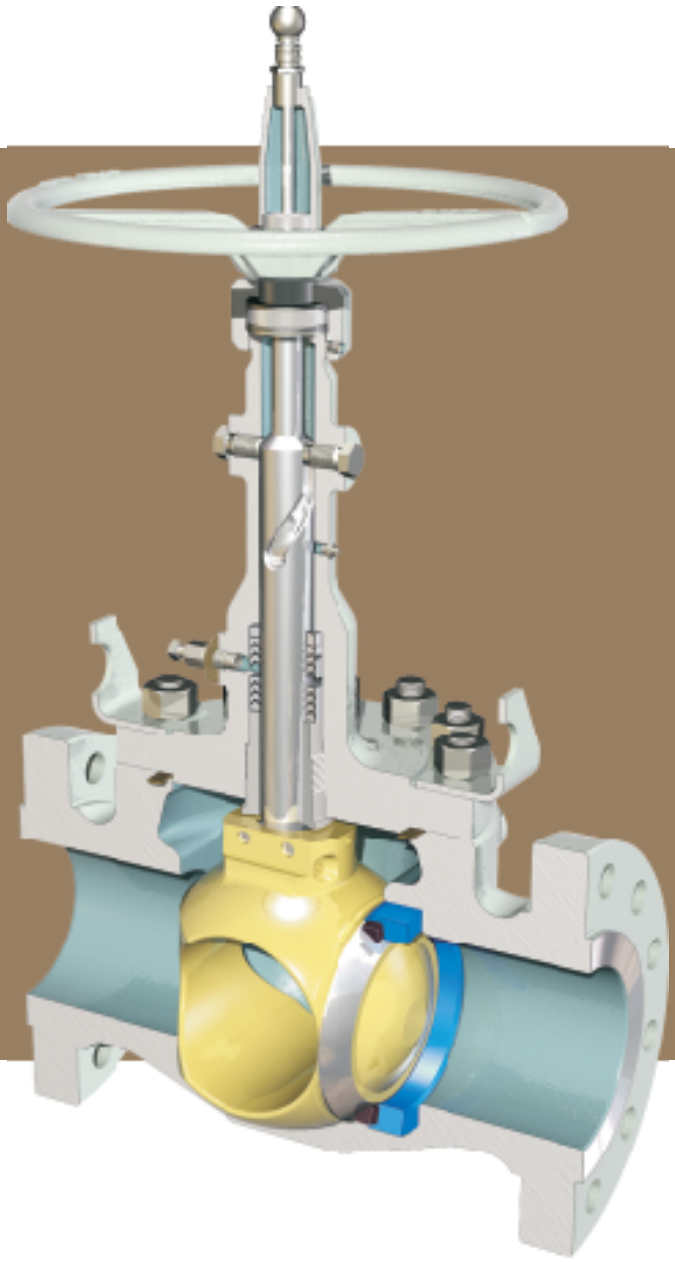
ORBIT® Technical Reference Data for Valves and Actuators



ORBIT®

TABLE OF CONTENTS

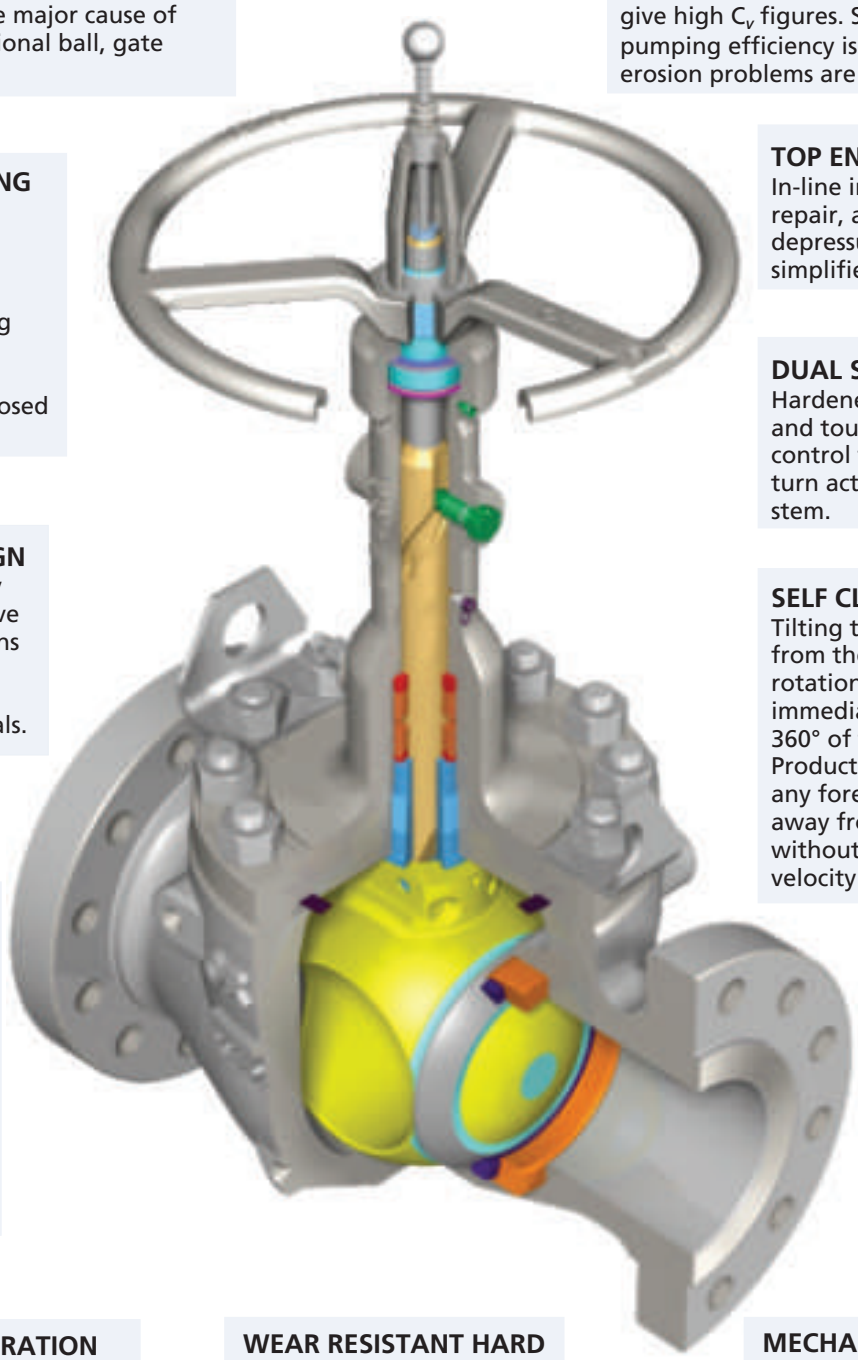
STANDARD FEATURES

FRICTION FREE OPENING & CLOSING
The tilt and turn action eliminates seal abrasion, which is the major cause of seat wear in conventional ball, gate and plug valves.

OPTIMUM FLOW
Full Port or Reduced Port openings give high C_v figures. System pumping efficiency is enhanced and erosion problems are minimized.

INJECTABLE PACKING
For in service maintenance, stem packing material is injected through the packing fitting, giving complete control of fugitive emissions. (Available on all enclosed bonnet models.)

TOP ENTRY DESIGN
In-line inspection and repair, after system depressurizing, simplifies maintenance.



DUAL STEM GUIDES
Hardened stem slots and tough guide pins control the lift and turn action of the stem.

SINGLE SEAT DESIGN
The single, stationary seat in the ORBIT valve seals in both directions and avoids the problems of trapped pressure between seals.

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.

LONG LIFE
ORBIT valves replace troublesome ball valves, gate valves, globe valves and plug valves. The ORBIT design has performance advantages that reduce plant outage and minimize the cost of ownership.

LOW TORQUE OPERATION
Characterized by their small handwheels and the absence of gear boxes on all but the largest sizes, ORBIT valves turn easily because seal rubbing is eliminated.

WEAR RESISTANT HARD FACING ON CORE
The core face is a hard, polished material that will endure the most 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.

NOTE: Never remove any part from an ORBIT valve unless specifically instructed to do so in ORBIT literature, or without first consulting an ORBIT Representative. Incorrect procedure could result in personal injury and/or property damage.

ORDERING INFORMATION

SIZES AVAILABLE

ASME CLASS (PN)		150 (20)	300 (50)	600 (100)	900 (150)	1500 (250)	2500 (420)
Reduced Port, Flanged	in. (mm)	2 thru 30 (50 thru 750)	2 thru 30 (50 thru 750)	2 thru 26 (50 thru 650)	3 thru 24 (80 thru 600)	3 thru 16 (80 thru 400)	3 thru 16 (80 thru 400)
Full Port, Flanged		1 thru 24 (25 thru 600)	1 thru 24 (25 thru 600)	1 thru 24 (25 thru 600)	1 thru 20 (25 thru 500)	1 thru 12 (25 thru 300)	2 thru 12 (50 thru 300)
Reduced Port, Butt Weld		3 thru 20 (80 thru 500)	3 thru 20 (80 thru 500)	3 thru 20 (80 thru 500)	3 thru 20 (80 thru 500)	3 thru 16 (80 thru 400)	3 thru 12 (80 thru 300)
Full Port, Butt Weld		2 thru 16 (50 thru 400)	2 thru 16 (50 thru 400)	2 thru 16 (50 thru 400)	2 thru 16 (50 thru 400)	2 thru 12 (50 thru 300)	2 thru 10 (50 thru 250
Full Port, Butt Weld x Flanged				2 thru 16 (50 thru 400)			
Full Port, Socket Weld				1 thru 2 (25 thru 50)	1 thru 2 (25 thru 50)	1 thru 2 (25 thru 50)	1 (25)
Full Port, Threaded				1 thru 3 (25 thru 80)	1 thru 3 (25 thru 80)	1 thru 2 (25 thru 50)	1 (25)

ORDERING INFORMATION

How to develop figure numbers:

CLASS

1 - ASME/ANSI 150
2 - ASME/ANSI 300
4 - ASME/ANSI 600
5 - ASME/ANSI 900
6 - ASME/ANSI 1500
7 - ASME/ANSI 2500
3 - API 1000
5 - API 2000
6 - API 3000
7 - API 5000

TRIM*

0 - T3 MODIFIED
2 - T7 MODIFIED
3 - STANDARD (T3)
5 - SPECIAL PREPARATION
7 - SOUR CORROSIVE (T7)
8 - CORROSIVE (316 SS) (T8)

1 4 3 3 H

MODEL

1 - STANDARD
2 - LOW TEMP -50°F (-46°C)
3 - LOW TEMP BELOW -50°F (-46°C)
4 - API
5 - NATIONAL GRID (UK)
6 - CORROSIVE: 316 SS -155°F (-104°C)
7 - DUPLEX SS
8 - DRILLING VALVES
9 - HIGH NICKEL ALLOY

PORT SIZE & CONNECTION

2 - FULL PORT, FLANGED
3 - REDUCED PORT, FLANGED
4 - FULL PORT, THREADED
5 - REDUCED PORT, BUTT WELD
6 - FULL PORT, BUTT WELD
6 - FULL PORT, SOCKET WELD
6 - FULL PORT, BUTT WELD x RF

SUFFIX**

A - TYPE OF SEAT 250°F MAX (121°C)
H - TYPE OF SEAT 500°F MAX (260°C)
H8 - TYPE OF SEAT 800°F MAX (427°C)
PK - TYPE OF SEAT 570°F MAX (299°C)
L - ADAPTED FOR ACTUATOR
BB - BLOCK AND BLEED MODEL
GS - GREASE SEAL MODEL
S - NON-STANDARD END TO END DIMENSION
SC - CHEVRON SPECIAL TRIM

NOTE: See page 16 for Seat Selection

Example:

1433H = Standard, ASME/ANSI Class 600, Reduced Port Flanged, Standard (T3)

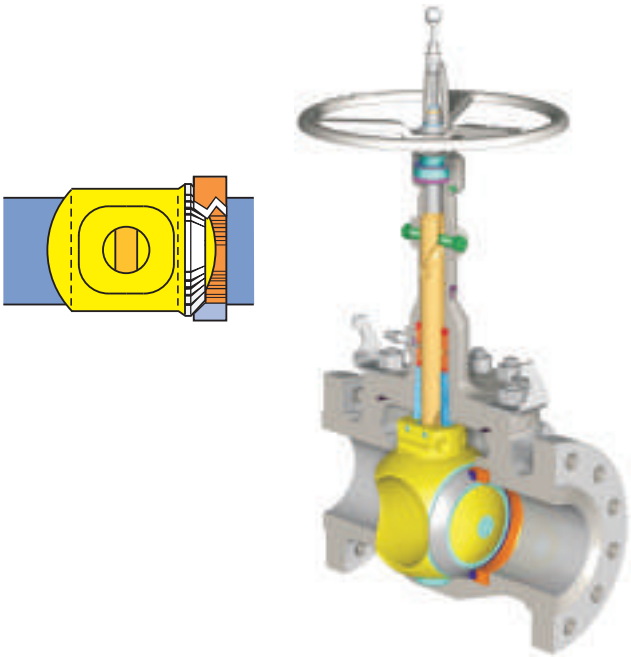
* For a more complete explanation of Trims and Figure Numbers, consult your ORBIT Representative.
** Valve Figure Number may use more that one suffix. Example 1433H8L

Cameron's Valves & Measurement group reserves the right to substitute materials listed on the following pages with alternate materials for the designated service.

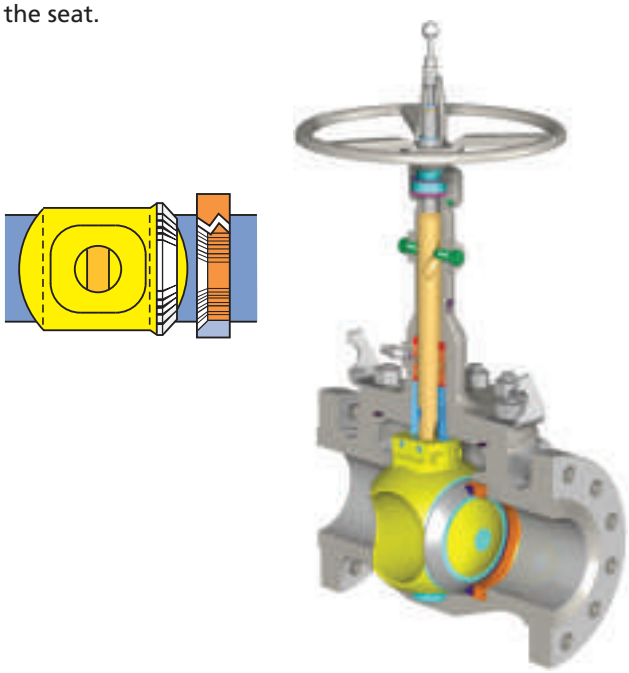
THE ORBIT PRINCIPAL

OPENING SEQUENCE

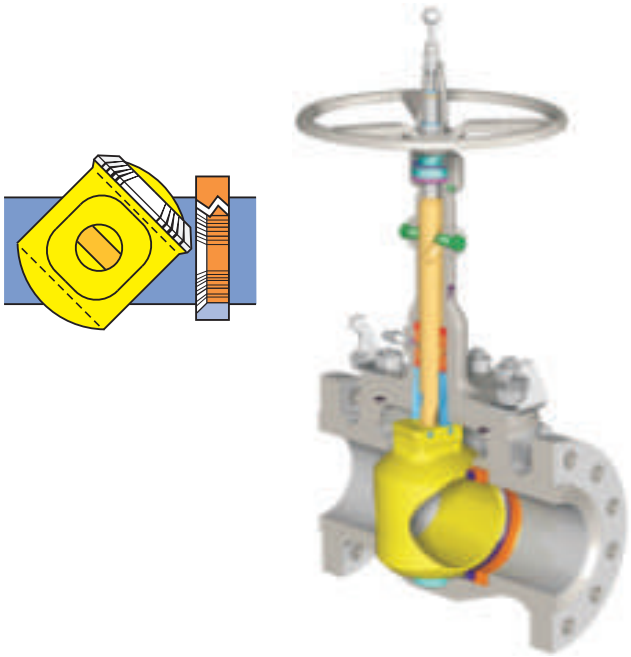
1 In the closed position, the core (yellow) is tightly pressed against the seat (orange) by the mechanical camming action of the stem (bronze).



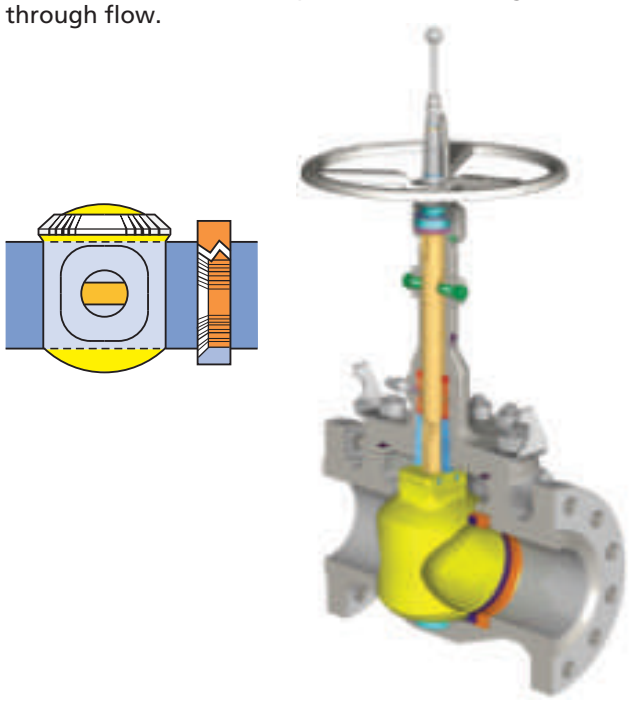
2 As the handwheel is turned counter-clockwise and the stem lifts upwards, an angled, flat surface on the lower end of the stem causes the core to tilt away from the seat.



3 As the stem continues to rise, the interaction of stem guides in the precision spiral grooves of the stem causes the core to begin its friction free rotation.



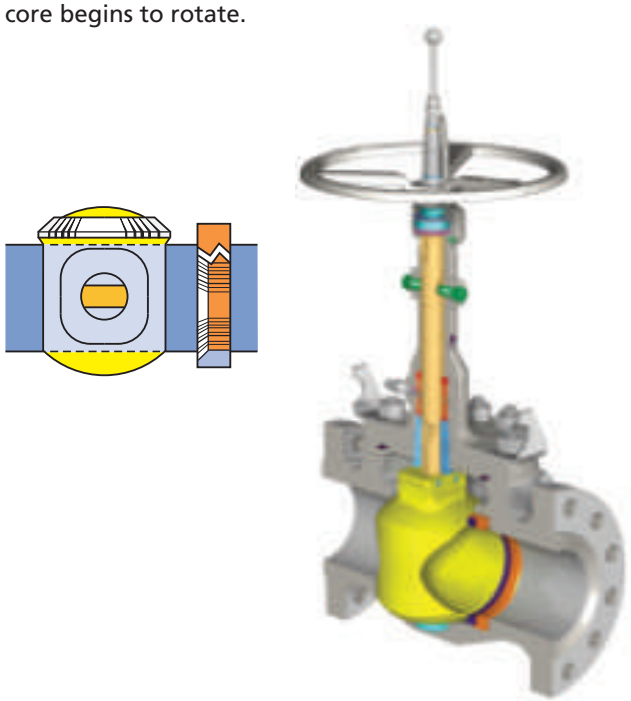
4 In the full open position, the stem has been raised to its limit and the core is positioned for straight through flow.



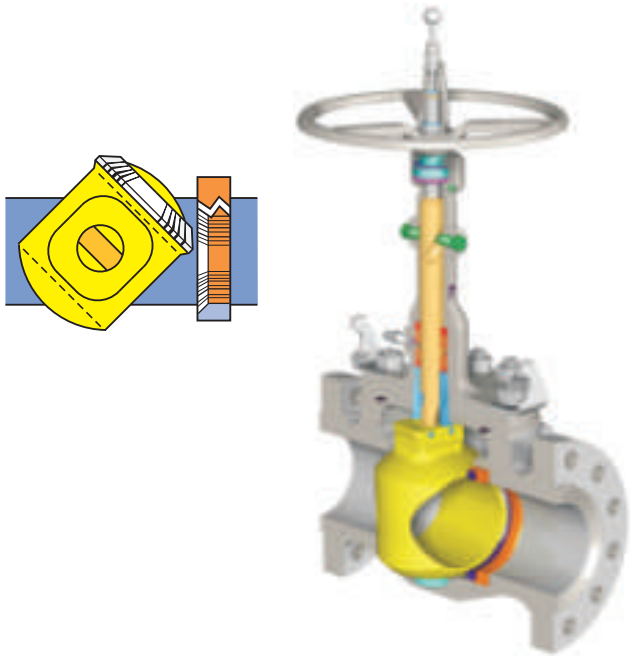
THE ORBIT PRINCIPAL

CLOSING SEQUENCE

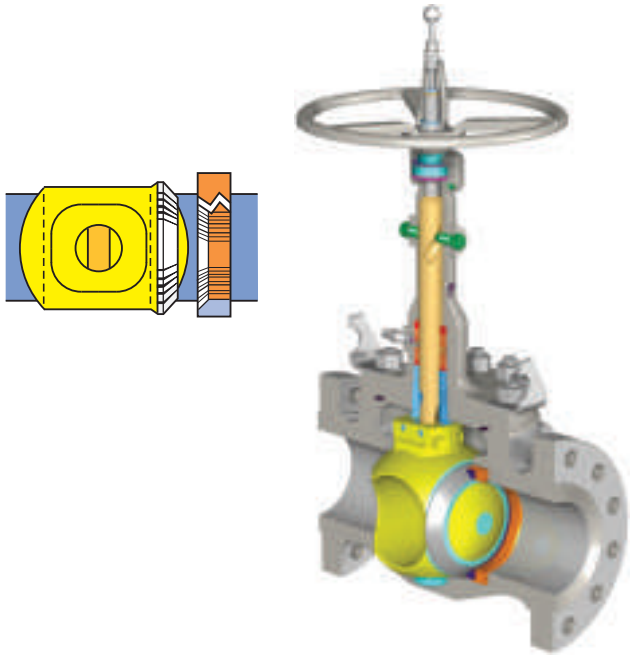
5 To close the valve, the handwheel is turned in a clockwise direction. The stem begins to lower and the core begins to rotate.



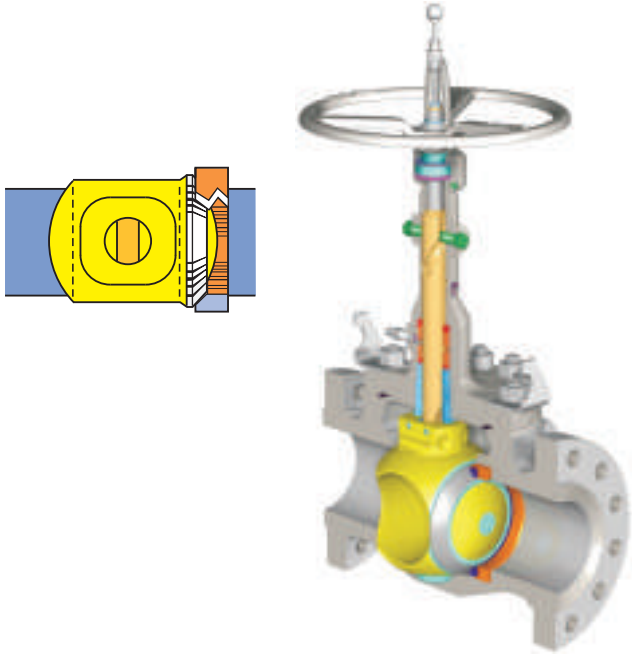
6 Continued turning of the handwheel causes the precision spiral grooves in the stem to act against the stem guides, rotating the stem and core 90 degrees.



7 Nearing the end of the closing cycle, the core has rotated a full 90 degrees without touching the seat.

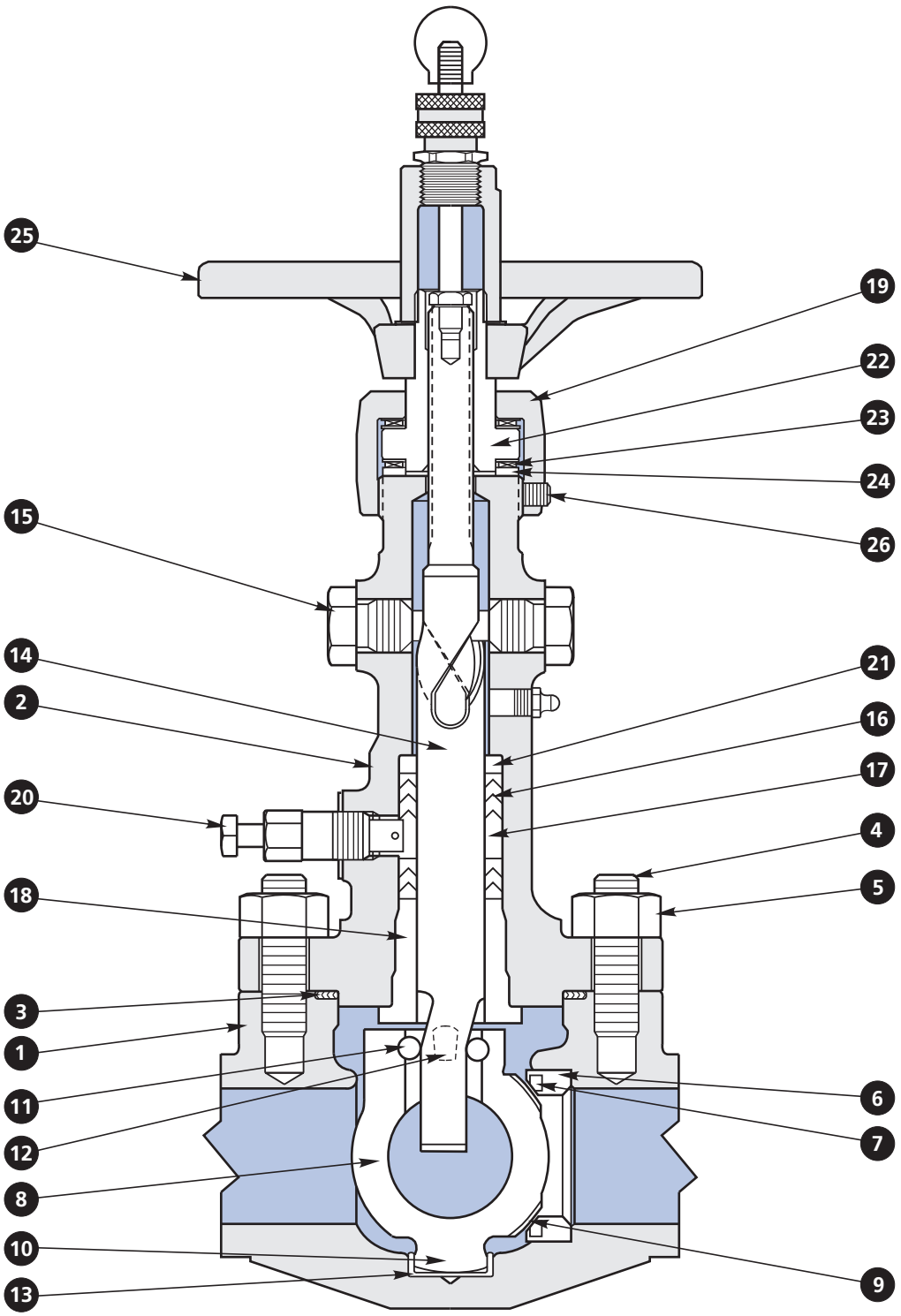


8 Final turns of the handwheel cause an angled flat surface on the lower stem to mechanically wedge the core tightly against the seat.



ONE PIECE STEM VALVES

ENCLOSED BONNET



ONE PIECE STEM VALVES

ENCLOSED BONNET

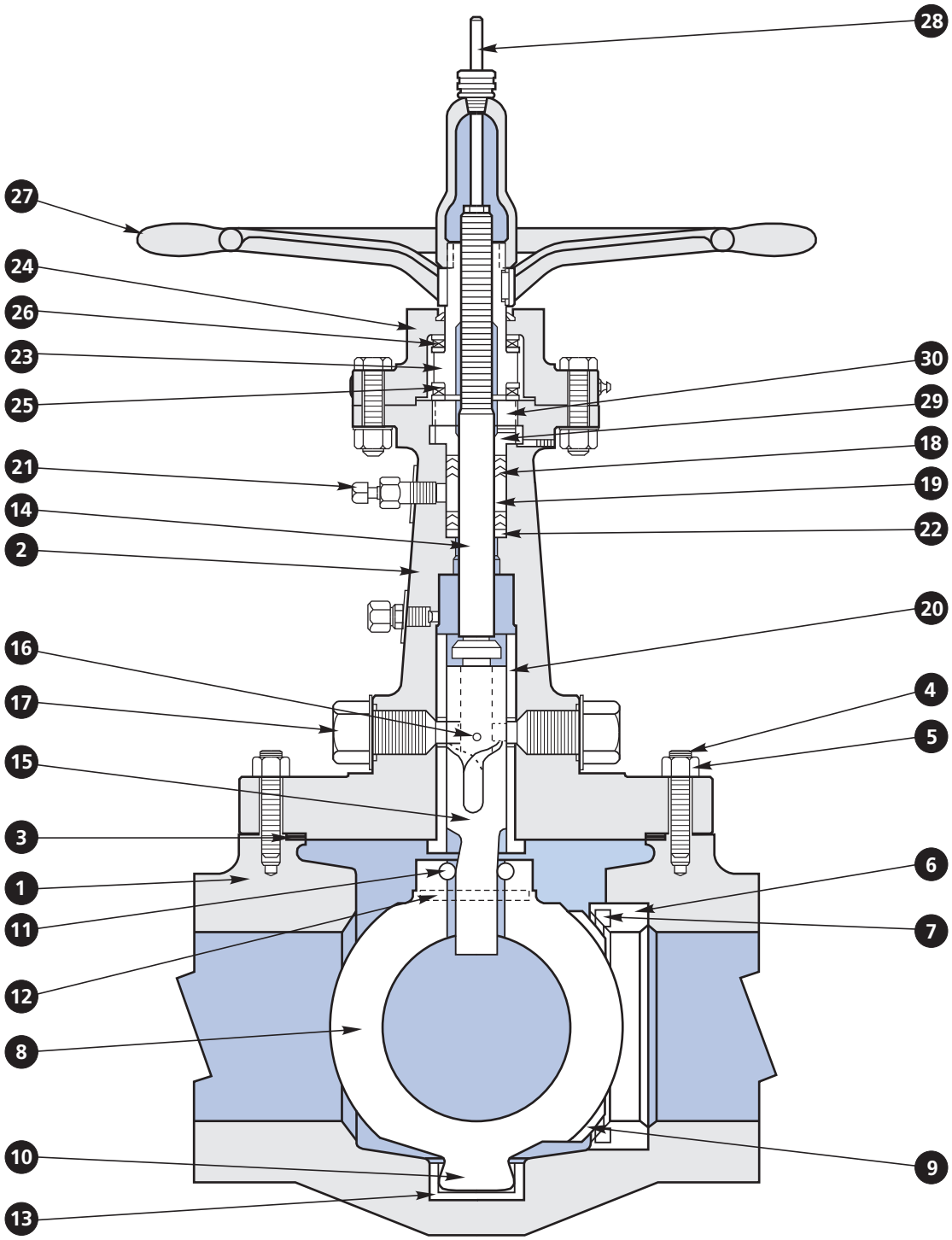
MATERIALS LIST

PARTS DESCRIPTION		STANDARD T3 -20°F/+500°F -29°C/+260°C	STANDARD T7 -20°F/+500°F -29°C/+260°C	LOW TEMP T3 -50°F/+500°F -46°C/+260°C	LOW TEMP T7 -50°F/+500°F -46°C/+260°C
1	Body	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A352 Gr. LCC	ASTM A352 Gr. LCC
2	Bonnet	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A352 Gr. LCC	ASTM A352 Gr. LCC
3	Gasket	Stainless Steel & Graphite	Stainless Steel & Graphite	Stainless Steel & Graphite	Stainless Steel & Graphite
4	Stud	ASTM A193 Gr. B7	ASTM A193 Gr. B7	ASTM A320 Gr. L7	ASTM A320 Gr. L7M
5	Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2H	ASTM A194 Gr. 4 or 7	ASTM A194 Gr. 7M
6	Seat Body	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
7	Seat Insert	Teflon	Teflon	Teflon	Teflon
8	Core	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC
9	Core Face	Nickel	Nickel Based CRA	Nickel	Nickel Based CRA
10	Trunnion Overlay	-	Nickel Based CRA	-	Nickel Based CRA
11	Core Pin	Stainless Steel	Nickel Based CRA	Stainless Steel	Stainless Steel
12	Support Pin	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
13	Trunnion Bushing	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
14	Stem	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
15	Stem Guide	Alloy Steel	Stainless Steel	Alloy Steel	Stainless Steel
16	Packing Rings	Teflon	Teflon	Teflon	Teflon
17	Injectable Packing	ORBIT GP6	ORBIT GP6	ORBIT GP6	ORBIT GP6
18	Bonnet Bushing	Stainless Steel	Monel	Stainless Steel	Monel
19	Bonnet Nut	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel
20	Packing Fitting	Alloy Steel	Stainless Steel	Alloy Steel	Stainless Steel
21	Packing Chamber Bushing	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel
22	Drive Nut	Ductile Iron	Alloy Steel	Alloy Steel	Alloy Steel
23	Bearing	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel
24	Bearing Race	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel
25	Handwheel	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron
26	Set Screw	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel

Actual materials of construction will depend on the valve size, pressure class, end configuration and service conditions.
Consult ORBIT for detailed materials list.
This is a partial list of material options. Many alternatives can be provided to match the actual service requirements.

TWO PIECE STEM VALVES

ENCLOSED BONNET



TWO PIECE STEM VALVES

ENCLOSED BONNET

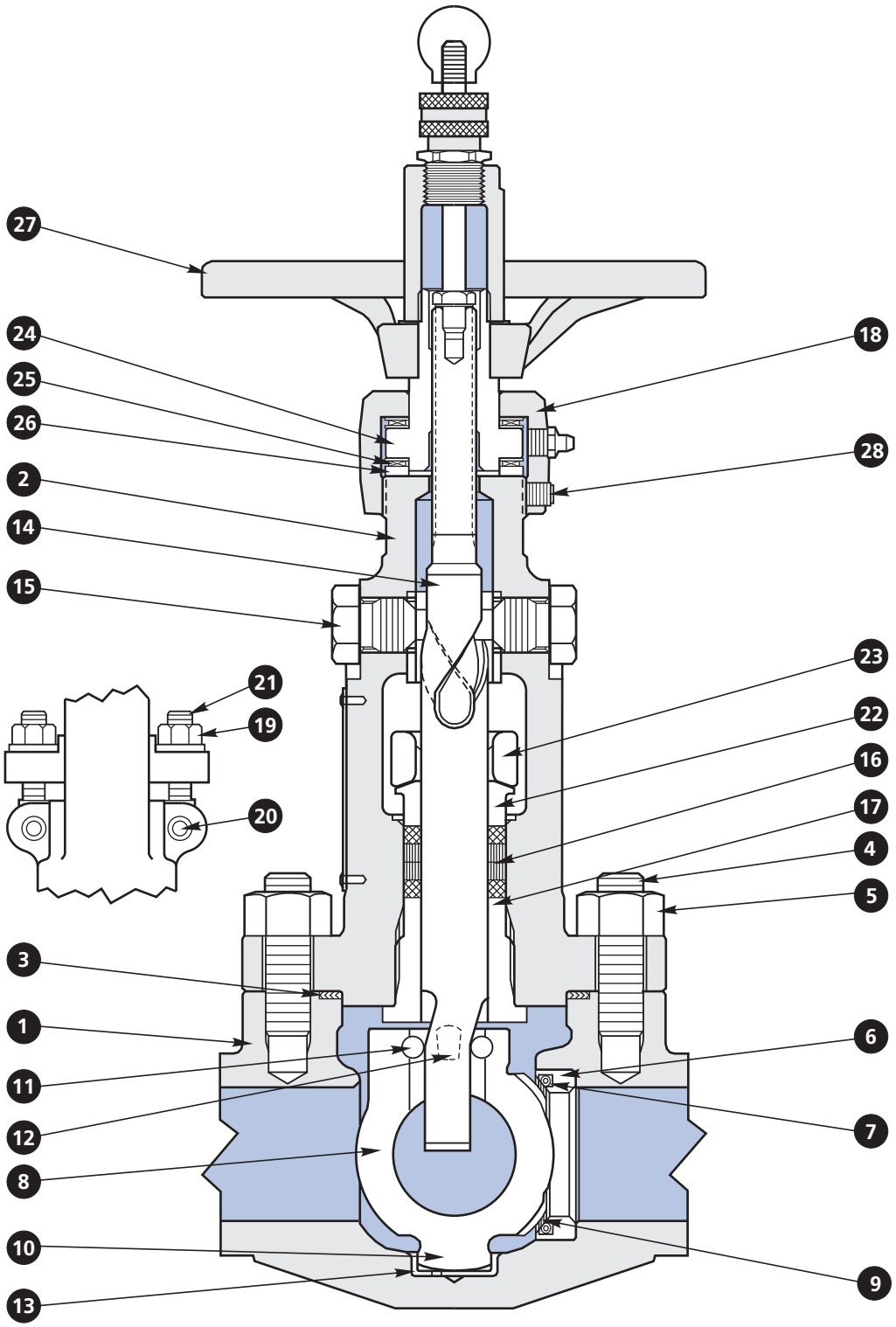
MATERIALS LIST

PARTS DESCRIPTION		STANDARD T3 -20°F/+500°F -29°C/+260°C	STANDARD T7 -20°F/+500°F -29°C/+260°C	LOW TEMP T3 -50°F/+500°F -46°C/+260°C	LOW TEMP T7 -50°F/+500°F -46°C/+260°C
1	Body	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A352 Gr. LCC	ASTM A352 Gr. LCC
2	Bonnet	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A352 Gr. LCC	ASTM A352 Gr. LCC
3	Gasket	Stainless Steel & Graphite	Stainless Steel & Graphite	Stainless Steel & Graphite	Stainless Steel & Graphite
4	Stud	ASTM A193 Gr. B7	ASTM A193 Gr. B7M	ASTM A320 Gr. L7	ASTM A320 Gr. L7M
5	Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2HM	ASTM A194 Gr. 7	ASTM A194 Gr. 7M
6	Seat Body	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
7	Seat Insert	Teflon	Teflon	Teflon	Teflon
8	Core	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC
9	Core Face	Nickel	Nickel Based CRA	Nickel	Nickel Based CRA
10	Trunnion Overlay	-	Nickel Based CRA	-	Nickel Based CRA
11	Core Pin	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
12	Support Pin	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
13	Trunnion Bushing	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
14	Stem	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
15	Stem Cam	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
16	Stem Pin	Alloy Steel	Stainless Steel	Alloy Steel	Stainless Steel
17	Stem Guide	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
18	Packing Rings	Teflon	Teflon	Teflon	Teflon
19	Injectable Packing	ORBIT GP6	ORBIT GP6	ORBIT GP6	ORBIT GP6
20	Bonnet Bushing	Stainless Steel	Monel	Stainless Steel	Monel
21	Packing Fitting	Alloy Steel	Stainless Steel	Alloy Steel	Stainless Steel
22	Packing Chamber Bushing	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel
23	Drive Nut	Aluminum Bronze	Alloy Steel	Alloy Steel	Alloy Steel
24	Drive Nut Retainer	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC
25	Bearing	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel
26	Bearing Race	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel
27	Handwheel	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron
28	Position Indicator Rod	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
29	Packing Gland	Aluminum Bronze	Carbon Steel	Carbon Steel	Carbon Steel
30	Packing Gland Retainer	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel

Actual materials of construction will depend on the valve size, pressure class, end configuration and service conditions.
Consult ORBIT for detailed materials list.
This is a partial list of material options. Many alternatives can be provided to match the actual service requirements.

ONE PIECE STEM VALVES

O.S. & Y. BONNET



ONE PIECE STEM VALVES

O.S. & Y. BONNET

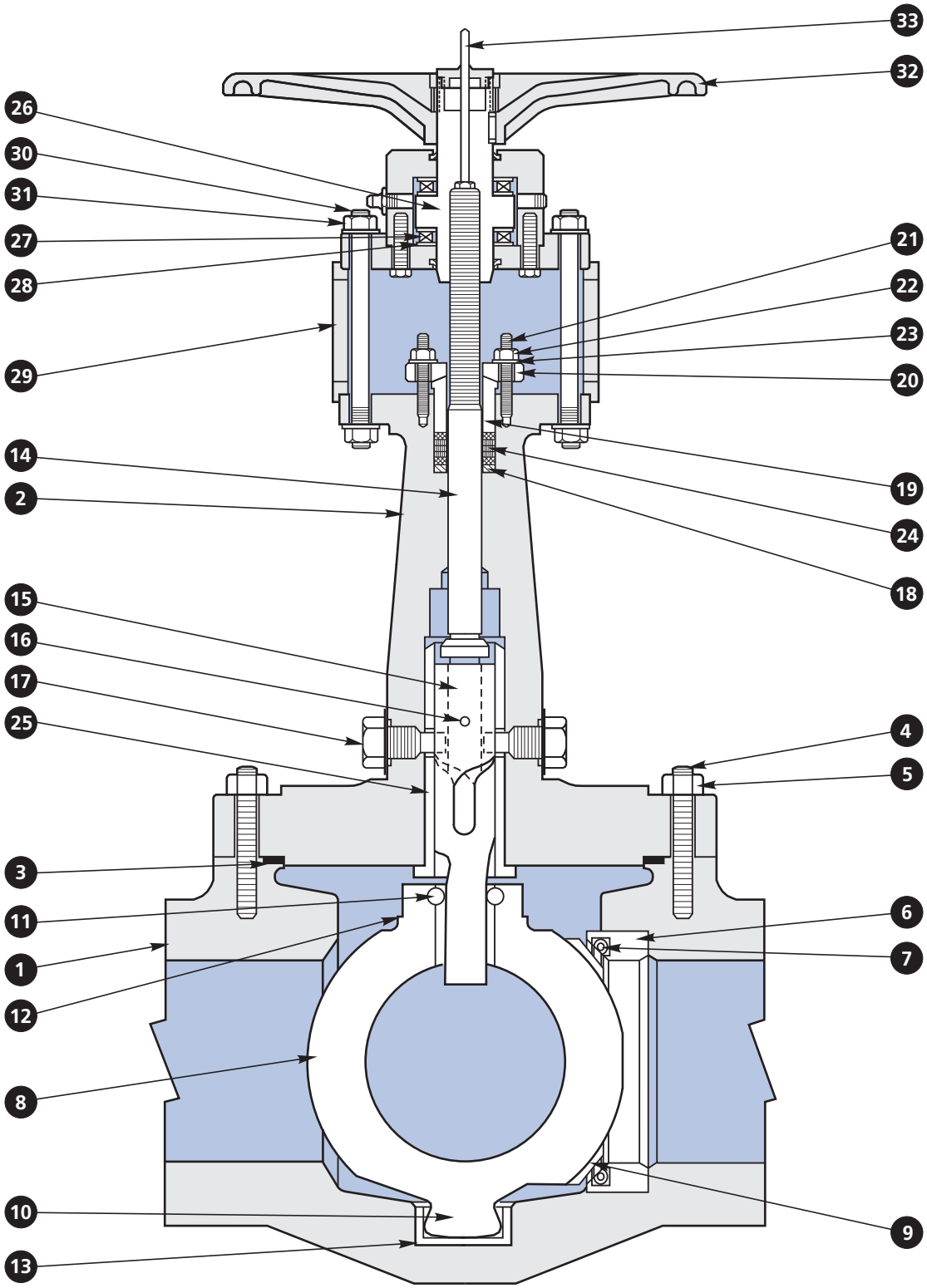
MATERIALS LIST

PARTS DESCRIPTION		STANDARD T3 -20°F/+800°F -29°C/+427°C	STANDARD T7 -20°F/+650°F -29°C/+343°C
1	Body	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC
2	Bonnet	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC
3	Gasket	Stainless Steel & Graphite	Stainless Steel & 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	Stainless Steel
8	Core	ASTM A216 Gr. WCC	ASTM A 216 Gr. WCC
9	Core Face	Nickel	Cobalt Alloy
10	Trunnion Overlay	-	Nickel Based CRA
11	Core Pin	Stainless Steel	Stainless Steel
12	Support Pin	Stainless Steel	Stainless Steel
13	Trunnion Bushing	Stainless Steel	Stainless Steel
14	Stem	Stainless Steel	Stainless Steel
15	Stem Guide	Alloy Steel	Stainless Steel
16	Packing Rings	Graphite & Carbon	Graphite & Carbon
17	Bonnet Bushing	Stainless Steel	Stainless Steel
18	Bonnet Nut	Carbon Steel	Carbon Steel
19	Packing Eyebolt Nut	ASTM A194 Gr. 2H	ASTM A193 Gr. 2HM
20	Packing Eyebolt Pin	Stainless Steel	Stainless Steel
21	Packing Eyebolt	Stainless Steel	Stainless Steel
22	Packing Gland	Ductile Iron	Ductile Iron
23	Packing Gland Retainer	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC
24	Drive Nut	Ductile Iron	Alloy Steel
25	Bearing	Alloy Steel	Alloy Steel
26	Bearing Race	Alloy Steel	Alloy Steel
27	Handwheel	Ductile Iron	Ductile Iron
28	Set Screw	Alloy Steel	Alloy Steel

Actual materials of construction will depend on the valve size, pressure class, end configuration and service conditions.
Consult ORBIT for detailed materials list.
This is a partial list of material options. Many alternatives can be provided to match the actual service requirements.

TWO PIECE STEM VALVES

O.S. & Y. BONNET



TWO PIECE STEM VALVES

O.S. & Y. BONNET

MATERIALS LIST

PARTS DESCRIPTION		STANDARD T3 -20°F/+800°F -29°C/+427°C	STANDARD T7 -20°F/+650°F -29°C/+343°C
1	Body	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC
2	Bonnet	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC
3	Gasket	Stainless Steel & Graphite	Stainless Steel & 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	Stainless Steel
8	Core	ASTM A216 Gr. WCC	ASTM A 216 Gr. WCC
9	Core Face	Nickel	Cobalt Alloy
10	Trunnion Overlay	-	Nickel Based CRA
11	Core Pin	Stainless Steel	Stainless Steel
12	Support Pin	Stainless Steel	Stainless Steel
13	Trunnion Bushing	Stainless Steel	Stainless Steel
14	Stem	Stainless Steel	Stainless Steel
15	Stem Cam	Stainless Steel	Stainless Steel
16	Stem Pin	Alloy Steel	Stainless Steel
17	Stem Guide	Stainless Steel	Stainless Steel
18	Packing Chamber Bushing	Carbon Steel	Carbon Steel
19	Packing Gland	Ductile Iron	Ductile Iron
20	Packing Gland Retainer	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC
21	Stud	ASTM A193 Gr. B7	ASTM A193 Gr. B7M
22	Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2HM
23	Washer	Carbon Steel	Carbon Steel
24	Packing Rings	Graphite & Carbon	Graphite & Carbon
25	Bonnet Sleeve	Stainless Steel	Stainless Steel
26	Drive Nut	Aluminum Bronze	Alloy Steel
27	Bearing	Alloy Steel	Alloy Steel
28	Bearing Race	Alloy Steel	Alloy Steel
29	Packing Access Sleeve	Carbon Steel	Carbon Steel
30	Stud	ASTM A193 Gr. B7	ASTM A193 Gr. B7
31	Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2H
32	Handwheel	Ductile Iron	Ductile Iron
33	Position Indicator Rod	Stainless Steel	Stainless Steel

Actual materials of construction will depend on the valve size, pressure class, end configuration and service conditions.
Consult ORBIT for detailed materials list.
This is a partial list of material options. Many alternatives can be provided to match the actual service requirements.

END FLANGE BOLTING DIMENSIONS

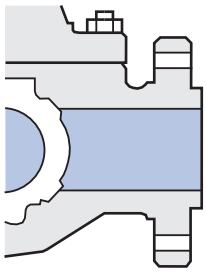
ASME/ANSI

Valve Size in.	CLASS 150				CLASS 300				CLASS 600				
	Number of Fasteners Per Valve	Fastener Diameter in.	Length of Studs in.	*Length of Capscrews in.	Number of Fasteners Per Valve	Fastener Diameter in.	Length of Studs in.	*Length of Capscrews in.	Number of Fasteners Per Valve	Fastener Diameter in.	Length of Stud RF in.	Length of Stud RTJ in.	*Length of Capscrew in.
1	8	1/2	3	-	8	5/8	3 1/4	-	8	5/8	3 1/2	3 1/2	-
1 1/2	8	1/2	3 1/4	-	8	3/4	3 1/2	-	8	3/4	4 1/4	4 1/4	-
2 x 1 1/ 2 x 2	8	5/8	3 1/4	-	16	5/8	3 1/2	-	16	5/8	4 1/4	4 1/4	-
2	8	5/8	2 1/2	-	8	5/8	3 1/2	-	16	5/8	4 1/4	4 1/4	-
2 BB/GS*	8	5/8	3 1/2	1 1/2	-	-	-	-	-	-	-	-	-
3 x 2 x 3	8	5/8	2 1/2	-	16	3/4	4 1/4	-	16	3/4	5	5	-
3*	8	5/8	2 1/2	1 1/2	16	3/4	4 1/4	-	16	3/4	5	5	-
4 x 3 x 4*	16	5/8	2 3/4	1 3/4	16	3/4	4 1/2	-	16	7/8	5 3/4	5 3/4	-
4*	16	5/8	2 3/4	1 3/4	12	3/4	4 1/2	-	16	7/8	5 3/4	5 3/4	-
	-	-	-	-	4	3/4	-	2 1/4	-	-	-	-	-
6 x 4 x 6	16	3/4	4	-	24	3/4	4 3/4	-	24	1	6 3/4	6 3/4	-
6*	16	3/4	3	2	16	3/4	4 3/4	-	24	1	6 3/4	6 3/4	-
	-	-	-	-	8	3/4	-	2 1/2	-	-	-	-	-
8 x 6 x 8	16	3/4	4 1/4	-	24	7/8	5 1/2	-	24	1 1/8	7 1/2	7 3/4	-
8*	12	3/4	4 1/4	1 1/2	16	7/8	5 1/2	-	24	1 1/8	7 1/2	7 3/4	-
	4	3/4	-	2	8	7/8	-	3	-	-	-	-	-
10 x 8 x 10*	20	7/8	4 1/2	-	28	1	6 1/4	-	32	1 1/4	8 1/2	8 1/2	-
	4	7/8	4 1/2	2 1/4	4	1	-	3 3/4	-	-	-	-	-
10	24	7/8	4 1/2	-	32	1	6 1/4	-	32	1 1/4	8 1/2	8 1/2	-
12 x 10 x 12	24	7/8	4 3/4	-	32	1 1/8	6 3/4	-	40	1 1/4	8 3/4	8 3/4	-
12	24	7/8	4 3/4	-	32	1 1/8	6 3/4	-	40	1 1/4	8 3/4	8 3/4	-
14 x 12 x 14	24	1	5 1/4	-	40	1 1/8	7	-	40	1 3/8	9 1/4	9 1/4	-
14	-	-	-	-	40	1 1/8	7	-	40	1 3/8	9 1/4	9 1/4	-
16 x 12 x 16	-	-	-	-	-	-	-	-	40	1 1/2	10	10	-
16 x 14 x 16	32	1	5 1/4	-	40	1 1/4	7 1/2	-	-	-	-	-	-
16	32	1	5 1/4	-	40	1 1/4	7 1/2	-	40	1 1/2	10	10	-
18 x 16 x 18	32	1 1/8	5 3/4	-	48	1 1/4	7 3/4	-	40	1 5/8	10 3/4	11	-
20 x 16 x 20	40	1 1/8	6 1/4	-	48	1 1/4	8	-	48	1 5/8	11 1/4	11 1/2	-
18	32	1 1/8	6 1/4	-	-	-	-	-	-	-	-	-	-
20*	-	-	-	-	48	1 1/4	7 3/4	-	36	1 5/8	11 1/4	11 1/2	-
	-	-	-	-	-	-	-	-	12	1 5/8	-	-	5 3/4
24 x 20 x 24	-	-	-	-	48	1 1/2	9	-	48	1 7/8	13	13 1/4	-
24	-	-	-	-	48	1 1/2	9	-	48	1 7/8	13	13 1/4	-

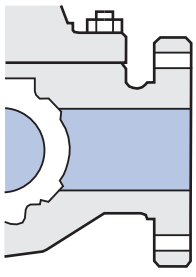
* Space limitations prevent the use of through bolts in some of the holes in the End Flanges on these valves. These holes are drilled and tapped so that a shorter Stud Bolt or Capscrew can be used.

END FLANGE BOLTING DIMENSIONS

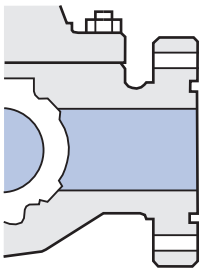
ASME/ANSI	CLASS 900				CLASS 1500				CLASS 2500			
Valve Size in.	Number of Fasteners Per Valve	Fastener Diameter in.	Length of Studs RF in.	Length of Studs RTJ in.	Number of Fasteners Per Valve	Fastener Diameter in.	Length of Studs RF in.	Length of Studs RTJ in.	Number of Fasteners Per Valve	Fastener Diameter in.	Length of Studs RF in.	Length of Studs RTJ in.
1	8	3/4	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 x 2 x 3	16	7/8	5 3/4	5 3/4	16	1 1/8	7	7	16	1 1/4	9	9 1/4
3	16	7/8	5 3/4	5 3/4	16	1 1/8	7	7	16	1 1/4	9	9 1/4
4 x 3 x 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 1/4	10 3/4
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 1/4	10 3/4
6 x 4 x 6	24	1 1/8	7 1/2	7 1/2	24	1 3/8	10 1/4	10 1/2	16	2	13 3/4	14 1/2
6	24	1 1/8	7 1/2	7 1/2	24	1 3/8	10 1/4	10 1/2	16	2	13 3/4	14 1/2
8 x 6 x 8	24	1 3/8	8 3/4	8 3/4	24	1 5/8	11 1/2	12 3/4	24	2	15 1/4	16
8	24	1 3/8	8 3/4	8 3/4	24	1 5/8	11 1/2	12 3/4	24	2	15 1/4	16
10 x 8 x 10	-	-	-	-	24	1 7/8	13 1/4	13 1/2	24	2 1/2	19 1/2	20 1/2
10	32	1 3/8	9 1/4	9 1/4	24	1 7/8	13 1/4	13 1/2	-	-	-	-
12 x 10 x 12	-	-	-	-	32	2	14 3/4	15 1/4	-	-	-	-
12	40	1 3/8	10	10	32	2	14 3/4	15 1/4	-	-	-	-
14 x 12 x 14	40	1 1/2	10 3/4	11	32	2 1/4	16	16 3/4	-	-	-	-
16 x 12 x 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	-	-	-	-	-	-	-	-
18 x 16 x 18	40	1 7/8	12 3/4	13 1/4	-	-	-	-	-	-	-	-
20 x 16 x 20	40	2	13 3/4	14 1/4	-	-	-	-	-	-	-	-
20	40	2	13 3/4	14 1/4	-	-	-	-	-	-	-	-



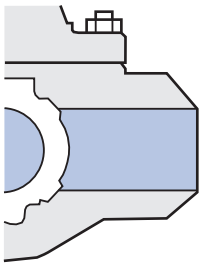
ASME/ANSI
RAISED FACE
FLANGED



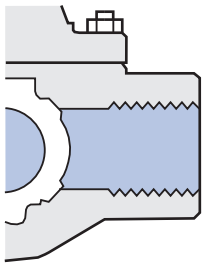
ASME/ANSI
FLAT FACE
FLANGED



RTJ
(RG)
FLANGED



BUTT
WELD



SOCKET WELD
OR
THREADED

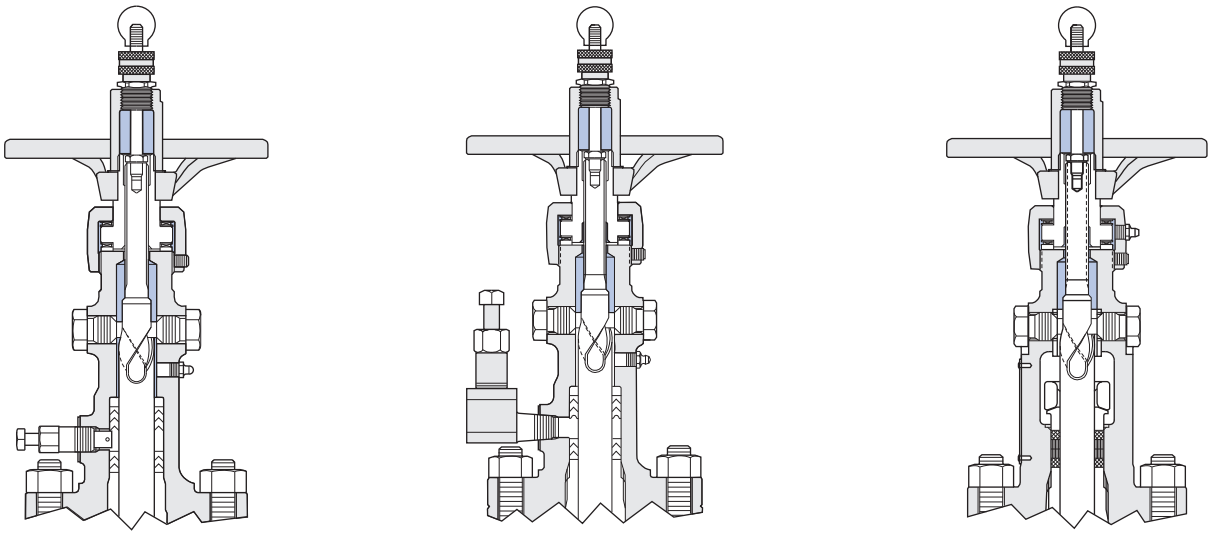
SEAT AND STEM PACKING SELECTION

SEAT SELECTION

Teflon TFE Type H | **All Metal Type H8** | **Nylon Type A** | **Nylon Block & Bleed Type BB** | **Nylon Grease Seal Type GS** | **PEEK Seat Type PK**

Temperature	Insert Material	Support Ring	Bore Sizes (in.)	Seat Options
-50°F to 250°F (-46°C to 121°C) -50°F to 250°F (-46°C to 121°C)	Nylon Nylon	Carbon Steel Stainless Steel	2 to 16 2 to 16	Type A, BB, GS Type A, BB, GS
-50°F to 500°F (-46°C to 260°C)	Teflon TFE	Stainless Steel	1 to 24	Type H
-155°F to 800°F (-104°C to 427°C)	None	Stainless Steel	1	Type H8
-155°F to 800°F (-104°C to 427°C)	Stainless Steel Tube	Stainless Steel	1 1/2 to 24	Type H8
-50°F to 570°F (-46°C to 300°C)	PEEK	Stainless Steel	2 to 12	Type PK

STEM PACKING SELECTION

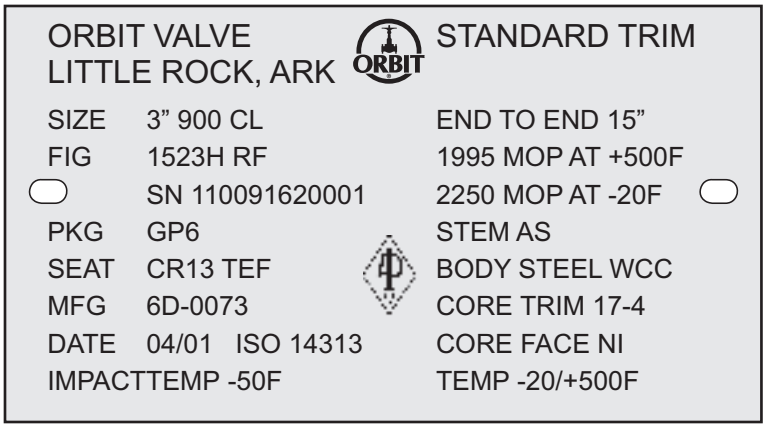


STANDARD INJECTABLE PACKING | **LOW TEMPERATURE INJECTABLE PACKING** | **O.S. & Y. PACKING**

Temperature/Service	Packing Material	ORBIT Designation
-50°F to 500°F (-46°C to 260°C)	Injectable Teflon Packing with Fire Safe Graphite Top Ring	GP6
-50°F to 800°F (-46°C to 427°C) *-155°F (104°C) For 316 SS Valve	Graphite Rings with O.S. & Y. Packing	GP20
-30°F to 550°F (-34°C to 288°C) Ammonia Service	Injectable Teflon Packing with Fire Safe Graphite Top Ring	GP19
-20°F to 400°F (-29°C to 204°C) M.T.B.E. Service	Injectable Teflon Packing with Teflon Rings	GP27
-30°F to 275°F (-34°C to 135°C) Oxygen Service	Injectable Teflon Packing with Teflon Rings	GP7

Other Packing Materials Available.

MARKINGS



NAMEPLATE MARKINGS FOR VALVE TRIM

AS	Alloy Steel
15-6	Carpenter 450® Stainless Steel
660	A-638 (Grade 660)
HF-C	Hardfacing Hastelloy C® and C-276
C-276	Hastelloy C-276®
MP35N	Latrobe®
CO-U	Cobalt-Based-Ultimet®
NICU	Monel®
NI	Nickel
COCR	Stellite®
17-4	17-4PH Stainless Steel
CR13	410 Stainless Steel (13% Chrome)
718	Inconel 718®
316	Stainless Steel
NYL	Nylon
PEEK®	Poly-Ether-Ether-Ketone
TEF	Teflon®

NAMEPLATE MARKINGS FOR STEM PACKING

GP-6	General Service
GP-7	Oxygen Service
GP-19	Ammonia Service
GP-27	MTBE Service
GP-20	Graphite O.S. & Y. Service

BODY MARKINGS-ASME/ANSI VALVE

The Serial Number is stamped into the side of the valve body or the outside diameter of the flange.

If the valve has Ring Joint Facings, the Ring Gasket Number is stamped into the O.D. of the flange.

Preferred Pressure End and seat size code are stamped on the O.D. 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.

PRESSURE TESTING AND PRESSURE DROP FORMULAS

TEST PRESSURES FOR ASME B16.34*, API 6D*

ASME/ANSI Class	150	300	600	900	1500	2500
CWP Rating						
psig	290	750	1500	2250	3750	6250
BAR	20	52	103	155	259	431
Seat Test						
psig Min.	325	825	1650	2475	4125	6875
BAR	22	57	114	171	284	474
Shell Test						
psig	450	1125	2250	3375	5625	9375
BAR	31	78	155	233	382	646

Seat Leakage Criteria: For Soft-Seated Valves, Zero. For Metal Seated Valves, 1/2 API 598.

TEST PRESSURES FOR API 6A (WELLHEAD) VALVES

API Flange	2000	3000	5000
Dimensionally Comparable ASME/ANSI Flange Class	600	900	1500
CWP (Seat Test)			
psig	2000	3000	5000
BAR	138	207	345
Shell Test			
psig	4000	6000	10000
BAR	276	414	690

DURATION OF PRESSURE TESTS FOR ASME B16.34*, API 6D*

VALVE SIZE in.	mm	Shell Test	Seat Test
1 - 4	25 - 100	2 minutes	2 minutes
6 - 10	150 - 250	5 minutes	5 minutes
12 - 18	300 - 450	15 minutes	5 minutes
20	500	30 minutes	5 minutes

* For valves of WCC material. Times shown are for API 6D valves
ASME B16.34 valves test times are less than values shown.

For each ORBIT valve there is a flow coefficient C_v. This is defined as the flow in gallons per minute of water at 60°F with a pressure drop of 1 psi across the valve. By using the following simplified formulas, the pressure drop for a given set of flow conditions may be calculated: (Refer to Bulletin FCI 62-1 of Fluid Controls Institute, Inc. for additional information.)

FOR LIQUIDS:

$$\Delta P = G(Q/C_v)^2$$

- ΔP = psi Drop across valve
- G = Specific gravity of liquid (water = 1.0)
- Q = Flow in gpm
- C_v = Valve coefficient (GPM water flow at 1 psi pressure drop across valve at 60°F)

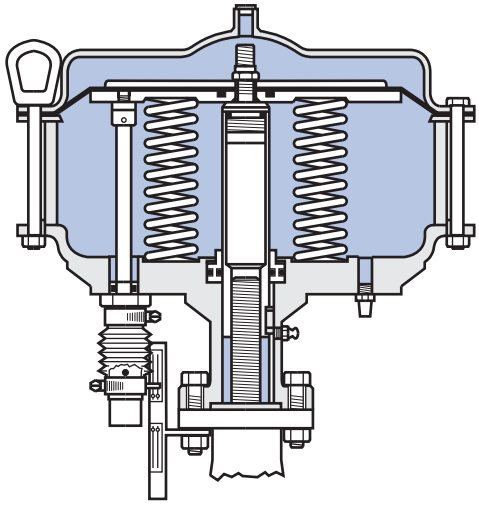
FOR GASES:

$$\Delta P = 541 \times 10^{-9} \left(\frac{Q}{C_v}\right)^2 \left(\frac{GT}{P}\right)$$

- ΔP = psi Drop across valve
- G = Specific gravity (air @ 14.7psi & 60°F = 1.0)
- T = Absolute temperature (F + 460)
- P = Line pressure psia (psi absolute - psi Gage + 14.7)
- Q = Flow standard cubic feet per hour @ 14.7 psi and 60°F
- C_v = Valve coefficient (GPM water flow at 1psi pressure drop across valve at 60°F)

ACTUATOR FIGURE NUMBERS

DIAPHRAGM ACTUATOR



Double Acting Style: Example: 164100-280

1st Figures (8, 16 or 42)
Nominal size of Diaphragm) x 10
8 = approximately 80 sq. in.
16 = approximately 160 sq. in.
42 = approximately 420 sq. in.

2nd Figure
(0)(4) etc. = Actuator/Valve Mounting Configuration.

3rd Figures
(100)(625)(1125) etc. = Valve Stem thread size.

4th Figures
Available Accessories
275 = Manual Close Mechanism
280 = Two-Way Manual Mechanism
301 = Snubber etc.

Spring Return Style: Example: 62585-275

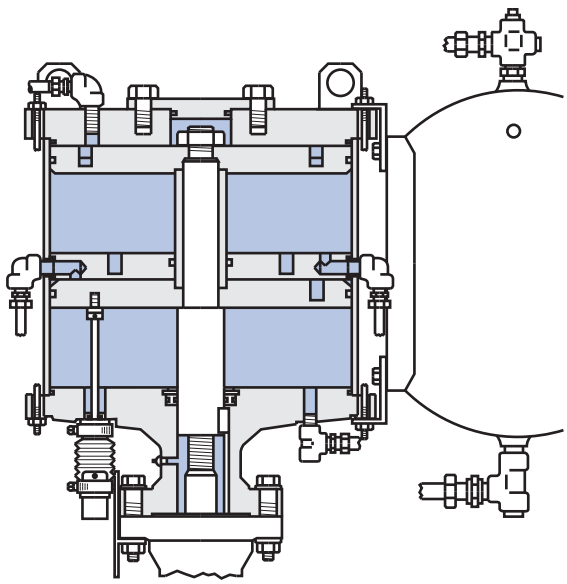
1st Figures
(100)(625)(1125) etc. = Valve Stem thread size.

2nd Figure (8, 16 or 42)
Nominal size of Diaphragm) x 10
8 = approximately 80 sq. in.
16 = approximately 160 sq. in.
42 = approximately 420 sq. in.

3rd Figures
Type of Spring Action and Mounting Configuration.
0 = Spring Close, Threaded Adapter
3 = Spring Open, Threaded Adapter
4 = Spring Close, Flange Adapter
5 = Spring Open, Flange Adapter etc.

4th Figures
Available Accessories
275 = Manual Close Mechanism for Spring Open
280 = Two-Way Manual Mechanism for Spring Open
301 = Snubber etc.

PISTON ACTUATOR



Example: LS-185-D-5-X-S

1st Figure
L = Low Pressure Cylinder Actuator, 80 psi maximum pressure

2nd Figure
G = Double Cylinder Damping or No Damping
S = Single Cylinder Damping

3rd Figures
(12)(18)(20) etc. = Nominal Diameter of Actuator Piston (inches)

4th Figure
(3)(4)(5) etc. = Nominal Piston Stroke (inches)

5th Figure
(D)(T) etc. = Number of Cylinders (Double/Triple etc.)

6th Figures
(1)(2)(3) etc. - Actuator/Valve Mounting Configuration. (Consult ORBIT for specific details)

7th Figure
Accessory Features
C = Mechanical Override-Close
H = Hydraulic Override-Open, Mechanical Override Close
L = Positive Close Locking Device
M (N) = Mechanical Override Open and Close
X = No Accessory Features

8th Figure
S = Spring Return

ACTUATOR FIGURE NUMBERS

These are typical selections of Actuators for Soft Seated Valves with standard T3 Trim and pipeline pressure from the preferred End. The correct choice of Actuator will depend on pressure direction, temperature, flow conditions, Valve Trim and Valve End Connections.

Consult ORBIT for specific Actuator/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	Spring Open Actuator	Double Acting Actuator	Spring Close Actuator	Spring Open Actuator	Double Acting Actuator	Spring Close Actuator	Spring Open Actuator
1	84625	62584	62588	84625	62584	62588	84625	62584	62588
1 1/2	84625	62584	62588	84625	62584	62588	84625	62584	62588
2	84625	62584	62588	84625	62584	62588	84625	62584	62588
3	84100	100164	100165	84100	100164	100165	164100	100164	100165
4	84100	100164	100165	84100	100164	100165	164100	100167	100165
6	164100	100167	100167	164100	100167	*	164100	123424	*
8	164100	123424	*	164100	123424	*	424125-301	LS-185-D-25-X-S	*
10	424125-301	125424	*	424125-301	LS-185-D-25-X-S	*	LS-185-D-5	LS-205-D-5-X-S	*
12	LS-185-D-5	LS-185-D-5-X-S	*	LS-185-D-5	LS-205-D-5-X-S	*	LS-205-D-6	LS-205-D-6-X-S	*
14	-	-	-	LS-185-D-5	LS-205-D-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	-	-	-	LS-2611-T-29	-	-	LS-2611-T-29	-	-
24	-	-	-	LS-4214-D-33	-	-	LS-4214-D-33	-	-

*Consult Factory

ASME/ANSI CLASS 900 / CLASS 1500 / CLASS 2500

Valve Size in.	Double Acting Actuator	Spring Close Actuator	Spring Open Actuator	Double Acting Actuator	Spring Close Actuator	Spring Open Actuator	Double Acting Actuator	Spring Close Actuator	Spring Open Actuator
1	84625	62584	62588	84625	62584	62588	84625	62584	62588
1 1/2	164100	100164	*	164100	100164	*	-	-	-
1 3/4	-	-	-	-	-	-	164100	100164	*
2	164100	100164	100165	164100	100164	100165	-	-	-
3	164100	100164	100165	164100	100167	*	164101	120424	*
4	164100	100167	*	164100	121424	*	424125-301	125424	*
6	424125-301	LS-185-D-25-X-S	*	LS-185-D-5	LS-205-D-5-X-S	*	LS-185-D-5	LS-205-D-5-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-205-D-16-X-S	*	LS-269-D-32	*	*	-	-	-
12	LS-267-D-19	LS-267-D-19-X-S	*	LS-2611-T-29	*	*	-	-	-
16	LS-2611-T-29	-	-	-	-	-	-	-	-

*Consult Factory

ELECTRIC ACTUATORS - Cameron's Valves & Measurement group 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 ORBIT so that field performance of the entire valve assembly can be assured.

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STELLITE	Stoody Deloro Stellite, Inc.
TEFLON	E.I. DuPont De Nemours & Company
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