



TECHNICAL BULLETIN

Serck Audco

Full Bore Super-H

Plug Valve for Slurry and Piggable Applications

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Easy upgrade to double block

With today's increasingly stringent Health and Safety requirements in O&G plants installations, upgrades to Double Block & Bleed are an increasingly common requirement. Often these upgrades have to be done in a short time frame (such as a planned shutdown) so reducing the work required for the upgrade is critical. With our DIPV (or TIPV if TIPV catalogue), Single Isolation Systems can be easily and timely upgraded to a Double Block & Bleed (DB&B) System without the need of pipework modification. Serck Audco DIPVs (or TIPVs) are supplied with the same Face-To-Face of a single valve for class 600 and above. Note that the Face-To-Face is maintained regardless of what type of single valve needs replacement, as the standard face to face dimension for ball, gate and plug valves are the same as per ASME B16.10

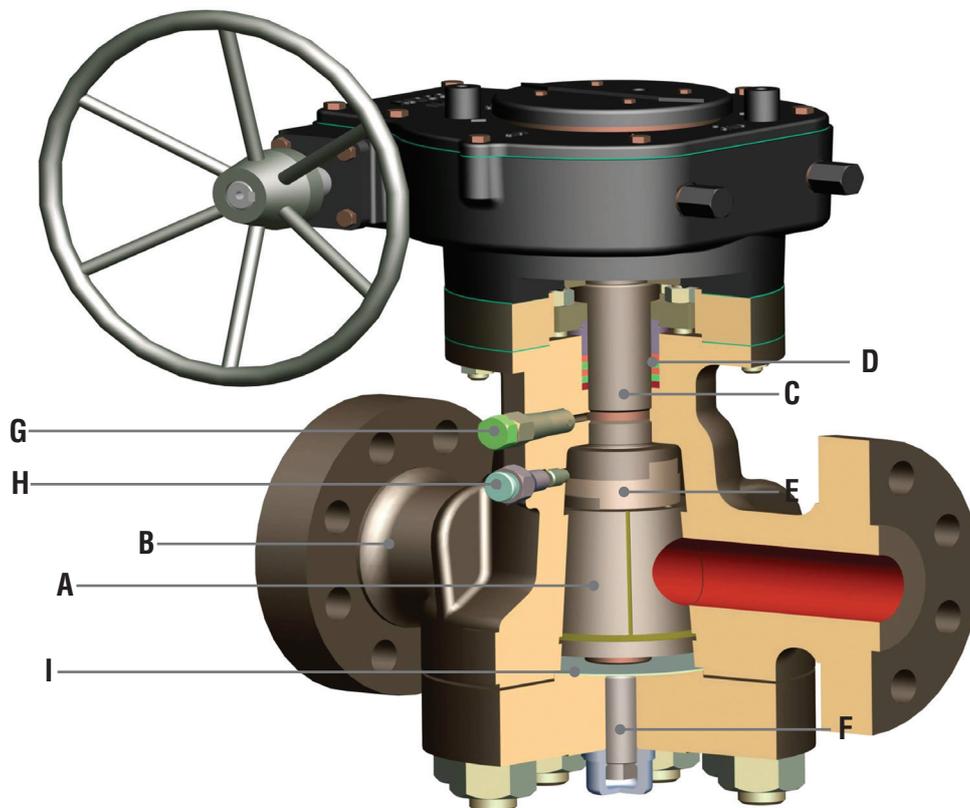
Full Bore Super-H

The well proven Super-H Pressure Balanced Plug Valve is also available in a Full Bore version, specifically developed for Slurry services and Piggable applications.

This design has proven its suitability on a range of demanding applications, when zero leakage and reliability of operation are of prime importance.

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

In the Full Bore configuration, the resistance to erosion is further enhanced by maintaining a streamlined flow at constant velocity and the valve is also suitable for pigging, enabling it to cope with the most challenging applications.



Key:

A	Full Bore Plug – Metal-to-metal wide seating area with Super LoMu Treatment for low torque
B	Body – Simple and robust design with no cavities
C	Stem – Anti blow out with Super LoMu Treatment
D	Gland – Adjustable with fugitive emission proof graphite packing
E	Equalizer ring – Prevents side loads for efficient stem to-plug connection

F	Plug Loading Screw – Factory set to ensure seat tightness with low torque
G	Stem Packing Injector – Renews stem packing and allows full in-line maintenance
H	Sealant Injector – Maintains bubble tight shut-off for the life of the valve
I	Cover Seals – Metal for long life and increased fire safety

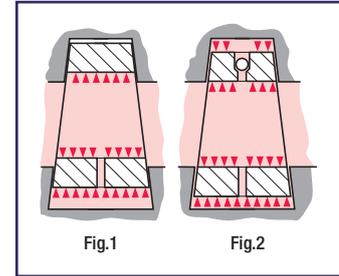
Super-H Features Explained

Plug Balancing and Protected Pressure Balancing for Slurry

All Super-H valves are protected against the possibility of seizure due to taper locking.

Taper locking is a phenomenon common to conventional type plug valves, caused by an imbalance of forces acting on the plug due to line pressure finding its way into the chamber at the larger end of the plug. As shown by the arrows in Fig. 1, the resultant force tends to push the plug into the taper, potentially jamming it in its tapered bore. The plug can remain locked even when line pressure is subsequently reduced.

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



Pressure Balancing for Standard Applications

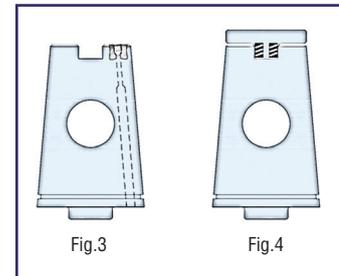
Super-H valves incorporate pressure balanced plugs as standard, as shown in Fig. 2. The passages top and bottom with a check valve at the smaller end of the plug allow the line pressure itself to balance the forces acting on the plug, preventing any possibility of taper locking – thus maintaining trouble-free operation without the need for frequent sealant injection.

Protected Pressure Balancing for Slurries and Dirty Services

When handling slurries and other dirty media, the pressure balancing holes can collect solids if left in direct contact with the media and lose their effectiveness. To ensure that this does not happen Serck Audco incorporate the protected pressure balance system (Fig.3).

Plug Balancing Spring

This design (Fig. 4) preloads the plug to prevent taper locking during pressure and/or temperature transients. Available as an option, this also enables total flexibility in piping configuration, regardless of valve orientation.



Super LoMu®

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

Super LoMu is a treatment of the metal surface that reduces coefficient of friction while maintaining a true metal-to-metal contact, and we can apply it to every material combination.

Super LoMu has extreme durability, as can be seen in the photograph illustrating the difference after 20,000 cycles between a conventional anti-friction treatment, compared with our Super LoMu treatment.



Fire Safety

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



Emission Control

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



Why Select a Plug Valve?

Robust **metal-to-metal seats** cope well with the solid impurities that can run at high velocities in close proximity to the integral seating surfaces, particularly when the valve is opened against a high differential pressure. Plug valves are the preferred choice for bypass and equalisation on main gas pipelines by most major gas transportation companies. (Fig. 5)

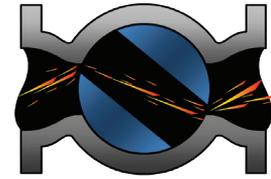


Fig.5

Robust metal-to-metal seats have also high resistance to solids objects and **lack of gap/cavity** between plug and body ensure that particles do not become trapped between plug and body thus avoiding damage to the seats while closing the valve. (Fig. 6)

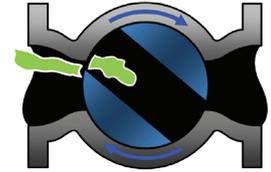


Fig.6

Large seating area further enhances the Super-H resistance to erosion. The wide area maximizes the effectiveness of sealant, so that if the valve starts passing it can quickly be solved by injecting Serck Audco Sealant, restoring the valve's **bubble tight shut-off** capabilities without the need of valve overhaul. Sealant can be injected with the valve in any position and also under pressure, making the valve **in-line maintainable**. (Fig. 7)

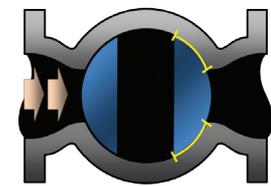


Fig.7

When the valve is open, unlike in other valve designs, the **seats are well protected** from the line media. This ensures that even if the valve is left open for long periods of time, its seating areas will not get damaged, thus ensuring good sealing and **long valve life**. (Fig. 8)

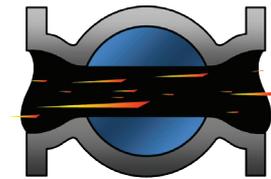


Fig.8

Why Select a Super-H?

With experience in valves manufacturing dating back to 1869 and a continuous drive for improvement, Serck Audco has all the knowledge to make the finest quality plug valve, including:

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

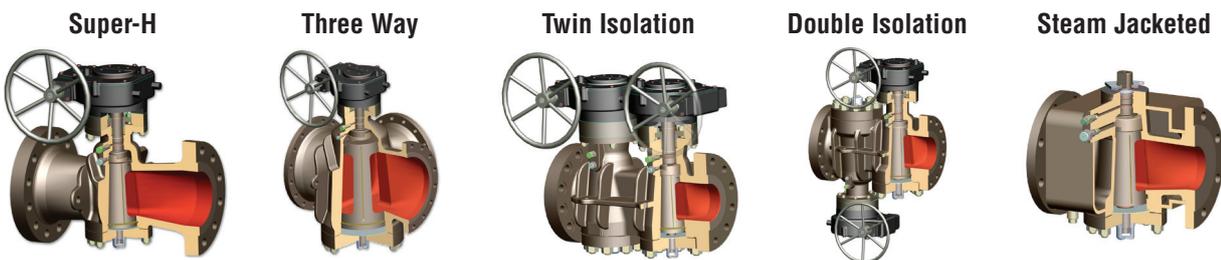
Full Bore Range

The table shows our Full Bore production range, face-to-face and end-to-end dimensions conform to API 6D and ANSI B16.10. For Regular, Venturi and Short Pattern please refer to the Super-H Catalogue.

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

API 6D Dimensions	in	1/2	3/4	1	"1.	2	3	4	6	8	10	12	14	16	18	20	24	30
	mm	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600	900
PN20 - ANSI 150	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
PN50 - ANSI 300	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
PN100 - ANSI 600	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
PN150 - ANSI 900	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
PN250 - ANSI 1500	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
PN420 - ANSI 2500	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
API 2000					<	<	<	<	<									
API 3000					<	<	<	<	<									
API 5000					<	<	<	<	<									
API 10000					<	<	<	<	<									
API 6A Dimensions	in				1. 13/16	2. 1/16	3. 1/8	4. 1/16	7. 1/16									
	mm					52	78	103	179									

Serck Audco Valves also manufactures the Super-H pressure balanced Plug Valve in special configurations such as:



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

Materials

Serck Audco Valves has extensive experience in manufacturing our Super-H in a wide range of materials to comply with any particular application or project specification. Below are few samples of the most common material combinations:

Service	Body / Cover	Plug	Stem / Eq Ring	Cover Bolting
Sweet Natural Gas and most non-aggressive services	Carbon Steel ASTM A216 WCB/WCC	ASTM A216WCB/WCC + Case Hardening	Alloy Steel ASTM A322 4140	ASTM A193 B7 + ASTM A194 2H (B7M/2HM if NACE bolting is required)
Sour Services (ISO 15156 – NACE)		ASTM A216WCB/WCC + ENP		
Abrasive Services		17-4PH Martensitic Stainless Steel ASTM A747 Gr. Cb7Cu1	17-4PH Martensitic Stainless Steel ASTM A564 Ty 630	
API 6A	60K Carbon Steel ASTM A487 Gr 4			
Low Temperature Services	Low Temp. Carbon Steel ASTM A352 LCB/LCC	ASTM A352 LCB/LCC + ENP	ASTM A322 4140	ASTM 320 L7 + ASTM A194 7
Corrosive Services	Austenitic Stainless Steel ASTM A351 CF3M/CF8M	ASTM A351 CF3M/CF8M + ENP	ASTM A564 Ty 630	ASTM A193 B8M + ASTM A194 8M
Corrosive and Abrasive Services	Duplex / Super Duplex Stainless Steel ASTM A995 4A/5A	ASTM A995 4A/5A + ENP	ASTM A182 F51/F55	UNS S32760
Highly Corrosive Services	ASTM A216 WCB/WCC + Inconel 625 Overlay	ASTM A216 WCB/WCC + Inconel 625 Overlay + ENP	Inconel 718	ASTM A193 B7 + ASTM A194 2H
Highly Abrasive Services	ASTM A216 WCB/WCC + Stellite Hard Facing	ASTM A216 WCB/WCC + Stellite Hard Facing	ASTM A322 4140	

Notes: Other Material combinations are available
 Super LoMu Anti Friction Treatment (AFT) is always applied on plugs and stem to reduce friction
 For small or flat parts, equivalent forged or plate grade is also widely used in lieu of castings

Full Bore Super-H with Hard Facing and Overlays

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

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

The result is superior technical performance and dramatically extended valve life at an affordable cost.

We recommend that customers consider hard facing or overlay for severe applications, such as: slurry handling and transportation, sand entrained oil and gas production, water injection, high temperature catalyst conveying, etc.



Full Bore or Rectangular Port?

When selecting a Full Bore Plug Valve it is important to be aware of the differences of this version when compared to a Regular or Venturi Pattern Plug Valve. Regular and Venturi are generally the best option, even on slurry applications.

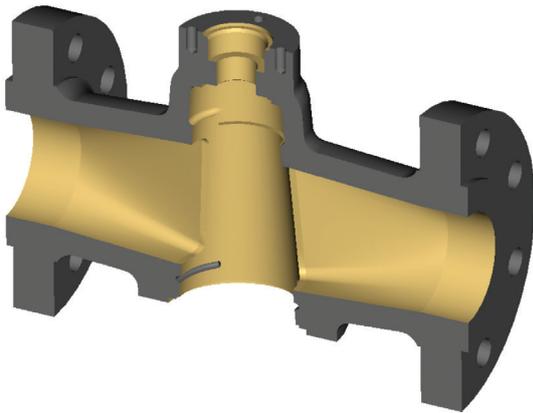
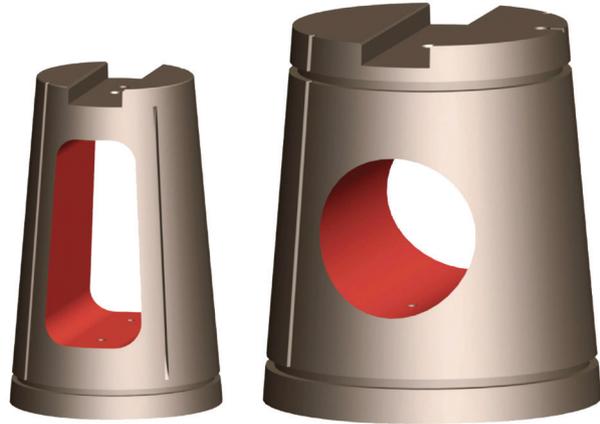
Size

In a given size plug, the biggest port area obtainable is in the shape of a trapezoid (commonly referred to as “rectangular”).

Regular and Venturi plugs use the rectangular shape so that the highest ratio “plug port”/“valve size” is obtained giving the end user the best value for money.

To have a Full Bore, the plug size has to be substantially increased to accommodate the round port. Bigger plug means bigger valve and hence this can have a considerable cost implication.

The Image shows a comparison between a regular pattern and a full bore plug for an 8”#2500 valve: even though the port area does not vary much, the overall size difference is evident.



Pressure Drop

Even though Full Bore will obviously be the most efficient from this point of view, even in Regular and Venturi Plug Valves, the pressure drop is generally a fraction of a psi. The image shows the flow bore of a rectangular port Plug Valve, where it is evident how its streamlined venturi shape is designed to minimize head loss.

If you are still unsure about this subject, SAV can provide the calculated pressure drop for your particular application

When is a Full Bore Required?

Full Bore shall be selected only when technically justified. Generally this is only for piggable applications as most other applications, even slurries, are normally handled by a Regular or Venturi Pattern Plug Valve that is much more economic.

Should you have any doubt, contact SAV that will support you in the selection of the right plug valve for your particular application.

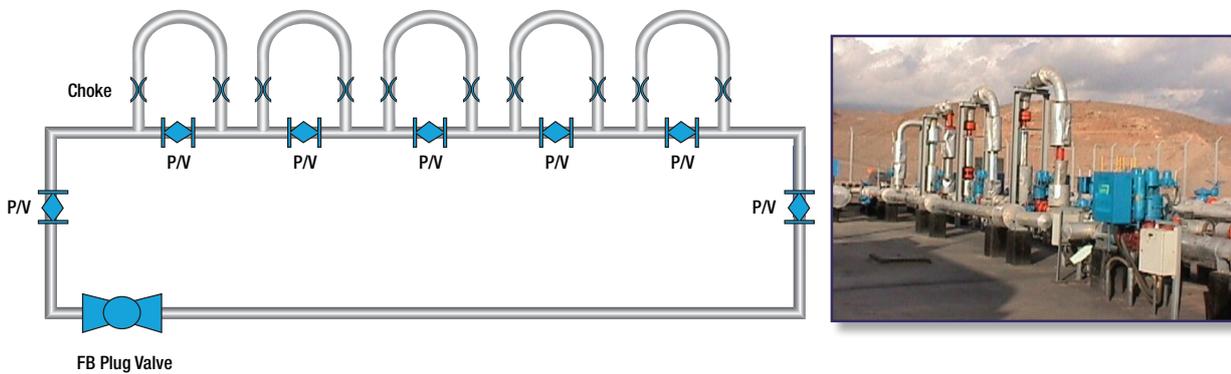
Slurry Applications

Super-H Plug Valves should be selected whenever bubble tight shut-off (zero leakage) is needed and there is a concern about seat damage due to valves being opened against a full differential pressure and/or the presence of solids or impurities in the process medium. For extremely abrasive and piggable applications Full Bore Plug valves should be used, elsewhere Regular Pattern Plug Valves are used.

Slurries often contain particles or other substances that can be very damaging for the environment. For this reason it is fundamental to select a robust valve to reduce the frequency at which valves need to be replaced. Serck Audco Plug Valves have demonstrated to be the valves with the longest service life available.

Choke Valve Station for Slurry

Choke Valve Station, with Regular Pattern Plug Valves on the chokes and Full Bore Plug Valve on the main line.



Pump Station

Pump Station with Regular Pattern Plug Valves isolating drains, chokes and rupture discs. Full Bore Plug Valves as pump train isolation and main line valve.

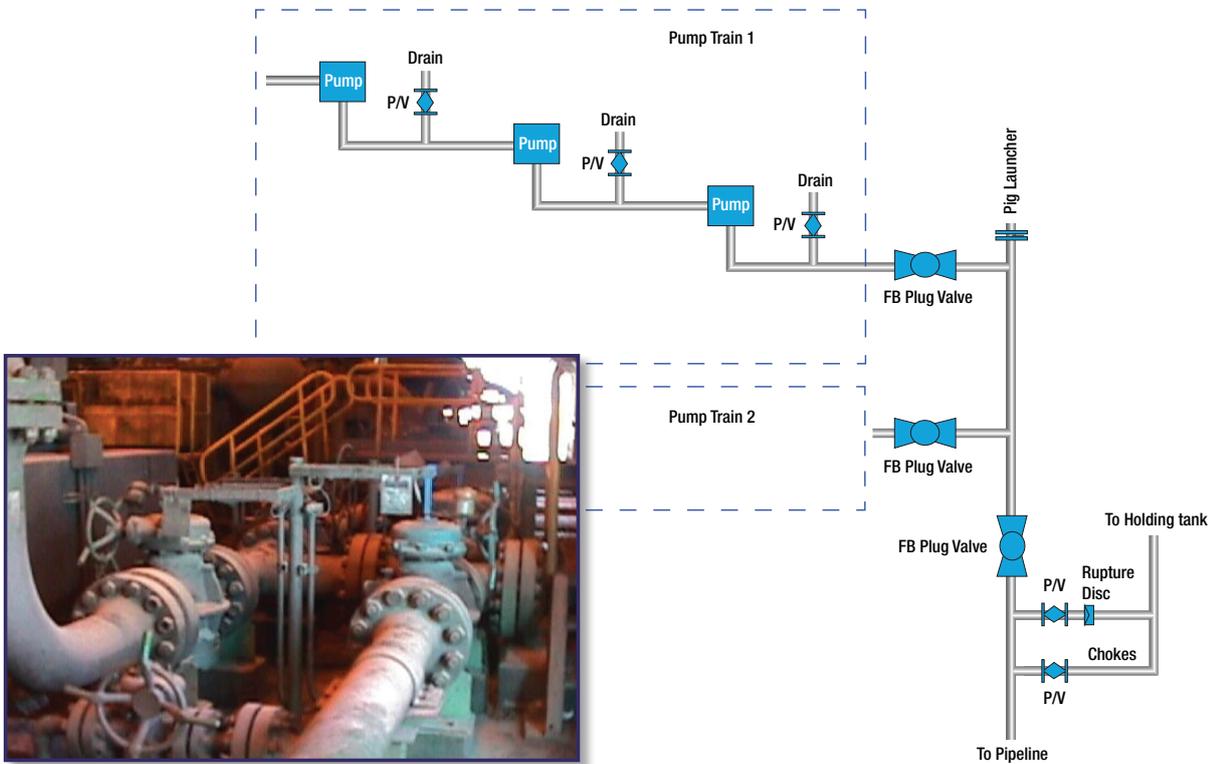
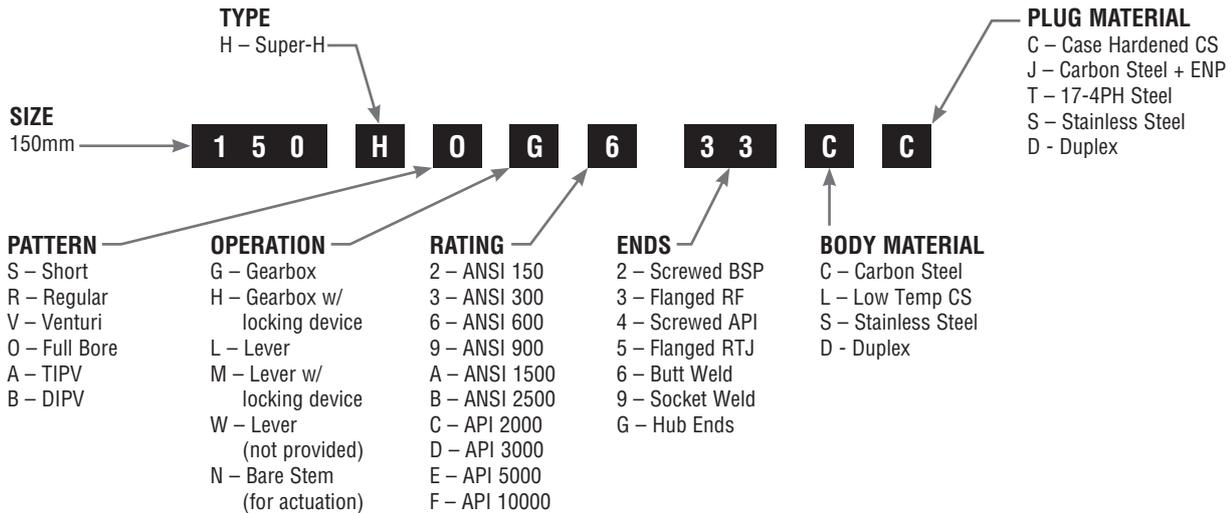


Figure Numbering

A familiarity with our figure numbering system is not necessary when specifying or ordering our valves. Providing a full description of the valve is given, our sales office will translate this into a figure number. A full description of the valve begins with 'Super-H Pressure Balanced Valve', and gives size, pressure rating, flanging details, materials of construction, application and every customer datasheet or specification available.

We give an example below with the most common coding in order to illustrate a typical figure number:



Standards and Quality Assurance

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

API 6D (ISO 14313)	Specification for pipeline valves
API 6A (ISO 10423)	Specification for wellhead equipment
API 599	Metal plug valves – flanged, threaded and welding ends
BS 5353	Specification for steel plug valves
ASME B16.34	Valves – flanged, threaded and welding end
BS EN14141	Valves for natural gas transportation in pipelines. Performance requirements and tests
ISO 15848-1/2	Industrial valves. Measurement, test and qualification procedures for fugitive emissions
ASME B16.10	Face-to-face and end-to-end dimensions of valves
BS EN 12627 BS EN 558 (formerly BS 2080)	Face-to-face, center-to-face, end-to-end, and center-to-end dimensions of flanged and butt welding end steel valves for the petroleum, petrochemical and allied industries
ASME B16.5	Pipe flanges and flanged fittings
BS EN 12266-1 BS EN 12266-2 API 598	Industrial valves. Testing of valves. Pressure tests, test procedures and acceptance criteria.
ISO 10497	Testing of valves. Fire type-testing requirements
API 6FA	Specification for fire test for valves
BS EN ISO 15156 (formerly NACE MR0175)	Sulphide stress cracking resistant metallic material for oilfield equipment
BS EN ISO 9001	Quality assurance approval standard
97/23/EC	Pressure equipment directive

The Search for Quality

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

The entire manufacturing process follows procedures as laid down in the Flowserve Company Quality Assurance Manual. Regular systems audits by third parties, our own QA department and customer assessments ensure these procedures are regularly revised and updated. The manual complies with BS EN ISO 9001 and API Q1 (ISO TS 29001).

Quality Assurance, Inspection and Testing

With Full Bore Super-H, quality is present at every stage to ensure that the range is manufactured to a consistently high standard. All suppliers are assessed to ensure they meet our rigorous standards. Goods Received Inspection maintains performance records and vendor ratings. By using the latest technology such as CNC machining and CMM inspection, the machining accuracy on the Super-H product range is outstanding. Stringent control of all processes including hard facing and Super LoMu Treatment ensures a uniformly high-quality, low-friction product. All manufacturing and assembly processes are monitored to ensure the product is right the first time with trouble-free installation, commissioning and a very long life.

Exhaustive testing at component and final product stages ensure that every valve meets the required performance levels. The Customer Inspection Department handles all materials witnessed by the customer or third party inspectors. All tests are substantiated as a minimum by EN 10204 3.1 certificates on pressure tests, NDTs and pressure containing parts mechanical and chemical tests.

Pressure Testing

All Full Bore Super-H valves are hydrostatically tested on body and seats at the following pressures before dispatch:

Valve Rating	Maximum C.W.P.		Body Test		Seat Test	
	Bar	Psi	Bar	Psi	Bar	Psi
PN20 - ANSI 150	19.5	285	29.3	427.5	21.5	313.5
PN50 - ANSI 300	51.1	740	76.7	1110	56.3	814
PN100 - ANSI 600	102.1	1480	153.2	2220	112.4	1628
ANSI 800	138	2000	207	3000	151.8	2200
PN150 - ANSI 900	153.2	2220	229.8	3330	168.6	2442
PN250 - ANSI 1500	255.3	3705	383	5558	280.9	4075.5
PN420 - ANSI 2500	425.5	6170	638.3	9255	468.1	6787
API 2000	138	2000	276	4000	138	2000
API 3000	207	3000	414	6000	207	3000
API 5000	345	5000	517	7500	345	5000
API 10000	690	10000	1035	15000	690	10000

(Class 800 pressures are taken from BS 5353, API pressures are taken from API 6A, all other pressures are taken from ANSI 16.34. The test pressures from ASME B16.34 are those relevant to Carbon Steel ASTM A216 Gr.WCB)

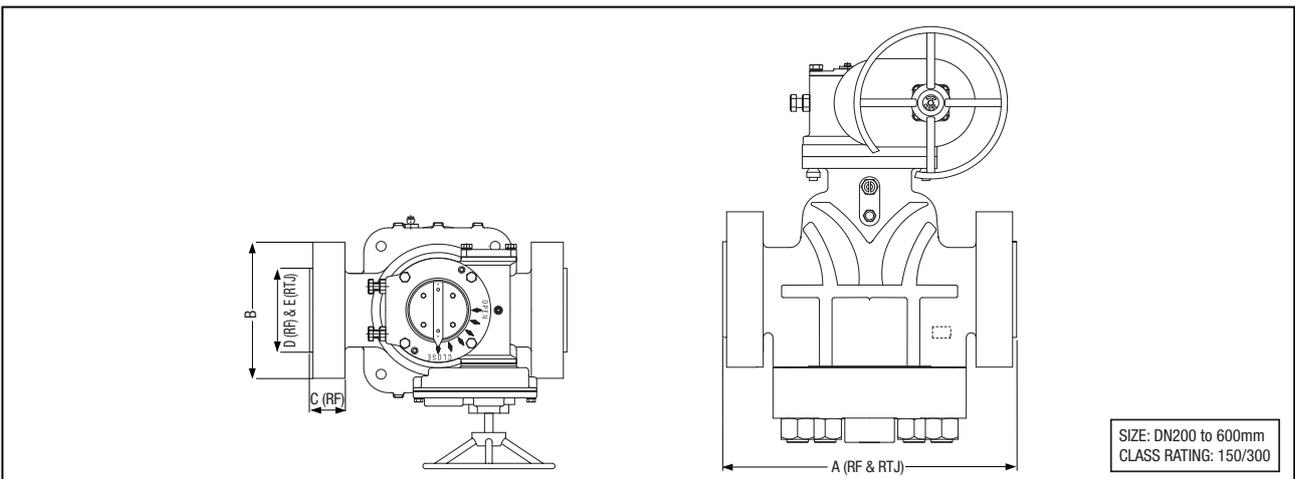
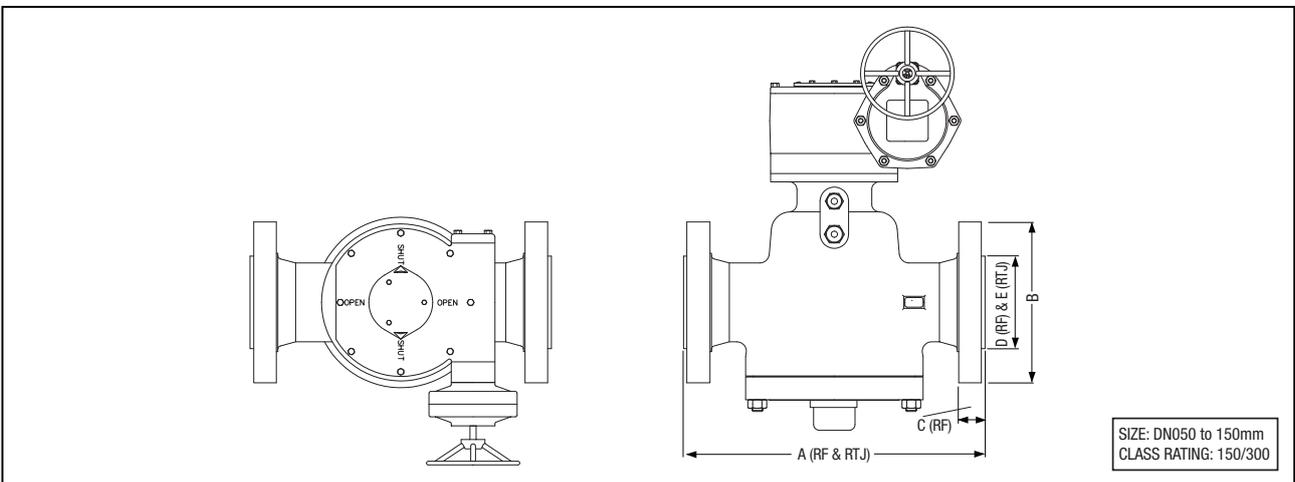
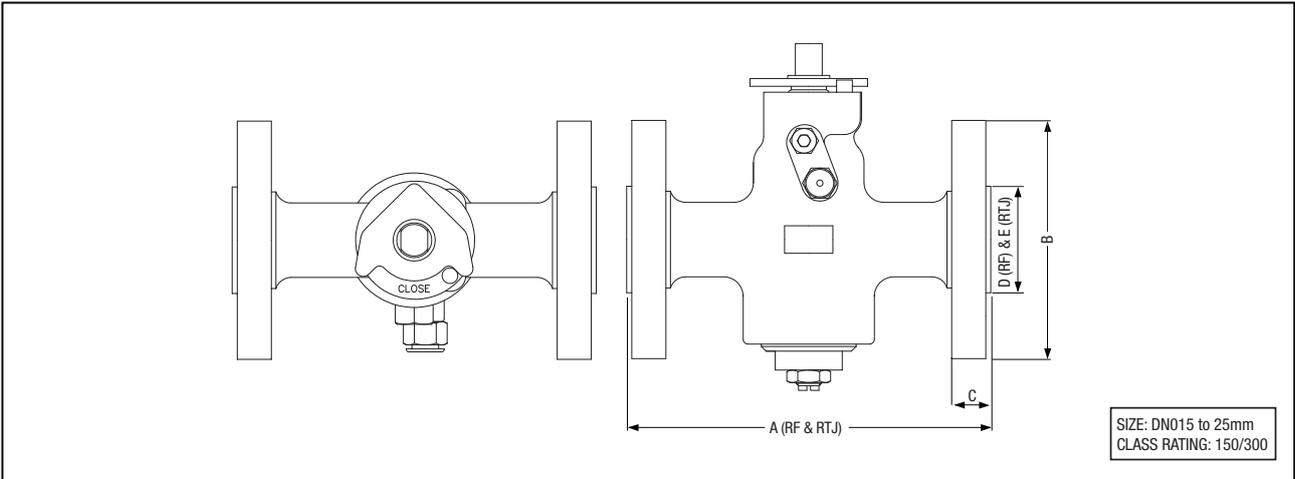
Even though API6D generally allows a seat leakage rate while testing metal seated valves, it shall be noted that for lubricated plug valves (such as the Super-H) in accordance with API6D no seat leakage is allowed (ISO 5208 class A).

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

Valve Size		API 6D	
Mm	In	Shell Test (min)	Seat Test (min)
≤ 50	≤ 2	2	2
65 – 100	2 ½ - 4	2	2
150	6	5	5
200 – 250	8 – 80	5	5
300	12	15	5
350 – 450	14 – 18	15	5
≥ 500	≥ 20	30	5

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

- Low pressure air test
- High pressure gas test
- Fugitive emission testing
- Low and high temperature testing



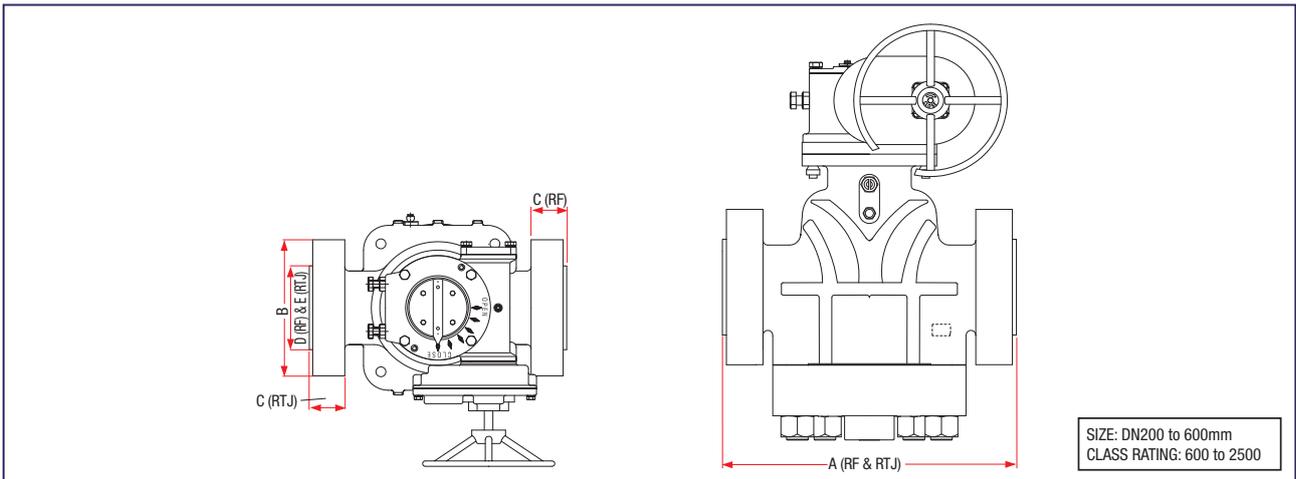
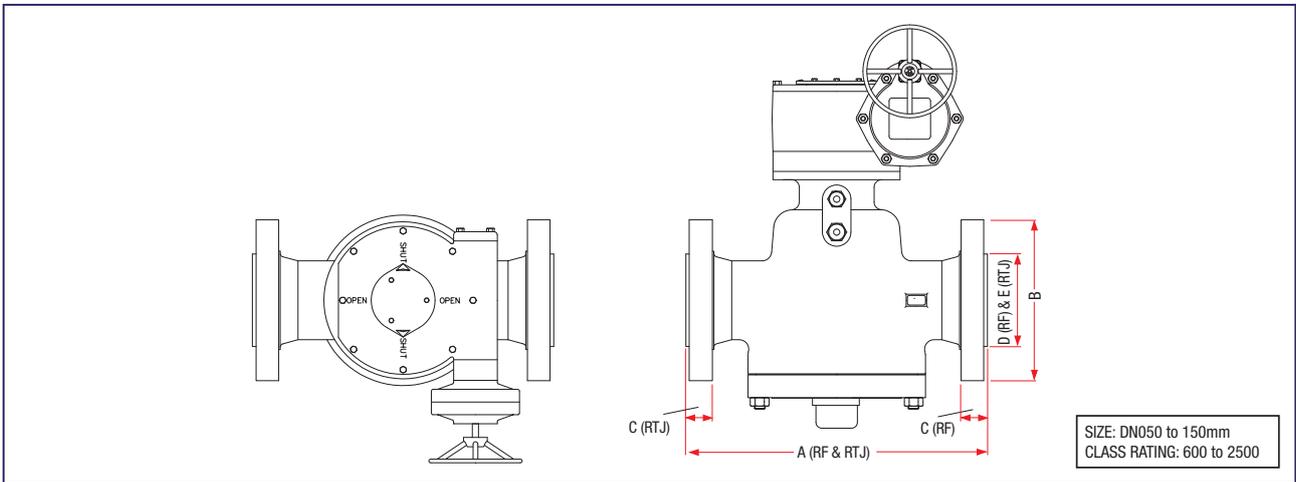
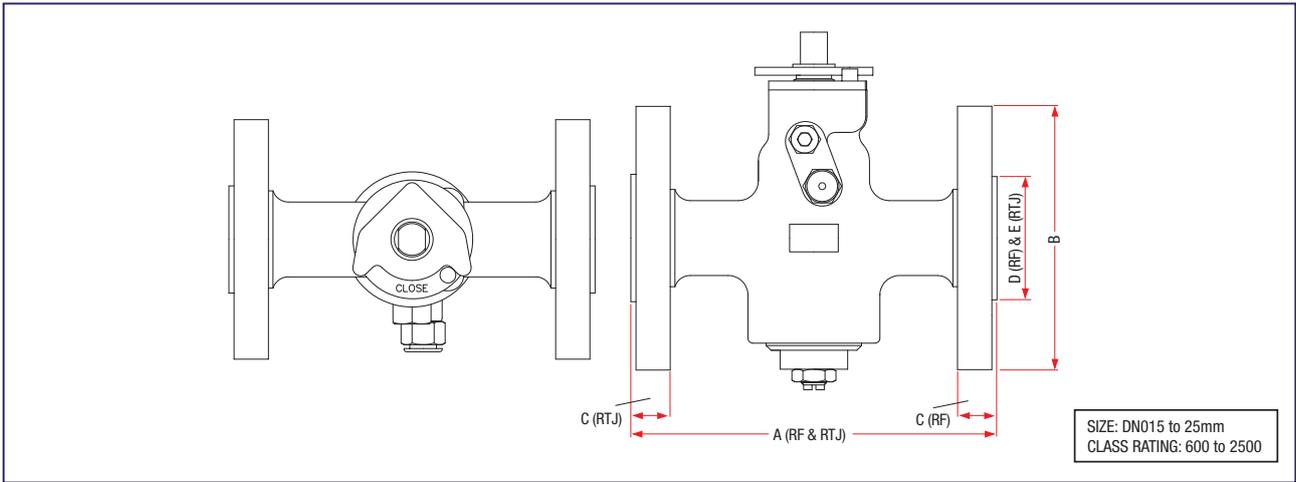
CLASS 150

		15 (1/2")	20 (3/4")	25 (1")	40 (1.1/2")	50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")	350-900 (14"-30")
A	Face-To-Face RF	108	117	176	222.00	267.00	343.00	432.00	546.00	622.00	660.00	762.00	Refer to Serck Audco Valves for details.
A	Face-To-Face RTJ	-	-	188.7	235.00	279.00	356.00	445.00	559.00	635.00	673.00	775.00	
B	Flange Diameter	88.9	98.5	110	127.00	152.00	191.00	229.00	279.00	343.00	406.00	483.00	
C	Total Flange Thickness RF	9.7	12.7	14.3	17.50	19.10	23.80	23.80	25.40	28.60	30.20	31.80	
D	Raised Face Diameter RF	34.90	42.90	50.80	73.20	92.00	127.00	157.00	216.00	270.00	324.00	381.00	
E	Ring Type Joint Diameter RTJ	-	-	63.50	82.50	102.00	133.00	171.00	219.00	273.00	330.00	406.00	

CLASS 300

		15 (1/2")	20 (3/4")	25 (1")	40 (1.1/2")	50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")	350-900 (14"-30")
A	Face-To-Face RF	139.70	152.40	190.00	241.00	283.00	387.00	457.00	559.00	686.00	826.00	965.00	Refer to Serck Audco Valves for details.
A	Face-To-Face RTJ	150.70	165.40	202.7	254	298.00	403.00	473.00	575.00	702.00	841.00	981.00	
B	Flange Diameter	95.00	115.00	125.00	155.00	165.00	210.00	254.00	318.00	381.00	445.00	521.00	
C	Total Flange Thickness RF	14.20	15.90	17.50	20.70	22.20	28.60	31.80	36.50	41.30	47.60	50.80	
D	Raised Face Diameter RF	34.90	42.90	50.80	73.00	92.00	127.00	157.00	216.00	270.00	324.00	381.00	
E	Ring Type Joint Diameter RTJ	51.00	63.50	70.00	90.50	108.00	146.00	175.00	241.00	302.00	356.00	413.00	

All above dimensions are expressed in mm



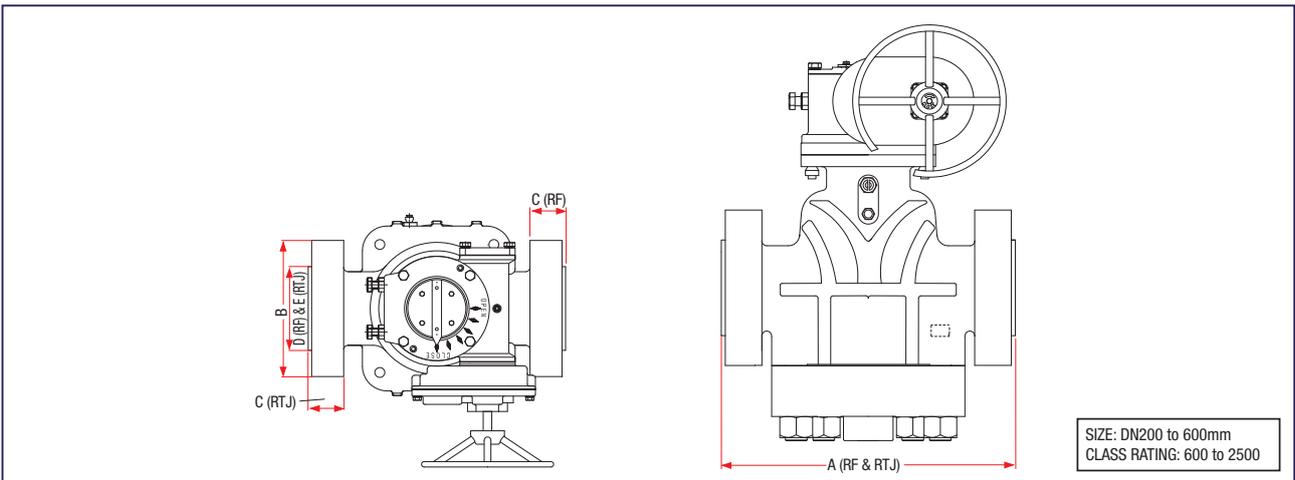
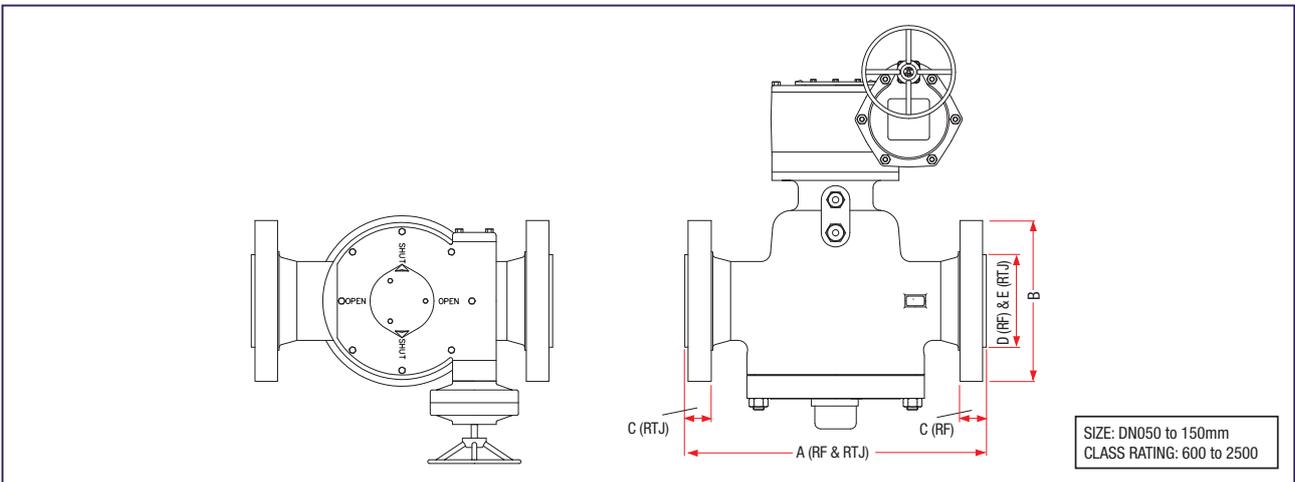
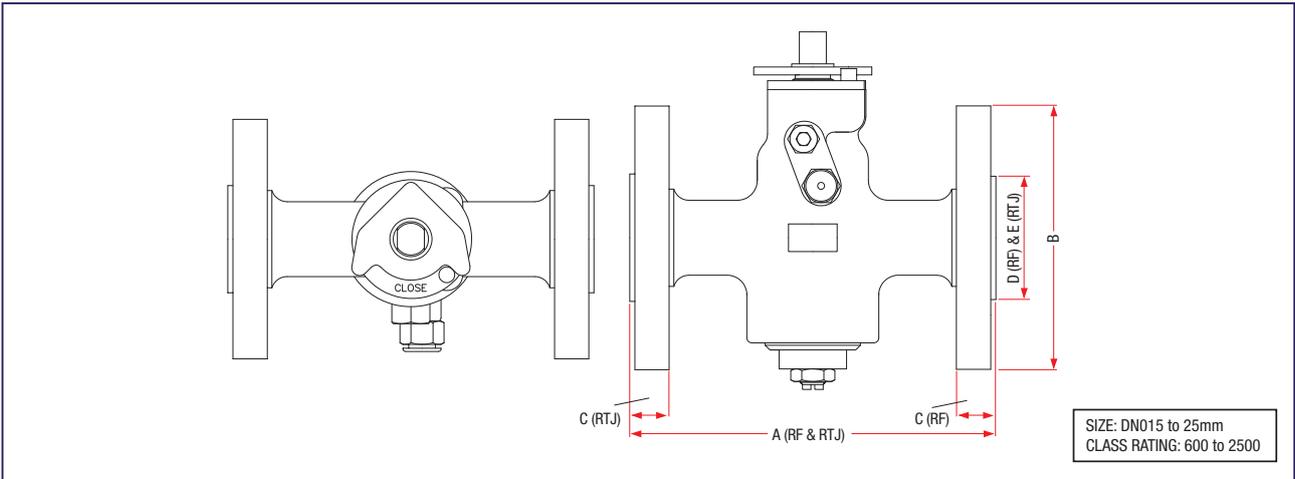
CLASS 600

		15 (1/2")	20 (3/4")	25 (1")	40 (1.1/2")	50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")	350-900 (14"-30")
A	Face-To-Face RF	165.10	190.50	254.00	318.00	330.00	445.00	508.00	660.40	794.00	940.00	1067.00	Refer to Serck Audco Valves for details.
A	Face-To-Face RTJ	163.50	190.50	254.00	318.00	333.00	448.00	511.00	664.00	797.00	943.00	1070.00	
B	Flange Diameter	95.00	115.00	124.00	155.00	165.00	210.00	273.05	356.00	419.00	508.00	559.00	
C	Total Flange Thickness RF	20.65	22.25	23.90	28.65	31.80	38.20	44.50	54.10	62.00	70.00	73.10	
C	Total Flange Thickness RTJ	19.84	22.25	23.90	28.65	33.32	39.70	46.02	55.62	63.52	71.40	74.62	
D	Raised Face Diameter RF	34.90	42.90	50.80	73.00	92.00	127.00	157.00	216.00	270.00	324.00	381.00	
E	Ring Type Joint Diameter RTJ	51.00	63.50	70.00	90.50	108.00	146.00	175.00	241.00	302.00	356.00	413.00	

CLASS 900

		15 (1/2")	20 (3/4")	25 (1")	40 (1.1/2")	50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")	350-600 (14"-24")
A	Face-To-Face RF	216.00	228.60	254.00	356.00	381.00	470.00	559.00	737.00	813.00	965.00	1118.00	Refer to Serck Audco Valves for details.
A	Face-To-Face RTJ	216.00	228.60	254.00	356.00	384.00	473.00	562.00	740.00	816.00	968.00	1121.00	
B	Flange Diameter	120.00	130.00	149.50	180.00	216.00	241.00	292.00	381.00	470.00	546.00	610.00	
C	Total Flange Thickness RF	28.65	31.75	34.90	38.15	44.50	44.50	50.80	62.00	69.85	76.30	85.80	
C	Total Flange Thickness RTJ	28.65	31.75	34.90	39.72	46.02	46.02	52.40	63.50	71.40	77.80	87.30	
D	Raised Face Diameter RF	34.90	42.90	50.80	73.00	92.00	127.00	157.00	216.00	270.00	324.00	381.00	
E	Ring Type Joint Diameter RTJ	60.50	66.50	71.40	92.00	124.00	156.00	181.00	241.00	308.00	362.00	419.00	

All above dimensions are expressed in mm



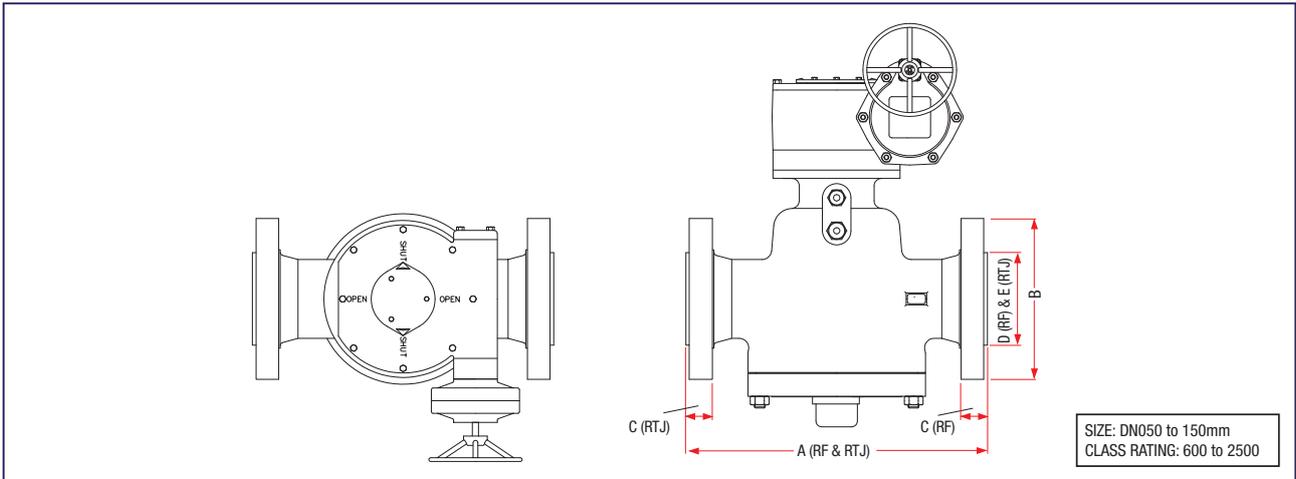
CLASS 1500

		15 (1/2")	20 (3/4")	25 (1")	40 (1.1/2")	50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")	350-500 (14"- 20")
A	Face-To-Face RF	216.00	228.60	254.00	356.00	391.00	524.00	625.00	787.00	889.00	1067.00	1219.00	Refer to Serck Audco Valves for details.
A	Face-To-Face RTJ	216.00	228.60	254.00	356.00	394.00	527.00	629.00	794.00	899.00	1076.00	1235.00	
B	Flange Diameter	120.00	130.00	149.50	180.00	216.00	265.00	311.00	394.00	483.00	584.00	673.00	
C	Total Flange Thickness RF	28.65	31.75	34.90	38.15	44.50	54.10	60.30	89.00	98.40	114.30	130.30	
C	Total Flange Thickness RTJ	28.65	31.75	34.90	39.72	46.00	55.60	61.90	92.13	103.00	119.10	138.17	
D	Raised Face Diameter RF	34.90	42.90	50.80	73.00	92.00	127.00	157.00	216.00	270.00	324.00	381.00	
E	Ring Type Joint Diameter RTJ	60.50	66.50	71.40	92.00	124.00	168.00	194.00	248.00	318.00	371.00	438.00	

CLASS 2500

		15 (1/2")	20 (3/4")	25 (1")	40 (1.1/2")	50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")	350-400 (14"- 16")
A	Face-To-Face RF	263.50	273.00	308.00	384.00	451.00	578.00	673.00	914.00	1022.00	1270.00	1422.00	Refer to Serck Audco Valves for details.
A	Face-To-Face RTJ	263.50	273.00	308.00	387.00	454.00	584.00	683.00	927.00	1038.00	1292.00	1445.00	
B	Flange Diameter	135.00	140.00	160.00	205.00	235.00	305.00	356.00	483.00	552.00	673.00	762.00	
C	Total Flange Thickness RF	36.55	38.15	41.35	50.85	57.20	73.00	82.60	114.40	133.40	171.50	190.00	
C	Total Flange Thickness RTJ	36.55	38.15	41.35	50.85	58.70	76.20	87.30	120.60	141.20	182.60	201.00	
D	Raised Face Diameter RF	34.90	42.90	50.80	73.00	92.00	127.00	157.00	216.00	270.00	324.00	381.00	
E	Ring Type Joint Diameter RTJ	65.00	73.00	82.60	114.00	133.00	168.00	203.00	279.00	340.00	425.00	495.00	

All above dimensions are expressed in mm



API 10000

		46 (1"13/16")	78 (3"1/16")	103 (4"1/16")	179 (7"1/16")
	Face-To-Face RJ	464	619	670	Refer to Serck Audco Valves for details.
C	Flange Diameter	185	270	315	
D	Total Flange Thickness RJ	42.1	58.4	70.3	
F	CL to Bottom of Body/Cap	277	312	342	
G	Hand Wheel Diameter	600	600	700	
H1	Body Width from CL	138	160	203	
H2	Body Width from CL	154	190	224	
O	Raised Face Diameter RJ	105	152	185	
R	CL to Face of Handwheel	480	510	545	
S	CL Valve to CL Operating Spindle	63	28.5	51	
T	CL Valve to Top of Hand Wheel	605	677	752	
	Weight (approx) kg	240	370	630	

All above dimensions are expressed in mm

Full Bore Super-H Operation

The pressure balance and Super-LoMu features ensure that a Super-H valve always turns with the lowest possible effort

All Super-H valves manual operating mechanisms are sized to allow valve operation with a maximum effort of 350N, a gearbox is always fitted when this effort cannot be obtained by using a lever.

Actuators

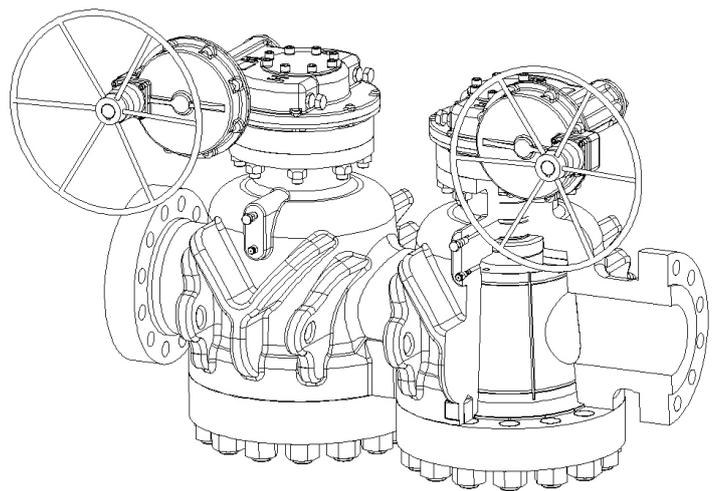
Due to the quarter-turn nature of the valve design, Super-H valves can easily be actuated by all the industry quarter-turn actuators, including electric, pneumatic, hydraulic, electro hydraulic etc. Serck Audco has years of experience with all major actuator manufacturers. We are happy to include your choice of actuator when manufacturing our valves. Alternatively, we source actuators to your specifications from leading actuator manufacturers around the world. Our plant has the facility to test most common types of actuators while mounted on the valve; giving peace of mind for the complete assembly. When sizing an actuator, a further safety factor of at least 30% is always added to the expected operating torque figures to allow for variations in working conditions.

When selecting a valve actuator, any actuator sizing should be checked with Serck Audco Valves.



Double Block & Bleed, Full Bore

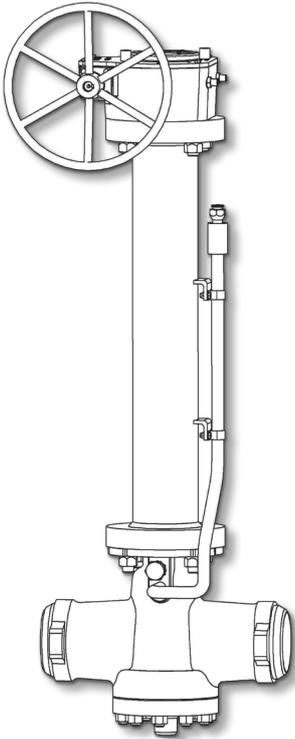
Full Bore Super-H can also be provided in Double Block & Bleed version, similar to Serck Audco Double Isolation Plug Valves (DIPV) and Twin Isolation Plug Valves (TIPV). True double block has become a prime requirement as safety standards are raised throughout the industry, especially where it is necessary for an operator to work downstream (or upstream) of the valve. A further advantage of true double isolation (where the first plug gives complete isolation), is that the bleed point can be used to verify that no contamination has occurred when more than one type of line medium has passed down the pipeline.



Accessories

Extension Columns

Valves for below ground operation are available with elevated gear unit mounting as shown. Extension can be made with the spindle length required to bring operator to surface. Extension columns in other configurations are available on request. Please contact Serck Audco Valves for more information.



Valve Stands

Valve stands for heavier valves when required to comply with installation procedures are available as an option.

Limit Switches

We can include limit switches on all types of valves for both visual and electronic indication of the valve position. Please specify your requirements when ordering.

Special Gearboxes

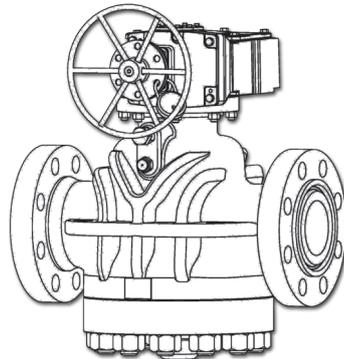
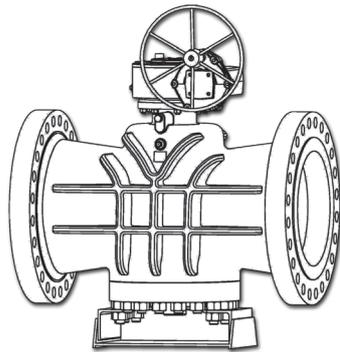
Special gearboxes can be provided, these can have different orientation drives for valves installed in difficult locations such as underground pits.

Locking Devices

Locking and interlocking devices are available as option for all Super-H valves. They enable the gearbox or lever to be locked in either the OPEN or SHUT position. Please specify if these are required when ordering.

Other Accessories

Serck Audco is used to handling specific requirements and we are flexible to accommodate non-standard demands. Please contact Serck Audco for more information.



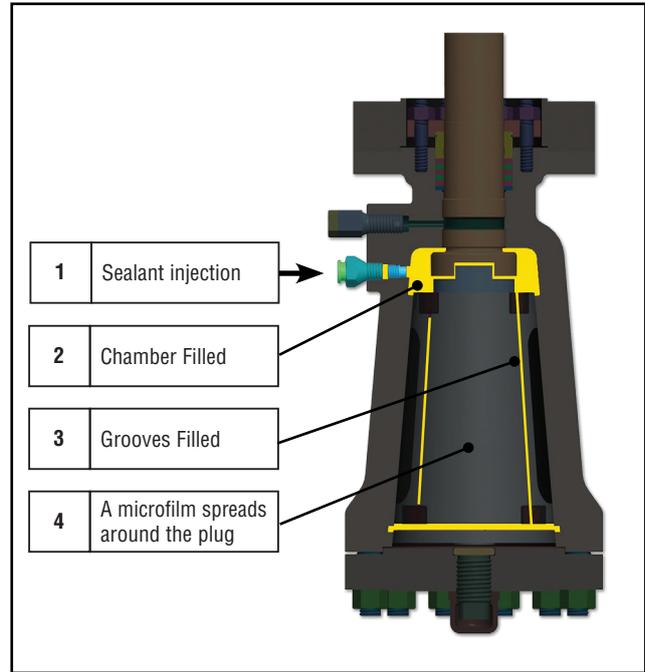
Sealants

Serck Audco Super-H valves are designed in a way that no spares will be required, the only minimal maintenance can be quickly done in-line and with the valve under pressure through sealant injection. Also, in comparison to other plug valve designs, the Super-H can guarantee zero leakage seal and smooth operation with minimal sealant injection frequency.

Serck Audco Sealants are high viscosity fluids, specially produced to seal and lubricate plug valves. Only Serck Audco sealants should be used in Serck Audco valves unless authorised by us. The use of a sealant or commercial greases not recommended by us can impair the functioning of the valve and in the worst case seize it completely.

Sealant is injected into the Super-H to ensure valve tight shut-off and maintain low torque. Audco sealants have excellent lubricating properties and great film strength. They supplement Super LoMu treatment to reduce friction between the seating surfaces and provide a very effective seal, even at higher line pressures.

Sealants should be selected based on service media and operating temperature. The tables below summarise our general sealant recommendations. Sealant should be carefully selected since the use of the correct Serck Audco Sealant will minimize injection frequency. The tables are self explanatory, however, if in doubt regarding sealant selection, Serck Audco can suggest a suitable sealant against service details.



Multi-Purpose Sealants

Serck Audco Valves research pays careful attention to the development of multi-purpose sealants to simplify plant maintenance where many services are encountered. As a result, we are able to offer three sealants which cover a very wide variety of services and have replaced many of the older Serck Audco sealants. A single multi-purpose Serck Audco sealant can often be used throughout an entire plant, often handling a variety of fluids. This simplifies maintenance and reduces the number of sealants which need to be kept.

Sealant	Form	Colour	Temp Range °C (°F)		Recommended for	Do not use on
			Min	Max		
733	K Sticks Cartridges Bulk	Cream	-20 (-5)	250 (480)	Most Hydrocarbon services, Butane, propane, gasoline, kerosene, oils, fuel oils, most hydrocarbon solvents. Sweet and sour natural and manufactured gas with water organic condensates, LPG systems, glycols	Strong alkali and high aromatic and chlorinated solvents
735	K Sticks Hard grade Bulk only	Black	-46 (-51)	325 (620)	Premium Multipurpose Sealant suitable for a range of fluids including hydrocarbon, water, amines and methanol Suitable for high / low temperature applications	Neat petroleum products Strong mineral acids Chlorinated and aromatic acids
731	K Sticks Cartridges Bulk	Cream	-15 (0) -20 (-5) -25 (-13)	230 (450) 230 (450) 230 (450)	Most chemical plant services, compressed air, water, aqueous solutions, dilute acids, all alkaline solutions tars and bitumens	Strong acid solutions, hydrocarbons, chlorinated and aromatic solvents

Specialised Sealants

Even though our multipurpose sealants can cover most applications, we can still supply our range of specialised sealants for those customers that prefer to use them.

Sealant	Form	Colour	Temp Range °C (°F)		Recommended for	Do not use on
			Min	Max		
985M	K Sticks Cartridges Soft grade Bulk only	Light Brown	-10 (12)	150 (300)	Sweet and sour natural and manufactured gas with water/organic condensates Preferred at elevated temperatures	As 733
201	K Sticks Cartridges Bulk	White	-7 (-20)	200 (390)	Domestic water services, foodstuffs and pharmaceuticals	As 731
147	K Sticks Cartridges Bulk	White	-10 (14)	70 (160)	Nitrating acids, sulphuric acid and other oxidising elements	Hydrocarbon chlorinated and aromatic solvents
734	K Sticks Cartridges Bulk	Cream	0 (32)	170 (340)	Water, high pressure, hot water and steam	As 731
591	K Sticks Cartridges Bulk	Cream	0 (32)	300 (570)	Petroleum based heat transfer oils. Hot fuel oil to 120°C	As 733
608	K Sticks Cartridges Bulk	Off White	0 (32)	340 (650)	Hot hydrocarbon gases and vapours including high temperature cracking and reforming Strong acids and alkalis to 150°C	Aromatic and chlorinated solvents Liquid hydrocarbons and nitrating acids
733LT	K Sticks Cartridges Bulk	Brown	-30 (-20) -46 (-50)	150 (300) 100 (200)	As for 733, but particularly useful at lower temperatures and winter conditions	As for 733
574	Cartridges Soft grade Bulk only	Beige	-50 (-58)	50 (120)	Ammonia and brine	As 731
2977	K Sticks Cartridges Soft grade Bulk only	Black	-46 (-51)	325 (620)	As for 735, also oil and water mixtures where water content is above 50% in the mixture	As 735

Sealant Injection Equipment

To ensure sealant injection is a quick and easy operation, all TIPV pressure balanced plug valves are fitted with giant button head sealant injectors positioned as a side feed in the body. All injection equipment is fitted with flexible hoses giving a hook-on connection to the sealant injectors on the valve, enabling a safe set up for the injection operation in just a few seconds.

The sealant injection equipment is specialized high pressure equipment and no other injection tools shall be used unless with our express recommendation.

400-D Sealant Gun

Hand operated hydraulic gun, fitted with a pressure gauge. Suitable for small number of valves or valves in remote locations, this gun is designed to take Size 'K' sealant sticks.

Effortless to operate, the 400D gives positive indication of when a valve has been fully charged.

The 400D replaces the now obsolete ALG4 gun. Cartridges for use with ALG4 gun are still available.



Pneumatic Pump

Trolley mounted, pneumatically operated large capacity injector pump. Suitable for large numbers or sizes of valves, the pump is designed to take five Quarter sealant cans. The pump will run when connected to an air supply that could be a compressed air system or an air bottle.

Automatic Sealant Injection System

Sealant Injection is generally an infrequent operation, so in most cases standard sealant injection equipment is the most effective option to maintain plug valves. However, for remote locations where sealant injection would be difficult or for specific applications where the media is extremely severe or the valve is cycled with very high frequency, SAV has developed a versatile Automatic Sealant Injection System that can inject sealant at user specified frequency.

Sealants Packaging

Sealant is packed in different forms to enable its use with the different available injection equipment.

Sealants Packaging	K Sticks – Box of 12	Cartridges – Box of 12	5 Quarter Can
For Use on	400D Sealant Gun	ALG4 Gun (superseded)	10-90 Pneumatic Pump
Stick Size (mm)	35ø x 240	50ø x 220	192ø x 203
Box Size (mm)	150 x 180 x 280	165 x 205 x 245	n/a
Box Weight (Kg)	4	5.2	5

Weights will vary from those shown over a range of approximately 20-30% according to grade of sealant. Sealant can also be purchased in bulk large containers of 18Kg, 80Kg and 180 Kg

Serck Audco Stem Packing Compound

Serck Audco Stem Packing Compound is a special graphite based material prepared in stick form for easily sealing the stems of our TIPV valves. At any time and even with the valve under full pressure the stem packing can be re-injected to restore original stem tightness.

Stem packing is not sealant and must under no circumstances be used in the valve sealant system. Also, valve sealants are not suitable for sealing stems. Stem packing compound is supplied packed in boxes as follows:

Stick Size	A	B	D
Suitable for valves in sizes	½” – 1”	1 ½” – 2”	≥3”
Number of Sticks per Container	40	24	24
Box Size (mm)	70ø x 60	70ø x 60	70ø x 150
Box Weight (Gr)	100	100	330

The Products of Success

Super-H Pressure Balanced Plug Valve



A high pressure plug valve, achieving exceptional reliability on both leak tightness and operability. The valve ensures long-term line and atmospheric sealing, minimizes routine maintenance, and is fire tested to API6FA.

Materials: Carbon Steel, Alloy Steel, Duplex Stainless Steel and Special Materials
Sizes: 15 to 1050mm
Pressures: Up to 690 bars (10000 psi) Maximum Cold Working Pressure
Temperatures: -46°C to +325°C
Ratings: ANSI 150-2500, API 2000, 3000, 5000 and 10000

Double Isolation Plug Valve (DIPV)



DIPV gives all the advantages of our pressure balanced plug valve but also provides a double block and bleed system with true double isolation and two independent obturators in an extremely compact form. In the DIPV, the plugs are mounted in inverse orientation to obtain the maximum port area

Materials: Carbon Steel, Alloy Steel, Duplex Stainless Steel and Special Materials
Sizes: 15 to 600mm
Pressures: Up to 690 bars (10000 psi) Maximum Cold Working Pressure
Temperatures: -46°C to +325°C
Ratings: ANSI 150-2500, API 2000, 3000, 5000 and 10000

Twin Isolation Plug Valve (TIPV)



TIPV gives all the advantages of our pressure balanced plug valve but also provides a double block and bleed system with true double isolation and two independent obturators in an extremely compact form. In the TIPV, the plugs are mounted in same orientation to facilitate installation on particular plant layouts

Materials: Carbon Steel, Alloy Steel, Duplex Stainless Steel and Special Materials
Sizes: 15 to 600mm
Pressures: Up to 690 bars (10000 psi) Maximum Cold Working Pressure
Temperatures: -46°C to +325°C

Ratings: ANSI 150-2500, API 2000, 3000, 5000 and 10000

Full Bore Plug Valve (FBPV)



Based on the Super-H valve design, the FBPV is designed for extremely abrasive applications where valves are required to be piggable, and turbulence or obstruction to the flow path is not allowed.

Materials: Carbon Steel, Alloy Steel, Duplex Stainless Steel and Special Materials
Sizes: 15 to 600mm
Pressures: Up to 690 bars (10000 psi) Maximum Cold Working Pressure
Temperatures: -46°C to +325°C
Ratings: ANSI 150-2500, API 2000, 3000, 5000 and 10000

Steam Jacketed Plug Valve



For all applications where the media needs to be maintained at elevated temperatures and metal to metal seats are required, such as molten sulphur, the SAV steam jacketed plug valve provides the best solution. Also suitable for high pressures, it will be supplied with oversized flanges for full jacket option.

Materials: Carbon Steel and Special Materials if required
Sizes: 50x25x50 to 300x250x300mm (higher sizes upon request)
Pressures: Up to 690 bars (10000 psi) Maximum Cold Working Pressure
Temperatures: -46°C to +325°C
Ratings: ANSI 150-2500, API 2000, 3000, 5000 and 10000



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