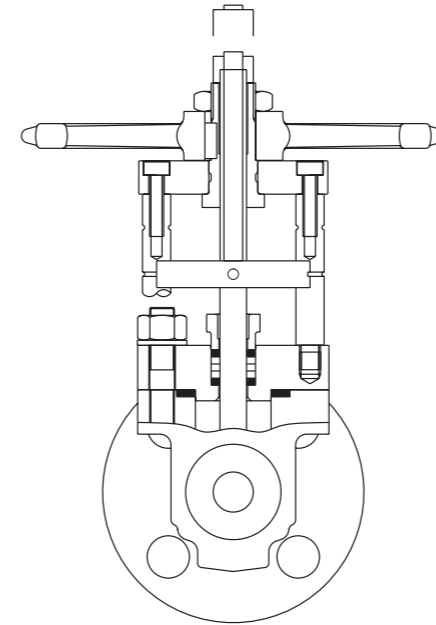
Class 300

Nominal Size	A		B		H		L		T		Weight	
	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)
15	35	(1 3/8)	95	(3 3/4)	220	(8 5/8)	140	(5 1/2)	14	(9/16)	6	(13)
20	43	(1 11/16)	118	(4 5/8)	220	(8 5/8)	152	(6)	16	(5/8)	7	(15.5)
25	51	(2)	124	(4 7/8)	255	(10)	165	(6 1/2)	18	(11/16)	10.5	(23)
32	64	(2 1/2)	133	(5 1/4)	330	(13)	178	(7)	19	(3/4)	16	(35)
40	73	(2 7/8)	156	(6 1/8)	365	(14 3/8)	190	(7 1/2)	21	(13/16)	21	(45)
50	92	(3 3/8)	165	(6 1/2)	425	(16 3/4)	216	(8 1/4)	22	(7/8)	29	(64)

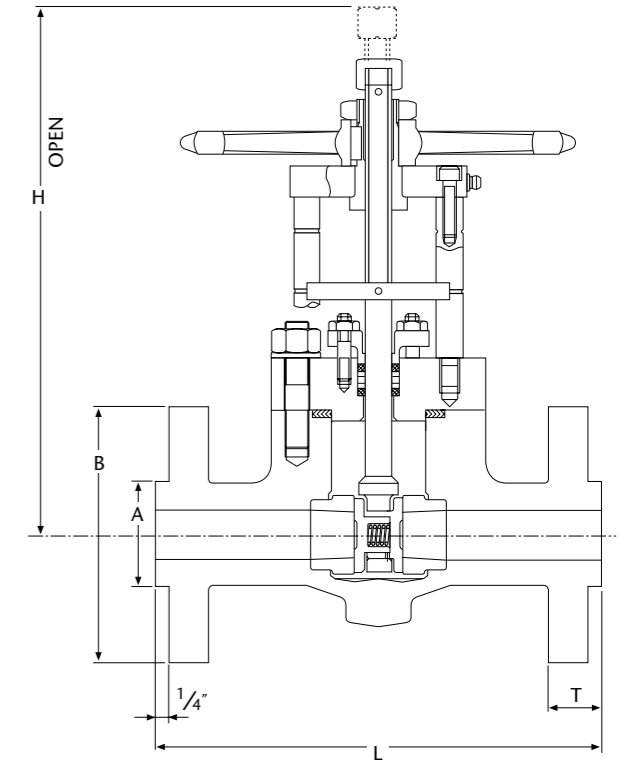
Flanged to ASME B16.5. Alternatives are available on request.

Materials

Description	
Body:	ASTM A105
Bonnet:	ASTM A105
Stem:	BS970 431 S29
Gasket:	Exfoliated graphite spiral wound
Seats:	Grade 6 stellite
Disc:	13% Cr Stainless Steel hardened
Gland Packing:	Exfoliated graphite and braided carbon fibre
Bonnet bolts:	ASTM-A193 Grade B7



Actual pillar locations



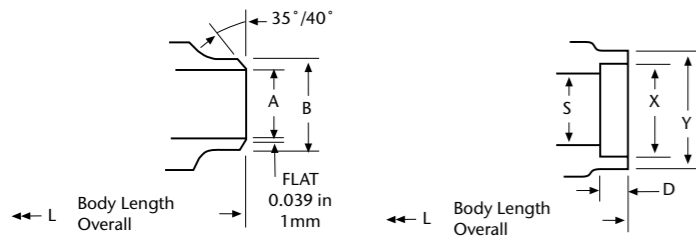
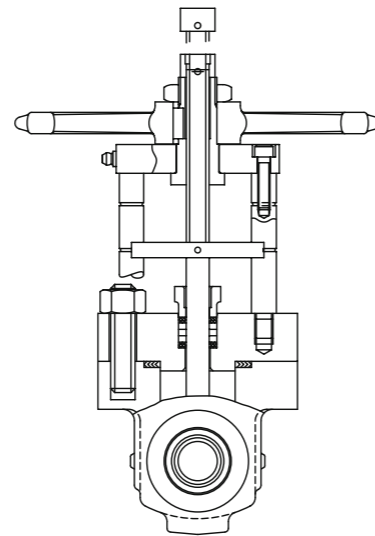
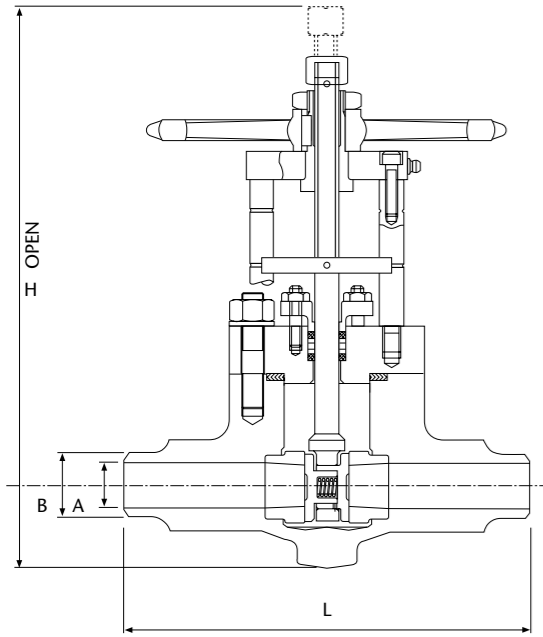
Class 600

Nominal Size	A		B		H		L		T		Weight	
	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)
15	35	(1 3/8)	95	(3 3/4)	220	(8 5/8)	165	(6 1/2)	21	(13/16)	7	(16)
20	43	(1 11/16)	118	(4 5/8)	220	(8 5/8)	190	(7 1/2)	22	(7/8)	7.5	(17)
25	51	(2)	124	(4 7/8)	255	(10)	216	(8 1/2)	24	(15/16)	12.5	(28)
32	64	(2 1/2)	133	(5 1/4)	330	(13)	229	(9)	27	(1 1/16)	18.5	(41)
40	73	(2 7/8)	156	(6 1/8)	365	(14 3/8)	241	(9 1/2)	29	(1 1/8)	26	(56)
50	92	(3 3/8)	165	(6 1/2)	425	(16 3/4)	292	(11 1/2)	32	(1 1/4)	39	(86)

Flanged to ASME B16.5. Alternatives are available on request.

Materials

Description	
Body:	ASTM A105
Bonnet:	ASTM A105
Stem:	BS970 431 S29
Gasket	Exfoliated graphite spiral wound
Seats:	Grade 6 stellite
Disc	13% Cr Stainless Steel hardened
Gland Packing	Exfoliated graphite and braided carbon fibre
Bonnet bolts	ASTM-A193 Grade B7



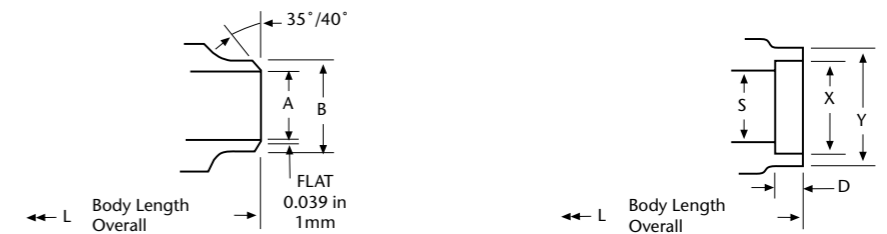
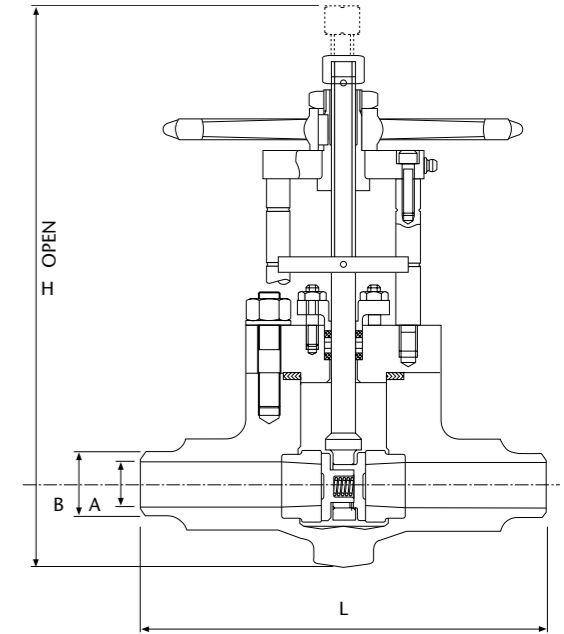
Class 600

Nominal Size mm	L mm	A mm	B mm	Weight kg	L mm	S mm	X mm	Y mm	D mm	Weight kg
15	—	—	—	—	140	18	21.97/21.72	40	10	4.5
20	190	19.10/18.60	27	5.5	140	18	27.30/27.05	40	13	5
25	216	24.55/24.05	34	8.5	165	24	34.04/33.78	45	3	7.5
32	229	32.70/32.20	43	14	178	32	42.80/42.54	54	13	13
40	241	38.30/37.80	49	21	190	38	48.90/48.64	61	13	20
50	292	49.50/49.00	61	32	241	49	61.37/61.11	74	16	30
in	in	in	in	lb	in	in	in	in	in	lb
1/2	—	—	—	—	5 1/2	23/32	0.865/0.855	1 9/16	3/8	10
3/4	7 1/2	0.752/0.732	1 1/16	12	5 1/2	23/32	1.075/1.065	1 9/16	1/2	11
1	8 1/2	0.967/0.947	1 11/32	19	6 1/2	15/16	1.340/1.330	1 25/32	1/2	16
1 1/4	9	1.288/1.268	1 1/16	31	7	1 1/4	1.685/1.675	2 1/8	1/2	29
1 1/2	9 1/2	1.508/1.488	1 5/16	46	7 1/2	1 1/2	1.925/1.915	2 13/32	1/2	44
2	11 1/2	1.949/1.929	2 3/32	71	9 1/2	1 5/16	2.416/2.406	2 29/32	5/8	66

Butt Weld Ends to ASME B16.25. Alternatives are available on request.

Materials

Description	
Body:	ASTM A105
Bonnet:	ASTM A105
Stem:	BS970 431 S29
Gasket	Exfoliated graphite spiral wound
Seats:	Grade 6 stellite
Disc	13% Cr Stainless Steel hardened
Gland Packing	Exfoliated graphite and braided carbon fibre
Bonnet bolts	ASTM-A193 Grade B7



Class 900

Nominal Size mm	L mm	A mm	B mm	Weight kg	L mm	S mm	X mm	Y mm	D mm	Weight kg
15	—	—	—	—	140	18	21.97/21.72	40	10	5
20	229	15.80/15.30	27	6	140	18	27.30/27.05	40	13	5.5
25	254	20.95/20.45	34	9	203	20	34.04/33.78	49	13	8.5
32	279	29.70/29.20	43	16	229	29	42.80/42.54	57	13	15
40	305	34.20/33.70	49	23	254	33	48.90/48.64	65	13	22
50	368	43.10/42.60	61	33	305	42	61.37/61.11	81	16	32
in	in	in	in	lb	in	in	in	in	in	lb
1/2	—	—	—	—	5 1/2	23/32	0.865/0.855	1 9/16	3/8	11
3/4	9	0.622/0.602	1 1/16	13	5 1/2	23/32	1.075/1.065	1 9/16	1/2	12
1	10	0.825/0.805	1 11/32	19	8	25/32	1.340/1.330	1 15/32	1/2	19
1 1/4	11	1.170/1.150	1 11/16	35	9	1 1/8	1.685/1.675	2 1/4	1/2	33
1 1/2	12	1.347/1.327	1 15/16	50	10	1 3/32	1.925/1.915	2 9/16	1/2	48
2	14 1/2	1.697/1.677	2 13/32	73	12	1 21/32	2.416/2.406	3 3/16	5/8	71

Butt Weld Ends to ASME B16.25. Alternatives are available on request.

Bonnetless Type 1/2" & 3/4" Sizes

Materials - Carbon Steel Valves

Body:	Carbon Steel - Forged	ASTM-A105
Gland Ring:	Nickel molybdenum alloy	
Stem:	18/10 Stainless Steel	
Seats:	Grade 6 Stellite	
Discs:	Nickel molybdenum alloy	
Gland Packing:	Exfoliated graphite & braided carbon fibre	

Materials - Alloy Steel Valves

Body:	Carbon Steel - Forged	ASTM-A182-F22
Gland Ring:	Nickel molybdenum alloy	
Stem:	18/10 Stainless Steel	
Seats:	Grade 6 Stellite	
Discs:	Nickel molybdenum alloy	
Gland Packing:	Exfoliated graphite & braided carbon fibre	

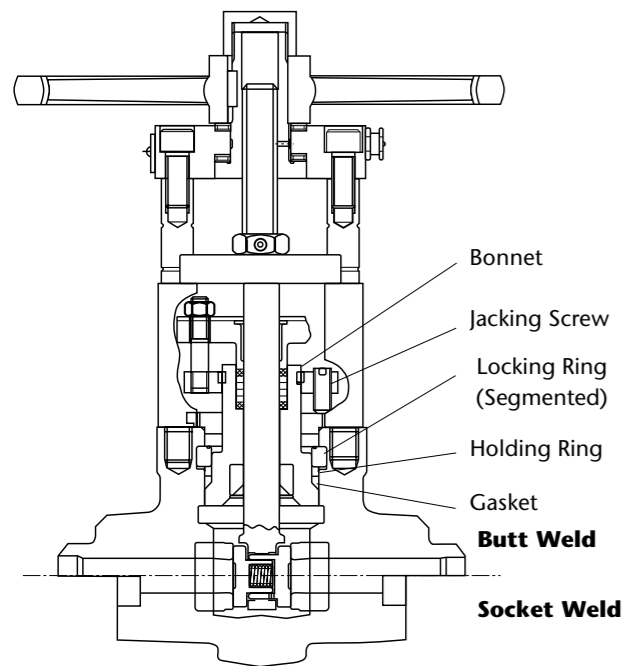
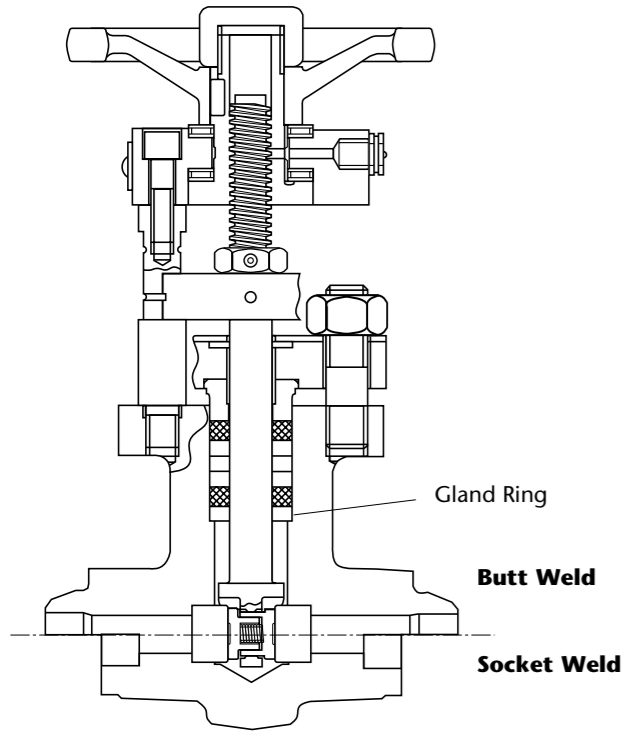
Pressure Seal Bonnet Type 1" to 2" Sizes

Materials - Carbon Steel Valves

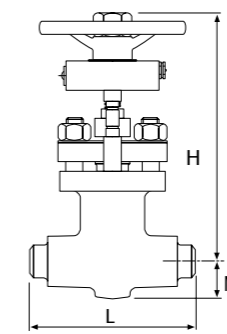
Body:	Carbon Steel - Forged	ASTM-A105
Bonnet:	Alloy Steel - Forged	ASTM A182-F22
Back Seat:	Nickel molybdenum alloy	
Gasket:	Exfoliated graphite	
Stem:	18/10 Stainless Steel	
Seats:	Grade 6 Stellite	
Discs:	Nickel molybdenum alloy	
Gland Packing:	Exfoliated graphite & braided carbon fibre	

Materials - Alloy Steel Valves

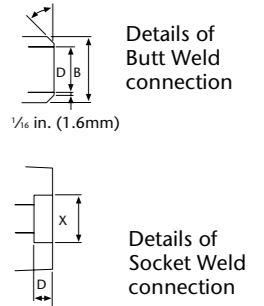
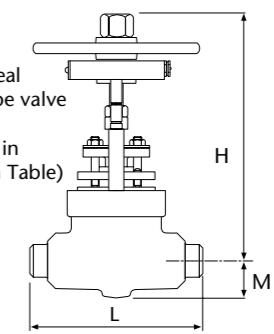
Body:	Alloy Steel - Forged	ASTM-A182-F22
Bonnet:	Alloy Steel - Forged	ASTM A182-F22
Back Seat:	Nickel molybdenum alloy	
Gasket:	Exfoliated graphite	
Stem:	18/10 Stainless Steel	
Seats:	Grade 6 Stellite	
Discs:	Nickel molybdenum alloy	
Gland Packing:	Exfoliated graphite & braided carbon fibre	



Bonnetless type valve
(Ref: 'BL' in Dimension Table)

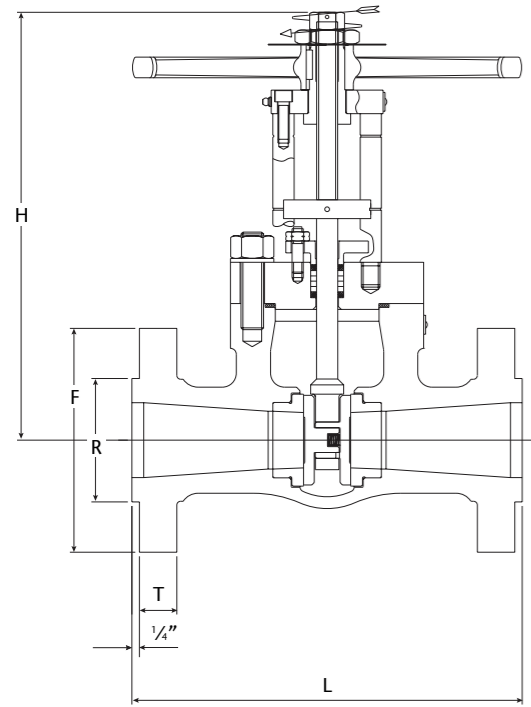


Pressure Seal Bonnet type valve
(Ref: 'PSB' in Dimension Table)



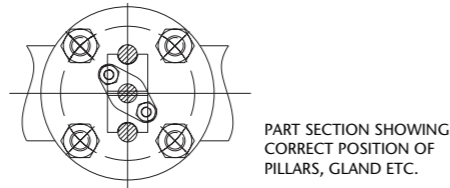
	Nominal Size	Imperial Units								Metric Units				
		H	M	W	Valve Type	L	A	B	Valve Weight	Valve Type	L	X	D	Valve Weight
	1/2	8 1/4	1 1/4	5	BL	5 1/2	0.50	0.94	13lb	BL	140	12.70	24	6kg
	3/4	10 3/8	1 1/8	7	PSB	7 1/8	0.61	1.10	23	PSB	186	15.54	28	11
	1	10 3/8	1 1/8	7	PSB	7 1/8	0.81	1.38	23	PSB	186	20.70	35	11
	1 1/4	12 5/8	2	11	PSB	9 1/8	1.16	1.69	46	PSB	232	29.46	43	21
	1 1/2	15 3/4	2 5/8	15	PSB	11	1.34	2.05	91	PSB	279	33.98	52	42
	2	15 3/4	2 5/8	15	PSB	11	1.69	2.44	91	PSB	279	42.89	62	42
Socket Weld Valves Figure No. A219155	15	210	32	125	BL	140	12.70	24	6kg	BL	5 1/2	0.50	0.94	13lb
	20	264	40	178	PSB	186	15.54	28	11	PSB	5 1/2	0.50	1.10	13
	25	264	40	178	PSB	186	20.70	35	11	PSB	7 1/8	0.60	1.38	23
	32	322	51	280	PSB	232	29.46	43	21	PSB	9 1/8	0.89	1.81	46
	40	402	67	380	PSB	279	33.98	52	42	PSB	11	1.10	2.17	91
	50	402	67	380	PSB	279	42.89	62	42	PSB	11	1.50	2.56	91
Class 2500 Butt Weld Valves Figure No. A21925W	1/2	8 1/2	1 1/4	5	BL	5 1/2	0.50	0.94	13lb	BL	140	12.70	24	6kg
	3/4*	8 1/4 (10 3/8)	1 1/4 (1 1/8)	5 (7)	BL	5 1/2	0.50	1.10	13	PSB	140	12.70	28	6
	1	10 3/8	1 1/8	7	PSB	7 1/8	0.60	1.38	23	PSB	186	15.21	35	11
	1 1/4	12 5/8	2	11	PSB	9 1/8	0.89	1.81	46	PSB	232	22.75	46	21
	1 1/2	15 3/4	2 5/8	15	PSB	11	1.10	2.17	91	PSB	279	27.94	55	42
	2	15 3/4	2 5/8	15	PSB	11	1.50	2.56	91	PSB	279	38.17	65	42
Socket Weld Valves Figure No. A219255	15	210	32	125	BL	140	12.70	24	6kg	BL	5 1/2	0.50	0.94	13lb
	20*	210 (264)	32(40)	125(178)	BL	140	12.70	28	6	PSB	5 1/2	0.50	1.10	13
	25	264	40	178	PSB	186	15.21	35	11	PSB	7 1/8	0.60	1.38	23
	32	322	51	250	PSB	232	22.75	46	21	PSB	9 1/8	0.89	1.81	46
	40	402	67	380	PSB	279	27.94	55	42	PSB	11	1.10	2.17	91
	50	402	67	380	PSB	279	38.17	65	42	PSB	11	1.50	2.56	91
Class 3100 Butt Weld Valves Figure No. A21931W	1/2	8 1/4	1 1/4	5	BL	5 1/2	0.50	0.94	13lb	BL	140	12.70	24	6kg
	3/4*	8 1/4 (10 3/8)	1 1/4 (1 1/8)	5 (7)	BL	5 1/2	0.50	1.10	13	PSB	140	12.70	28	6
	1	10 3/8	1 1/8	7	PSB	7 1/8	0.60	1.38	23	PSB	186	15.21	35	11
	1 1/4	12 5/8	2	11	PSB	9 1/8	0.89	1.81	46	PSB	232	22.75	46	21
	1 1/2	15 3/4	2 5/8	15	PSB	11	1.10	2.17	91	PSB	279	27.94	55	42
	2	15 3/4	2 5/8	15	PSB	11	1.50	2.56	91	PSB	279	38.17	65	42
Socket Weld Valves Figure No. A219315	15	210	32	125	BL	140	12.70	24	6kg	BL	102	21.77	13	6kg
	20*	210 (264)	32(40)	125(178)	BL	149	12.70	28	6	PSB	127	27.17	13	10
	25	264	40	178	PSB	186	15.21	35	11	PSB	127	33.91	13	10
	32	322	51	280	PSB	232	22.75	46	21	PSB	165	42.67	13	20
	40	402	67	380	PSB	279	27.94	55	42	PSB	200	48.77	13	40
	50	402	67	380	PSB	279	38.17	65	42	PSB	200	61.24	16	40

*Figures in parentheses relate to Socket Weld End valves.



Materials

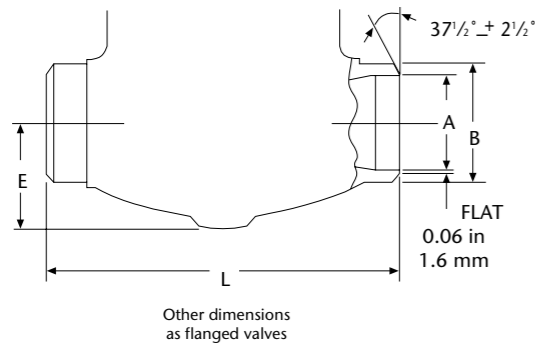
Description	
Body:	ASTM A216-WCB
Bonnet:	ASTM A105
Stem:	18/2 Stainless Steel
Gasket	Exfoliated graphite spiral wound
Seats:	Grade 6 stellite
Disc	13% Cr Stainless Steel hardened
Gland Packing	Exfoliated graphite and braided carbon fibre
Bonnet bolts	ASTM-A193 Grade B7



Class 600

Nominal Size	T		F		H		L		R		Weight	
	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)
65	2½	35	1⅜	190	7½	425	16¼	330	13	105	4½	41 (90)
80	(3)	38	(1½)	210	(8¼)	425	(16¼)	356	(14)	127	(5)	52 (114)
100	(4)	45	(1¾)	273	(10¾)	510	(20)	356	(14)	157	(6⅜)	83 (183)

Flanged to ASME B16.5. Alternatives are available on request.

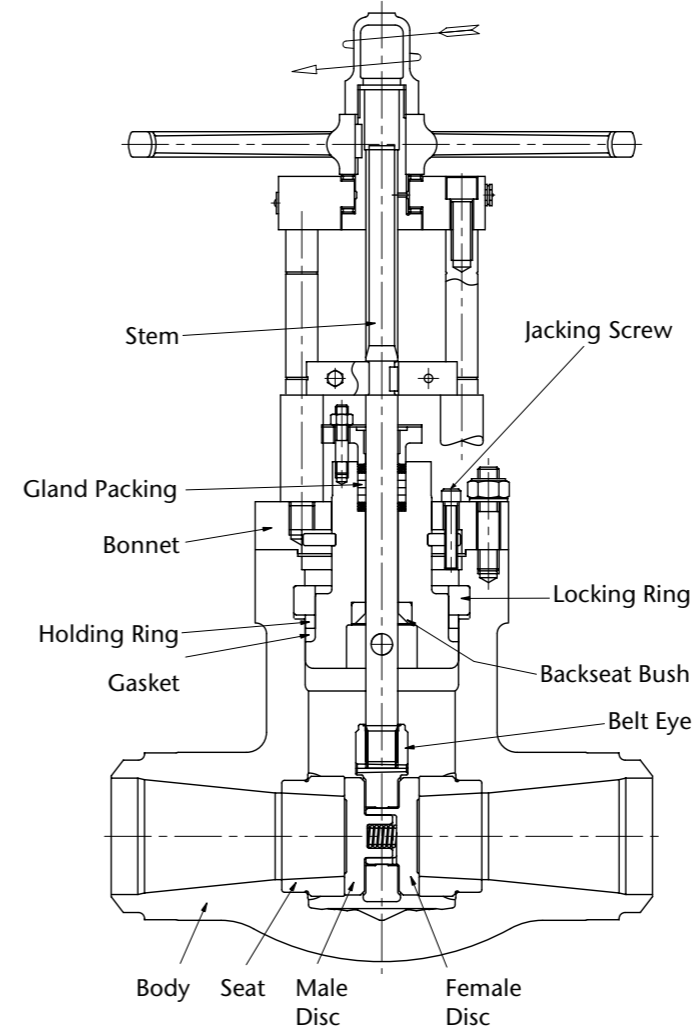


Butt Weld Valves

Figure No. A21906W

Nominal Size	E		L		A		B		Weight		
	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)	
65	2½	65	(2⅞)	216	(8½)	59	(2.32)	73	(2.88)	30	(66)
80	(3)	68	(2⅝)	254	(10)	73	(2.87)	89	(3.50)	31	(68)
100	(4)	80	(3⅞)	305	(12)	97	(3.81)	114	(4.50)	44	(97)

Flanged to ASME B16.5. Alternatives are available on request.



Materials - Carbon Steel Valves

Body:	Carbon Steel - Forged	ASTM-A105
Bonnet:	Sizes 2½ & 3in (65 & 80mm): Alloy steel - forged ASTM A182-F22 Size 4i (100mm): Carbon Steel - forged ASTM-A105	
Back Seat:	Nickel molybdenum alloy	
Gasket:	Exfoliated graphite	
Stem:	BS 25 143	
Belt Eye:	Sizes 2½ & 3in (65 & 80mm): Austenitic SS ASTM A453 Grade 660B Size 4in (100mm): Alloy Steel - forged ASTM-182-F22	
Seats:	Grade 6 Stellite	
Discs:	Nickel molybdenum alloy	
Gland Packing:	Exfoliated graphite & braided carbon fibre	

Materials - Alloy Steel Valves

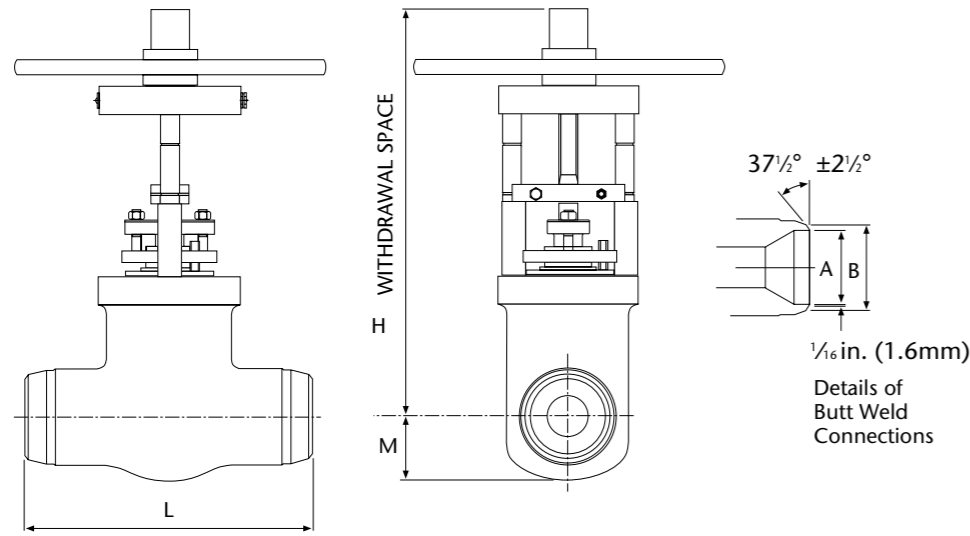
Body:	Alloy Steel - Forged	ASTM-A182-F22
Bonnet:	Alloy steel - forged	ASTM A182-F22
Back Seat:	Nickel molybdenum alloy	
Gasket:	Exfoliated graphite	
Stem:	ASTM A638 Grade 660	
Belt Eye:	Sizes 2½ & 3in (65 & 80mm): Austenitic SS ASTM A453 Grade 660B Size 4in (100mm): Alloy Steel - forged ASTM-182-F22	
Seats:	Grade 6 Stellite	
Discs:	Nickel molybdenum alloy	
Gland Packing:	Exfoliated graphite & braided carbon fibre	

Butt Weld End Valves

Class 900	Figure No. A21909W
Class 1500	Figure No. A21915W
Class 2500	Figure No. A21925W
Class 3100	Figure No. A21931W
Class 3600	Figure No. A21936W

Nominal Sizes:

inch	2½	3	4
mm	65	80	100



Class 900

Nominal Size		A		B		H		L		M		Weight	
mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)
65	(2½)	54	(2.12)	85	(3.34)	430	(17)	254	(10)	68	(2⅝)	35	(77)
80	(3)	66	(2.62)	100	(3.93)	435	(17⅞)	305	(12)	68	(2⅝)	37	(81)
100	(4)	87	(3.43)	120	(4.72)	615	(24¼)	356	(14)	94	(3¾)	82	(180)

Class 1500

Nominal Size		A		B		H		L		M		Weight	
mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)
65	(2½)	54	(2.12)	85	(3.34)	430	(17)	254	(10)	68	(2⅝)	35	(77)
80	(3)	66	(2.62)	100	(3.93)	435	(17⅞)	305	(12)	68	(2⅝)	37	(81)
100	(4)	87	(3.43)	125	(4.92)	615	(24¼)	406	(16)	94	(3¾)	86	(189)

Figure No. A21915W

Figure No. A21925W Class 2500

Figure No. A21931W Class 3100 Size 2½" (65mm) only, Alloy Steel only

CLASS 2500, 3100 & 3600

Figure No. A21936W Class 3600 Sizes 3 & 4" (80 & 100mm) only, Alloy Steel only

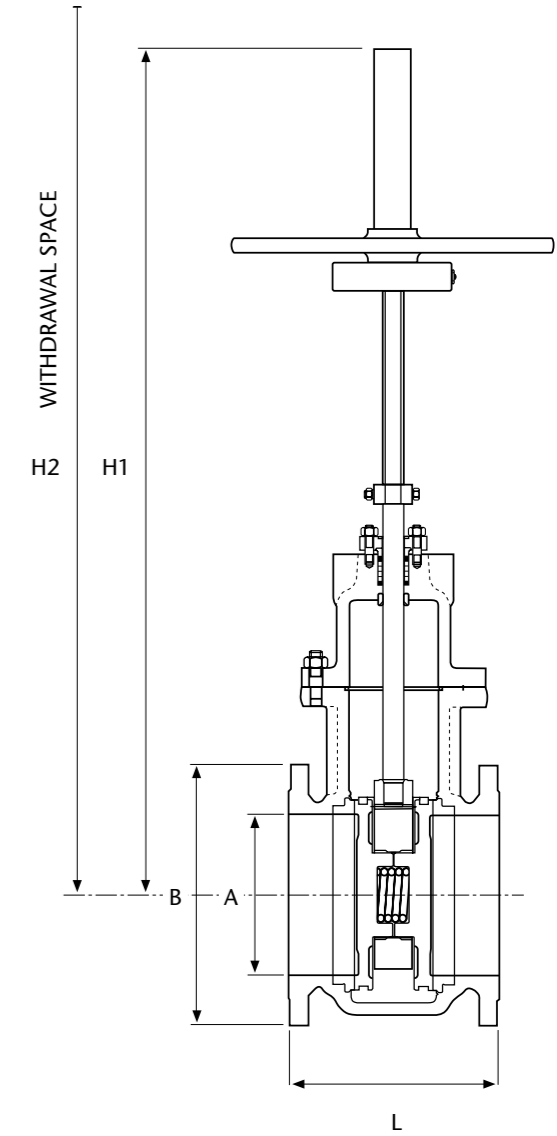
Nominal Size		A		B		H		L		M		Weight	
mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)
65	(2½)	45	(1.77)	85	(3.34)	430	(17)	330	(13)	70	(2¾)	41*	(90*)
80	(3)	55	(2.17)	100	(3.93)	430	(17⅞)	368	(14½)	70	(2¾)	43*	(95*)
100	(4)	66	(2.62)	125	(4.92)	615	(24¼)	457	(18)	96	(3¾)	93*	(205*)

*Weights shown in column are for Fig. A21925W. Other valves: Fig. A21931W 2½ in (65mm) = 106 lb (48kg). Fig. A21936W 3 in (80mm) = 110lb (50kg). 4in (100mm) = 253lb (115kg).

Butt Weld Ends to ASME B16.25 Alternatives are available on request.

Materials

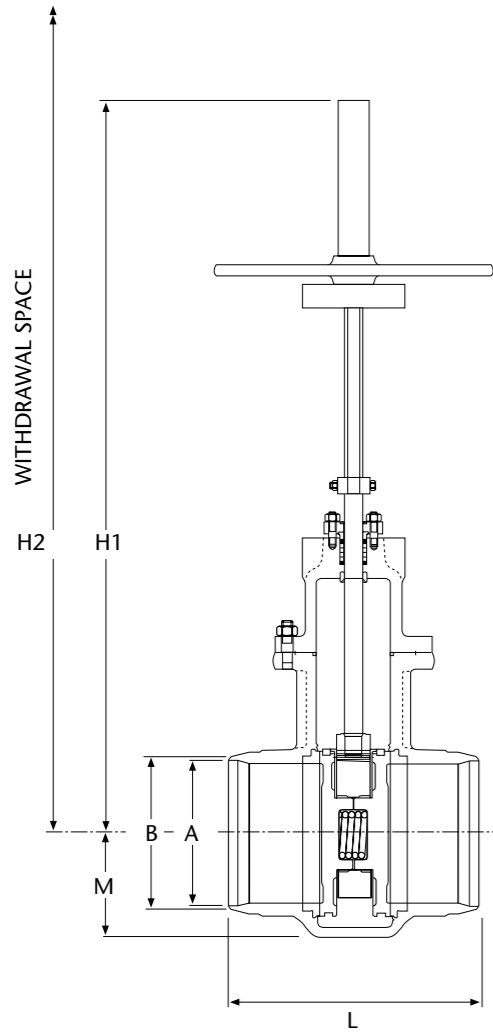
Description	
Body:	Carbon Steel - A216 Gr WCB
Bonnet:	Carbon Steel - A216 Gr WCB
Stem:	A182 - 321
Gasket	Exfoliated graphite
Seats:	Nickel Moly-Alloy
Disc	ASTM A105 Stellite 6 faced
Gland Packing	Exfoliated graphite and braided graphite fibre
Bonnet bolts	ASTM-A193 Grade B7



Class 150

Nominal Size		A		B		H1		H2		L		Weight	
mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)
65	(2½)	65	(2½)	178	(7)	365	(14⅜)	510	(20⅞)	190	(7½)	33	(73)
80	(3)	80	(3)	191	(7½)	535	(21⅞)	680	(26¾)	203	(8)	40	(88)
100	(4)	100	(4)	229	(9)	685	(27)	835	(32⅞)	229	(9)	70	(154)
150	(6)	150	(6)	280	(11)	1000	(39⅜)	1165	(45⅞)	267	(10½)	129	(284)
200	(8)	200	(8)	343	(13½)	1130	(44½)	1300	(51¼)	292	(11½)	195	(430)
250	(10)	250	(10)	407	(16)	1330	(52⅝)	1560	(61½)	330	(13)	275	(606)
300	(12)	300	(12)	483	(19)	1545	(60⅝)	1820	(71¾)	356	(14)	370	(816)
350	(14)	335	(13.18)	533	(21)	1568	(61¼)	1925	(76)	381	(15)	508	(1120)
400	(16)	385	(15.16)	597	(23½)	1691	(66⅝)	2000	(79)	406	(16)	655	(1444)
450	(18)	440	(17.32)	635	(25)	1978	(77⅞)	2315	(91⅞)	432	(17)	840	(1852)
500	(20)	485	(19.10)	698	(27½)	2167	(85⅝)	2515	(99)	457	(18)	1065	(2304)
600	(24)	590	(23.23)	813	(32)	2720	(107)	3120	(123)	508	(20)	2000	(4400)

Withdrawal space shown refers to the valve being in the fully open position.
Flanged to ASME B16.5. Alternatives are available on request.



Materials

Description	
Body:	Carbon Steel - A216 Gr WCB
Bonnet:	Carbon Steel - A216 Gr WCB
Stem:	A182 - 321
Gasket	Exfoliated graphite
Seats:	Nickel Moly-Alloy
Disc	ASTM A105 Stellite 6 faced
Gland Packing	Exfoliated graphite and braided graphite fibre
Bonnet bolts	ASTM-A193 Grade B7

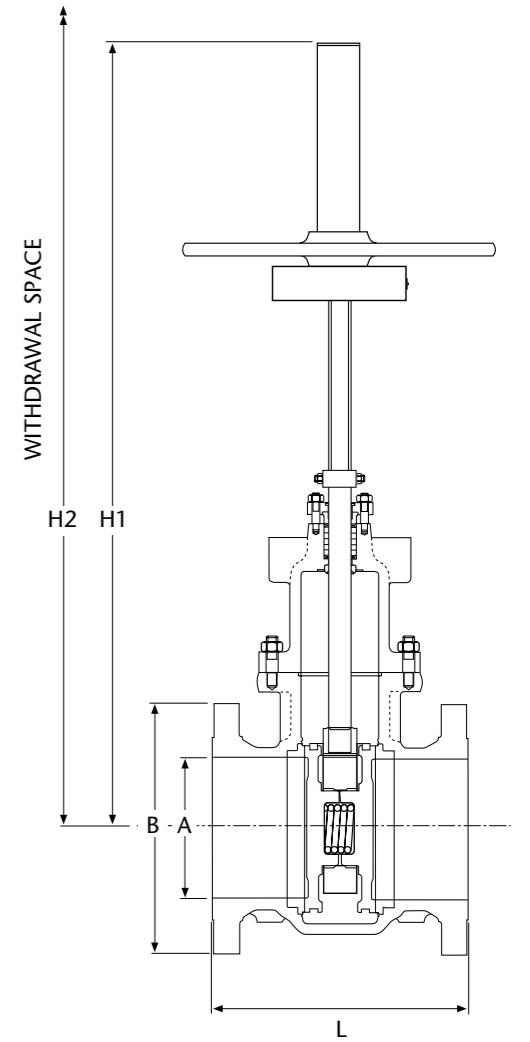
Class 150

Nominal Size	A	B	H1	H2	L	M	Weight
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)
65 (2½)	60 (2.36)	90 (3.54)	365 (14½)	510 (20¾)	241 (9½)	70 (2¾)	32 (71)
80 (3)	74 (2.91)	100 (3.5)	535 (21½)	680 (26¾)	283 (11½)	75 (3)	36 (79)
100 (4)	97 (3.81)	130 (5.12)	685 (27)	835 (32¾)	305 (12)	90 (3½)	63 (139)
150 (6)	149 (5.87)	185 (7.28)	980 (38¾)	1165 (45¾)	403 (15¾)	125 (5)	139 (306)
200 (8)	193 (7.60)	240 (9.44)	1130 (44½)	1300 (51¼)	419 (16½)	160 (6¾)	168 (370)
250 (10)	245 (9.6)	290 (11.42)	1330 (52¾)	1560 (61½)	457 (18)	190 (7½)	250 (551)
300 (12)	295 (11.61)	345 (13.58)	1545 (60¾)	1820 (71¼)	502 (19¾)	220 (8¾)	318 (701)
350 (14)	330 (12.99)	390 (15.35)	1568 (61¼)	1925 (76)	572 (22½)	245 (9¾)	535 (1180)
400 (16)	380 (14.96)	445 (17.5)	2000 (79)	2000 (79)	610 (24)	270 (10¾)	630 (1389)
450 (18)	425 (16.73)	495 (19)	2315 (91½)	2315 (91½)	660 (26)	300 (11¾)	952 (2099)
500 (20)	480 (18.90)	550 (21)	2167 (85¾)	2515 (99)	711 (28)	365 (14¼)	1135 (2503)
600 (24)	575 (22.64)	650 (25.60)	2720 (107)	3120 (123)	787 (31)	390 (15¾)	1500 (3300)

Withdrawal space shown refers to the valve being in the fully open position.
Butt Weld Ends to ASME B16.25. Alternatives are available on request.

Materials

Description	
Body:	Carbon Steel - A216 Gr WCB
Bonnet:	Carbon Steel - A216 Gr WCB
Stem:	A182 - 321
Gasket	Exfoliated graphite
Seats:	Nickel Moly-Alloy
Disc	ASTM A105 Stellite 6 faced
Gland Packing	Exfoliated graphite and braided graphite fibre
Bonnet bolts	ASTM-A193 Grade B7



Class 300

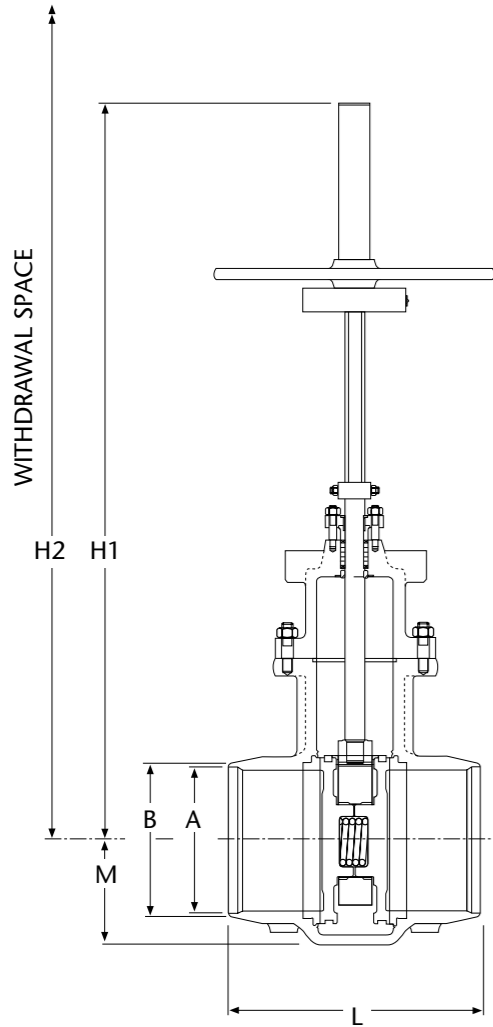
Nominal Size	A	B	H1	H2	L	Weight
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)
65 (2½)	65 (2½)	190 (7½)	480 (18¾)	510 (20¾)	241 (9½)	39 (86)
80 (3)	80 (3)	210 (8¼)	535 (21½)	680 (26¾)	283 (11½)	46 (101)
100 (4)	100 (4)	254 (10)	685 (27)	835 (32¾)	305 (12)	83 (183)
150 (6)	150 (6)	318 (12½)	1000 (39¾)	1165 (45¾)	403 (15¾)	170 (375)
200 (8)	200 (8)	381 (15)	1140 (45)	1300 (51¼)	419 (16½)	245 (540)
250 (10)	250 (10)	444 (17½)	1454 (57¼)	1560 (61½)	457 (18)	411 (906)
300 (12)	300 (12)	521 (20½)	1599 (63)	1820 (71¼)	502 (19¾)	610 (1345)
350 (14)	335 (13.18)	584 (23)	1708 (67¼)	1925 (76)	572 (22½)	780 (1726)
400 (16)	385 (15.16)	648 (25½)	1896 (74¾)	2000 (79)	610 (24)	1008 (2223)
450 (18)	430 (16.93)	710 (28)	2081 (81¾)	2315 (91½)	660 (26)	1402 (3091)
500 (20)	485 (19.10)	775 (30½)	2570 (101)	2515 (99)	711 (28)	1545 (3407)
600 (24)	585 (23.03)	914 (36)	3050 (120)	3120 (123)	787 (31)	2135 (4700)

Withdrawal space shown refers to the valve being in the fully open position.
Flanged to ASME B16.5. Alternatives are available on request.

Materials

Description

Body: WCB	Carbon Steel - A216 Gr
Bonnet:	Carbon Steel - A216 Gr WCB
Stem:	A182 - 321
Gasket	Exfoliated graphite
Seats:	Nickel Moly-Alloy
Disc	ASTM A105 Stellite 6 faced
Gland Packing	Exfoliated graphite and braided graphite fibre
Bonnet bolts	ASTM-A193 Grade B7



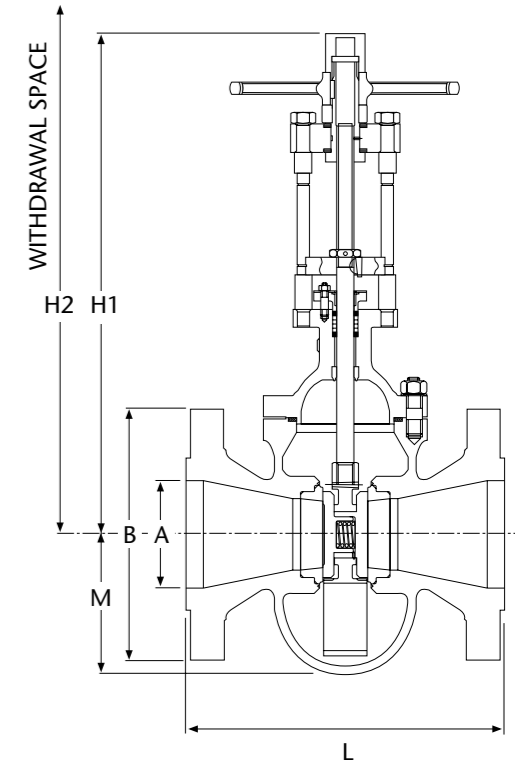
Class 300

Nominal Size	A		B		H1		H2		L		M		Weight	
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)	kg (lb)
65 (2½)	60 (2.36)	90 (3.54)	480 (18¾)	510 (20⅞)	241 (9½)	70 (2⅝)	32 (71)							
80 (3)	74 (2.91)	100 (3.94)	535 (21½)	680 (26⅞)	283 (11⅞)	75 (3)	36 (79)							
100 (4)	97 (3.8)	130 (5.12)	685 (27)	835 (32⅞)	305 (12)	90 (3⅝)	63 (139)							
150 (6)	149 (5.8)	185 (7.28)	980 (38⅝)	1165 (45⅞)	403 (15⅝)	125 (5)	139 (306)							
200 (8)	193 (7.60)	240 (9.44)	1143 (45)	1210 (47¼)	419 (16½)	160 (6⅝)	210 (463)							
250 (10)	245 (9.64)	300 (11.81)	1454 (57¼)	1690 (66⅞)	457 (18)	190 (7⅝)	397 (875)							
300 (12)	295 (11.61)	345 (13.58)	1599 (59)	1850 (72⅞)	502 (19⅞)	220 (8¾)	520 (1147)							
350 (14)	345 (12.48)	390 (15.47)	1708 (67¼)	1980 (78)	572 (22½)	255 (10⅞)	611 (1347)							
400 (16)	380 (14.96)	445 (17.51)	1896 (79)	2020 (80)	610 (24)	275 (10⅞)	778 (1715)							
450 (18)	425 (16.73)	495 (19.50)	2081 (95)	2440 (96)	660 (26)	310 (12¼)	1127 (2485)							
500 (20)	480 (18.19)	550 (21.65)	2570 (101)	2975 (117½)	711 (28)	365 (14⅝)	1230 (2712)							
600 (24)	575 (22.64)	650 (25.60)	2845 (112)	3365 (132½)	787 (31)	415 (16⅝)	1615 (3300)							

Withdrawal space shown refers to the valve being in the fully open position. Butt Weld Ends to ASME B16.25. Alternatives are available on request.

Materials

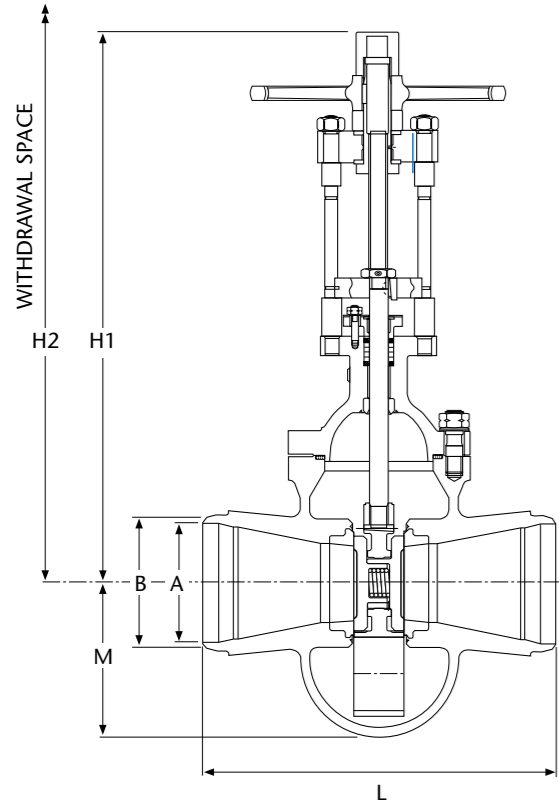
Description	Carbon Steel	Alloy Steel	Alloy Steel
Body:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Bonnet:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Stem:	BS 2S.143	ASTM A638 Gr 660	ASTM A638 Gr 660
Gasket	Exfoliated graphite		
Disc/Seat	ASTM A105 Stellite 6 faced	ASTM A182 Stellite 6 faced	
Gland Packing	Exfoliated graphite ring		
Bonnet bolts	ASTM A193 Gr B7	ASTM A193 Gr B16	



Class 600

Nominal Size	A		B		L		M		H1		H2		Weight	
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)	kg (lb)
125 (5)	122 (4¾)	330 (13)	381 (15)	229 (9)	660 (26)	868 (34¼)	143 (316)							
150 (6)	146 (5¾)	356 (14)	457 (18)	263 (10⅜)	740 (29⅞)	992 (39)	175 (386)							
200 (8)	193 (7⅞)	419 (16½)	584 (23)	340 (13⅝)	840 (33)	1134 (44¾)	278 (613)							
250 (10)	242 (9½)	508 (20)	711 (28)	413 (16¼)	1030 (40⅞)	1414 (55¾)	474 (1045)							
300 (12)	288 (11⅜)	559 (22)	813 (32)	488 (19¼)	1210 (47⅞)	1684 (66⅞)	676 (1490)							
350 (14)	317 (12¼)	603 (23¾)	889 (35)	531.5 (20⅞)	-	1794 (70⅞)	829 (1821)							
400 (16)	363 (14¼)	689 (27⅞)	991 (39)	603 (23¾)	-	1973 (77¼)	1136 (2505)							
450 (18)	409 (16⅞)	743 (29¼)	1092 (43)	673 (26½)	-	2137 (84⅞)	1495 (3296)							
500 (20)	455 (18)	813 (32)	1194 (47)	741.5 (29¼)	-	2441 (96⅞)	1961 (4324)							
550 (22)	501 (19¾)	813 (32)	1295 (51)	812.5 (32)	-	2700 (106⅞)	2352 (5185)							
600 (24)	547 (21½)	940 (37)	1397 (55)	884.5 (34⅞)	-	2957 (116½)	3183 (6797)							

Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Flanged to ASME B16.5. Alternatives are available on request.



Materials

Description	Carbon Steel	Alloy Steel	Alloy Steel
Body:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Bonnet:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Stem:	BS 2S.143	ASTM A638 Gr 660	ASTM A638 Gr 660
Gasket	Exfoliated graphite		
Disc/Seat	ASTM A105 Stellite 6 faced	ASTM A182 Stellite 6 faced	
Gland Packing	Exfoliated graphite ring		
Bonnet bolts	ASTM A193 Gr B7	ASTM A193 Gr B16	

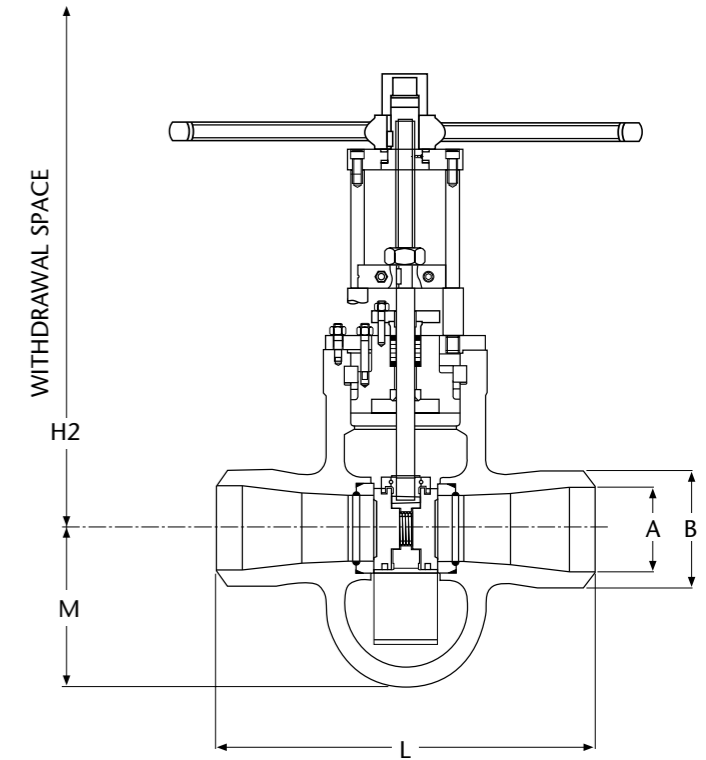
Class 600

Nominal Size	A		B		L		M		H1		H2		Weight	
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)	kg (lb)
125 (5)	122 (4¾)	144 (5.67)	381 (15)	229 (9)	660 (26)	868 (34¼)	89 (196)							
150 (6)	146 (5¾)	172 (6.77)	457 (18)	263 (10⅜)	740 (29⅞)	992 (39)	116 (255)							
200 (8)	193 (7⅝)	223 (8.78)	584 (23)	340 (13⅜)	840 (33)	1134 (39)	189 (416)							
250 (10)	242 (9½)	278 (10.94)	711 (28)	413 (16¼)	1030 (40⅝)	1414 (55¾)	329 (725)							
300 (12)	288 (11⅜)	329 (12.95)	813 (32)	488 (19¼)	1210 (47⅞)	1684 (66⅜)	504 (1111)							
350 (14)	317 (12¼)	362 (14.25)	889 (35)	531.5 (20⅞)	-	1794 (70⅞)	623 (1373)							
400 (16)	363 (14¼)	413 (16.26)	991 (39)	603 (23⅜)	-	1973 (77¾)	847 (1867)							
500 (20)	455 (18)	516 (20.31)	1194 (43)	741.5 (29¼)	-	2441 (96⅞)	1195 (2634)							
550 (22)	501 (19¾)	567 (23.32)	1294 (47)	812.5 (32)	-	2700 (106⅞)	1516 (3342)							
600 (24)	547 (21½)	619 (24.37)	1397 (51)	884.5 (34⅞)	-	2957 (116½)	1973 (4350)							

Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Butt Weld Ends to ASME B16.25. Alternatives are available on request.

Materials

Description	
Body:	ASTM A217-C12A
Bonnet:	ASTM A217-C12A
Back Seat:	Nickel molybdenum alloy
Gasket	Exfoliated graphite
Stem:	ASTM A638 Gr 660
Seat:	ASTM A182 GR F22 Stellite 6 faced
Disc:	Sizes 125 & 150 mm nickel molybdenum alloy
Gland Packing:	Exfoliated graphite & braided carbon fibre
Cover Bolts:	ASTM A193 Gr B16



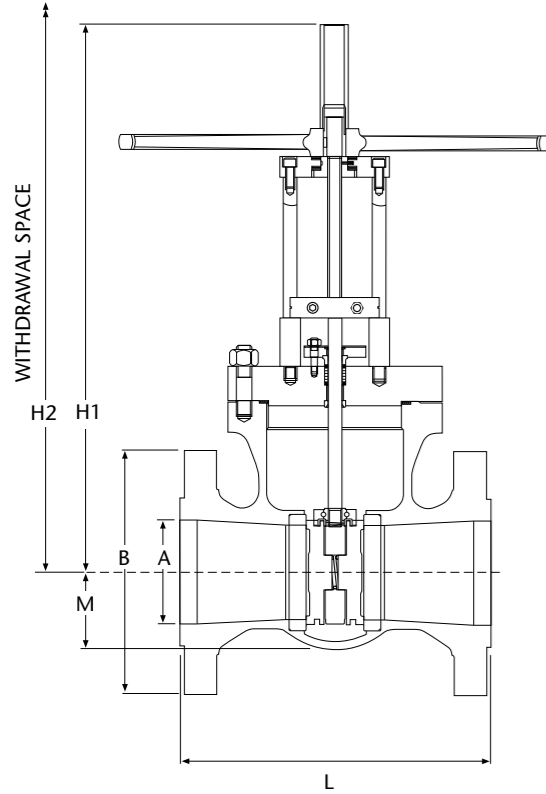
Class 600

Nominal Size	A		B		L		M		H2		Weight	
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)	kg (lb)
400 (16)	387 (15.23)	406.4 (16.00)	990 (39)	616 (24¼)	2099 (82½)	1033 (2277)						
450 (18)	434 (17.08)	457 (18.00)	1092 (43)	689 (27⅞)	2274 (89⅞)	1394 (3073)						
500 (20)	482 (18.97)	508 (20.00)	1194 (47)	760 (30)	2572 (101⅞)	1883 (4151)						
550 (22)	533 (20.98)	578 (22.00)	1296 (51)	831 (32¾)	2898 (114⅞)	2512 (5538)						
600 (24)	581 (22.87)	609 (24.00)	1397 (55)	903 (35⅞)	3148 (124)	3190 (7032)						

Withdrawal space shown refers to the valve being in the fully open position. C12A Venturi to ASME B16.25 Alternatives are available on request.

Materials

Description	Carbon Steel	Alloy Steel	Alloy Steel
Body:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Bonnet:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Stem:	BS 2S.143	ASTM A638 Gr 660	ASTM A638 Gr 660
Gasket:	Exfoliated graphite		
Disc/Seat:	ASTM A105 Stellite 6 faced	ASTM A182 Stellite 6 faced	
Gland Packing:	Exfoliated graphite ring		
Bonnet bolts:	ASTM A193 Gr B7	ASTM A193 Gr B16	



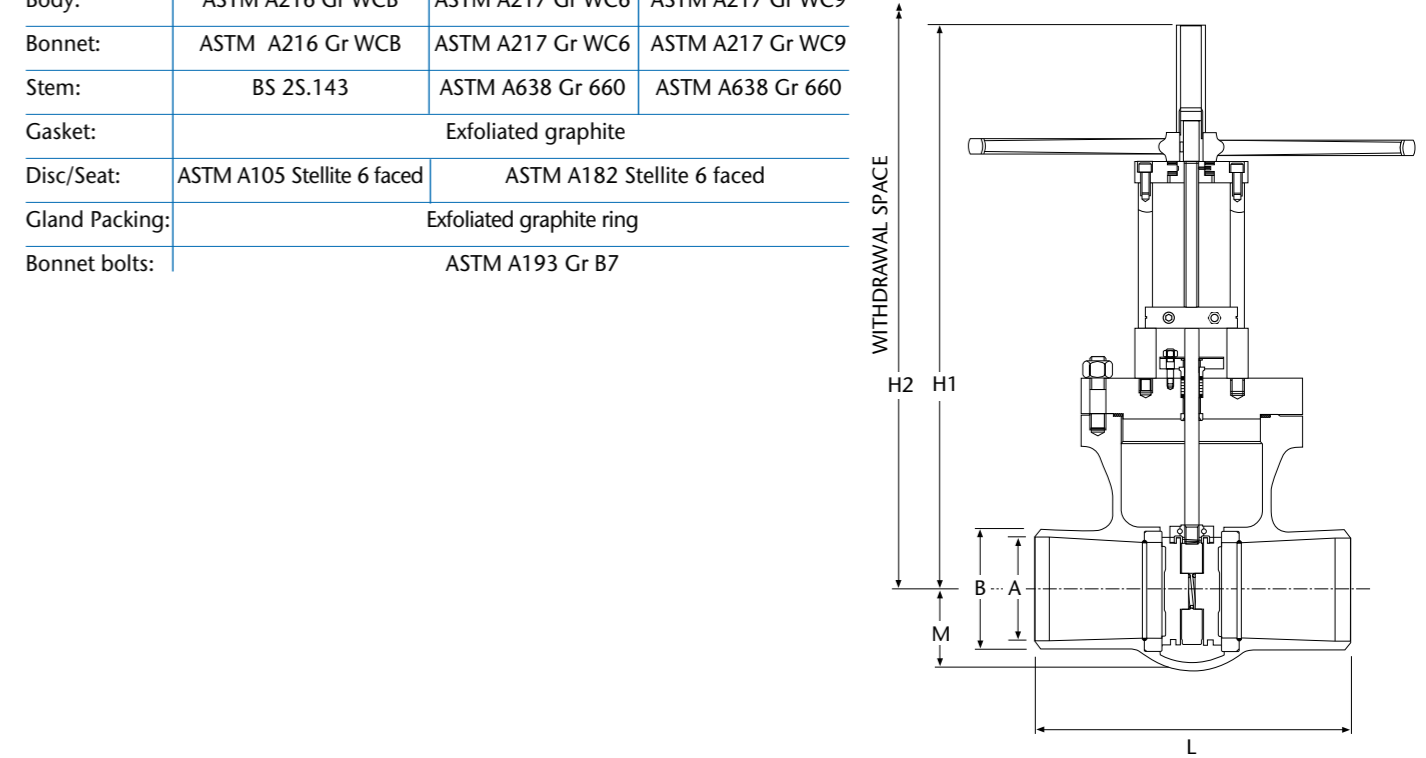
Class 600

Nominal Size	A	B	L	M	H1	H2	Weight
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)
125 (5)	122 (4¾)	330 (13)	508 (20)	101 (4)	740 (29½)	863 (34)	146 (322)
150 (6)	146 (5¾)	356 (14)	457 (18)	112 (4½)	840 (33)	982 (38¼)	175 (386)
200 (8)	193 (7⅝)	419 (16½)	584 (23)	145 (5¾)	1030 (40⅝)	1218 (48)	306 (675)
250 (10)	242 (9½)	508 (20)	711 (28)	173 (6⅞)	1220 (48)	1448 (57)	493 (1087)
300 (12)	288 (11⅜)	559 (22)	813 (32)	201 (8)	1410 (55½)	1686 (66⅝)	692 (1526)
350 (14)	317 (12¼)	603 (23¾)	889 (35)	218 (8⅝)	-	1824 (71⅞)	869 (1916)
400 (16)	363 (14¼)	689 (27⅞)	991 (39)	245.5 (9¾)	-	2085 (82⅞)	1210 (2668)
450 (18)	409 (16⅞)	743 (29¼)	1092 (43)	273.5 (10¾)	-	2302 (90⅝)	1617 (3565)
500 (20)	455 (18)	813 (32)	1194 (47)	301 (11⅞)	-	2519 (99¼)	2091 (4610)
550 (22)	501 (19¾)	813 (32)	1295 (51)	329 (13)	-	2723 (107¼)	2432 (5362)
600 (24)	547 (21½)	940 (37)	1397 (55)	357 (14⅞)	-	2993 (117⅞)	3302 (7280)

Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Flanged to ASME B16.5. Alternatives are available on request.

Materials

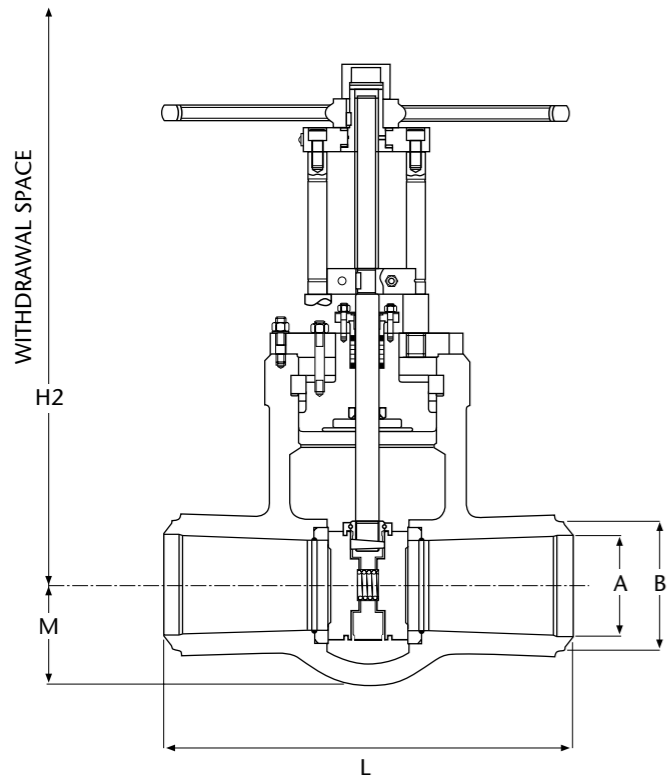
Description	Carbon Steel	Alloy Steel	Alloy Steel
Body:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Bonnet:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Stem:	BS 2S.143	ASTM A638 Gr 660	ASTM A638 Gr 660
Gasket:	Exfoliated graphite		
Disc/Seat:	ASTM A105 Stellite 6 faced	ASTM A182 Stellite 6 faced	
Gland Packing:	Exfoliated graphite ring		
Bonnet bolts:	ASTM A193 Gr B7		



Class 600

Nominal Size	A	B	L	M	H1	H2	Weight
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)
125 (5)	122 (4¾)	144 (5¾)	381 (15)	101 (4)	740 (29½)	863 (34)	92 (203)
150 (6)	146 (5¾)	172 (6¾)	457 (18)	112 (4½)	840 (33)	982 (38¼)	116 (256)
200 (8)	193 (7⅝)	223 (8¾)	584 (23)	145 (4¾)	1030 (40⅝)	1218 (48)	217 (478)
250 (10)	242 (9½)	278 (11)	711 (28)	173 (6⅞)	1220 (48)	1448 (57)	348 (767)
300 (12)	288 (11⅜)	329 (13)	813 (32)	201 (8)	1410 (55½)	1686 (66⅝)	520 (1146)
350 (14)	317 (12¼)	362 (14¼)	889 (35)	218 (8⅝)	-	1824 (71⅞)	663 (1462)
400 (16)	363 (14¼)	413 (16¼)	991 (39)	245.5 (9¾)	-	2085 (82⅞)	921 (2030)
450 (18)	409 (16⅞)	464 (18¼)	1092 (43)	273.5 (10¾)	-	2302 (90⅝)	1318 (2906)
500 (20)	455 (18)	516 (20⅝)	1194 (47)	301 (11⅞)	-	2519 (99¼)	1646 (3629)
550 (22)	501 (19¾)	567 (22⅝)	1294 (51)	329 (13)	-	2723 (107¼)	2053 (4526)
600 (24)	547 (21½)	619 (24⅝)	1397 (55)	357 (14⅞)	-	2993 (117⅞)	2658 (5860)

Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Butt Weld Ends to ASME B16.25. Alternatives are available on request.



Materials

Description	
Body:	ASTM A217-C12A
Bonnet:	ASTM A217-C12A
Back Seat:	Nickel molybdenum alloy
Gasket:	Exfoliated graphite
Stem:	ASTM A638 Gr 660
Seat:	ASTM A182 Stellite 6 faced
Disc:	Sizes 125 & 150 mm nickel molybdenum alloy
Gland Packing:	Exfoliated graphite & braided carbon fibre
Cover Bolts:	ASTM A193 Gr B16

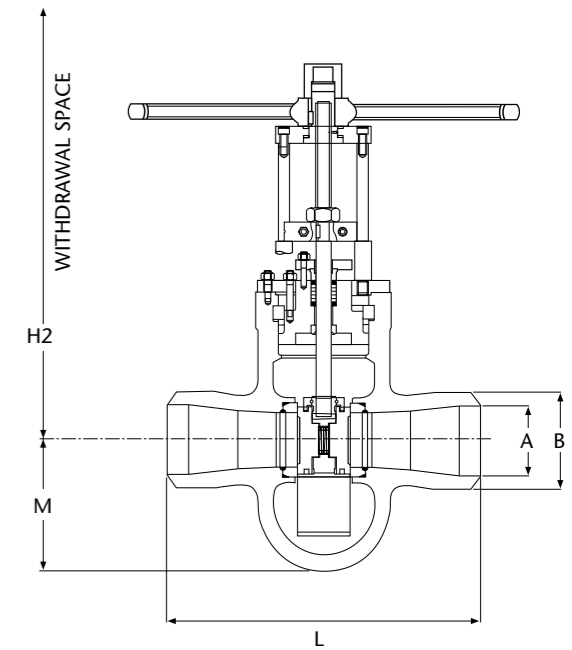
Class 600

Nominal Size	A		B		L		M		H2		Weight	
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)	kg (lb)
400 (16)	387 (15.23)	406.4 (16.00)	991 (39)	689 (27 ¹ / ₈)	2517 (99 ¹ / ₈)	1639 (3614)						
450 (18)	434 (17.08)	457 (18.00)	1092 (43)	760 (30)	2727 (107 ³ / ₈)	2093 (4614)						
500 (20)	482 (18.97)	508 (20.00)	1194 (47)	831 (32 ³ / ₄)	3000 (118 ¹ / ₈)	2730 (6018)						
550 (22)	533 (20.98)	578 (22.00)	1296 (51)	903 (35 ³ / ₈)	3205 (126 ¹ / ₄)	3377 (7445)						
600 (24)	581 (22.87)	609 (24.00)	1397 (55)	1000 (39 ³ / ₈)	3500 (137 ¹ / ₄)	4200 (9260)						

Withdrawal space shown refers to the valve being in the fully open position. Butt Weld Ends to ASME B16.25. Alternatives are available on request.

Materials

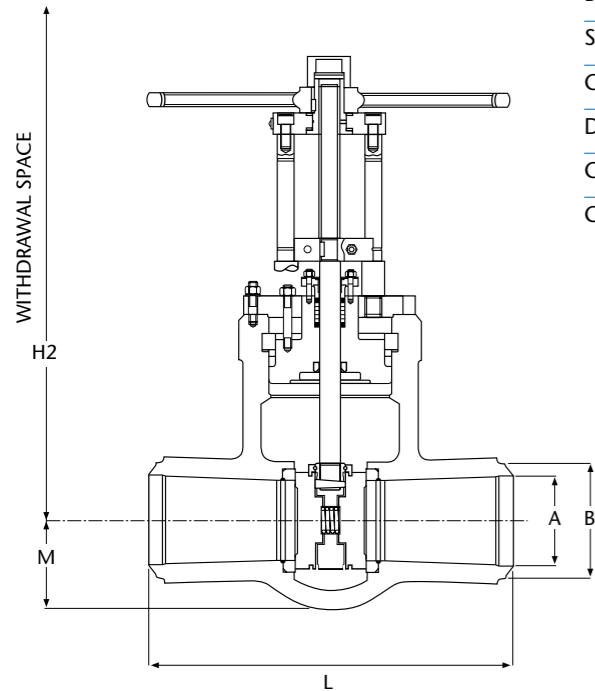
Description	Carbon Steel	Alloy Steel	Alloy Steel
Body:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Bonnet:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Stem:	BS 2S.143	ASTM A638 Gr 660	ASTM A638 Gr 660
Gasket:	Exfoliated graphite		
Disc/Seat:	ASTM A105 Stellite 6 faced	ASTM A182 Stellite 6 faced	
Gland Packing:	Exfoliated graphite ring		
Cover bolts:	ASTM A193 Gr B7	ASTM A193 Gr B16	



Class 1000

Nominal Size	A		B		L		M		H1		H2		Weight	
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)	kg (lb)
125 (5)	116 (4.57)	144 (5.67)	432 (17)	230 (9 ¹ / ₈)	660 (26)	886 (34 ⁷ / ₈)	86 (190)							
150 (6)	140 (5.51)	172 (6.77)	508 (20)	277.5 (11)	750 (29 ³ / ₄)	1018 (40 ¹ / ₈)	136 (300)							
200 (8)	182 (7.16)	223 (8.78)	660 (26)	343 (13 ¹ / ₂)	870 (34 ¹ / ₄)	1191 (47)	233 (514)							
250 (10)	230 (9.05)	278 (10.94)	787 (31)	423.5 (16 ³ / ₄)	1050 (41 ³ / ₈)	1462 (57 ³ / ₈)	403 (888)							
300 (12)	273 (10.74)	329 (12.95)	914 (36)	494.5 (19 ¹ / ₂)	-	1785 (70 ³ / ₈)	648 (1429)							
350 (14)	300 (11.81)	362 (14.25)	991 (39)	544.5 (21 ¹ / ₂)	-	1878 (74)	818 (1804)							
400 (16)	344 (13.54)	413 (16.26)	1092 (43)	616 (24 ¹ / ₄)	-	2099 (82 ³ / ₈)	1148 (2531)							
450 (18)	387 (15.24)	464 (18.26)	1219 (48)	688.5 (27 ¹ / ₈)	-	2274 (89 ³ / ₈)	1549 (3415)							
500 (20)	431 (16.96)	516 (20.31)	1321 (52)	760 (30)	-	2572 (101 ³ / ₈)	2092 (4612)							
550 (22)	476 (18.74)	567 (22.32)	1422 (56)	831 (32 ³ / ₄)	-	2898 (114 ¹ / ₈)	2791 (6153)							
600 (24)	517 (20.35)	619 (24.37)	1549 (61)	902.5 (35 ³ / ₄)	-	3148 (124)	3545 (7815)							

Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Butt Weld Ends to ASME B16.25. Alternatives are available on request.

**Materials**

Description	Carbon Steel	Alloy Steel	Alloy Steel
Body:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Bonnet:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Stem:	BS 2S.143	ASTM A638 Gr 660	ASTM A638 Gr 660
Gasket:	Exfoliated graphite		
Disc/Seat:	ASTM A105 Stellite 6 faced	ASTM A182 Stellite 6 faced	
Gland Packing:	Exfoliated graphite ring		
Cover bolts:	ASTM A193 Gr B7	ASTM A193 Gr B16	

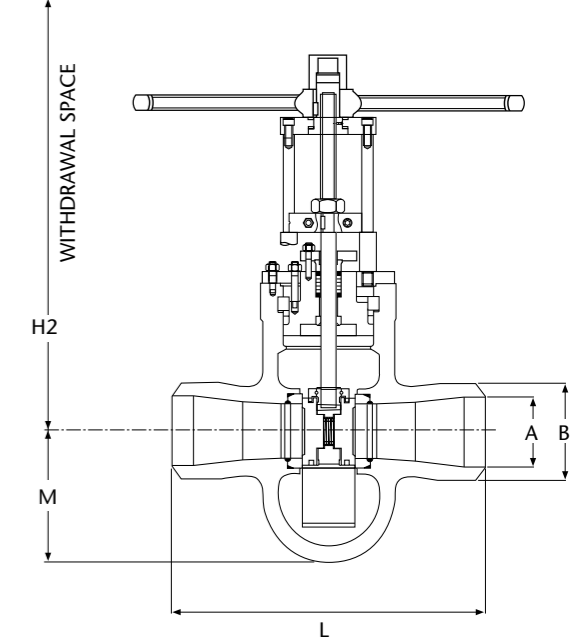
Class 1000

Nominal Size	A		B		L		M		H1		H2		Weight	
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)	kg (lb)
125 (5)	116 (4.57)	144 (5.67)	432 (17)	107 (4¼)	750 (29½)	893 (31¼)	83 (183)							
150 (6)	140 (5.51)	172 (6.77)	508 (20)	130.5 (5½)	870 (34¼)	1051 (41½)	140 (309)							
200 (8)	182 (7.16)	223 (8.78)	660 (26)	153.5 (6⅝)	1050 (41⅜)	1280 (50½)	233 (514)							
250 (10)	230 (9.05)	278 (10.94)	787 (31)	188 (7½)	1260 (49⅝)	1557 (61⅝)	414 (913)							
300 (12)	273 (10.74)	329 (12.95)	914 (36)	217.5 (8⅝)	-	1826 (72)	628 (1385)							
350 (14)	300 (11.81)	362 (14.25)	991 (39)	240.5 (9½)	-	1975 (77⅝)	803 (1771)							
400 (16)	344 (13.54)	413 (16.26)	1092 (43)	270.5 (10⅝)	-	2233 (88)	1152 (2540)							
450 (18)	387 (15.24)	464 (18.26)	1219 (48)	300.5 (11⅝)	-	2517 (99⅝)	1639 (3614)							
500 (20)	431 (16.96)	516 (20.31)	1321 (52)	330 (13)	-	2727 (107⅝)	2093 (4614)							
550 (22)	476 (18.74)	567 (22.32)	1422 (56)	359.5 (14¼)	-	3000 (118⅝)	2730 (6018)							
600 (24)	517 (20.35)	619 (24.37)	1549 (61)	389.5 (15⅝)	-	3205 (126¼)	3377 (7445)							

Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Butt Weld Ends to ASME B16.25. Alternatives are available on request.

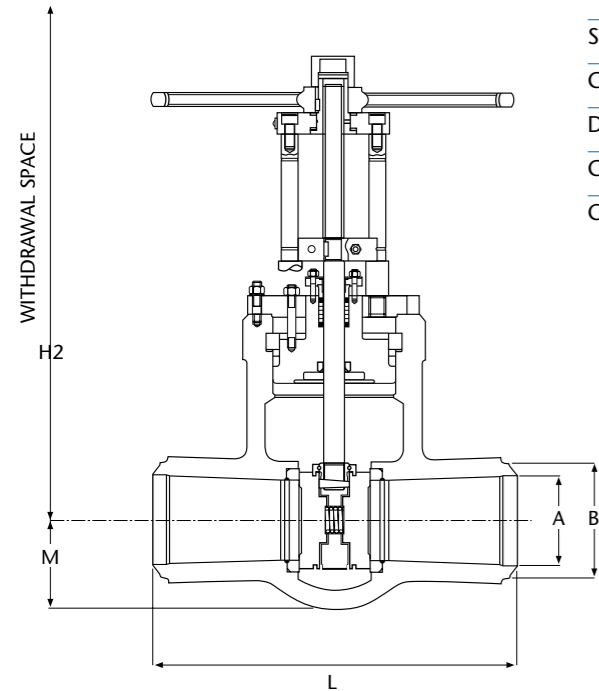
Materials

Description	Carbon Steel	Alloy Steel	Alloy Steel
Body:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Bonnet:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Stem:	BS 2S.143	ASTM A638 Gr 660	ASTM A638 Gr 660
Gasket:	Exfoliated graphite		
Disc/Seat:	ASTM A105 Stellite 6 faced	ASTM A182 Stellite 6 faced	
Gland Packing:	Exfoliated graphite ring		
Cover bolts:	ASTM A193 Gr B7	ASTM A193 Gr B16	

**Class 1700**

Nominal Size	A		B		L		M		H1		H2		Weight	
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)	kg (lb)
125 (5)	106 (4.17)	144 (5.67)	483 (19)	242 (9⅝)	650 (25⅝)	876 (34½)	127 (280)							
150 (6)	128 (5.04)	172 (6.77)	559 (22)	291.5 (11½)	760 (30)	1047 (41¼)	213 (470)							
200 (8)	167 (6.57)	223 (8.78)	711 (28)	366.5 (14½)	870 (34¼)	1213 (47⅝)	389 (858)							
250 (10)	209 (8.23)	278 (10.94)	864 (34)	451 (17⅝)	1080 (42⅝)	1534 (60½)	702 (1548)							
300 (12)	249 (9.80)	329 (12.95)	991 (39)	524.5 (20¾)	-	1864 (73½)	1113 (2454)							
350 (14)	273 (10.75)	362 (14.25)	1067 (42)	570.5 (22½)	-	1953 (77)	1367 (3014)							
400 (16)	313 (12.32)	413 (16.26)	1194 (47)	651 (25¾)	-	2161 (85⅝)	1959 (4319)							
450 (18)	352 (13.86)	464 (18.26)	1346 (53)	725.5 (28⅝)	-	2338 (92⅝)	2664 (5873)							
500 (20)	392 (15.43)	516 (20.31)	1473 (58)	806 (31¾)	-	2651 (104⅝)	3732 (8228)							
550 (22)	432 (17.00)	567 (22.32)	1575 (62)	880 (34¾)	-	2911 (114⅝)	4701 (10364)							
600 (24)	471 (18.54)	619 (24.37)	1676 (66)	960 (37⅝)	-	3244 (127¼)	6200 (13668)							

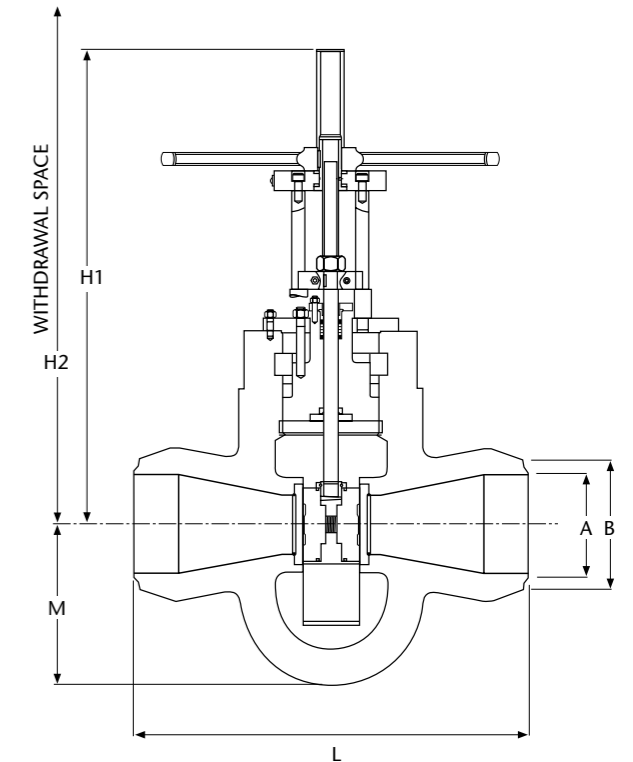
Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Butt Weld Ends to ASME B16.25. Alternatives are available on request.

**Materials**

Description	Carbon Steel	Alloy Steel	Alloy Steel
Body:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Bonnet:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Stem:	BS 2S.143	ASTM A638 Gr 660	ASTM A638 Gr 660
Gasket:	Exfoliated graphite		
Disc/Seat:	ASTM A105 Stellite 6 faced	ASTM A182 Stellite 6 faced	
Gland Packing:	Exfoliated graphite ring		
Cover bolts:	ASTM A193 Gr B7	ASTM A193 Gr B16	

Materials

Description	
Body:	ASTM A217-C12A
Bonnet:	ASTM A217-C12A
Back Seat:	Nickel molybdenum alloy
Gasket:	Exfoliated graphite
Stem:	ASTM A638 Gr 660
Seat:	ASTM A182 GR F22 Stellite 6 faced
Disc:	ASTM A182 GR F22 Stellite 6 faced
Gland Packing:	Exfoliated graphite & braided carbon fibre
Cover Bolts:	ASTM A193 Gr B16

**Class 1700**

Nominal Size	A		B		L		M		H1		H2		Weight		
	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)	
125	(5)	106	(4.17)	144	(5.67)	483	(19)	119	(4 ³ / ₄)	760	(30)	936	(36 ⁵ / ₈)	124	(274)
150	(6)	128	(5.04)	172	(6.77)	559	(22)	144.5	(5 ³ / ₄)	870	(34 ¹ / ₄)	1080	(42 ¹ / ₂)	201	(444)
200	(8)	167	(6.57)	223	(8.78)	711	(28)	177	(7)	1080	(42 ¹ / ₂)	1363	(53 ³ / ₈)	385	(849)
250	(10)	209	(8.23)	278	(10.94)	864	(34)	215	(8 ¹ / ₂)	1320	(62)	1657	(65 ¹ / ₄)	677	(1492)
300	(12)	249	(9.80)	329	(12.95)	991	(39)	247.5	(9 ³ / ₄)	-	-	1913	(75 ³ / ₈)	1027	(2264)
350	(14)	273	(10.75)	362	(14.25)	1067	(42)	266.5	(10 ¹ / ₂)	-	-	2068	(81 ¹ / ₂)	1560	(3440)
400	(16)	313	(12.32)	413	(16.26)	1194	(47)	305.5	(12)	-	-	2345	(92 ³ / ₈)	1928	(4250)
450	(18)	352	(13.86)	464	(18.26)	1346	(53)	337.5	(13 ³ / ₄)	-	-	2567	(101 ¹ / ₈)	2547	(5615)
500	(20)	392	(15.43)	516	(20.31)	1473	(58)	376	(14 ⁵ / ₈)	-	-	2862	(112 ³ / ₄)	3522	(7765)
550	(22)	432	(17.00)	567	(22.32)	1575	(62)	408.5	(16 ¹ / ₈)	-	-	3029	(119 ¹ / ₄)	4339	(9566)
600	(24)	471	(18.54)	619	(24.37)	1676	(66)	447	(17 ³ / ₈)	-	-	3335	(131 ³ / ₈)	5681	(12524)

Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Butt Weld Ends to ASME B16.25. Alternatives are available on request.

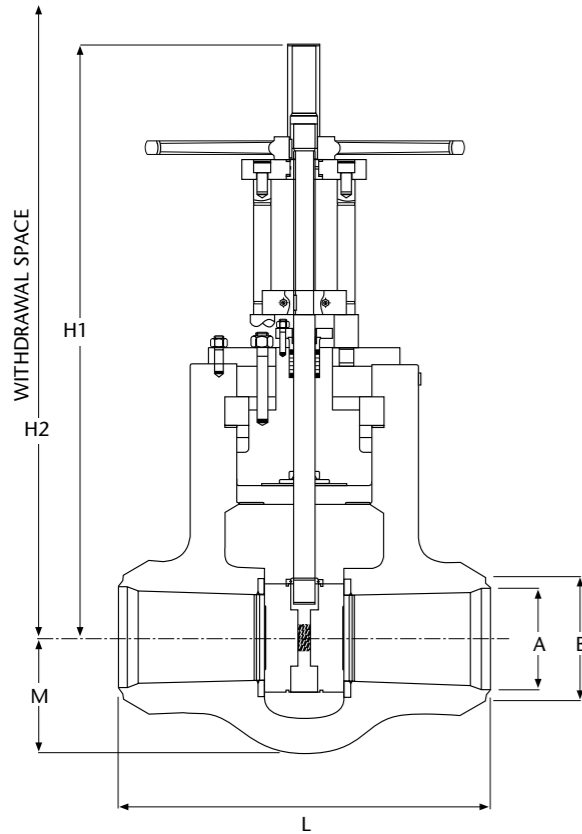
Class 2050

Nominal Size	A		B		H1		H2		L		M		Weight		
	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)	
150	(6)	131.8	(5.19)	168.3	(6.625)	840	(33 ¹ / ₈)	1184	(46 ¹ / ₈)	610	(24)	400	(15 ³ / ₄)	500	(1100)
200	(8)	172.9	(6.81)	219.1	(8.625)	-	-	1463	(57 ⁵ / ₈)	762	(30)	487	(19 ¹ / ₄)	881	(1942)
250	(10)	215.9	(8.5)	273.1	(10.75)	-	-	1785	(70 ³ / ₈)	914	(36)	570	(22 ¹ / ₂)	1416	(3122)
300	(12)	259.3	(10.13)	323.8	(12.75)	-	-	1870	(73 ⁵ / ₈)	1041	(41)	622	(24 ¹ / ₂)	1780	(3924)
350	(14)	284.2	(11.19)	355.6	(14.0)	-	-	2101	(82 ³ / ₄)	1118	(44)	705	(27 ³ / ₈)	2225	(4905)
400	(16)	325.3	(12.81)	406.4	(16.0)	-	-	2543	(100 ¹ / ₈)	1245	(49)	872	(30 ³ / ₈)	2782	(6133)
450	(18)	366.7	(14.44)	457.2	(18.0)	-	-	3128	(123 ¹ / ₂)	1397	(55)	963	(37 ³ / ₈)	3477	(7665)
500	(20)	407.9	(16.06)	508	(20)	-	-	3754	(148)	1524	(60)	1046	(41 ¹ / ₄)	4346	(9582)
550	(22)	450.8	(17.75)	558.8	(22)	-	-	4617	(182)	1625	(64)	1100	(43 ¹ / ₂)	5433	(11977)
600	(24)	490.4	(19.31)	609.6	(24)	-	-	5540	(218)	1727	(68)	1200	(47 ¹ / ₄)	6791	(14971)

Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Butt Weld Ends to ASME B16.25. Alternatives are available on request.

Materials

Description	
Body:	ASTM A217-C12A
Bonnet:	ASTM A217-C12A
Back Seat:	Nickel molybdenum alloy
Gasket:	Exfoliated graphite
Stem:	ASTM A638 Gr 660
Seat:	ASTM A182 GR F22 Stellite 6 faced
Disc:	ASTM A182 GR F22 Stellite 6 faced
Gland Packing:	Exfoliated graphite & braided carbon fibre
Cover Bolts:	ASTM A193 Gr B16



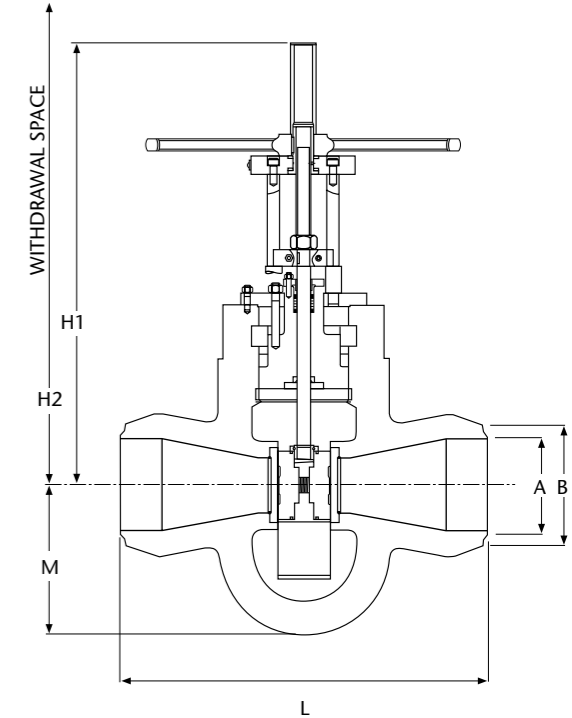
Class 2050

Nominal Size	A		B		H1		H2		L		M		Weight	
	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)
150	131.8	(5.19)	168.3	(6.625)	1010	(39 3/4)	1326	(52 1/4)	610	(24)	210	(8 3/8)	451	(994)
200	172.9	(6.81)	219.1	(8.625)	-	-	1620	(63 3/8)	762	(30)	251	(10)	813	(1792)
250	215.9	(8.5)	273.1	(10.75)	-	-	1902	(75)	914	(36)	293	(11 1/2)	1260	(2778)
300	259.3	(10.13)	323.8	(12.75)	-	-	2047	(80 3/8)	1041	(41)	318	(12 1/2)	1598	(3523)
350	284.2	(11.19)	355.6	(14)	-	-	2297	(90 3/8)	1118	(44)	359	(14 1/4)	2100	(4630)
400	325.3	(12.81)	406.4	(16)	-	-	2608	(102 3/4)	1245	(49)	442	(17 3/8)	2730	(6018)
450	366.7	(14.44)	457.2	(18)	-	-	2870	(113)	1397	(55)	491	(19 3/8)	3400	(7495)
500	407.9	(16.06)	508	(20)	-	-	3100	(122)	1524	(60)	533	(21)	4250	(9370)
550	450.8	(17.75)	558.8	(22)	-	-	3350	(132)	1625	(64)	600	(23 3/8)	5332	(11750)
600	490.4	(19.31)	609.6	(24)	-	-	3600	(142)	1727	(68)	680	(26 3/4)	6665	(14693)

Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Butt Weld Ends to ASME B16.25. Alternatives are available on request.

Materials

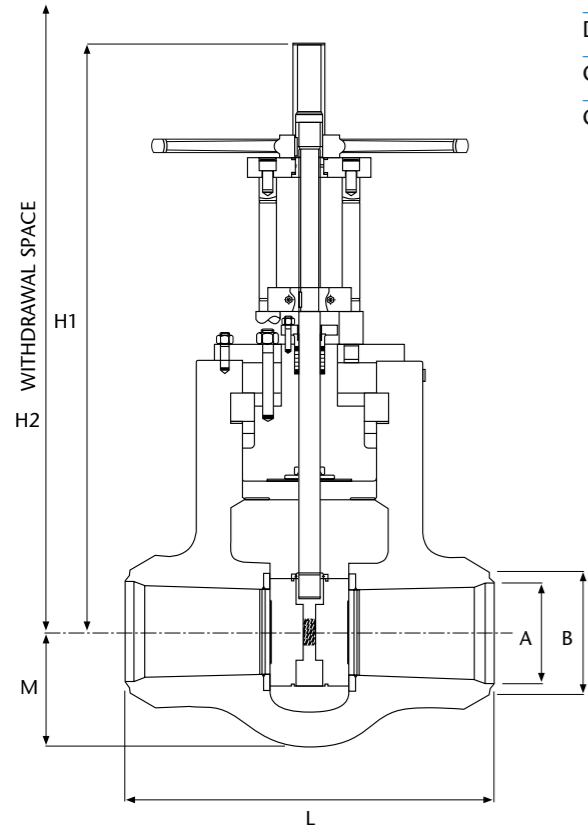
Description	Carbon Steel	Alloy Steel	Alloy Steel
Body:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Bonnet:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Stem:	BS 2S.143	ASTM A638 Gr 660	ASTM A638 Gr 660
Gasket:	Exfoliated graphite		
Disc/Seat:	ASTM A105 Stellite 6 faced	ASTM A182 Stellite 6 faced	
Gland Packing:	Exfoliated graphite ring		
Cover bolts:	ASTM A193 Gr B7	ASTM A193 Gr B16	



Class 2500

Nominal Size	A		B		L		M		H1		H2		Weight	
	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)
125	95	(3.78)	144	(5.67)	533	(21)	254	(10)	660	(26)	896	(35 3/8)	173	(382)
150	113	(4.45)	172	(6.77)	610	(24)	299	(11 3/8)	750	(29 3/8)	1039	(41)	273	(602)
200	149	(5.86)	223	(8.78)	762	(30)	378	(15)	860	(33 3/8)	1212	(47 3/4)	508	(1120)
250	187	(7.36)	278	(10.94)	914	(36)	466	(18 3/8)	-	-	1500	(59 1/8)	935	(2062)
300	223	(8.78)	329	(12.95)	1041	(41)	550	(21 3/4)	-	-	1800	(71)	1511	(3331)
350	245	(9.64)	362	(14.25)	1118	(44)	605.5	(23 3/8)	-	-	1946	(76 3/8)	1977	(4359)
400	281	(11.06)	413	(16.26)	1245	(49)	690	(27 1/4)	-	-	2131	(84)	2863	(6312)
450	317	(12.48)	464	(18.26)	1397	(55)	767.5	(30 1/4)	-	-	2332	(91 3/8)	3891	(8578)
500	353	(13.89)	516	(20.31)	1524	(60)	845.5	(33 3/8)	-	-	2674	(105 3/8)	5243	(11559)
550	389	(15.31)	567	(22.32)	1626	(64)	922.5	(36 3/8)	-	-	2926	(115 1/4)	6685	(14738)
600	424	(16.69)	619	(24.37)	1727	(68)	1007	(39 3/4)	-	-	3214	(126 3/8)	8687	(19152)

Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Butt Weld Ends to ASME B16.25. Alternatives are available on request.



Body:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Bonnet:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Stem:	BS 2S.143	ASTM A638 Gr 660	ASTM A638 Gr 660
Gasket:		Exfoliated graphite	
Disc/Seat:	ASTM A105 Stellite 6 faced	ASTM A182 Stellite 6 faced	
Gland Packing:	Exfoliated graphite ring		
Cover bolts:	ASTM A193 Gr B7	ASTM A193 Gr B16	

Nominal Size	A		B		L		M		H1		H2		Weight	
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)	kg (lb)
125 (5)	95 (3.78)	144 (5.67)	533 (21)	131 (5 1/4)	750 (29 3/8)	939 (37)	164 (353)							
150 (6)	113 (4.45)	172 (6.77)	610 (24)	152 (6)	860 (33 3/8)	1094 (43 1/8)	254 (560)							
200 (8)	149 (5.86)	223 (8.78)	762 (30)	188.5 (7 1/2)	1060 (41 3/4)	1348 (53 1/8)	484 (1067)							
250 (10)	187 (7.36)	278 (10.94)	914 (36)	230.5 (9 1/8)	-	1616 (63 5/8)	866 (1920)							
300 (12)	223 (8.78)	329 (12.95)	1041 (41)	273 (10 3/4)	-	1909 (75 1/4)	1371 (3023)							
350 (14)	245 (9.64)	362 (14.25)	1118 (44)	301.5 (12)	-	2090 (82 3/8)	1821 (4015)							
400 (16)	281 (11.06)	413 (16.26)	1245 (49)	344.5 (13 3/8)	-	2400 (94 1/2)	2722 (6000)							
450 (18)	317 (12.48)	464 (18.26)	1397 (55)	379.5 (15)	-	2617 (103 1/8)	3633 (8010)							
500 (20)	353 (13.89)	516 (20.31)	1524 (60)	415.5 (16 3/8)	-	2875 (113 3/8)	4783 (10545)							
550 (22)	389 (15.31)	567 (22.32)	1626 (64)	451 (17 3/8)	-	3080 (121 1/8)	6023 (13279)							
600 (24)	424 (16.69)	619 (24.37)	1727 (68)	494 (19 1/2)	-	3357 (132 1/4)	7778 (17148)							

Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Butt Weld Ends to ASME B16.25. Alternatives are available on request.

Materials

Description	Carbon Steel	Alloy Steel	Alloy Steel
Body:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Bonnet:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Stem:	BS 2S.143	ASTM A638 Gr 660	ASTM A638 Gr 660
Gasket:		Exfoliated graphite	
Disc/Seat:	ASTM A105 Stellite 6 faced	ASTM A182 Stellite 6 faced	
Gland Packing:	Exfoliated graphite ring		
Cover bolts:	ASTM A193 Gr B7	ASTM A193 Gr B16	

Nominal Size	A		B		L		M		H1		H2		Weight	
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	kg (lb)	kg (lb)
125 (5)	83 (3.27)	144 (5.67)	533 (21)	266.5 (10 1/2)	650 (25 3/8)	883 (34 3/8)	220 (485)							
150 (6)	100 (3.94)	172 (6.77)	610 (24)	315.5 (12 1/2)	740 (29 1/4)	1042 (41 1/8)	346 (763)							
200 (8)	132 (5.20)	223 (8.78)	762 (30)	399.5 (15 3/4)	840 (33 1/8)	1184 (46 3/8)	663 (1462)							
250 (10)	165 (6.50)	278 (10.94)	914 (36)	486.5 (19 1/4)	-	1463 (57 3/8)	1175 (2590)							
300 (12)	197 (7.75)	329 (12.95)	1041 (41)	569.5 (22 1/2)	-	1785 (70 3/8)	1889 (4165)							
350 (14)	217 (8.54)	362 (14.25)	1118 (44)	621.5 (24 1/2)	-	1870 (73 3/8)	2374 (5234)							
400 (16)	249 (9.80)	413 (16.26)	1245 (49)	704.5 (27 3/8)	-	2101 (82 3/4)	3205 (7065)							
450 (18)	280 (11)	464 (18.26)	1397 (55)	796.5 (31 3/8)	-	2264 (90)	4327 (9539)							
500 (20)	312 (12.28)	516 (20.31)	1524 (60)	871.5 (34 3/8)	-	2543 (100 3/8)	5841 (12877)							
550 (22)	344 (13.54)	567 (22.32)	1626 (64)	962.5 (37 3/8)	-	2850 (112)	7885 (17838)							
600 (24)	375 (14.76)	619 (24.37)	1727 (68)	1045.5 (41 1/4)	-	3100 (122)	10645 (23468)							

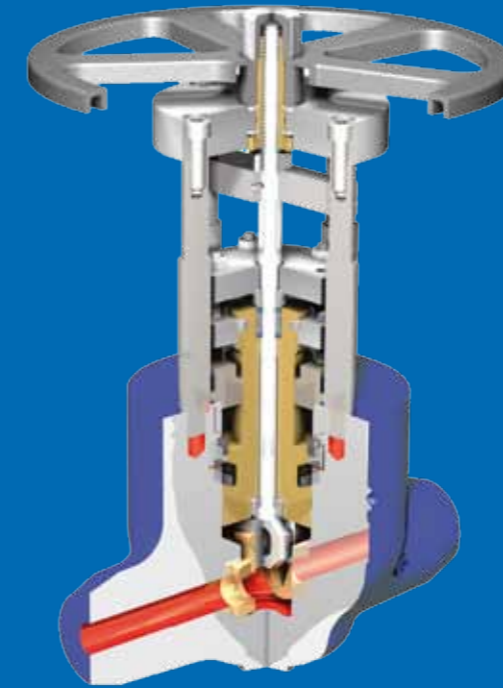
Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Butt Weld Ends to ASME B16.25. Alternatives are available on request.

Body:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Bonnet:	ASTM A216 Gr WCB	ASTM A217 Gr WC6	ASTM A217 Gr WC9
Stem:	BS 2S.143	ASTM A638 Gr 660	ASTM A638 Gr 660
Gasket:		Exfoliated graphite	
Disc/Seat:	ASTM A105 Stellite 6 faced	ASTM A182 Stellite 6 faced	
Gland Packing:		Exfoliated graphite ring	
Cover bolts:	ASTM A193 Gr B7	ASTM A193 Gr B16	

Class 3100

Nominal Size	A		B		L		M		H1		H2		Weight		
	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	kg	(lb)	
125	(5)	83	(3.27)	144	(5.67)	533	(21)	143.5	(5 ³ / ₄)	740	(29 ¹ / ₄)	951	(37 ¹ / ₂)	204	(450)
150	(6)	100	(3.94)	172	(6.77)	610	(24)	168.5	(6 ⁵ / ₈)	840	(33 ¹ / ₈)	1077	(42 ¹ / ₂)	314	(693)
200	(8)	132	(5.20)	223	(8.78)	762	(30)	210	(8 ³ / ₈)	1010	(39 ³ / ₈)	1326	(52 ¹ / ₄)	601	(1325)
250	(10)	165	(6.50)	278	(10.94)	914	(36)	251	(10)	-	-	1620	(63 ³ / ₈)	1084	(2390)
300	(12)	197	(7.75)	329	(12.95)	1041	(41)	292.5	(11 ¹ / ₂)	-	-	1902	(75)	1681	(3706)
350	(14)	217	(8.54)	362	(14.25)	1118	(44)	317.5	(12 ¹ / ₂)	-	-	2047	(80 ⁵ / ₈)	2130	(4696)
400	(16)	249	(9.80)	413	(16.26)	1245	(49)	359	(14 ¹ / ₄)	-	-	2297	(90 ¹ / ₂)	3061	(6749)
450	(18)	280	(11.00)	464	(18.26)	1397	(55)	408.5	(16 ¹ / ₈)	-	-	2608	(102 ³ / ₄)	4474	(9864)
500	(20)	312	(12.28)	516	(20.31)	1524	(60)	441.5	(17 ³ / ₈)	-	-	2807	(110 ³ / ₈)	5680	(12523)
550	(22)	344	(13.54)	567	(22.32)	1626	(64)	491	(19 ³ / ₈)	-	-	3250	(128)	7700	(16975)
600	(24)	375	(14.76)	619	(24.37)	1727	(68)	532.5	(21)	-	-	3500	(158)	10000	(22046)

Withdrawal space shown refers to the valve being in the fully open position. Dimension H1 when not shown is dependent on size of operator fitted. Butt Weld Ends to ASME B16.25. Alternatives available on request.



Master valve - has a connecting eye-piece which protects the seat faces and avoids turbulence in the valve. This valve used in conjunction with the martyr valve produces maximum benefits of double isolation.

For extreme service conditions such as on superheated steam drain lines, Hopkinsons have developed a new range of high performance parallel slide gate valves. They give extended service life and continued tight shut off when subject to frequent operation, two phase flow, thermal shock and large pressure drops. Unique features of the valves include square discs (gates) and 'winged' seats. These provide accurate gate guidance, low seat contact stresses and enhanced wear resistance for repeatedly handling large pressure drops in the part open position.

The valves can be installed singly but for maximum effect, two valves operating in a martyr valve and master valve configuration are recommended.

- Winged seats - the seating area is extended in the opening direction providing greater contact area with the gates.
- Square gates - provide greater contact area and support during operation. Titanium nitride coating gives improved erosion resistance.

High Performance Drain Valves

Ratings:	ASME Class 900 to 3600
Sizes:	20 to 100 mm ¾ to 4 in
Materials:	Carbon Steel, Alloy Steel.
End Connection:	Butt weld and socket weld.

Martyr valve - incorporates a 'V' port outlet seat and is ideal for regulating the flow. The 'V' port is set back from the sealing face and any wear associated with high velocities and throttling is confined to this and not the sealing face.

Operation

Manual or Actuated - Motorising frequently operated valves is essential for modern plant operation. Actuators can ensure the master valve is opened first and closed last, and that it is opened to its full open position.

Optional Extras

Pipework - Pairs of valve can be supplied with a joining piece of pipework welded and tested thereby simplifying site installation.

Alternative 'V' ports - the standard 50% 'V' port provides excellent all round performance and is appropriate for the majority of applications. Where necessary, 'V' ports from 20% to 80% area, and parallel ports from 5% to 30% area for linear regulation can be selected for specific applications.



Martyr valve



Metric & Imperial Pressure/Temperature Ratings

ASME Class 900 Valves - Fig No. A21809W, A26809W, Sizes 1 - 2 ½ inch. Body Material: Carbon Steel, ASTM-105, ASTM A216-WCB. In accordance with ASME B16.34 Limited & Special Class 900																				
Temperature °C	-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	-	-	-	-
Ltd Class Pressure bar	155.1	155.1	154.9	153.1	151.7	151.6	151.6	150.3	146.7	141.3	130.2	107.9	86.3	65.4	44.6	23.0	-	-	-	-
Sp Class Pressure bar	155.1	155.1	154.9	153.1	151.7	151.6	151.6	150.3	146.7	141.3	130.2	107.9	86.3	65.4	44.1	22.2	-	-	-	-
Temperature °F	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000	-	-	-	-	-	-
Ltd Class Pressure Psi	2250	2250	2220	2200	2200	2200	2145	2075	1905	1545	1195	860	521	332	-	-	-	-	-	-
Sp Class Pressure Psi	2250	2250	2220	2200	2200	2200	2145	2075	1905	1545	1195	860	515	320	-	-	-	-	-	-

ASME Class 1500 Valves - Fig No. A21815W, A26815W, Sizes 1 - 2 ½ inch. Body Material: Carbon Steel, ASTM-105, ASTM A216-WCB. In accordance with ASME B16.34 Limited & Special Class 1500																				
Temperature °C	-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	-	-	-	-
Ltd Class Pressure bar	258.6	258.6	258.2	255.2	252.9	252.6	252.6	250.6	244.6	235.5	217.0	179.8	143.8	109.0	75.1	39.4	-	-	-	-
Sp Class Pressure bar	258.6	258.6	258.2	255.2	252.9	252.6	252.6	250.6	244.6	235.5	217.0	179.8	143.8	109.0	73.5	36.9	-	-	-	-
Temperature °F	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000	-	-	-	-	-	-
Ltd Class Pressure Psi	3750	3750	3700	3665	3665	3665	3575	3455	3170	2570	1995	1435	873	571	-	-	-	-	-	-
Sp Class Pressure Psi	3750	3750	3700	3665	3665	3665	3575	3455	3170	2570	1995	1435	855	535	-	-	-	-	-	-

ASME Class 2500 Valves - Fig No. A21825W, A26825W, Sizes 1 - 2 ½ inch. PN 420 Rated Valves - Fig No. M218420W, M268420W, Sizes 20-50mm Body Material: Carbon Steel, ASTM-105, ASTM A216-WCB. In accordance with ASME B16.34 Limited and Special Class 2500																				
Temperature °C	-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	-	-	-	-
Ltd Class Pressure bar	430.9	430.9	430.3	425.3	421.4	421.1	421.1	417.6	407.6	392.5	361.7	299.6*	239.6*	181.6*	126.9*	68.9*	-	-	-	-
Sp Class Pressure bar	430.9	430.9	430.3	425.3	421.4	421.1	421.1	417.6	407.6	392.5	361.7	299.6	239.6	181.6	122.4	61.6	-	-	-	-
Temperature °F	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000	-	-	-	-	-	-
Ltd Class Pressure Psi	6250	6250	6170	6105	6105	6105	5960	5760	5285	4285	3320	2395	1482	1002	-	-	-	-	-	-
Sp Class Pressure Psi	6250	6250	6170	6105	6105	6105	5960	5760	5285	4285	3320	2395	1430	895	-	-	-	-	-	-

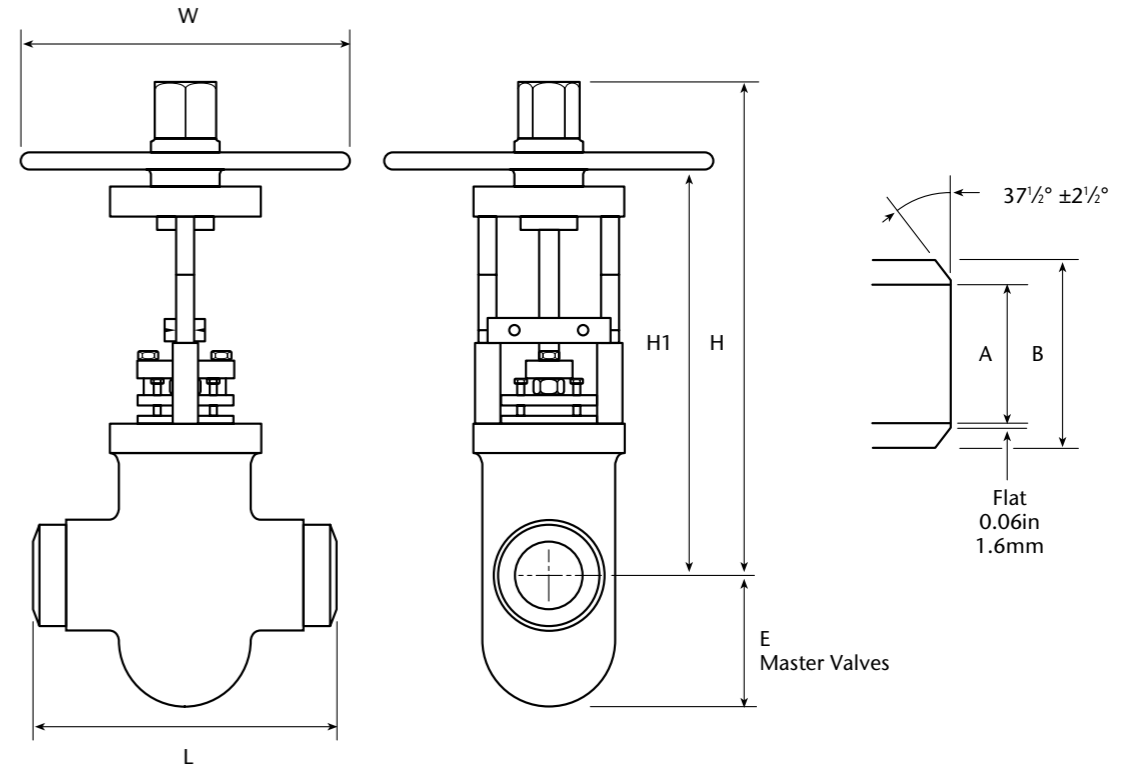
ASME Class 3100 Valves - Fig No. A21831W, A26831W, Sizes 1 - 2 ½ inch. PN 520 Rated Valves - Fig No. M218520W, M268520W, sizes 20 - 50 mm. Body Material: Alloy Steel, ASTM A182-F22, WC9. In accordance with ASME B16.34 Limited and Special Class 3100																					
Temperature °C	-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575	600	625	650
Ltd Class Pressure bar	534.3	534.3	533.4	526.5	518.9	516.4	514.3	512.4	508.4	503.8	503.8	503.8	487.4	441.8	385.8	274.5	232.7	156.8	102.5	66.4	42.2
Sp Class Pressure bar	534.3	534.3	533.4	526.5	518.9	516.4	514.3	512.4	508.4	503.8	503.8	503.8	487.4	441.8	368.8	238.1	201.8	136.0	88.9	57.6	36.6
Temperature °F	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	-	-	-
Ltd Class Pressure Psi	7750	7750	7639	7520	7484	7451	7396	7308	7308	7308	6999	6200	5097	3983	2603	1635	1021	613	-	-	-
Sp Class Pressure Psi	7750	7750	7639	7520	7484	7451	7396	7308	7308	7308	6999	6200	4872	3454	2258	1418	886	532	-	-	-

FOR INTERMEDIATE VALUES IT IS RECOMMENDED THAT THEY ARE OBTAINED BY LINEAR INTERPOLATION USING THE TABLE OF lb/in²: F RATINGS.
* ASTM A105 MATERIAL TEMPERATURE LIMITATIONS: USE AT TEMPERATURES ABOVE 425°C (800°F) IS PERMISSIBLE BUT IS NOT RECOMMENDED FOR PROLONGED USE. SHORT EXCURSIONS UP TO 482°C (900°F) ARE PERMISSIBLE.
† RESTRICTED SEATING: MAX PRESSURE DIFFERENTIAL ACROSS THE CLOSURE MEMBER IS LIMITED TO 431 BAR (6250 lb/in²).

Metric & Imperial Pressure/Temperature Ratings

ASME Class 900 Valves - Fig No. A21809W, A26809W, Sizes 3 - 4 inch. Body Material: Carbon Steel, ASTM-105, ASTM A216-WCB. In accordance with ASME B16.34 Std Class 900																		
Temperature °C	-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538		
Std Class Pressure bar	153.2	150.4	139.8	135.2	131.4	125.8	119.5	116.1	112.7	109.1	104.2	86.3*	69*	52.3*	35.3*	17.7*		
Temperature °F	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000				
Std Class Pressure Psi	2220	2035	1965	1900	1810	1705	1650	1590	1520	1235	955*	690*	410*	255*				
ASME Class 900 Valves - Fig No. A21809W, A26809W, Sizes 3 - 4 inch. Body Material: Alloy Steel, ASTM A182-F22, WC9. In accordance with ASME B16.34 Std Class 900																		
Temperature °C	-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575
Std Class Pressure bar	155.1	155.1	154.6	150.6	145.8	139	128.6	124	120.7	116.5	109.8	105.1	101.4	95.1	84.7	55.3	46.9	31.6
Temperature °F	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200
Std Class Pressure Psi	2250	2250	2165	2080	1995	1815	1765	1705	1595	1525	1460	1350	955	650	430	290	195	125
ASME Class 1500 Valves - Fig No. A21815W, A26815W, Sizes 3 - 4 inch. Body Material: Carbon Steel, ASTM-105, ASTM A216-WCB. In accordance with ASME B16.34 Std Class 1500																		
Temperature °C	-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538		
Std Class Pressure bar	255.3	250.6	233	225.4	219	209.7	199.1	193.6	187.8	181.8	173.6	143.8*	115*	87.2*	58.8*	29.5*		
Temperature °F	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000				
Std Class Pressure Psi	3705	3395	3270	3170	3015	2840	2745	2665	2535	2055	1595*	1150*	685*	430*				
ASME Class 1500 Valves - Fig No. A21815W, A26815W, Sizes 3 - 4 inch. Body Material: Alloy Steel, ASTM A182-F22, WC9. In accordance with ASME B16.34 Std Class 1500																		
Temperature °C	-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575
Std Class Pressure bar	258.6	258.6	257.6	250.8	243.4	231.8	214.4	206.6	201.1	194.1	183.1	175.1	169.0	158.2	140.9	92.2	78.2	52.6
Temperature °F	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200
Std Class Pressure Psi	3750	3750	3640	3530	3325	3025	2940	2840	2660	2540	2435	2245	1930	1335	875	550	345	205
ASME Class 2500 Valves - Fig No. A21825W, A26825W, Sizes 3 - 4 inch. Body Material: Carbon Steel, ASTM-105, ASTM A216-WCB. In accordance with ASME B16.34 Std Class 2500																		
Temperature °C	-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538		
Std Class Pressure bar	425.5	417.5	388.3	375.6	365	349.5	331.8	322.6	313	303.1	289.3	239.7*	191.7*	145.3*	97.9*	49.2*		
Temperature °F	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000				
Std Class Pressure Psi	6170	5655	5450	5280	5025	4730	4575	4425	4230	3430	2655*	1915*	1145*	715*				
ASME Class 3600 Valves - Fig No. A21836W, A26836W, Sizes 3 - 4 inch. Body Material: Alloy Steel, ASTM A182-F22, WC9. In accordance with ASME B16.34 Std Class 3600																		
Temperature °C	-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	538	550	575
Std Class Pressure bar	620.49	620.49	618.33	602.18	583.77	555.88	514.075	495.665	482.65	465.38	438.83	419.755	405.6	379.845	338.35	221.245	187.56	126.26
Temperature °F	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200
Std Class Pressure Psi	7749.5	7749.5	7526	7291	6867	6248.5	6080.5	5865	5491.5	5243.5	5033	4643	3992	2763.5	1805.5	1133.5	707.5	425.5

FOR INTERMEDIATE VALUES IT IS RECOMMENDED THAT THEY ARE OBTAINED BY LINEAR INTERPOLATION USING THE TABLE OF lb/in²: F RATINGS.
 * ASTM A105 MATERIAL TEMPERATURE LIMITATIONS: USE AT TEMPERATURES ABOVE 425°C (800°F) IS PERMISSIBLE BUT IS NOT RECOMMENDED FOR PROLONGED USE. SHORT EXCURSIONS UP TO 482°C (900°F) ARE PERMISSIBLE.
 † RESTRICTED SEATING: MAX PRESSURE DIFFERENTIAL ACROSS THE CLOSURE MEMBER IS LIMITED TO 431 BAR (6250 lb/in²).



Class PN420 & PN520

Nominal Size	A	B PN420	B PN520	E	H	H1	L	W
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
20 (3/4)	20 (0.79)	35 (1.38)	40 (1.57)	78 (3.07)	321 (12.75)	277 (10.9)	254 (10)	280 (11)
25 (1)	25 (0.98)	42 (1.65)	46 (1.81)	78 (3.07)	321 (12.75)	277 (10.9)	254 (10)	280 (11)
32 (1 1/4)	32 (1.26)	57 (2.24)	60 (2.36)	110 (4.33)	401 (15.75)	349 (13.75)	305 (12)	380 (15)
40 (1 1/2)	38 (1.5)	65 (2.56)	68 (2.68)	110 (4.33)	401 (15.75)	349 (13.75)	305 (12)	380 (15)
50 (2)	47 (1.85)	85 (3.35)	85 (3.35)	130 (5.12)	430 (17)	368 (14.5)	330 (13)	330 (13)

Class 900 & 1500

Nominal Size	A Cl.900	A Cl.1500	B	E	H	H1	L	W
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
20 (3/4)		15.44 (0.61)	28 (1.1)	65 (2.56)	264 (10.38)	242 (9.5)	186 (7.31)	178 (7)
25 (1)		20.7 (0.81)	35 (1.38)	65 (2.56)	264 (10.38)	242 (9.5)	186 (7.31)	178 (7)
32 (1 1/4)		29.46 (1.16)	43 (1.69)	78 (3.07)	321 (12.63)	277 (10.9)	232 (9.13)	260 (11)
40 (1 1/2)		33.98 (1.34)	52 (2.05)	110 (4.33)	401 (15.75)	349 (13.75)	305 (12)	380 (15)
50 (2)		42.9 (1.69)	62 (2.44)	110 (4.33)	401 (15.75)	349 (13.75)	305 (12)	380 (15)
65 (2 1/2)	54 (2.13)	54 (2.13)	73 (2.87)	130 (5.12)	430 (17)	368 (14.5)	330 (13)	330 (13)
80 (3)	66.65 (2.63)	66.65 (2.63)	89 (3.5)	130 (5.12)	436 (17.17)	374 (14.75)	368 (14.5)	330 (13)
100 (4)	87.32 (3.44)	87.32 (3.44)	114 (4.49)	175 (6.89)	618 (24.3)	519 (20.4)	452 (17.75)	330 (13)

Dimensions

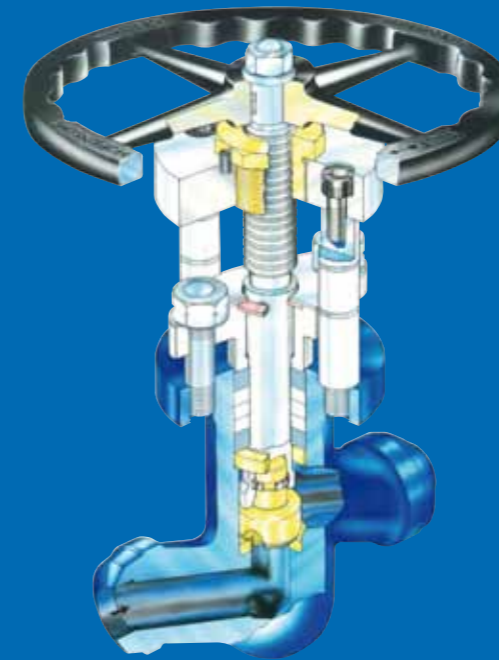
Class 2500, 3100 & 3600

Nominal Size	A		B		E		H		H1		L		W	
	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)
25 (1)	15.21	(0.60)	35	(1.38)	65	(2.56)	264	(10.38)	242	(9.5)	186	(7.31)	178	(7)
32 (1¼)	22.75	(0.89)	46	(1.81)	78	(3.07)	321	(12.63)	277	(12.63)	232	(9.13)	280	(11)
40 (1½)	27.94	(1.10)	55	(2.17)	110	(4.33)	401	(15.75)	349	(13.75)	305	(12)	380	(15)
50 (2)	38.17	(1.50)	65	(2.56)	110	(4.33)	401	(15.75)	349	(13.75)	305	(12)	380	(15)
65 (2½)	45	(1.77)	73	(2.87)	130	(5.12)	430	(17)	368	(14.5)	330	(13)	380	(15)
80 (3)	58	(2.28)	89	(3.50)	130	(5.12)	436	(17.17)	375	(14.75)	368	(14.5)	330	(13)
100 (4)	80	(3.15)	114	(4.48)	175	(6.89)	618	(24.3)	519	(20.4)	457	(18)	470	(18.5)

Valve Availability

Martyr Valves - Fig No. M218520W, M218420W, A21831W, A21825W, A21815W, A21809W Master Valves - Fig No. M268520W, M268420W, A26831W, A26825W, A26815W, A26809W Combined Valves - as Master Valves - with 'V' port			
Figure Number	Rating	Material	Sizes
M218520W, M268520W	PN520	F22/WC9	20mm to 50mm
M218420W, M268420W	PN420	A105/WCB	20mm to 50mm
A21831W, A26831W	ASME Class 3100*	F22/WC9	1" to 4" nom.
A21825W, A26825W	ASME Class 2500	A105/WCB, F22/WC9	1" to 4" nom.
A21815W, A26815W	ASME Class 1500	A105/WCB, F22/WC9	¾" to 4" nom
A21809W, A26809W	ASME Class 900	A105/WCB, F22/WC9	2½", 3", 4" nom

* 3" AND 4" SIZES (80mm AND 100mm) AVAILABLE IN CLASS 3600 AS FIGURE NO. A21836W. PLEASE CONSULT US FOR OTHER SIZES OR PRESSURE CLASSES.
SOCKET WELD ENDS AVAILABLE ON SIZES UP TO AND INCLUDING 2½". DIMENSIONS IN THE TABLES OPPOSITE ARE FOR BUTT WELD ENDS. 2½" SIZE AND ABOVE ARE FITTED WITH SPLIT STEM GUIDE.



Globe Valve

Applications

A range of general purpose globe valves suitable for regulating, isolating and blowdown duties.

Design

The replaceable seat is screwed into the body, the joint being made by accurately machined taper surfaces.

An extension on the underside of the valve acts as a throttling device to protect the seating faces against the scoring or cutting action of steam during opening and closing.

Pipe Connections

Flanged

Trim

Seating components are of high grade nickel alloy (Hopkinsons Platnam).

Stem stainless steel.

Optional

Index to indicate closed and open positions

Locking device to secure valves in open or shut position.

Hopkinsons

Globe Valves (Steel)

Range 15mm - 50mm ½" - 2"

Body material ASTM A105
425 barg 6170 psi

For pressure up to:-

Body material ASTM A182-F22
534 barg 7750 psi



Globe Stop & Check Valve (Steel)

Range 15mm - 50mm 1/2" - 2"

Body material ASTM A105
425 barg 6170 psi

For pressure up to:-

Body material ASTM A182-F22
534 barg 7750 psi

Globe Valve

Applications

A high quality general purpose screwdown stop and non-return valve which is eminently suitable for high pressure drain, vent and instrumentation duties.

Design

Main Features

- Simplicity of construction with a minimum number of components.
- Bonnetless design with integral seat
- Easy access to internal parts
- Quick and easy maintenance

Simplicity of construction, the minimum number of components and easy access to the internal parts are key features of the design. The valve is 'bonnetless' and has an integral seat design. Expanded graphite packing rings are fitted in the stuffing box for optimum spindle sealing.

Indication of open and shut position is provided by grooves on both pillars, except the 10mm (3/8") size which has a pointer and index plate.

ASTM A105 2500 Class

Deg C	-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	550
Barg	425.5	417.5	388.3	375.6	365.0	349.5	331.8	322.6	313.0	303.1	289.3	239.7	191.7	145.3	97.9	

ASTM A182-F22

Barg	534.3	534.3	533.4	526.5	518.9	516.4	514.3	512.4	508.4	503.8	503.8	503.8	487.4	441.8	385.8	
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ASTM A105 2500 Class

Deg F	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000	1050	1100
PSI	6170	5655	5450	5280	5025	4730	4575	4425	4230	3430	2655	1915	1145	715		

ASTM A182-F22

PSI	7750	7750	7526	7291	6867	6249	6081	5865	5492	5244	5033	4643	3992	2764	1806	1134
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Rating	Body Material	End Connections
Class 2500	Carbon Steel ASTM A105	Socket or Butt Weld
Class 3100	Alloy Steel ASTM A182-F22	Socket or Butt Weld

Pipe Connections

Butt weld or Socket weld.

Trim

Seating components are of high grade nickel alloy (Hopkinsons Platnam).

Spindle material stainless steel.

Stop Valve

Should the valve need to be stop valve this can be achieved by changing the spindle and valve head assembly. All other components remain the same.

Optional

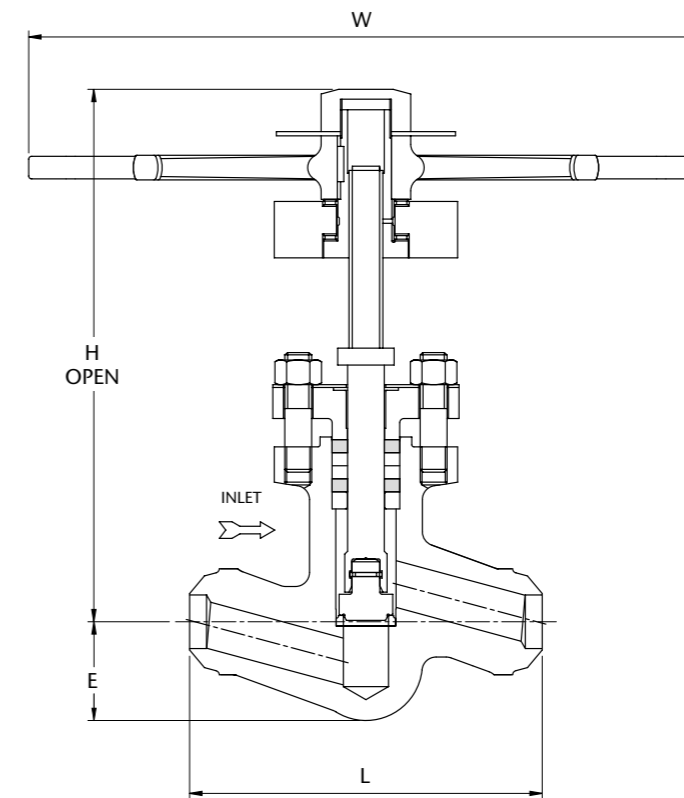
Locking device to secure valve in the closed or open position.

Maintenance

The valve has been designed for quick and easy maintenance. Only the spindle requires lubrication.

Needle bearings in bridge for ease of operation

When repacking is necessary, the valve spindle acts as the packing extractor by rotation of the hand wheel after removing the gland from the stuffing box.



Globe Stop & Check Valve (Steel)

Range 15mm - 50mm 1/2" - 2"

Body material ASTM A105
425 barg 6170 psi

For pressure up to:-

Body material ASTM A182-F22
534 barg 7750 psi

Butt Weld Imperial

Size mm	A	B	L	H	E	W	Weight Kg
1/2	0.500	1.125	5.50	8.750	1.50	6	11
3/4	0.781	1.375	5.50	8.750	1.50	6	11
1	1.00	1.656	7.875	13.250	2.375	13	29
1 1/4	1.250	2.250	7.875	13.250	2.375	13	29
1 1/2	1.500	2.625	9.875	14.750	2.750	21	44
2	1.844	3.375	11.812	16.500	3.563	26.750	

110

Butt Weld Metric

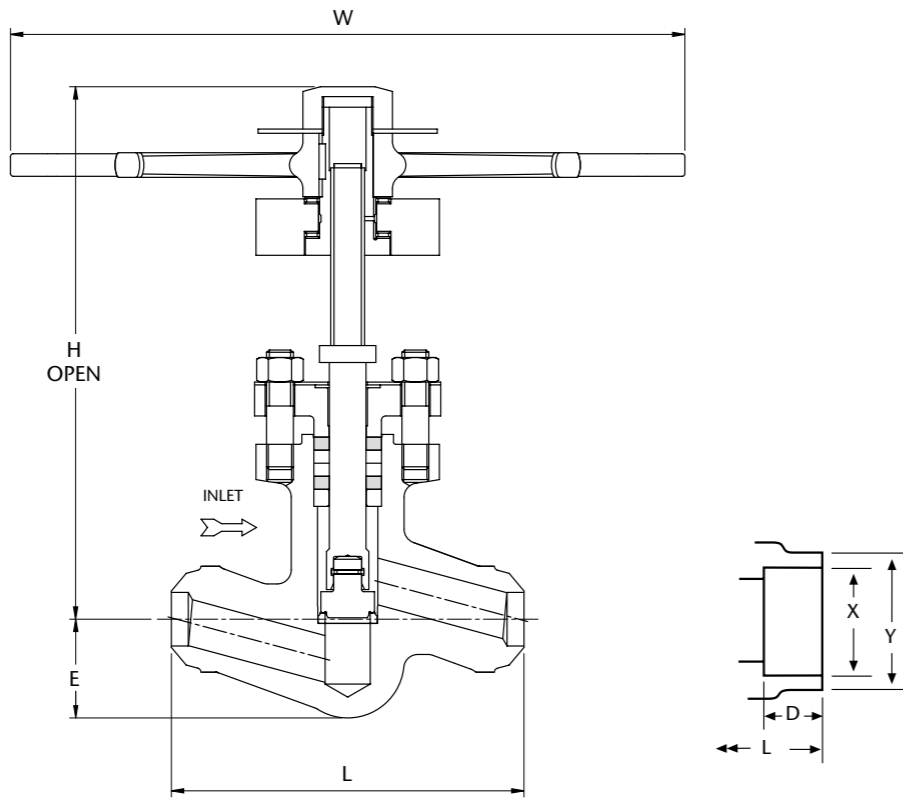
Size mm	A	B	L	H	E	W	Weight Kg
15	12.7	28	140	220	38	150	5
20	20	35	140	220	38	150	5
25	25	42	200	335	60	330	13
32	32	57	200	335	60	330	13
40	38	65	250	375	70	533	40
50	47	95	300	420	90	675	50

Range 15mm - 50mm 1/2" - 2"

Body material ASTM A105
425 barg 6170 psi

For pressure up to:-

Body material ASTM A182-F22
534 barg 7750 psi



Socket Weld Imperial

Size inches	X	Y	L	H	E	W	Weight lbs
1/2	1.750	0.855	5.50	8.750	1.50	6	11
3/4	1.750	1.065	5.50	8.750	1.50	6	11
1	2.562	1.330	7.875	13.250	2.375	13	29
1 1/4	2.562	1.675	7.875	13.250	2.375	13	29
1 1/2	2.937	1.915	9.875	14.750	2.750	21	44
2	4.125	2.406	11.812	16.500	3.563	26.750	110

Socket Weld Metric

Size mm	X	Y	L	H	E	W	Weight Kg
15	45	21.71	140	220	38	150	5
20	45	27.05	140	220	38	150	5
25	65	33.78	200	335	60	330	13
32	65	42.55	200	335	60	330	13
40	75	48.64	250	375	70	533	40
50	105	61.11	300	420	90	675	50

Rating	Body Material	End Connections
Class 2500	Carbon Steel ASTM A105	Socket or Butt Weld
Class 3100	Alloy Steel ASTM A182-F22	Socket or Butt Weld

Uniflow Slide Valves (Steel)

Range 20mm - 40mm 3/4" - 1 1/2"
For pressures up to 431Barg 6250 psi

Uniflow Slide Valve

Applications

Designed for general one way isolation and blowdown duties where there is no possibility of reversal flow.

Ideally suitable for drain, vent, instrument isolation and other auxiliary applications.

Design

The uniflow valve is an adaptation of the parallel slide valve. It has only one disc which slides over the seat face on to which is firmly held by fluid pressure when the valve is under pressure.

An Inconel Alloy spring keeps the disc in contact with the seat when the valve is not in under pressure.

Only one third of a turn is required to operate the valve between the open and shut positions which is indicated on the index plate.

Pipe Connections

Flanged, butt weld or Socket weld.

Trim

Seat is a grade 6 Stellite. Disc is high grade nickel alloy(Hopkinsons Platman)

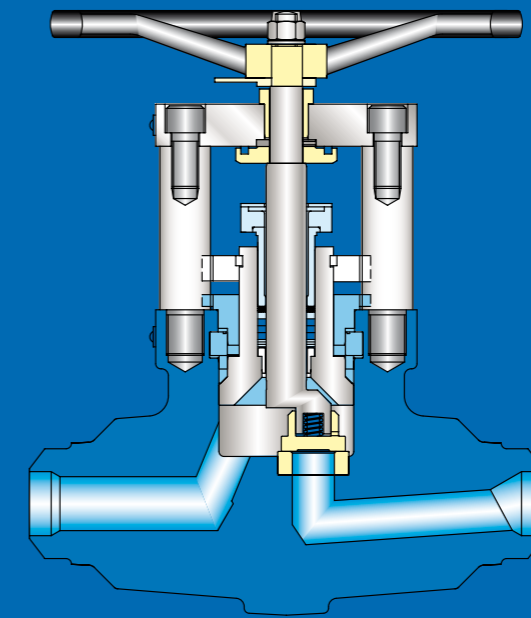
Spindle material stainless steel.

Optional

Locking device to secure valves in open or shut position.

Features

- Index with travel Limit stops
- Needle bearings in bridge for ease of operation
- Pressure sealed lid joint incorporating Expanded Graphite joint ring
- Sliding action of disc cleans seating faces
- Quick Action
- Easy access to seating area for maintenance.



Pressure Temperature Ratings

Class 2500 Carbon Steel Valve
Body Material ASTM A105
In accordance with B16.34 Limited Class

Figure No's

Metric Range M880420

Imperial Range A88025
ASTM A182-F22 2500

	-29 to 38	50	100	150	200	250	300	325	350	375	400	425	450	475	500	550
	430.9	430.9	430.3	430.3	421.4	421.1	421.1	417.6	407.6	392.5	361.7	299.6	239.6	181.6	126.9	

	534.3	534.3	533.4	526.5	518.9	516.4	514.3	512.4	508.4	503.8	503.8	503.8	487.4	441.8	385.8	
--	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	--

	-20 to 100	200	300	400	500	600	650	700	750	800	850	900	950	1000	1050	1100
	6170	5655	5450	5280	5025	4730	4575	4425	4230	3430	2655	1915	1145	715		

	6250	6250	6170	6105	6105	6105	5960	5760	5285	4285	3320	2395	1482	886		
--	------	------	------	------	------	------	------	------	------	------	------	------	------	-----	--	--

Note to Pressure Temperature Ratings Tables

* ASTM Material temperature limitations Use at temperatures above 800°F / 425°C is permissible but is not recommended for long prolonged use. Short excursions up to 900°F/482°C are permissible.

† Restricted Seating Maximum pressure differential across the closer member is limited to 6250 PSI / 431 barg

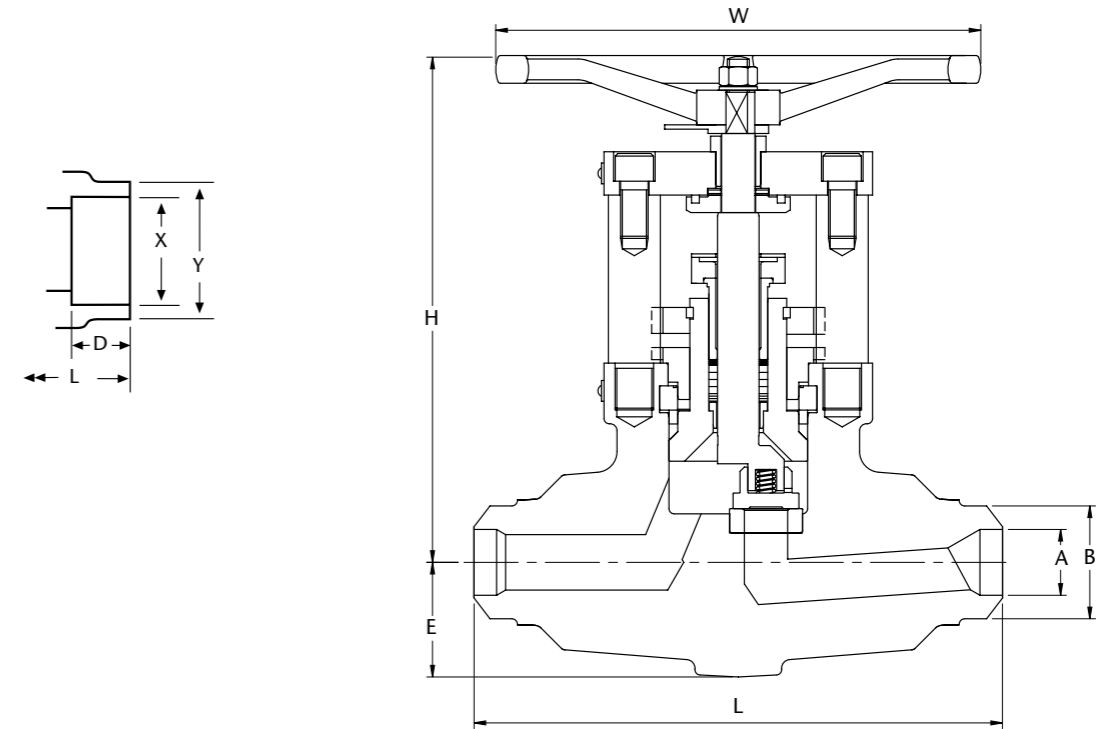
Pressure Temperature Ratings

Class 3100 Alloy Steel Valve
Body Material ASTM A182 - F22
In accordance with B16.34 Limited Class

Figure No's

Metric Range M880520

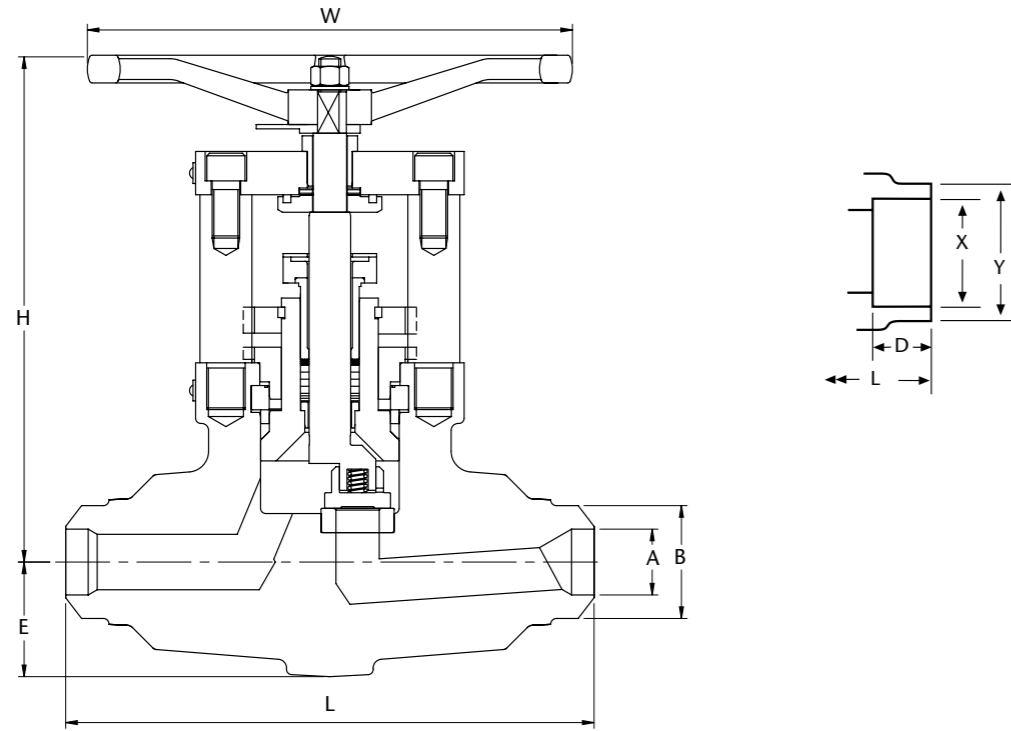
Imperial Range A88031



Class 2500

Size inches	Socket Weld							Butt Weld			
	H	E	W	L	X	D	Weight lbs	L	A	B	Weight lbs
3/8	7.5	1.25	5	4	0.692	0.375	12	4	.375	-	13
1/2	7.5	1.25	5	4	0.857	0.375	12	4	0.50	1.10	13
3/4	9.5	2	9	6.5	1.070	0.5	12	6.5	0.79	1.382	3
1	9.5	2	9	6.5	1.335	0.5	22	6.5	0.98	1.65	46
1 1/2	9.625	2	9	6.5	1.68	0.5	43	6.5	1.26	2.24	91
1 1/2	11.625	2.5	11	7.875	1.920	0.5	87	7.875	1.50	2.56	91
2	11.625	2.5	11	7.875	2.411	0.5	87	7.875	1.85	3.35	91

Size mm	Socket Weld							Butt Weld			
	H	E	W	L	X	D	Weight Kgs	L	A	B	Weight Kgs
10	190	32	125	102	17.58	10	6	140	-	-	6
15	190	32	125	102	21.77	10	6	140	12.7	28	6
20	240	50	230	165	21.77	13	6	254	20	35	6
25	240	50	230	165	33.91	13	10	254	25	42	11
32	245	50	230	165	42.67	13	20	305	32	57	42
40	295	65	280	200	48.77	13	40	305	38	65	42
50	295	65	280	200	61.24	17	40	305	47	85	42



Class 3100

Size inches	H	E	W	Socket Weld				Butt Weld			
				L	X	D	Weight lbs	L	A	B	Weight lbs
3/8	7.5	1.25	5	4	0.692	0.375	12	4	.375	-	13
1/2	7.5	1.25	5	4	0.857	0.375	12	4	0.50	1.10	13
3/4	9.5	2	9	6.5	1.070	0.5	12	6.5	0.79	1.38	23
1	9.5	2	9	6.5	1.335	0.5	22	6.5	0.98	1.65	46
1 1/4	9.625	2	9	6.5	1.68	0.5	43	6.5	1.26	2.24	91
1 1/2	11.625	2.5	11	7.875	1.920	0.5	87	7.875	1.50	2.56	91
2	11.625	2.5	11	7.875	2.411	0.712	87	7.875	1.85	3.35	91

Size mm	H	E	W	Socket Weld				Butt Weld			
				L	X	D	Weight Kgs	L	A	B	Weight Kgs
10	190	32	125	102	17.58	10	6	140	-	-	6
15	190	32	125	102	21.77	10	6	140	12.7	28	6
20	240	50	230	165	21.77	13	6	254	20	40	6
25	240	50	230	165	33.91	13	10	254	25	46	11
32	245	50	230	165	42.67	13	20	305	32	60	42
40	295	65	280	200	48.77	13	40	305	38	68	42
50	295	65	280	200	61.24	17	40	305	47	85	42

Feed Pump Leak Off Valve

Applications

The equipment ensures automatic protection of boiler feed pumps at low flow conditions. The system comprises of:

A leak off valve which is a venturi parallel slide gate valve fitted with a direct mounted pneumatic actuator.

A control panel housing air filter regulator, solenoid operated air valve, electrical terminal board.

A differential pressure switch actuated by a differential pressure unit.

Operation

Control of the leak off valve is through the differential pressure switch* connected to each side of the of a flow measuring orifice in the main feed pipe.

The pneumatic control system ' fail-safe' if either the pneumatic or electric supply fails.

*As an alternative to the differential pressure switch the system can be operated by a different pressure transmitter and trip amplifiers complete with power supply unit.

Installation

The valve must be installed in a horizontal position with the spindle vertical.

End Connections

Butt Weld or Flanged.

Design

The outstanding feature of the parallel design is that of maintained fluid tightness without the aid of wedging action. No mechanical stress is exerted between the disc, and the valve is not subject to dangerous strains on opening or closing. A light non corrodible spring keeps the disc in close contacts with the seats when the valve is not under pressure. When the valve is closed and under pressure, the disc at the out let side is held in contact with its seat by the fluid pressure.

The sliding action of the discs during opening and closing removes any foreign matter from the seat faces.

As the travel limit stops are external to the pressure envelope, fluid-tightness and operating effort are unaffected by temperature changes within the valve. No undesired stresses are imposed on the discs and spindle.

Valve Actuator

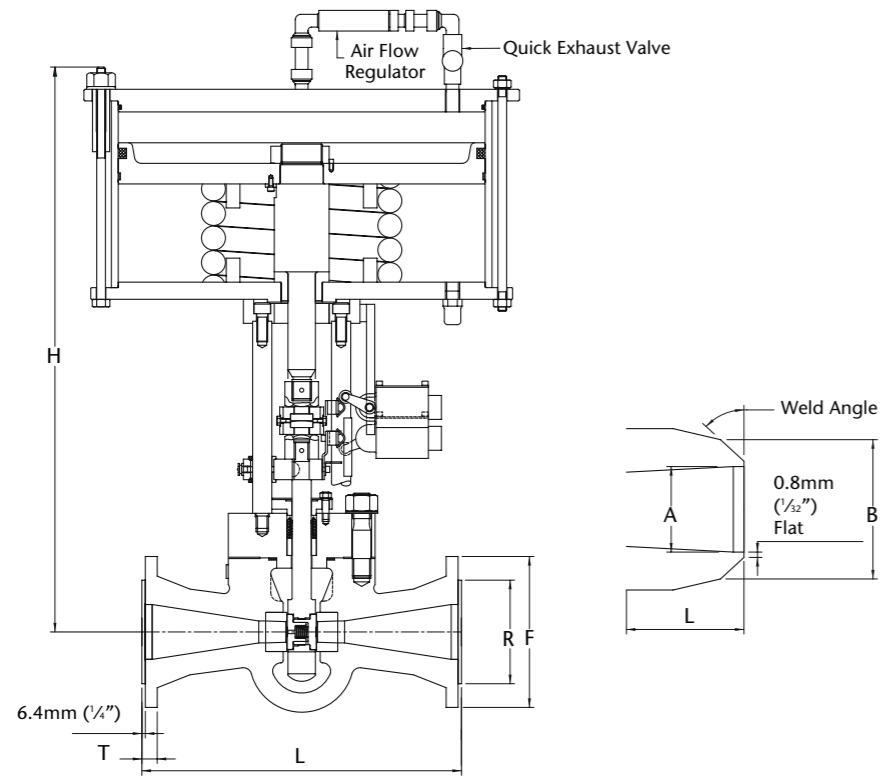
Is the direct acting type i.e. spring to open valve and air to close.

In the normal position the actuator holds the valve in the fully open position by means of the spring.

Increasing air pressure in the upper part of the actuator thrust the spindle downwards to close the valve. Removal of the air pressure allows the spring to return the valve to the open position.

A quick exhaust valve incorporating a silencer is fitted in the upper chamber of the actuator. This increases the opening speed of the leak-off valve by providing immediate escape of exhaust air.

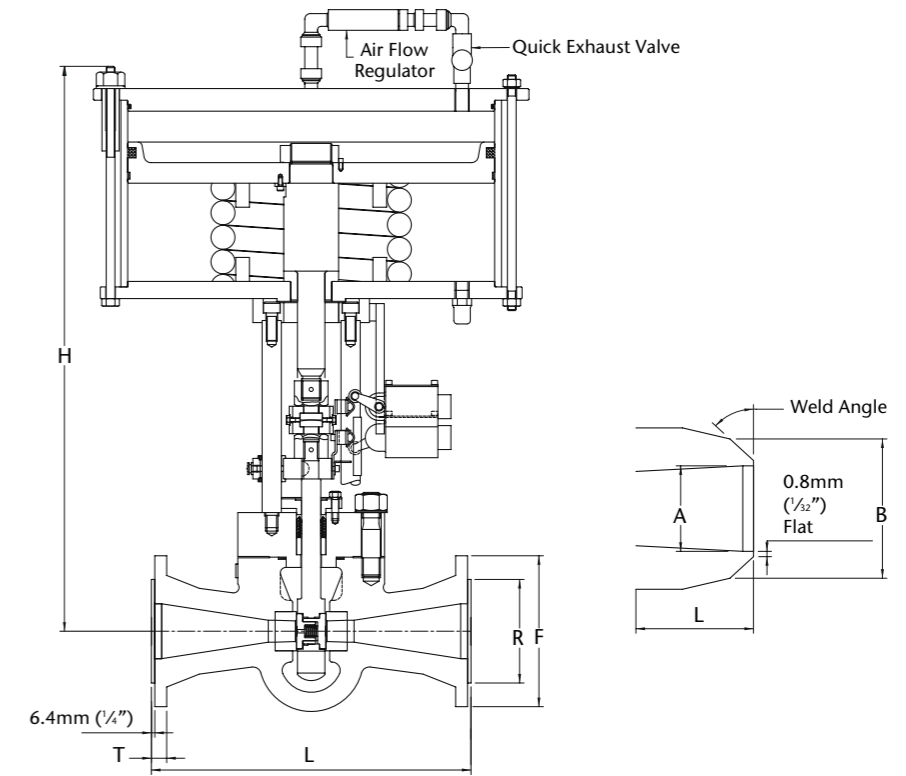
Closing speed of the leak-off valve is governed by a flow regulator situated in the air supply line to the actuator.



Butt Weld Valves

Figure No.	Nominal Size mm	A	B	L	H	Weld Angle	Weight (Kgs)
M279100W	32	32	46	320	675	40°	67
	150	150	205	737	1470	25°	236
M279250W	50	50	76	380	910	40°	88
M279420W	80	80	120	456	1290	25°	152
	100	100	165	673	1175	25°	262

Figure No.	Nominal Size inches	A	B	L	H	Weld Angle	Weight (lbs)
M279100W	1.25	1.26	1.812	12.625	—	40°	147
	6	5.9	8.063	29	1470	25°	520
M279250W	2	1.97	3	15	910	40°	193
M279420W	3	3.15	4.75	18	1290	25°	336
	4	3.940	6.50	26.5	1175	25°	577



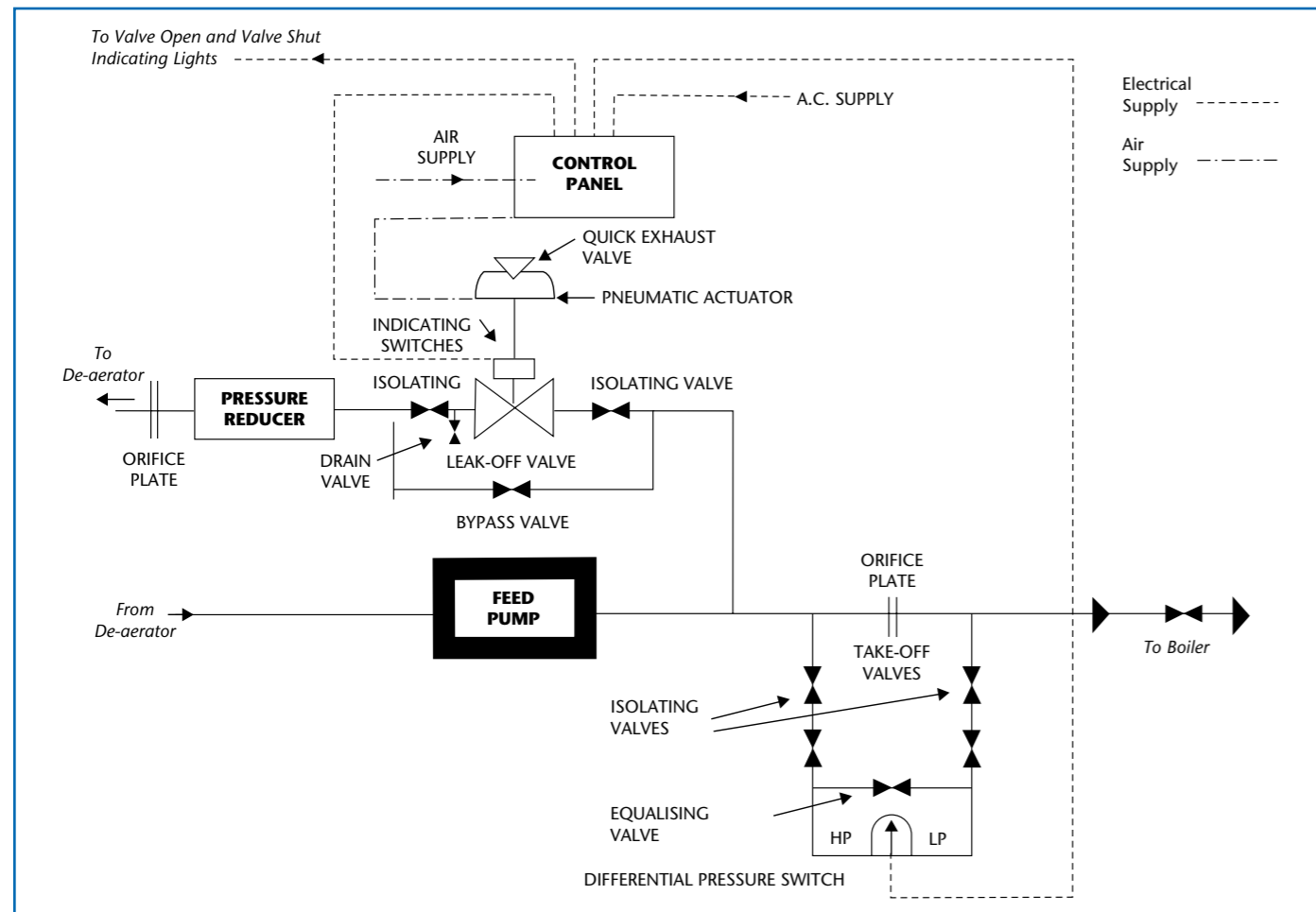
M279100	32	159	29	64	4	25	111	320	675	81
	150	381	62	216	12	32	318	737	1470	304
M279250	50	216	45	92	8	25	165	380	910	88
M279420	80	305	73	127	8	35	229	456	1290	152
	100	565	83	157	8	42	273	673	1175	262

Figure No.	Nominal Size inches	F	T	R	N	O	P	L	H	Weight (Kgs)
M279100	1.25	6.25	1.125	2.50	4	1	4.375	12.625	26.5	178
	6	15	2.437	8.50	12	1.25	12.5	29	58	669
M279250	2	8.50	1.375	3.625	8	1	6.5	15	36	232
M279420	3	12	2.875	5	8	1.375	9	18	50.75	468
	4	22.25	3.25	6.187	8	1.625	10.75	26.5	40.25	775

Pressure Temperature Ratings

Carbon Steel Valve Body Material ASTM A105 In accordance with B16.34

Figure Number	Nominal Size	Temperature 0 – 230°C	Temperature 32 – 450°F
M279100 Flanged	32mm-150mm 1 ¼" - 6"	85 barg	1247 PSI
M279100W Butt Weld	32mm-150mm 1 ¼" - 6"	103 barg	1500 PSI
M279250 Flanged	50mm 2"	213 barg	3092 PSI
M279250W Butt Weld	50mm 2"	252 barg	3665 PSI
M279420 Flanged	80mm – 100mm 3" – 4"	355 barg	5152 PSI
M279420W Butt Weld	80mm – 100mm 3" – 4"	431 barg	6250 PSI



Reducing Valve

Applications

The 'R' type Reducing Valve is relay operated, reducing in a single stage from a boiler pressure to the required reduced pressure.

It is suitable for any pressure reduction provided that there is always a difference of at least 1bar (15 psi) between the inlet and the outlet. The reduced pressure will remain constant, regardless of fluctuations either on the inlet side or in the low pressure demand.

The valve is of full area type, capable of passing a much larger quantity of steam than a direct acting valve of equal size; consequently a smaller size of valve can be used.

The main valve is actuated by a piston, controlled by a pilot valve. This relay system of operation permits the use of a single seated main valve which opens to maintain the required reduced pressure and closes when this pressure is exceeded.

Working Principle

The reduced pressure acting on the underside of the diaphragm is balanced by the load extended on the top of the diaphragm spring. A fall in the reduced pressure allows the diaphragm spring to open the relay valve and thus admit high pressure steam to the piston chamber.

The steam forces down a piston which, in turn, opens the main valve to allow more steam to pass through from the high side and thus maintain to correct reduced pressure.

Under working conditions a balance is set up with the main valve open sufficiently to maintain the low pressure at the predetermined figure.

Durability

In addition to the valve and seats, the cylinder liner is of high grade nickel alloy ('Hopkinsons Platnom') which gives maximum resistance to wear.

Mechanical Freedom of Moving Parts

The design of the valve allows all parts to align themselves freely in relation to each other.

Accessibility

All internal moving parts are easily accessible and can be taken out for inspection by removing the top fittings and bottom plug.

Installation

The 'R' type Reducing valve must be installed in a horizontal pipe.

Isolating Devices

Ratings:	Up to ASME Class 4500 Higher on request.
Sizes:	Up to 1500 mm Up to 60 in
Body Materials:	Carbon Steel, Alloy Steel, Stainless Steel.

Reheater Isolating Device

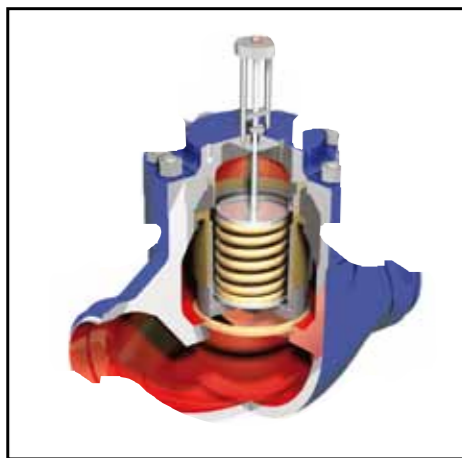
Isolating devices to facilitate the hydraulic testing of sections of power plant such as reheaters following repair.

During normal boiler operation the body of the device acts as a smooth flow component of the pipeline. If required for isolation duty during boiler shutdown, a disc set is inserted in the device to blank-off the flow passage.



Spring Loaded Feedheater Bypass Valve

The valve automatically opens to maintain feed flow if the feedheater has to be isolated during fault conditions. Available in carbon steel, sizes to suit pipeline. Contact our Sales Division for further details.



Micrometer Valve

Applications

A range of general purpose globe valves suitable for regulating, isolating and blowdown duties.

Design

Very close regulation of flow is obtainable with the design of this valve.

The spiral groove on the lower part of the stem is narrow near the collar and gradually widens as it leads up the stem. The latter is a close fit in the seat and all passage of fluid must take place through the spiral.

A graduate index plate and pointer show the degree of opening and allow predetermined conditions to be easily established. The valve can be secured in the selected position by a padlock.

Pipe Connections

Flanged.

Trim

Seat: High grade nickel alloy (Hopkinsons Platnam).

Stem: Stainless steel

Optional

Index to indicate closed and open positions.

Locking device to secure valves in open or shut position.



Centigrade to Fahrenheit - Fahrenheit to Centigrade

-459.4° to 0°			1° to 60°			61° to 290°			300° to 890°			900° to 3000°		
C	Cent. or Fah.	F	C	Cent. or Fah.	F	C	Cent. or Fah.	F	C	Cent. or Fah.	F	C	Cent. or Fah.	F
-273	-459.4		-17.2	1	33.8	16.1	61	141.8	149	300	572	482	900	1652
-268	-450		-16.7	2	35.6	16.7	62	143.6	154	310	590	488	910	1670
-262	-440		-16.1	3	37.4	17.2	63	145.4	160	320	608	493	920	1688
-257	-430		-15.6	4	39.2	17.8	64	147.2	166	330	626	499	930	1706
-251	-420		-15.0	5	41.0	18.3	65	149.0	171	340	644	504	940	1724
-246	-410		-14.4	6	42.8	18.9	66	150.8	177	350	662	510	950	1742
-240	-400		-13.9	7	44.6	19.4	67	152.6	182	360	680	516	960	1760
-234	-390		-13.3	8	46.4	20.0	68	154.4	188	370	698	521	970	1778
-229	-380		-12.8	9	48.2	20.6	69	156.2	193	380	716	527	980	1796
-223	-370		-12.2	10	50.0	21.1	70	158.0	199	390	734	532	990	1814
-218	-360		-11.7	11	51.8	21.7	71	159.8	204	400	752	538	1000	1832
-212	-350		-11.1	12	53.6	22.2	72	161.6	210	410	770	549	1020	1868
-207	-340		-10.6	13	55.4	22.8	73	163.4	215	420	788	560	1040	1904
-201	-330		-10.0	14	57.2	23.3	74	165.2	221	430	806	571	1060	1940
-196	-320		-9.4	15	59.0	23.9	75	167.0	227	440	824	582	1080	1976
-190	-310		-8.9	16	60.8	24.4	76	168.8	232	450	842	593	1100	2012
-184	-300		-8.3	17	62.6	25.0	77	170.6	238	460	860	604	1120	2048
-179	-290		-7.8	18	64.4	25.6	78	172.4	243	470	878	616	1140	2084
-173	-280		-7.2	19	66.2	26.1	79	174.2	249	480	896	627	1160	2120
-169	-273	-459.4	-6.7	20	68.0	26.7	80	176.0	254	490	914	638	1180	2156
-168	-270	-454	-6.1	21	69.8	27.2	81	177.8	260	500	932	649	1200	2192
-162	-260	-436	-5.6	22	71.6	27.8	82	179.6	266	510	950	660	1220	2228
-157	-250	-418	-5.0	23	73.4	28.3	83	181.4	271	520	968	671	1240	2264
-151	-240	-400	-4.4	24	75.2	28.9	84	183.2	277	530	986	682	1260	2300
-146	-230	-382	-3.9	25	77.0	29.4	85	185.0	282	540	1004	693	1280	2336
-140	-220	-364	-3.3	26	78.8	30.0	86	186.8	288	550	1022	704	1300	2372
-134	-210	-346	-2.8	27	80.6	30.6	87	188.6	293	560	1040	715	1320	2408
-129	-200	-328	-2.2	28	82.4	31.1	88	190.4	299	570	1058	726	1340	2444
-123	-190	-310	-1.7	29	84.2	31.7	89	192.2	304	580	1076	737	1360	2480
-118	-180	-292	-1.1	30	86.0	32.2	90	194.0	310	590	1094	748	1380	2516
-112	-170	-274	-0.6	31	87.8	32.8	91	195.8	316	600	1112	759	1400	2552
-107	-160	-256	0.0	32	89.6	33.3	92	197.6	321	610	1130	770	1420	2588
-101	-150	-238	0.6	33	91.4	33.9	93	199.4	327	620	1148	781	1440	2624
-96	-140	-220	1.1	34	93.2	34.4	94	201.2	332	630	1166	792	1460	2660
-90	-130	-202	1.7	35	95.0	35.0	95	203.0	338	640	1184	803	1480	2696
-84	-120	-184	2.2	36	96.8	35.6	96	204.8	343	650	1202	814	1500	2732
-79	-110	-166	2.8	37	98.6	36.1	97	206.6	349	660	1220	825	1520	2768
-73	-100	-148	3.3	38	100.4	36.7	98	208.4	354	670	1238	836	1540	2804
-68	-90	-130	3.9	39	102.2	37.2	99	210.2	360	680	1256	847	1560	2840
-62	-80	-112	4.4	40	104.0	37.8	100	212.0	366	690	1274	858	1580	2876
-57	-70	-94	5.0	41	105.8	43	110	230	371	700	1292	869	1600	2912
-51	-60	-76	5.6	42	107.6	49	120	248	377	710	1310	880	1620	2948
-46	-50	-58	6.1	43	109.4	54	130	266	382	720	1328	891	1640	2984
-40	-40	-40	6.7	44	111.2	60	140	284	388	730	1346	902	1660	3020
-34	-30	-22	7.2	45	113.0	66	150	302	392	740	1364	913	1680	3056
-29	-20	-4	7.8	46	114.8	71	160	320	399	750	1382	924	1700	3092
-23	-10	14	8.3	47	116.6	77	170	338	404	760	1400	935	1720	3128
-17.8	0	32	8.9	48	118.4	82	180	356	410	770	1418	946	1740	3164
			9.4	49	120.2	88	190	374	416	780	1436	957	1760	3200
			10.0	50	122.0	93	200	392	421	790	1454	968	1780	3236
			10.6	51	123.8	99	210	410	427	800	1472	979	1800	3272
			11.1	52	125.6	100	212	413.6	432	810	1490	990	1820	3308
			11.7	53	127.4	104	220	428	438	820	1508	1001	1840	3344
			12.2	54	129.2	110	230	446	443	830	1526	1012	1860	3380
			12.8	55	131.0	116	240	464	449	840	1544	1023	1880	3416
			13.3	56	132.8	121	250	482	454	850	1562	1034	1900	3452
			13.9	57	134.6	127	260	500	460	860	1580	1045	1920	3488
			14.4	58	136.4	132	270	518	466	870	1598	1056	1940	3524
			15.0	59	138.2	138	280	536	471	880	1616	1067	1960	3560
			15.6	60	140.0	143	290	554	477	890	1634	1078	1980	3596

Locate temperature in middle column. If in degrees Centigrade, read Fahrenheit equivalent in right hand column; if in degrees Fahrenheit, read Centigrade equivalent in left hand column.

$$C = \frac{5}{9}(F-32), F = \frac{9}{5}C + 32$$

$$C + 273.15 = K \text{ Kelvin}$$

$$F + 459.67 = R \text{ Rankin}$$

$$\times 100 = \text{Kilopascals (kPa)}$$

$$\times 14.504 = \text{Pounds-force per square inch (psi)}$$

$$\times 33.52 = \text{Feet of water (ftH}_2\text{O) at } 68^\circ\text{F}$$

$$\times 29.53 = \text{Inches of mercury (inHg) at } 0^\circ\text{C}$$

$$\times 1.0197 = \text{Kilograms-force per square centimeter (kg/cm}^2\text{)}$$

$$\times 0.98692 = \text{Atmospheres (atm) sea-level standard}$$

$$\times 1.0443 = \text{Tons-force per square foot (tonf/ft}^2\text{)}$$

$$\times 750.06 = \text{Torr (torr) (-mmHg at } 0^\circ\text{C.)}$$

$$\times 10^5 = \text{Pascals (Pa) or newtons per square meter (N/m}^2\text{)}$$

$$\times 0.1450 = \text{Pounds-force per square inch (psi)}$$

$$\times 0.010197 = \text{Kilograms-force per square centimeter (kg/cm}^2\text{)}$$

$$\times 0.2953 = \text{Inches of mercury (inHg) at } 32^\circ\text{F}$$

$$\times 0.3351 = \text{Feet of water (ftH}_2\text{O) at } 68^\circ\text{F}$$

$$\times 4.021 = \text{Inches of water (inH}_2\text{O) at } 68^\circ\text{F}$$

$$\times 6.896 = \text{Kilopascals (kPa)}$$

$$\times 0.06805 = \text{Standard atmospheres}$$

$$\times 2.311 = \text{Feet of water (ftH}_2\text{O) at } 68^\circ\text{F}$$

$$\times 27.73 = \text{Inches of water (inH}_2\text{O) at } 68^\circ\text{F}$$

$$\times 2.036 = \text{Inches of mercury (inHg) at } 0^\circ\text{C}$$

$$\times 0.07031 = \text{Kilograms-force per square centimeter (kg/cm}^2\text{)}$$

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