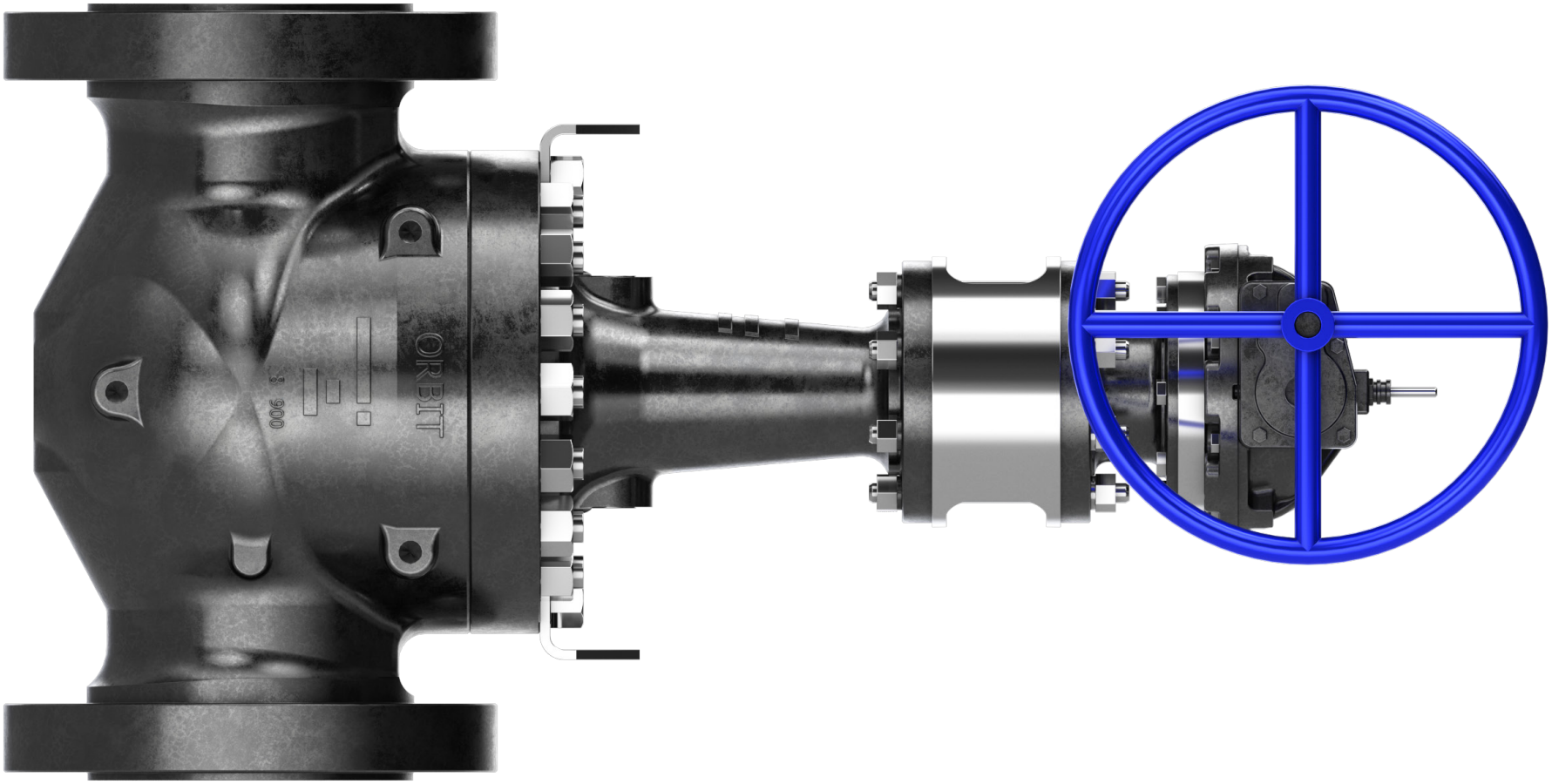


Orbit

Rising stem ball valves

Overview

One of the most trusted valves in the petroleum and natural gas industry for more than 90 years, the Orbit™ rising stem ball valve is a bidirectional, mechanically sealed, trunnion-mounted ball valve with a spherical body and superior stem seal compliant with the most stringent fugitive emission regulations. The valve's unique design enables friction-free tilt-and-turn functionality that increases service life, reduces leak paths, and supports high open and closed cycle counts.

Orbit valves are available in ASME pressure Classes 150 to 2500 [PN 20 to 420]. They can be specified from nominal pipe size (NPS) 1 to 30 in [DN 25 to 750]. Testing certificates available to API Standard 598, API Specification 6D, API Standard 607, and ISO 15848-1 and -2.

Orbit valves are ideal where frequent cycling and a positive shutoff are required, conditions that are prevalent in molecular sieve dehydration applications in gas processing plants.

Applications

Engineered for heavy-duty, maintenance-free usage—there are Orbit valves still operating after more than 40 years of field service—the Orbit rising stem ball valve is commonly selected for several applications, including

- molecular sieve dehydration units
- block and bypass
- heat-transfer fluids or hot oil
- flowlines
- product segregation
- hydrogen service
- meter isolation
- emergency shutdown
- glycol dryer units
- suction and discharge isolation.

The Orbit valve's top-entry design provides convenient access for inline inspection and repairs. For environmental protection, all Orbit valve bonnet styles allow reenergizing the packing while the valve is under full line pressure.

This Orbit valve model is on display in a valve showroom.

Features and benefits

Orbit rising stem ball valves are ideal for applications when zero leakage and frequent operation are demanded.

They are used globally in gas processing plants as switching valves on molecular sieve systems.

No rubbing between sealing surfaces
The tilt-and-turn action eliminates seal abrasion, which is the major cause of seat wear in conventional ball, gate, and plug valves.

Single-seat design
The single, stationary seat in the Orbit valve seals in both directions and avoids the problems of trapped pressure between seals.

Long life
Orbit valves replace troublesome ball valves, gate valves, globe valves, and plug valves. The Orbit valve design has performance advantages that reduce plant outage and the cost of ownership.

Optimum flow
Full port or reduced port openings give high flow coefficient (C_v) values. System pumping efficiency is enhanced and erosion problems are reduced.

Top-entry design
Inline inspection and repair, after system depressurizing, simplify maintenance.

Dual stem guides
Hardened stem slots and tough guide pins control the tilt-and-turn action of the stem.

Self-cleaning
Tilting the core away from the seat before rotation causes immediate flow around 360° of the core face. Product flow flushes any foreign material away from the seat without localized high-velocity erosive flow.

Low-torque operation
Orbit valves turn easily because seal rubbing is eliminated.

Wear-resistant hard facing on core
The core face is a hard, polished material that endures difficult service without loss of sealing integrity.

Mechanical cam closure
The cam angle at the lower end of the stem provides a mechanically energized seal.

Adjustable stem packing
For in-service maintenance, stem packing can be adjusted to provide complete control of fugitive emissions. (Injectable packing is available on enclosed bonnet models.)

Note: Never remove any part from an Orbit valve unless specifically instructed to do so in the literature or without first consulting an SLB representative. Incorrect procedure could result in personal injury, property damage, or both.

Quality assurance

Specifications and compliances

Orbit rising stem ball valves are tested and can be certified per the customer's specified service requirements:

- ASME B16.34
- API Standard 598
- ISO 9001: 2015
- PED 2014/68/EU
- ATEX directive 2014/34/EU
- GOST
- Russian EAC
- ISO 15848-1 (fugitive emission-type testing)
- Shell DVT (MESC SPE 77/300A) qualified and Technically Accepted Manufacturers and Products (TAMAP) two-star rating
- API Standard 607 (fire testing)
- API Specification 6D testing

Our manufacturing philosophy and the standard 36-month warranty ensure that the design, materials, and manufacturing of all Orbit valve products result in years of dependable operation.

Certifications for hydrostatic test results and material properties are available on request.

Operating principle

Every Orbit valve incorporates a proven tilt-and-turn operation that eliminates seal rubbing, which is the primary cause of valve failure.

When the valve is closed, the core is mechanically wedged tightly against the seat, ensuring positive shutoff.

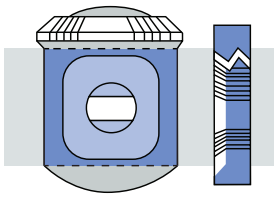
When the valve begins to open, the core tilts away from the seat and fluid flows uniformly around the core face. This eliminates the localized high-velocity flow that typically creates uneven seat wear in ordinary ball, gate, and plug valves. The core then rotates to the fully open position.

Absence of seal rubbing during both opening and closing means easy, low-torque valve operation and long-term reliable performance.

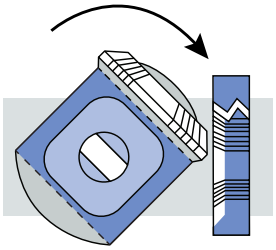
When valve leakage cannot be tolerated, our Orbit valve operating principle can be relied upon to deliver a positive shutoff.

To close an Orbit valve

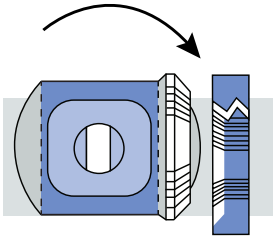
As the handwheel is turned, the stem begins to lower.



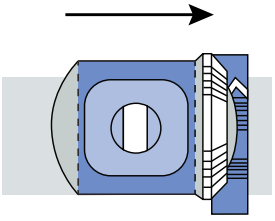
Precision spiral grooves in the stem act against fixed guide pins, causing the stem and core to rotate.



Continued turning of the handwheel rotates the core and stem a full 90° without the core touching the seat.

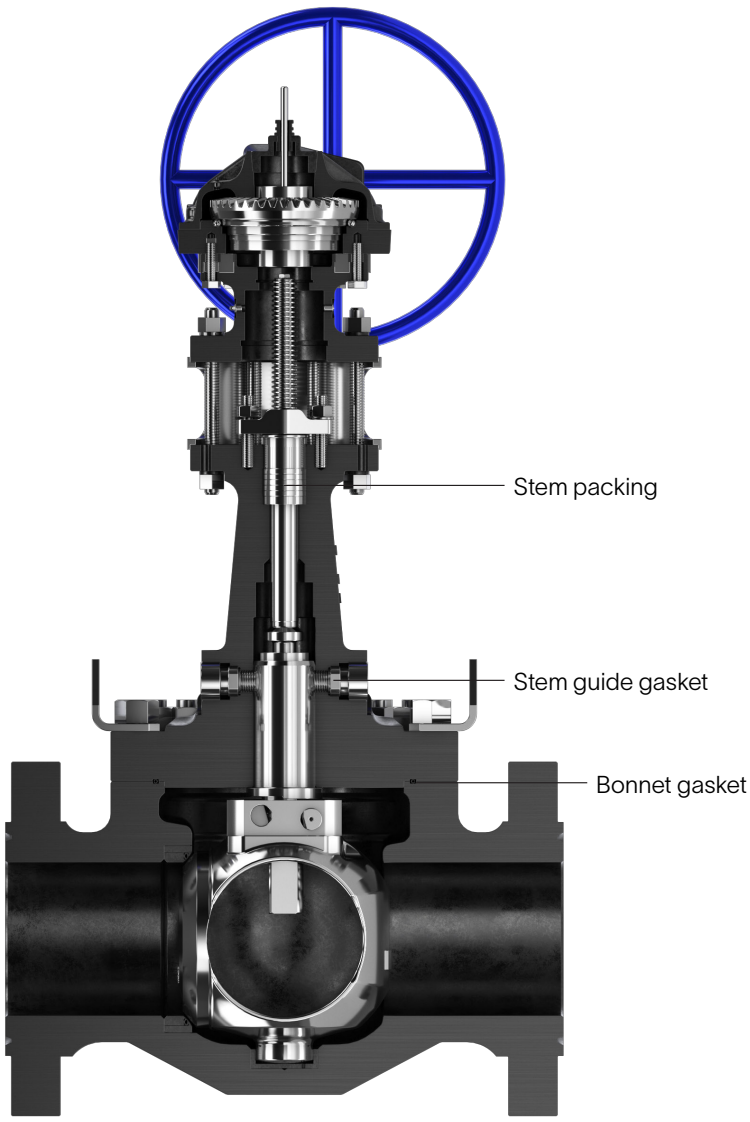


Final turns of the handwheel mechanically wedge the stem down, pressing the core firmly against the seat.



Certified low emissions valve

Because the key sources of fugitive emissions (FE) from a typical valve are the stem packing, body joints, and fittings, SLB performed extensive in-house testing on these critical sealing elements to validate and enhance the FE performance of Orbit valves. All Orbit valves have been certified as low emissions valves, with emissions well below industry standards up to 800 degF.



ISO 15848-1 FE type testing and certification

The ISO 15848-1 Industrial Valves—Measurement, Test and Qualification Procedures for Fugitive Emissions standard was used for the certification of Orbit valves because it meets or exceeds the most stringent tightness requirements in local or regional regulations.

Although ISO 15848-1 specifies methane or helium as the test fluid for three endurance classes, three tightness classes, multiple temperature classes, and different detection methods, SLB selected helium for the test fluid because of its safety benefits and smaller atomic size.Helium is a monatomic element with very low molecular weight compared with the relatively large methane molecule, which makes helium the most stringent fluid available for testing to the three ISO 15848-1 tightness classes. The leak rates defining the tightness classes are differentiated by orders of magnitude.

The Orbit rising stem ball valve design achieves the best possible ISO 15848-1 tightness class rating of AH from –50 degC to 400 degC.

Advanced low-E sealing elements

- High- and low-temperature packings are certified to the most stringent ISO 15848-1 tightness class AH.
- Stem packings meet API Standard 622 and achieve validated leak rates below 10 ppmv.
- Extreme-service bonnet gasket and stem guide gasket employ spring-energized metallic seals to maintain low FE (<50 ppmv) through thermal cycles.

Product range and options

Orbit valves are manufactured in a variety of materials, sizes, and trims to meet specific requirements.

Materials
Carbon steel, stainless steel (SS), duplex SS, high-nickel alloys, and other special materials are used as service conditions require. External protective coatings are available for added durability in corrosive environments.

Seats
Soft- or metal-seated options are selected for the intended service. Because the seals in the valves do not rub and because they are mechanically compressed shut, they excel in high-temperature and abrasive situations.

Operation
Hand or power operation can be selected. Orbit valves offer double-acting, spring-close, and spring-open pneumatic actuators. User-selected electric and hydraulic actuators are available. Instrumentation choices also are offered.

Customizing
Handwheel extensions, safety interlocks, position indicator limit switches, thermal jackets, custom painting, and special inspection can be provided.

Maintenance and repairs
Our services include inspection, maintenance, and repairs for all Orbit valve products.

The Orbit valve line offers complete packages that can include valves, actuators, and instrumentation.

How to order

Example

E1423H-RF = Orbit Low-E certified low emissions valve, carbon steel, ASME Class 600, full opening with flanged end and hub end, T3 standard trim, raised face end connection

E1423H-RF

Configuration Indicator

None	Standard low emissions valve
E	Valve with extreme-service bonnet gasket
C	Cladded valve

Type

1	Carbon steel
2	Low-temperature carbon steel
3	Low-alloy steel (e.g., WC6, WC9, C5)
4	API Specification 6A*
5	British Gas Council (min. –50 degF)
6	Stainless steel
7	Duplex stainless steel
8	Drilling applications
9	High-alloy steel (e.g., MONEL®, HASTELLOY®, INCONEL®, 6MO)

Pressure Rating or ASME Class (PN)

	API Spec 6A* Pressure Rating,** psi	ASME Class (PN)
1	–	150 (20)
2	–	300 (50)
3	1,000†	400‡ (64)
4	–	600 (100)
5	2,000 Block-and-bleed model	900 (150)
6	3,000	1500 (250)
7	5,000	2500 (420)
8		– (500)

Valve Opening and Connections

2	Full opening and flanged end and hub end
3	Reduced port and flanged end and hub end
4	Full opening and threaded end
5	Reduced port and butt weld and socket weld
6	Full opening and butt weld, socket weld, or butt weld × flanged end
7	Full opening and special
8	Reduced port and special

Trim

0	T3 modified
2	T7 modified§
3	Standard (T3)
4	T8 modified§, ††
7	Sour corrosive (T7)
8	Corrosive (316 SS) (T8)

End Connection

RTJ	Ring-type joint
RF	Raised face
RFM	Raised face with modified finish
BW	Butt weld
SW	Socket weld
LFF	Large female face
8V	API line pipe thread (2- to 4-in port)
115	11½ API line pipe (1- to 2-in port)
115	11½ sharp tubing thread (nonupset) (2½- to 3-in port)

Suffix‡‡

S	SLB standard end-to-end dimension (not per ASME B16.10)
BB seat	Block and bleed (max. 250 degF)
GS seat	Grease seal (max. 250 degF)
H seat	Type H (PTFE insert; max. 500 degF)
H8 seat	Type H8 (max. 800 degF)
PK seat	Type PK (PEEK insert; max. 570 degF)
L	Valves prepared for actuators

* SLB discontinued API Spec 6A monogramming for Orbit valves in April 1986, when the 15th edition of API Spec 6A went into effect.

** At –20 to 250 degF.

† Pressure class not recognized by API Specification 6A and is not monogrammed.

‡ Class no longer offered.

§ T7 modified and T8 modified trim valves are not in compliance with NACE MR0175 unless both the pressure containing and trim components comply. Not all grades of duplex stainless steel comply with NACE MR0175. Materials also must be in a specific condition for compliance.

†† T8 modified trim can also be used for duplex stainless steel or high-alloy (generally high-nickel alloy) valves.

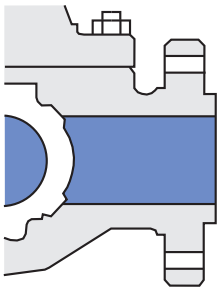
‡‡ Valve figure number may use more than one suffix (e.g., 1433H8L).

How to order (cont.)

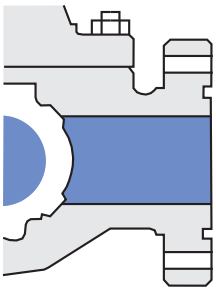
Sizes Available

ASME Class (PN)	150 (20)	300 (50)	600 (100)	900 (150)	1500 (250)	2500 (420)
Reduced port, flanged, in [mm]	2–30 [50–750]	2–30 [50–750]	2–30 [50–750]	3–24 [80–600]	3–20 [80–500]	3–16 [80–400]
Full port, flanged, in [mm]	1–24 [25–600]	1–24 [25–600]	1–24 [25–600]	1–20 [25–500]	1–16 [25–400]	2–12 [50–300]
Reduced port, butt weld, in [mm]	3–20 [80–500]	3–20 [80–500]	3–20 [80–500]	3–20 [80–500]	3–20 [80–500]	3–12 [80–300]
Full port, butt weld, in [mm]	2–16 [50–400]	2–16 [50–400]	2–16 [50–400]	2–16 [50–400]	2–16 [50–400]	2–10 [50–250]
Full port, socket weld, in [mm]	–	–	1–2 [25–50]	1–2 [25–50]	1–2 [25–50]	1 [25]
Full port, threaded, in [mm]	–	–	1–3 [25–80]	1–3 [25–80]	1–2 [25–50]	1 [25]

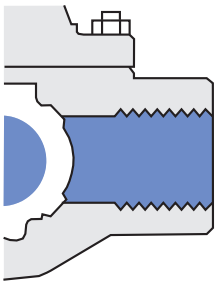
Contact SLB for full port, butt weld × flange options.



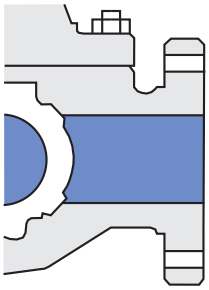
ASME/ANSI raised face flange



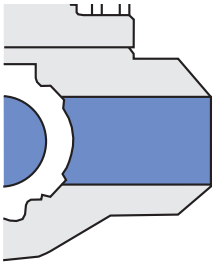
RTJ ring groove flange



Socket weld or threaded



ASME/ANSI flat face flange

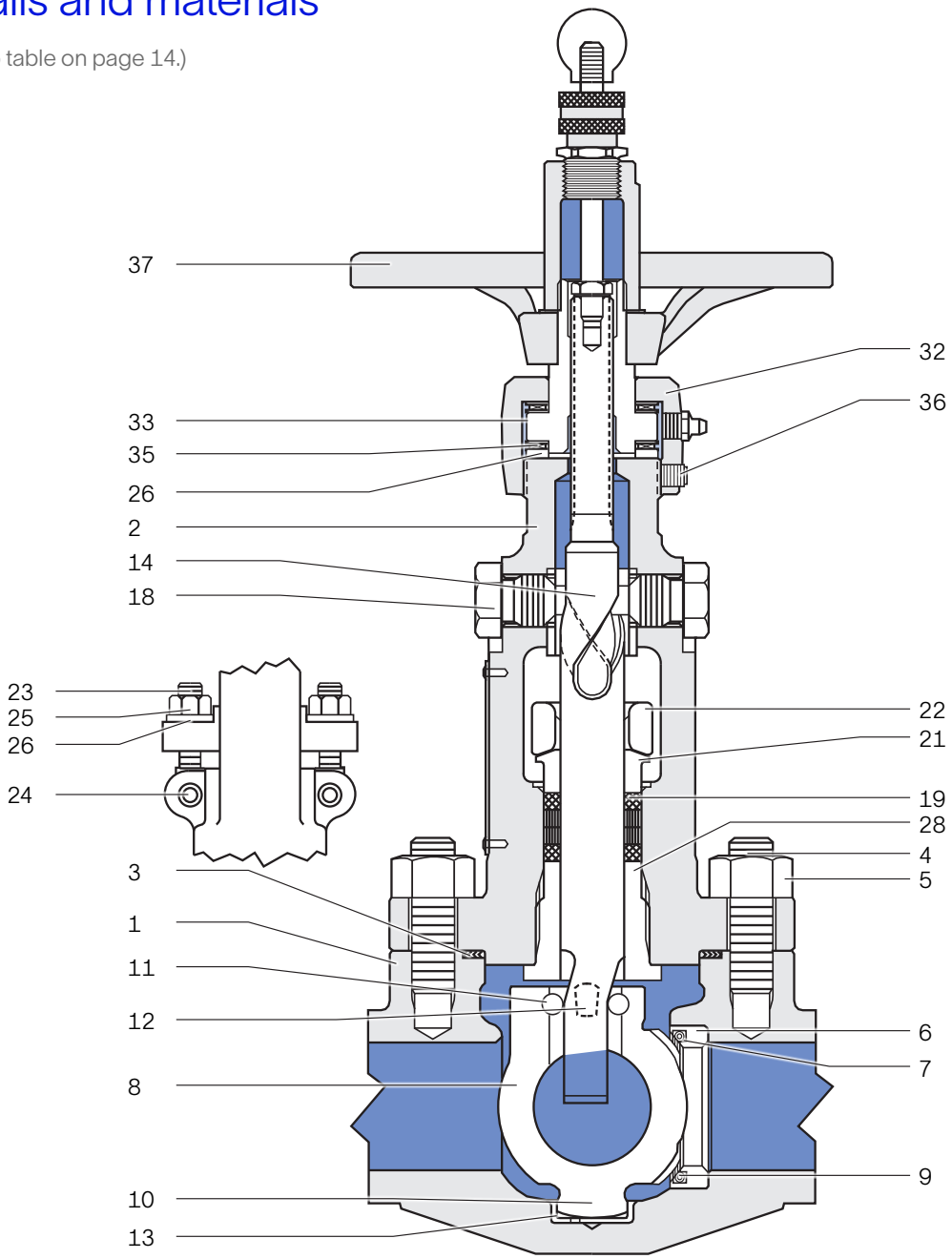


Butt weld

One-piece stem, outside screw and yoke (OS&Y) bonnet valves

Details and materials

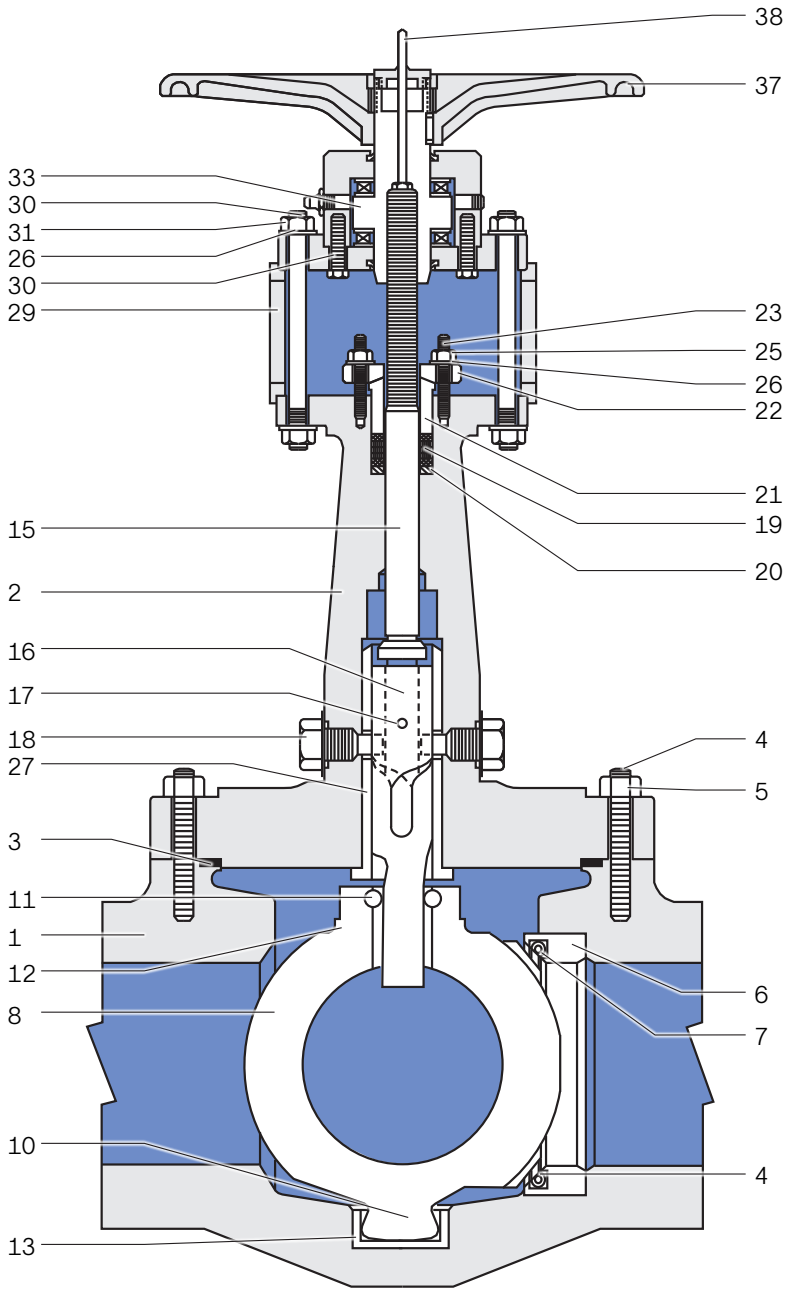
(Refer to table on page 14.)



Two-piece stem, OS&Y bonnet valves

Details and materials

(Refer to table on page 14.)



Materials list

For one- and two-piece stem, OS&Y bonnet valves

No.	Parts Description	Standard T3 Trim –20 to 800 degF [–29 to 427 degC]	Standard T7 Trim –20 to 650 degF [–29 to 343 degC]
1	Body	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC
2	Bonnet	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC
3	Gasket	Stainless steel and graphite	Stainless steel and graphite
4	Stud	ASTM A193 Gr. B7	ASTM A193 Gr. B7M
5	Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2HM
6	Seat body	Stainless steel	Stainless steel
7	Seat insert	Stainless steel or PTFE	Stainless steel or PTFE
8	Core	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC
9	Core face	Nickel	Cobalt alloy
10	Trunnion overlay	–	Nickel-based CRA
11	Core pin	Stainless steel	Nickel-based CRA
12	Support pin	Stainless steel	Stainless steel
13	Trunnion bushing	Stainless steel	Stainless steel
14	Stem*	Alloy steel	Stainless steel
15	Upper stem**	Stainless steel	Stainless steel
16	Stem cam**	Alloy steel	Stainless steel
17	Stem pin**	Alloy steel	Stainless steel
18	Stem guide	Alloy steel	Stainless steel
19	Packing rings	Graphite	Graphite
20	Packing chamber bushing**	Carbon steel	Carbon steel
21	Packing gland	Ductile iron	Ductile iron
22	Packing gland retainer	ASTM A351 Gr. CF3M	ASTM A351 Gr. CF3M
23	Packing fastener	ASTM A193 Gr. B7	ASTM A193 Gr. B7M
24	Packing fastener pin*	Stainless steel	Stainless steel
25	Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2HM
26	Washer	Carbon steel	Carbon steel
27	Bonnet sleeve**	Stainless steel	Stainless steel
28	Bonnet bushing*	Stainless steel	Stainless steel
29	OS&Y sleeve**	Carbon steel	Carbon steel
30	Screw* or stud**	ASTM A193 Gr. B7	ASTM A193 Gr. B7
31	Nut*	ASTM A194 Gr. 2H	ASTM A194 Gr. 2H
32	Bonnet nut*	Carbon steel	Carbon steel
33	Drive nut	Ductile Ni-Resist	Ductile Ni-Resist
34	Bearing	Alloy steel	Alloy steel
35	Bearing race	Alloy steel	Alloy steel
36	Set screw*	Alloy steel	Alloy steel
37	Handwheel	Cast iron	Cast iron
38	Position indicator rod	Stainless steel	Stainless steel

Additional construction materials are available; materials used depend on valve size, pressure class, end configuration, and service conditions. Consult SLB for details.

* Only on valves with one-piece stem ** Only on valves with two-piece stem

End flange bolting dimensions

ASME/ANSI Class 150							ASME/ANSI Class 300					
Valve Size, in	Number of Fasteners per Valve	Fastener Diameter, in	Length of Studs, in				Number of Fasteners per Valve	Fastener Diameter, in	Length of Studs, in			
			RF		RTJ				RF		RTJ	
			Through Hole*	Threaded Hole**	Through Hole*	Threaded Hole**			Through Hole*	Threaded Hole**	Through Hole*	Threaded Hole**
1	8	½	3	–			8	⅝	3¼		3½	
1½	8	½	2¾				8	¾	3½		4	
2 × 1½ × 2	8	⅝	3¼				16	⅝	3½		4	
2	8	⅝	3¼				16	⅝	3½		4	
3 × 2 × 3	8	⅝	3½				16	¾	4¼		4¾	
3	8	⅝	–	2½	–	3	16	¾	4¼		4¾	–
4 × 3 × 4	16	⅝	–	2¾			16	¾	4½		5	
4*	16	⅝	–	2¾			12	¾	4½	–	5	–
							4	¾	–	3½	–	4
6 × 4 × 6	16	¾	4				24	¾	4¾		5½	
6*	16	¾	–	3¼			16	¾	4¾	–	5½	–
							8	¾	–	3¾	–	4¼
8 × 6 × 8	16	¾	4¼				24	⅞	5½		6	–
8*	12	¾	4¼	–	4¾	–	16	⅞	5½		6	
	4	¾	–	3¼	–	3¾	8	⅞	–	4¼	–	4¾
10 × 8 × 10*	20	⅞	4½	–			28	1	6¼	–	6¾	–
	4	⅞	–	3¾			4	1	–	5¼	–	6¼
10	24	⅞	4½		5		32	1	6¼		6¾	
12 × 10 × 12	24	⅞	4¾				32	1⅛	6¾		7¼	
12	24	⅞	4¾				32	1⅛	6¾		7¼	
14 × 12 × 14	24	1	5¼				40	1⅛	7			
14	24	1	5¼		5¾		40	1⅛	7			
16 x 12 x 16	32	1	5¼				40	1¼	7½			
16	32	1	5¼				40	1¼	7½		8	
18 × 16 × 18	32	1⅛	7¾				48	1¼	7¾			
20 × 16 × 20	40	1⅛	6¼				48	1¼	8			
18	32	1⅛	5¾									
20*												
							48	1¼	8			
24 × 20 × 24							48	1½	9			
24	40	1¼	6¾				48	1½	9			
26 × 24 × 26												
30 × 24 × 30							56	1¾	11¾			

RF = Raised face, RTJ = Ring-type joint

* For valve flange through hole, stud length is sized for a nut behind both the valve and pipe flanges.

** For valve flange threaded hole, stud length is sized for threading into valve flange and a nut behind the pipe flange.

End flange bolting dimensions (cont.)

ASME/ANSI Class 600						
Valve Size, in	Number of Fasteners per Valve	Fastener Diameter, in	Length of Studs, in			
			RF		RTJ	
			Through Hole*	Threaded Hole**	Through Hole*	Threaded Hole**
1	8	5/8	3 1/2		3 1/2	
1 1/2	8	3/4	4 1/4		4 1/4	
2 × 1 1/2 × 2	16	5/8	4 1/4		4 1/4	
2	16	5/8	4 1/4		4 1/4	
3 × 2 × 3	16	3/4	5		5	
3	16	3/4	5		5	
4 × 3 × 4	16	7/8	5 3/4		5 3/4	
4*	16	7/8	5 3/4		5 3/4	
6 × 4 × 6	24	1	6 3/4		6 3/4	
6*	24	1	6 3/4		6 3/4	
8 × 6 × 8	24	1 1/8	7 1/2		7 3/4	
8*	24	1 1/8	7 1/2		7 3/4	
	24	1 1/8	7 1/2		7 3/4	
10 × 8 × 10*	32	1 1/4	8 1/2		8 1/2	
10	32	1 1/4	8 1/2		8 1/2	
12 × 10 × 12	40	1 1/4	8 3/4		8 3/4	
12	40	1 1/4	8 3/4		8 3/4	
14 × 12 × 14	40	1 3/8	9 1/4		9 1/4	
14	40	1 3/8	9 1/4		9 1/4	
16 × 12 × 16	40	1 1/2	10		10	
16	40	1 1/2	10		10	
18 × 16 × 18	40	1 5/8	10 3/4		10 3/4	
20 × 16 × 20	48	1 5/8	11 1/4		11 1/2	
18			–			
20*	36	1 5/8	11 1/4	–	11 1/2	
	12	1 5/8	–	7 3/4		8
24 × 20 × 24	48	1 7/8	13		13 1/4	
24	48	1 7/8	13		13 1/4	
26 × 24 × 26	56	1 7/8	14			
30 × 24 × 30	56	2	14 1/2			

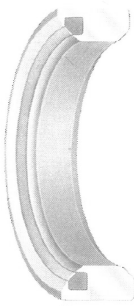
RF = Raised face, RTJ = Ring-type joint
* For valve flange through hole, stud length is sized for a nut behind both the valve and pipe flanges.
** For valve flange threaded hole, stud length is sized for threading into valve flange and a nut behind the pipe flange.

End flange bolting dimensions (cont.)

ASME/ANSI Class 900					ASME/ANSI Class 1500				ASME/ANSI Class 2500			
Valve Size, in	Number of Fasteners per Valve	Fastener Diameter, in	Length of Studs, in		Number of Fasteners per Valve	Fastener Diameter, in	Length of Studs, in		Number of Fasteners per Valve	Fastener Diameter, in	Length of Studs, in	
			RF	RTJ			RF	RTJ			RF	RTJ
1	8	7/8	5	5	8	7/8	5	5				
1 1/2	8	1	5 1/2	5 1/2	8	1	5 1/2	5 1/2				
2	16	7/8	5 3/4	5 3/4	16	7/8	5 3/4	5 3/4	16	1	7	7
3 × 2 × 3	16	7/8	5 3/4	5 3/4	16	1 1/8	7	7	16	1 1/4	8 3/4	9
3	16	7/8	5 3/4	5 3/4	16	1 1/8	7	7	16	1 1/4	8 3/4	9
4 × 3 × 4	16	1 1/8	6 3/4	6 3/4	16	1 1/4	7 3/4	7 3/4	16	1 1/2	10	10 1/4
4*	16	1 1/8	6 3/4	6 3/4	16	1 1/4	7 3/4	7 3/4	16	1 1/2	10	10 1/4
6 × 4 × 6	24	1 1/8	7 1/2	7 3/4	24	1 3/8	10 1/4	10 1/2	16	2	13 1/2	14
6*	24	1 1/8	7 1/2	7 3/4	24	1 3/8	10 1/4	10 1/2	16	2	13 1/2	14
8 × 6 × 8	24	1 3/8	8 3/4	8 3/4	24	1 5/8	11 1/2	11 3/4	24	2	15	15 1/2
8*	24	1 3/8	8 3/4	8 3/4	24	1 5/8	11 1/2	11 3/4	24	2	15	15 1/2
	24	1 3/8	8 3/4	8 3/4	24	1 5/8	11 1/2	11 3/4	24	2	15	15 1/2
10 × 8 × 10*	32	1 3/8	9 1/4	9 1/4	24	1 7/8	13 1/4	13 1/2	24	2 1/2	19 1/4	20
10	32	1 3/8	9 1/4	9 1/4	24	1 7/8	13 1/4	13 1/2	24	2 1/2	19 1/4	20
12 × 10 × 12	40	1 3/8	10	10	32	2	14 3/4	15 1/4	24	2 3/4	21 1/4	22
12	40	1 3/8	10	10	32	2	14 3/4	15 1/4				
14 × 12 × 14	40	1 1/2	10 3/4	11	32	2 1/4	16	16 3/4				
14												
16 × 12 × 16	40	1 5/8	11 1/4	11 1/2	32	2 1/2	17 1/2	18 1/2				
16	40	1 5/8	11 1/4	11 1/2	32	2 1/2	17 1/2	18 1/2				
18 × 16 × 18	40	1 7/8	12 3/4	13 1/4	32	2 3/4	19 1/2	20 3/4				
20 × 16 × 20	40	2	13 3/4	14 1/4	32	3	21 1/4	22 1/4				
18					32	2 3/4	19 1/2	20 3/4				
20*	40	2	13 3/4	14 1/4	32	3	21 1/4	22 1/4				
24 × 20 × 24	40	2 1/2	17 1/4	18	32	3 1/2	24 1/4	25 1/2				
24	40	2 1/2	17 1/4	18								

RF = Raised face, RTJ = Ring-type joint
* For valve flange through hole, stud length is sized for a nut behind both the valve and pipe flanges.
** For valve flange threaded hole, stud length is sized for threading into valve flange and a nut behind the pipe flange.

Seat and stem packing selection

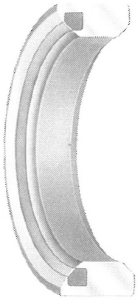


PTFE
type H

All-metal
type H8

Nylon
block-and-bleed
type BB

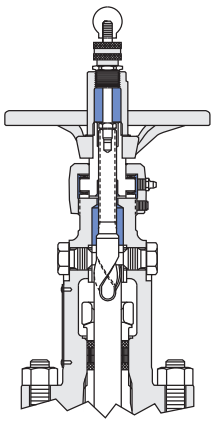
Nylon
grease seal
type GS



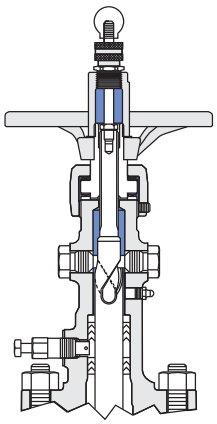
PEEK
seat
type PK

Seat Selection

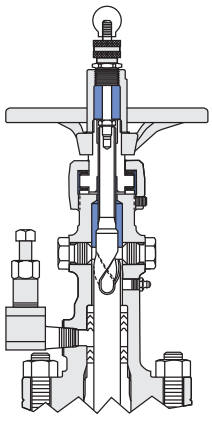
Temperature, degF [degC]	Insert Material	Support Ring	Bore Sizes, in	Seat Options
–50 to 250 [–46 to 121]	Nylon	Carbon steel	2 to 16	Type BB and GS
–50 to 250 [–46 to 121]	Nylon	Stainless steel	2 to 16	Type BB and GS
–155 to 500 [–104 to 260]	PTFE	Stainless steel	1 to 24	Type H
–155 to 800 [–104 to 427]	–	Stainless steel	1	Type H8
–155 to 800 [–104 to 427]	Stainless steel tube	Stainless steel	1½ to 24	Type H8
–50 to 570 [–46 to 300]	PEEK	Stainless steel	2 to 12	Type PK



Standard OS&Y packing



Injectable packing



Low-temperature injectable packing

Stem Packing Selection

Temperature or Service, degF [degC]	Packing Material	Orbit Valve Designation
OS&Y packings		
–155 to 800 [–104 to 427]	Graphite rings	GRPH
–155 to 500 [–104 to 260]	Graphite rings with PTFE	GRPH/TEF
Closed bonnet injectable packings		
–50 to 500 [–46 to 260]	Injectable PTFE packing with fire-safe graphite top ring	GP-6
–30 to 550 [–34 to 288]	Injectable PTFE with fire-safe top ring for ammonia service	GP-19
–20 to 400 [–29 to 204]	Injectable PTFE with PTFE rings for MTBE service	GP-27

Markings

Example nameplate

Orbit		Standard Trim	
Size	NPS 4X3 CL900	End to End	15 in
FIG	1523H RF	PKG	GRPH/TEF
SN	110091620001	Seat	CR13 TEF
MOP at Max T:	1995 PSI at +500F	Stem	AS
MOP at Min T:	2250 PSI at –20F	Body Steel	WCC
MFG	B16.34	Core Trim	CR13
DATE	04/ 24	Core Face	NI
PPE	2250 PSI	Impact	–50F
SE	1500 PSI		

Nameplate markings for valve trim

AS	Alloy steel
15-6	CarTech® Custom 450® stainless steel
660	A-638 (Grade 660)
HF-C	Hardfacing - HASTELLOY C
C-276	HASTELLOY C-276
MP35N®	Latrobe Steel Company
NICU	MONEL
NI	Nickel
COCR	Stellite®
17-4	17-4-PH® stainless steel
CR13	410 and 420 stainless steel (13% chrome)
718	INCONEL 718
316	316 stainless steel
NYL	Nylon
PEEK	Polyetheretherketone
TEF	PTFE
PPE	Max. pressure from pressure-preferred end
SE	Max. pressure from seat end

Nameplate markings for stem packing

OS&Y bonnet packings

GRPH	Graphite
GRPH/TEF	Graphite with PTFE

Closed bonnet packings

GP-6	General service
GP-19	Ammonia service
GP-27	MTBE service

Body markings—ASME/ANSI valve

The serial number is stamped into the side of the valve body or the OD of the flange. If the valve has ring joint facings, the ring gasket number is stamped into the OD of the flange. Preferred pressure end and seat size code are stamped on the OD of flanged valves and on the hub end of butt weld and threaded valves. The end connection size and class are stamped or cast on the body.

Diaphragm actuator figure numbers

Double-acting style

Spring-return style

164100-301 62585-301

Nominal Size of Diaphragm

8	Approximately 80 in²
16	Approximately 160 in²
42	Approximately 420 in²

Mounting Configuration

0	Threaded adapter sleeve
4	Flange on lower diaphragm case casting

Stem Thread Size and Adaptation*

625	⅝-7 left-hand ACME
100	1-6 left-hand ACME
1125	1⅛-7 left-hand ACME

Accessories

275	Manual close mechanism
280	Two-way manual mechanism
287	Positive close locking mechanism for spring close
291	Two-way manual mechanism for spring close
301	Snubber
376	Snubber and manual close mechanism
381	Snubber and two-way manual mechanism

Stem Thread Size and Adaptation*

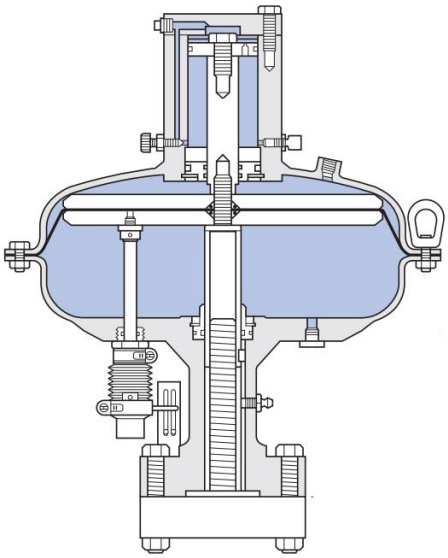
625	⅝-7 left-hand ACME
100	1-6 left-hand ACME
1125	1⅛-7 left-hand ACME

Nominal Size of Diaphragm

8	Approximately 80 in²
16	Approximately 160 in²
42	Approximately 420 in²

Spring Action Type and Mounting Configuration

0	Spring close with threaded adapter sleeve
3	Spring open with threaded adapter sleeve
4	Spring close with flange on lower diaphragm case casting
5	Spring open with flange on lower diaphragm case casting
7	Same as 4 with increased spring rate
8	Same as 5 with increased spring rate (6 die springs)



*Additional options based on mounting onfiguration

Piston actuator figure numbers

LS-185-D-25-X-S

Cylinder Supply Pressure (Maximum)

L	Low pressure (0–80 psi)

Actuator Type

G	Linear actuator with double-cylinder damping or no damping
S	Liner actuator with single-cylinder damping (gas-over-oil tank or hydraulic snubber)

Nominal Cylinder Diameter

12	12 in
18	18 in
20	20 in
26	26 in
42	42 in

Number of Cylinders

D	Double cylinder
T	Triple cylinder

Nominal Stroke

4	4 in
5	5 in
6	6 in
7	7 in
8	8 in
9	9 in
11	11 in
14	14 in

Mounting Configuration

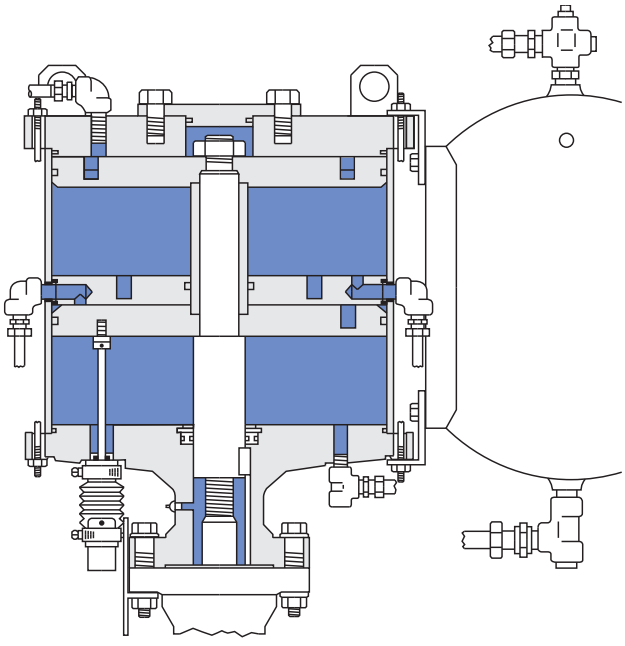
Consult SLB

Spring Return

S	Spring return

Accessories

C	Mechanical override to close
H	Hydraulic override to open and mechanical override to close
L	Positive close locking mechanism
M	Mechanical override to open and close (double acting and LS-205 spring close override)
N	Mechanical override to open and close (LS-124 and LS-185 spring close override)
O	Hydraulic override to open and close (e.g., LG02611-T-29-O)
X	Used only with spring-closed actuator with no accessories



Typical actuator figure numbers

These are typical selections of actuators for soft-seated OS&Y valves with standard T3 trim and pipeline pressure from the preferred end. The correct choice of actuator depends on pressure direction, temperature, flow conditions, valve trim, and valve end connections. Consult SLB for the specific actuator and valve combination that is most suitable for the intended service.

ASME/ ANSI	Class 150		Class 300		Class 600	
Valve Size, in	Double-Acting Actuator	Spring-Close Actuator	Double-Acting Actuator	Spring-Close Actuator	Double-Acting Actuator	Spring-Close Actuator
1	84625-301	62584	84625-301	62584	84625-301	62584
1½	84625-301	62584	84625-301	62584	84625-301	62584
2	84625-301	62584	84625-301	62584	84625-301	62584
3	84100-301	100164	84100-301	100164	164100-301	100164
4	164100-301	100167	164100-301	100167	164100-301	100167
6	164100-301	122424	164100-301	122424	164100-301	123424
8	164100-301	LS-185-D-24-X-S	424124-301	LS-185-D-24-X-S	424126-301	LS-205-D-26-X-S
10	424126-301	LS-185-D-26-X-S	424126-301	LS-185-D-26-X-S	LS-185-D-15	LS-205-D-15-X-S
12	LS-185-D-15	LS-185-D-15-X-S	LS-185-D-15	LS-205-D-15-X-S	LS-205-D-16	LS-267-D-16-X-S
14	–	–	LS-185-D-15	LS-205-D-15-X-S	LS-267-D-19	LS-267-D-19-X-S
16	LS-207-D-19	LS-267-D-X-S	LS-207-D-19	LS-267-D-19-X-S	LS-267-D-19	LS-267-D-19-X-S
18	LS-267-D-19	–*	–	–	–	–
20	–	–	LG-2611-T-29	–*	LG-2611-T-29	–*
24	–	–	LG-4214-D-33	–*	LG-4214-D-33	–*

ASME/ ANSI	Class 900		Class 1500		Class 2500	
Valve Size, in	Double-Acting Actuator	Spring-Close Actuator	Double-Acting Actuator	Spring-Close Actuator	Double-Acting Actuator	Spring-Close Actuator
1	84625-301	62584	84625-301	62584	84625-301	62584
1½	164100-301	100164	164100-301	100164	–	–
2	164100-301	100164	164100-301	100164	164100-301	122424
3	164100-301	100164	164100-301	100167	424126-301	–*
4	164100-301	122424	LS-185-D-26	LS-185-D-26-X-S	LS-185-D-26	LS-185-D-26-X-S
6	424126-301	LS-185-D-26-X-S	LS-185-D-15	LS-185-D-15-X-S	LS-185-D-15	LS-185-D-15-X-S
8	LS-185-D-15	LS-205-D-15-X-S	LS-208-D-31	–*	LS-269-D-32	–*
10	LS-205-D-16	LS-267-D-16-X-S	LS-269-D-32	–*	–	–
12	LS-267-D-19	LS-267-D-19-X-S	LG-2611-T-29	–*	–	–
14	–	–	–	–	–	–
16	LG-2611-T-29	–*	LG-4214-D-33	–*	–	–
18	–	–	LG-4214-D-33	–*	–	–
20	LG-4214-D-33	–*	–*	–*	–	–
24	LG-4214-D-33	–*			–	–

* Consult SLB

Electric actuators

SLB supplies electric-actuated valve packages using many of the commercially available power actuators built by other companies. The electric actuator is selected, mounted, adjusted, and tested by SLB so that field performance of the entire valve assembly can be ensured.

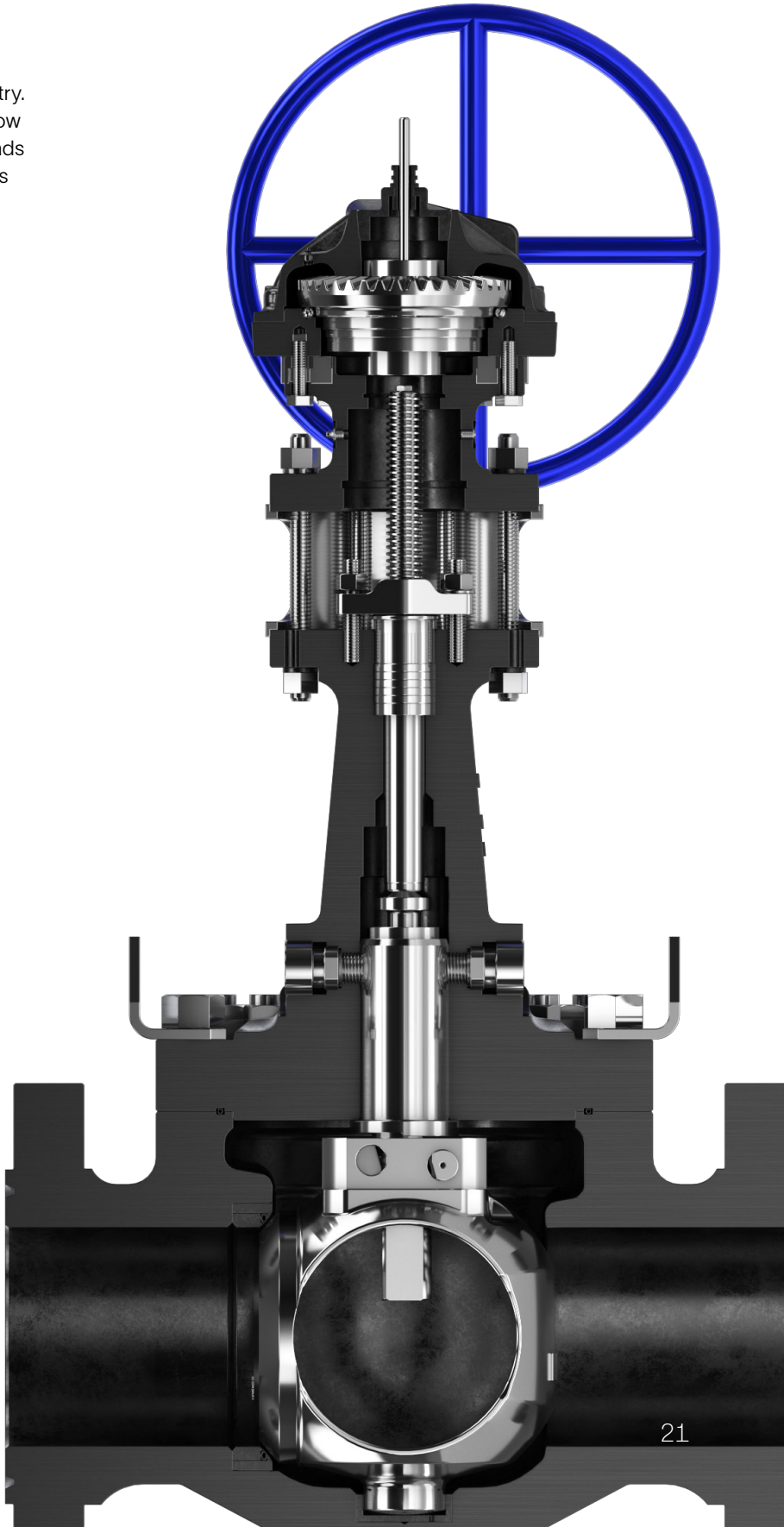
Hydraulic actuators

Commercially available hydraulic actuators built by other vendors are available upon request.

Innovative and reliable valves

SLB is a leading provider of valves for the oil and gas industry. Our products are primarily used to control and direct the flow of hydrocarbons as they are moved from individual wellheads through flowlines, gathering lines, and transmission systems to refineries, petrochemical plants, and industrial centers for processing. We provide a wide range of valves for use in natural gas, liquefied natural gas (LNG), crude oil, and refined products. Our portfolio includes

- Cameron T30 Series™ fully welded ball valves
- Demco™ butterfly and gate valves
- Entech™ nozzle check valves
- General Valve™ plug and diverter valves
- Grove™ valves
- Navco™ floating ball valves
- Nutron™ ball valves
- Ring-O™ subsea valves
- Texsteam™ plug valves
- Tom Wheatley™ check valves
- Wheatley™ check valves
- WKM™ valves.



Services for valves and actuation

We build it. We back it.

Global network and local support

SLB is well-positioned to deliver total aftermarket support, quickly and efficiently, with unmatched OEM expertise. Our highly skilled engineers and technicians are available around the clock, seven days a week, to respond to customer queries, troubleshoot problems, and offer reliable solutions.

Easily accessible parts and spare valves

- → OEM spare valves, actuators, and parts (including non-SLB brands)
- → Handling, storage, packaging, and delivery
- → Dedicated stocking program

Comprehensive aftermarket services portfolio

- → Parts and spare valves
- → Repair
- → Field services
- → Preventative maintenance
- → Equipment testing and diagnostics
- → Remanufacturing
- → Asset preservation
- → Customer property management
- → Training and recertification services
- → Warranty

Customized total valve care programs

Customized asset management plans that optimize uptime, availability, and dedicated services.

- → Engineering consultancy
- → Site management
- → Flange management
- → Startup and commissioning
- → Spare parts and asset management
- → Operational support

Ideal for applications when zero leakage and frequent operation are demanded

The bidirectional, mechanically sealed, trunnion-mounted Orbit rising stem ball valve complies with the most stringent fugitive emission requirements.

slb.com/Orbit