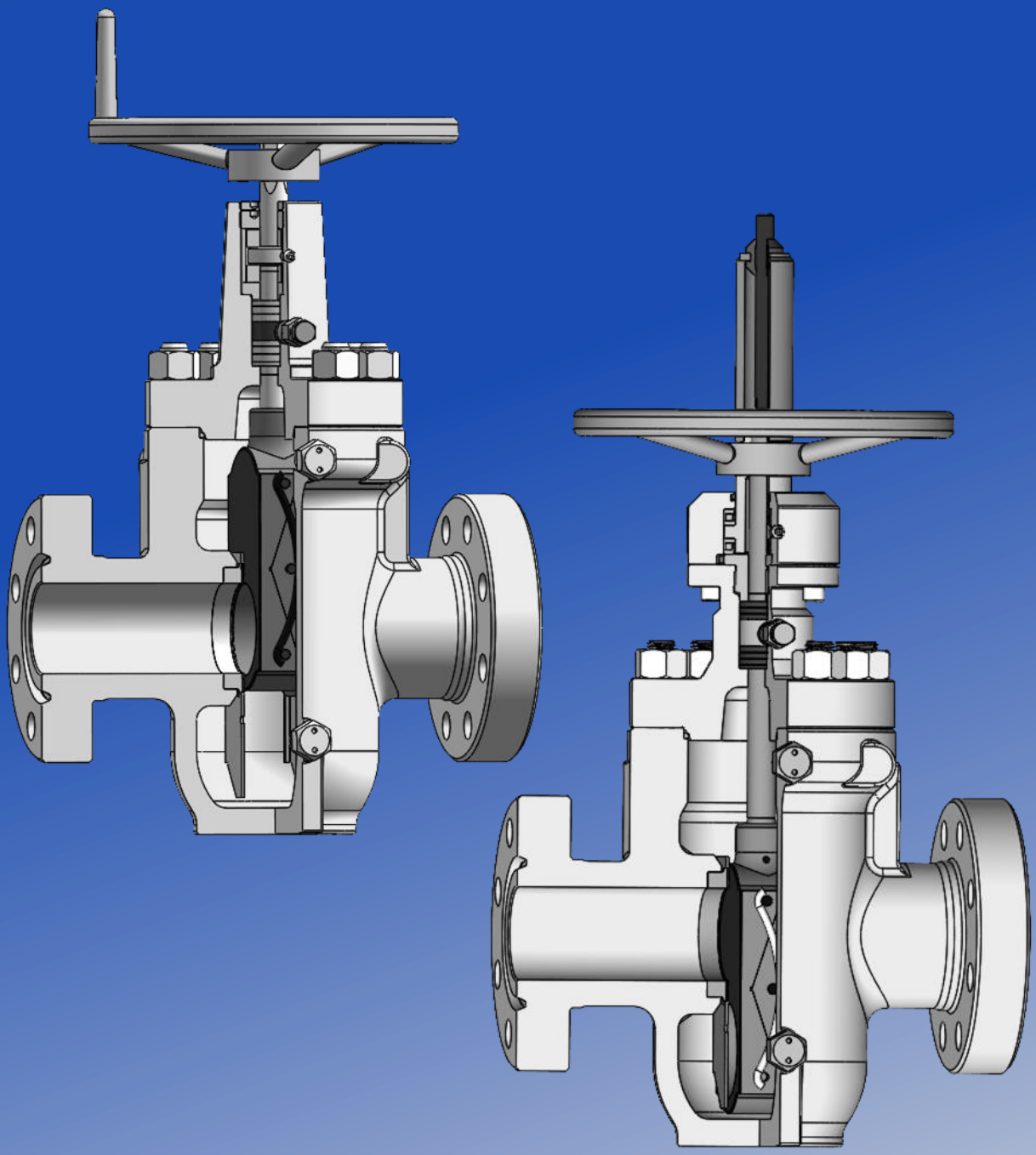
VERSA-WEDGE™ GATE VALVES



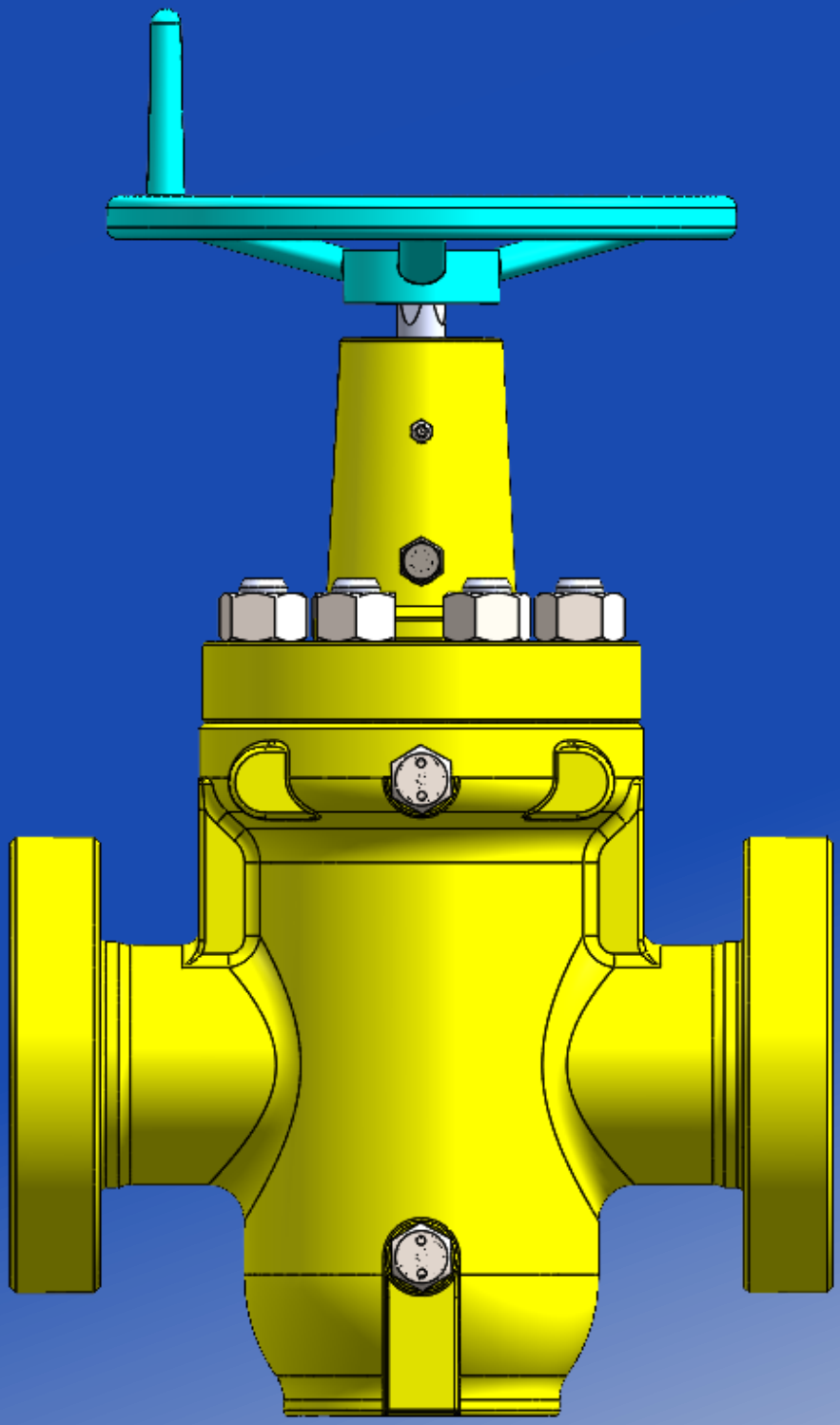
API 6A LICENSE
LICENSE NO. 6A-0541

Issued 251218

Table of Content

DRILLING & PRODUCTION GEOTHERMAL WELLHEAD VALVE

VERSA-WEDGE™ GATE VALVE



SOURCE®

SV-04 R01

PRODUCTS INTRODUCTION

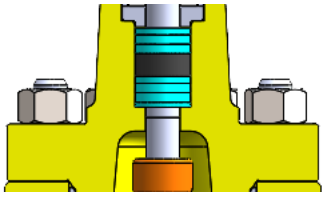
The **GEOTHERMAL EXPANDING GATE VALVE** is an unidirectional manual operated valve with non-rising or rising stem and parallel expanding gate and segment design. The parallel expanding gate design provides a tight mechanical seal which is normally unaffected by pressure fluctuations or variations. The gate assembly uses an angular gate face which is collapsed during travel. When closed, a stop causes any further downward travel to force the faces of the gate assembly outward to effect a positive line flow seal. When opened, a stop causes any further upward travel to force bottom faces to expand and seal against the seats to isolate flow from the valve body cavity.

The stem is sealed by reinforced graphite packing and injectable packing. In an emergency, injecting injectable packing into packing box would affect a temporary seal while the valve is under pressure.

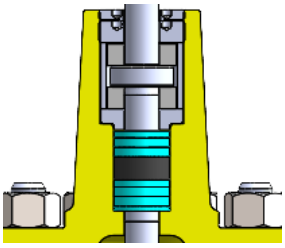
The expanding valve is designed, manufactured and tested in accordance with API Spec. 6A unless otherwise specified.

FEATURES:

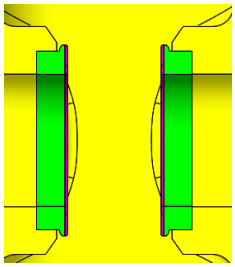
- Nominal Size 2-1/16”, 3-1/8”
- Work Pressure 2000-5000psi
- Metal to Metal Seal (Gate-to-Seat & Seat-to-Body)
- Steel Reinforced Graphite Packing and Injectable Packing
- High Temperature up to 650˚F (Class Y)
- Non-rising Stem with Handwheel Operation
- Option of Cast or Forged Body
- Expanding Wedge Gate and Seats Design
- Flange Connection refer to requirement of API 6A



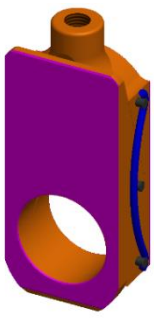
Steel reinforced graphite stem packing to provide excellent resistance to chemicals and corrosive elements



Upper and lower roller thrust bearings are isolated from well fluid, minimizing torque

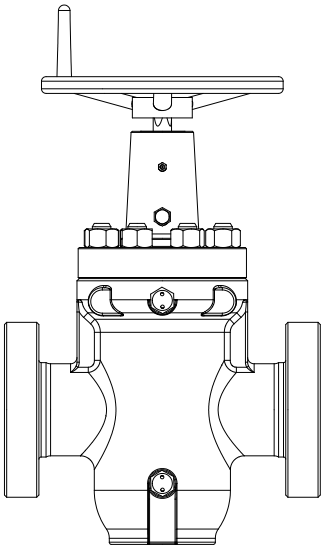


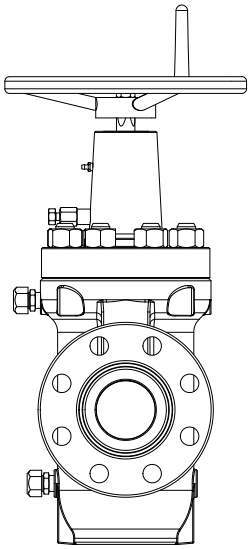
Shrink Fit for Seat and Body to create a metal to metal seal

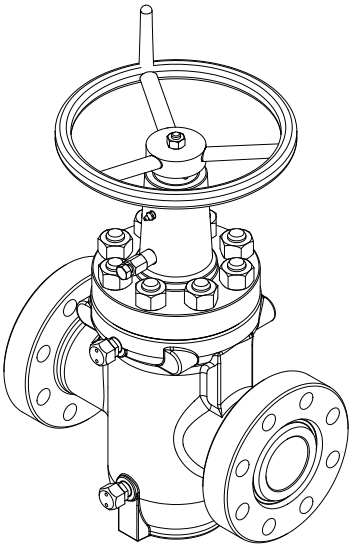


Stellite hard-faced gate and seat

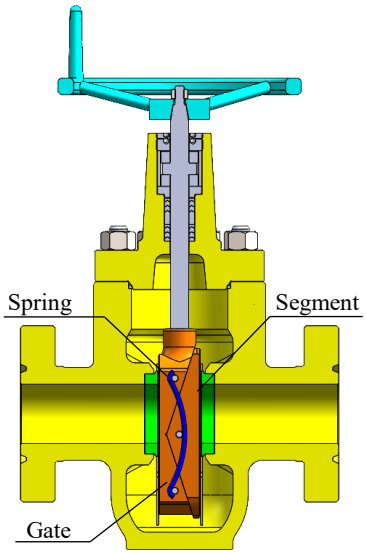
PRODUCT VIEW AND FUNCTION

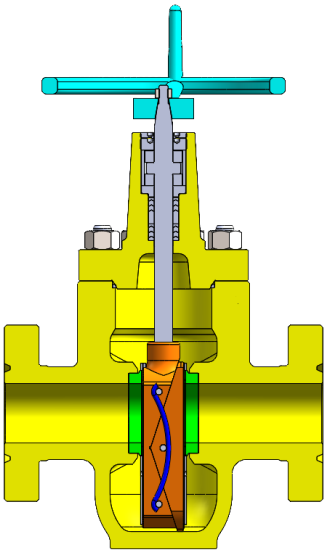


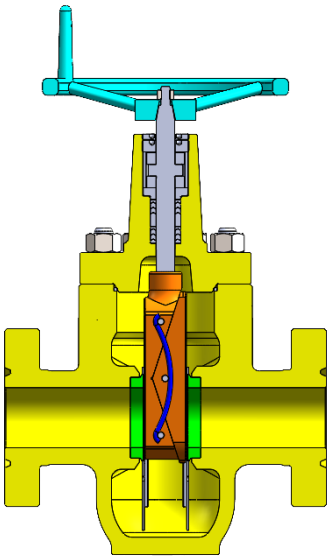




THREE OPERATION STATUS:





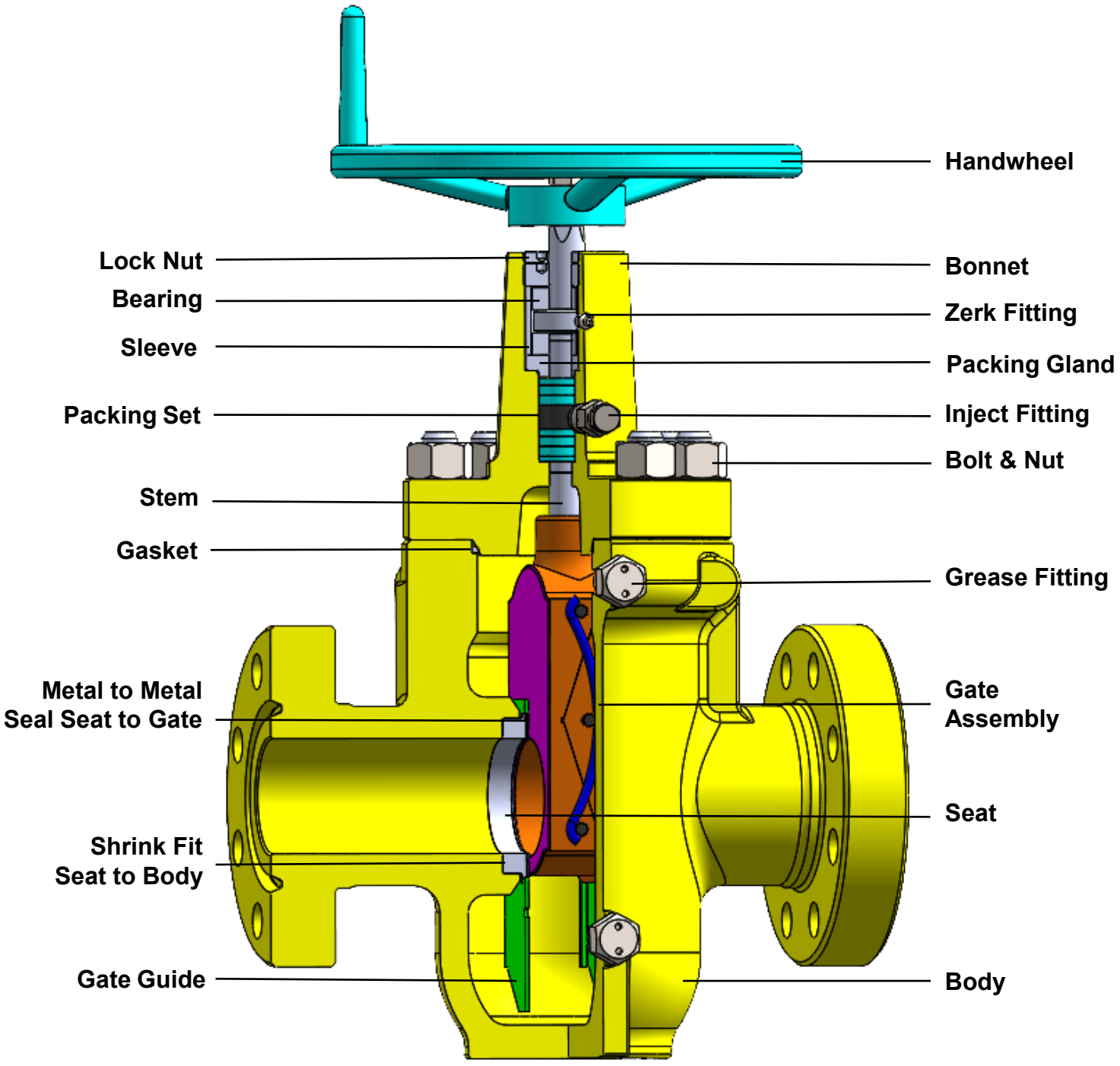


Stroking Position:
When stroking to open or closed position, the gate and segment is held by spring with no forced contact in between closure member (gate and segment) against the seats which minimize friction during stroking.

Fully Closed:
The segment going down is stopped by contact with the bottom body. The gate continuous moving down to expand the segment and gate against both seats to form a positive mechanical seal, no matter with or without line pressure.

Fully Opened:
The segment is stopped by contacting with the bonnet stop. The gate continuous moving up to expand the segment and gate against both seats to form a positive mechanical seal, no matter with or without line pressure

GEOTHERMAL WELLHEAD VALVE



Source Manufacturing (Shanghai) Co., Ltd
988 Xiang Jing Road, Songjiang District
Shanghai 201611, P.R.China
Tel: 86 21 57775088
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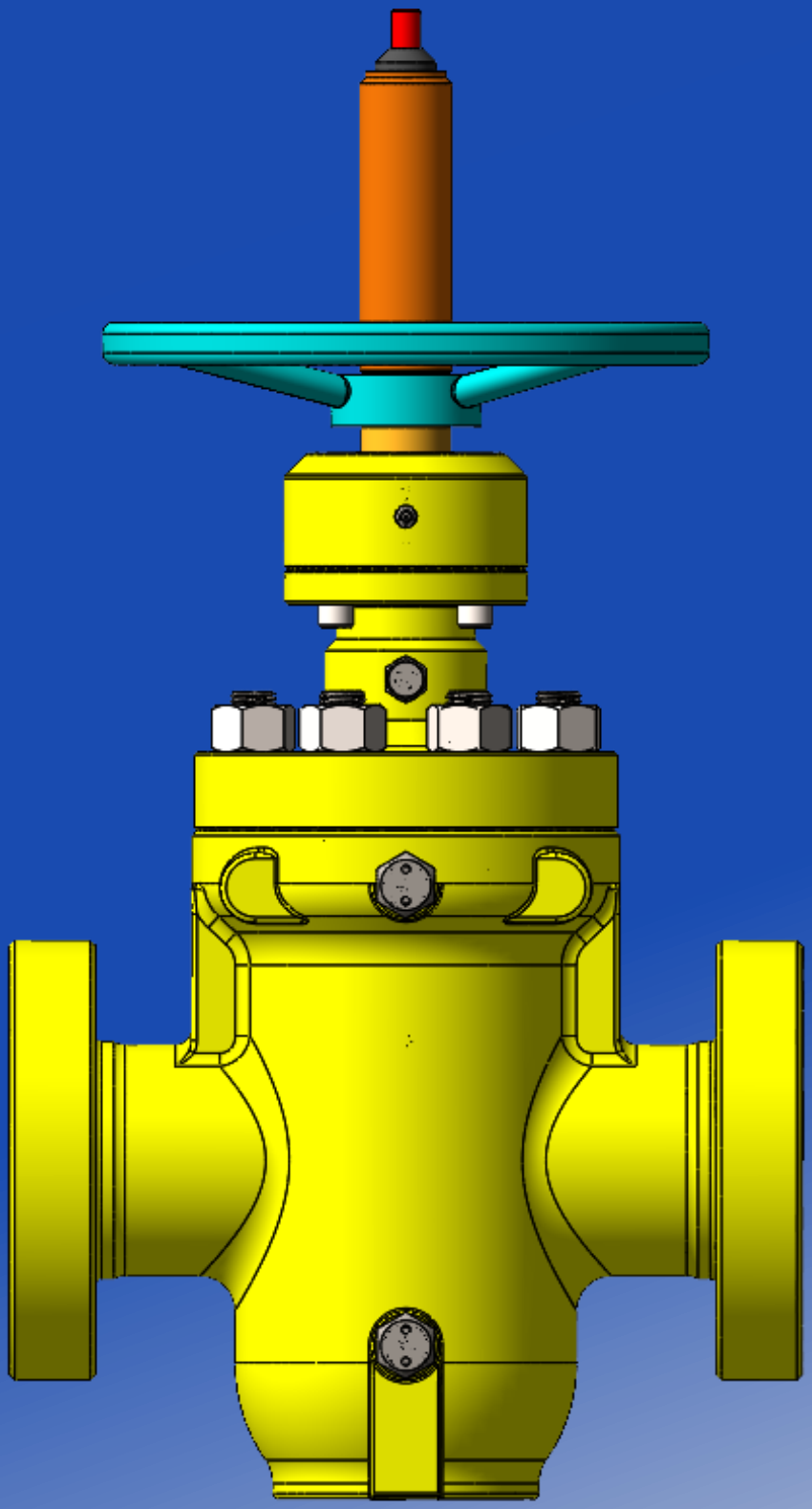
DRILLING & PRODUCTION GEOTHERMAL WELLHEAD VALVE

VERSA-WEDGE™ GATE VALVE



SV-05 R01

PRODUCTS INTRODUCTION

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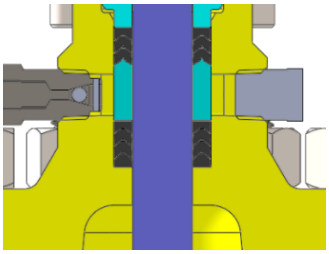

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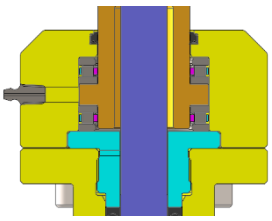

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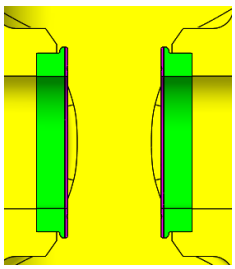

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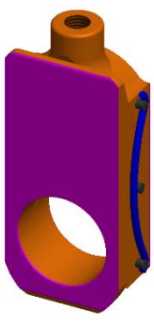
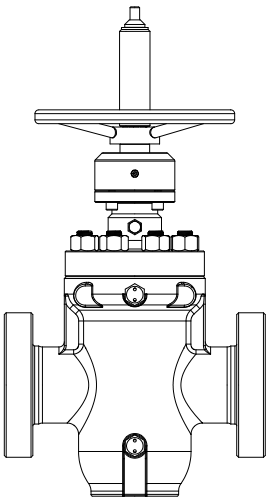
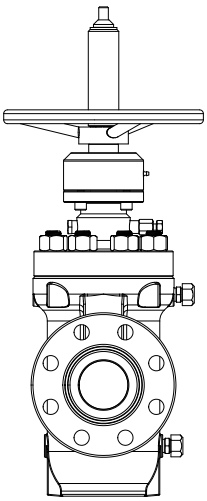
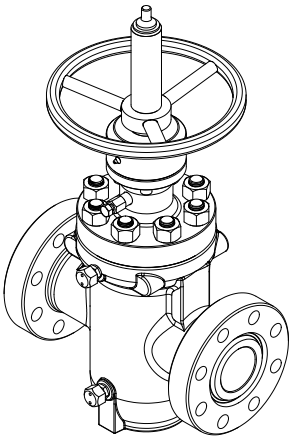


Stellite hard-faced gate and seat

PRODUCT VIEW AND FUNCTION







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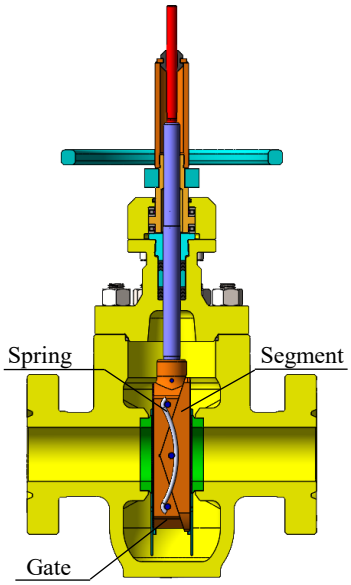

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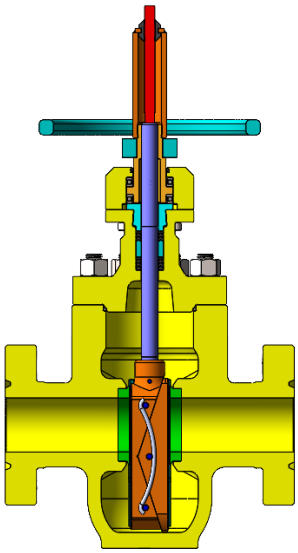

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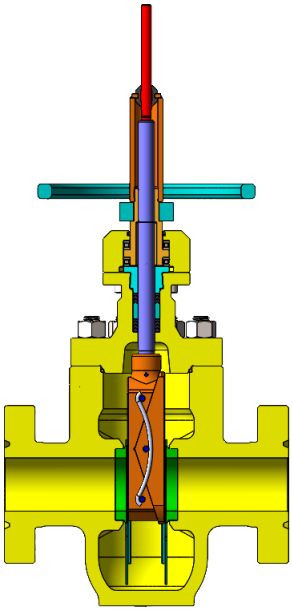

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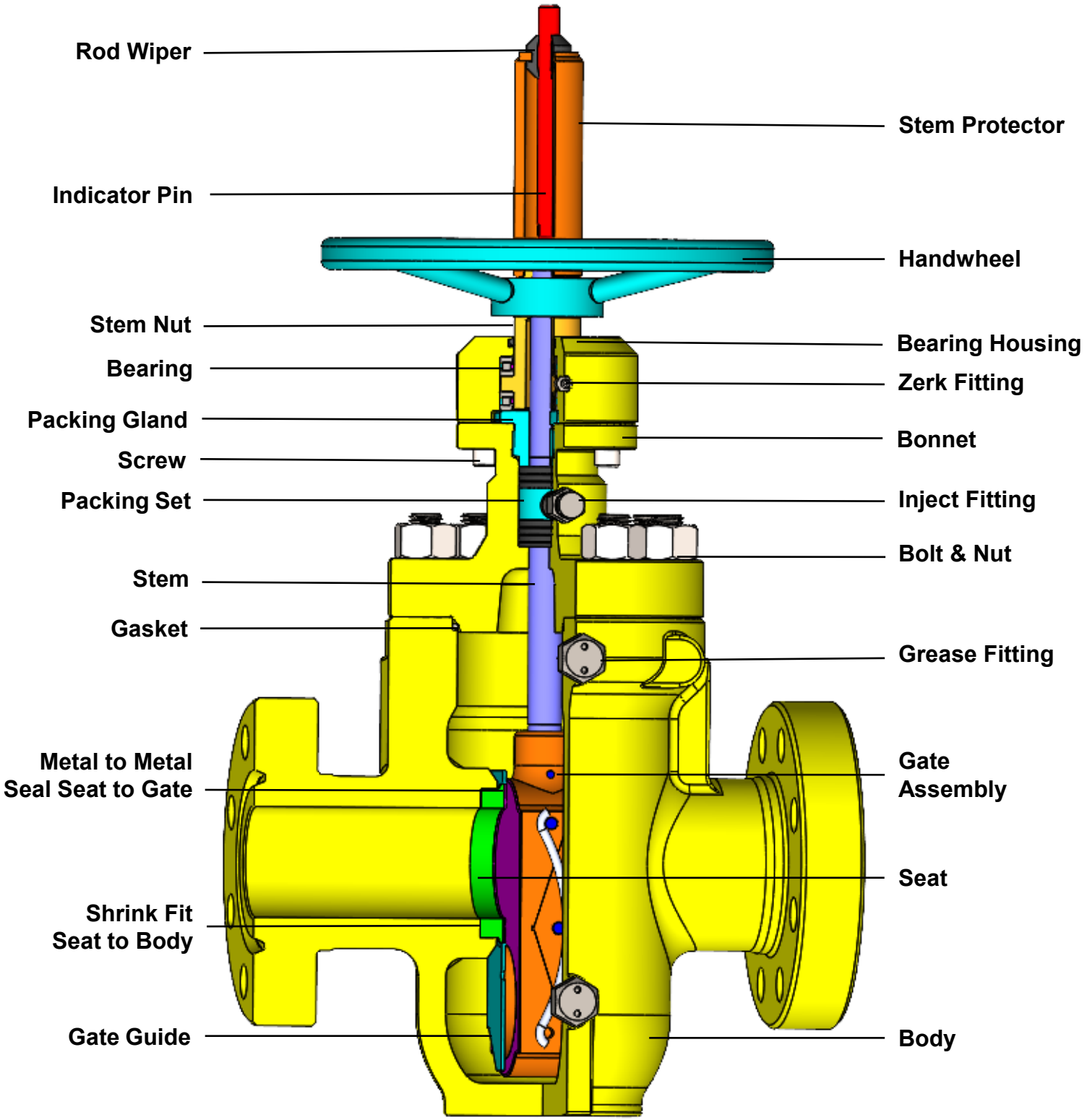
GEOTHERMAL WELLHEAD VALVE



Source Manufacturing (Shanghai) Co., Ltd
988 Xiang Jing Road, Songjiang District
Shanghai 201611, P.R.China
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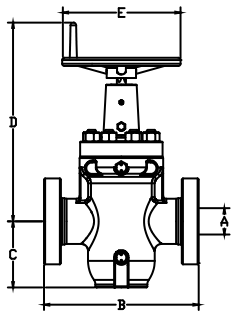
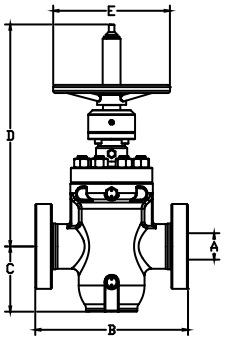
EXPANDING GATE VALVE REFERENCE DIMENSIONS AND WEIGHTS (NON-RISING STEM)



A Valve Bore
B Flange Face to Face
C Bore Centerline to Bottom of Valve
D Bore Centerline to Handwheel Top
E Handwheel Diameter
N Number of Turns to Open/Close
WT Estimated Weight

NPS in	Pressure Class	A		B		C		D		E		WT		N	API
		in	mm	in	mm	in	mm	in	mm	in	mm	lbs	kg		Ring
2	600	2 1/16	52	11.63	295	4.81	122	19	489	13	330	119	54	13	R-23
	900	2 1/16	52	14.63	372	5.02	128	19	494	13	330	123	56		R-24
3	600	3 1/8	79	14.13	359	7.07	180	22	556	13	330	218	99	20	R-31
	900	3 1/8	79	15.13	384	7.13	181	22	556	13	330	299	136		R-31

EXPANDING GATE VALVE REFERENCE DIMENSIONS AND WEIGHTS (RISING STEM)



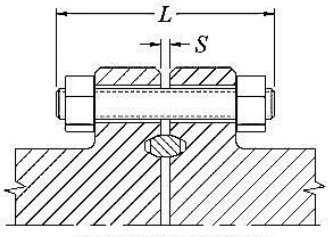
A Valve Bore
B Flange Face to Face
C Bore Centerline to Bottom of Valve
D Bore Centerline to Handwheel Top
E Handwheel Diameter
N Number of Turns to Open/Close
WT Estimated Weight

NPS in	Pressure Class	A		B		C		D	-Closed -Open	E		WT		N	API Ring
		in	mm	in	mm	in	mm	in	mm	in	mm	lbs	kg		
2	600	2 1/16	52	11.63	295	4.81	122	23.15	588	13	330	119	54	13	R-23
								25.90	658						
	900	2 1/16	52	14.63	372	5.02	128	23.57	599	13	330	123	56		R-24
								26.27	667						
3	600	3 1/8	79	14.13	359	7.07	180	24.15	613	13	330	218	99	20	R-31
								28.15	715						
	900	3 1/8	79	15.13	384	7.13	181	24.85	631	13	330	299	136		R-31
								28.85	733						
10	600	10	254	31.13	791	19.75	502	66.29	1684	30	762	2204	1002	34	R-53
								77.10	1958						
	900	10	254	33.13	842	20.15	512	66.29	1684	30	762	2721	1237		R-53
								77.10	1958						
12 Note	600	12 3/8	314	33.13	842	23.00	584	71.00	1803	30	762	2673	1215	44	R-57
								85.75	2178						
	900	12 3/8	314	38.13	969	23.50	597	73.51	1867	24	610	3362	1528	176	R-57
								88.35	2244						

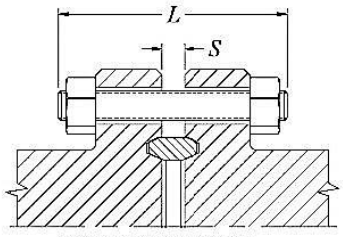
Note: All the valves are handwheel operated, except 12" Class900 valve is bevel gear operated.

RECOMMENDED FLANGE BOLT LENGTHS & RING GASKET TYPE

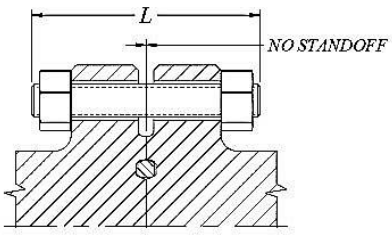
Recommended Bolt Lengths						
Nominal Size	Working Pressure (psi)	Stud			Nut	Ring Gasket
		Bolt Size and Thread	Length +0.125/−0	Qty	Qty	
2 1/16	2000	5/8-11 UNC	5	8	16	R23
	3000-5000	7/8-9 UNC	6.5	8	16	R24
	10000	3/4-10 UNC	5.5	8	16	BX-152
2 9⁄16	2000	3/4-10 UNC	5.5	8	16	R26
	3000-5000	1-8 UNC	7	8	16	R27
3 1⁄8	2000	3/4-10 UNC	5.75	8	16	R31
	3000	7/8-9 UNC	6.5	8	16	R31
	5000	1-1/8-8 UNC	7.75	8	16	R35
3 1/16	10000	1-8 UNC	7.25	8	16	BX-154
4 1⁄16	2000	7/8-9 UNC	6.5	8	16	R37
	3000	1-1/8-8 UN	7.5	8	16	R37
	5000	1-1/4-8 UN	8.5	8	16	R39
	10000	1-1/8-8 UN	8.5	8	16	BX-155
5 1⁄8	5000	1-1/2-8 UN	10.5	8	16	R44
	10000	1-1/8-8 UN	9.25	12	24	BX-169



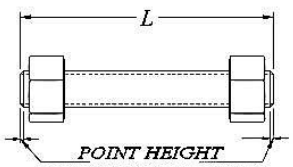
API TYPE 6B FLANGE WITH R GASKET



API TYPE 6B FLANGE WITH RX GASKET



API TYPE 6BX FLANGE



STUD BOLT WITH NUTS

LENGTH = 2(T + t + d) + S + 2(P)

T is total flange thickness;

t is plus tolerance for flange thickness;

d is heavy hex nut thickness;

S is flange face standoff (with “RX” gasket),S=0 for BX connection which has no standoff height;

P is point max. (1.5 x pitch).

6A GATE VALVE TRIM CHART

TRIM		SERVICE CONDITION	BODY	BONNET	GATE	SEAT	STEM[*3]
AA	Non-sour Service	Standard Trim, Non Corrosive	A487 4C /4130LA	4130LA	4130LA	4130LA	17-4PH
BB		Stainless Trim, Slightly Corrosive	A487 4C /4130LA	4130LA	410SS	410SS	17-4PH
CC		Full Stainless Trim, Moderately Corrosive	410SS	410SS	410SS	410SS	17-4PH
DD-0.5	Sour Service	Standard Trim, Non Corrosive	A487 4C /4130LA	4130LA	4130LA	4130LA	17-4PH
DD-NL		Standard Trim, Non Corrosive	A487 4C /4130LA	4130LA	4130LA	4130LA	4130LA
EE-0.5		Stainless Trim, Slightly Corrosive	4130LA	4130LA	410SS	410SS	17-4PH
EE-1.5		Stainless Trim, Highly Corrosive	4130LA	4130LA	410SS	410SS	410SS
EE-NL		Stainless Trim, Highly Corrosive	4130LA	4130LA	410SS	410SS	Inconel 718[*4]
FF-0.5		Full Stainless Trim Highly Corrosive	410SS	410SS	410SS	410SS	17-4PH
FF-1.5		Full Stainless Trim Highly Corrosive	410SS	410SS	410SS	410SS	410SS
FF-NL		Full Stainless Trim Highly Corrosive	410SS	410SS	410SS[*3]	410SS[*3]	Inconel 718[*4]
HH-NL[*5]		Highly Corrosive Extreme Service	4130 W/625 Inlay[*5]	4130 W/625 Inlay[*5]	Inconel 718[*4]	Inconel 718[*4]	Inconel 718[*4]

NOTES:

1.This trim chart provides information on materials included in standard valves offered by Array. Special materials, trims and configurations are available upon customer request.

2.Standard trim parts are QPQ nitrided. Tungsten Carbide HVOF, Hardfaced gates and seats are available for any TRIM upon request.

3.Materials for sour service trims conform to latest edition of NACE MR0175/ISO15156. Explanation for suffixes used for sour trims:

a) 0.5 = 0.5 psi maximum partial pressure of hydrogen sulfide(H2S)

b) 1.5 = 1.5 psi maximum partial pressure of hydrogen sulfide(H2S)

c) NL = No limit to hydrogen sulfide (H2S) exposure.

4.Inconel 718 is an alternative material for upgrade.

5.Inconel 718 is only "NL" for temperatures K thru U. Inconel 725 can be used up to temp. X.

6.CRA material is not available for temp. Y service.

7.Source reserves the right to use material class ZZ when customers request materials of construction that do not comply with current NACE MR0175/ISO standards

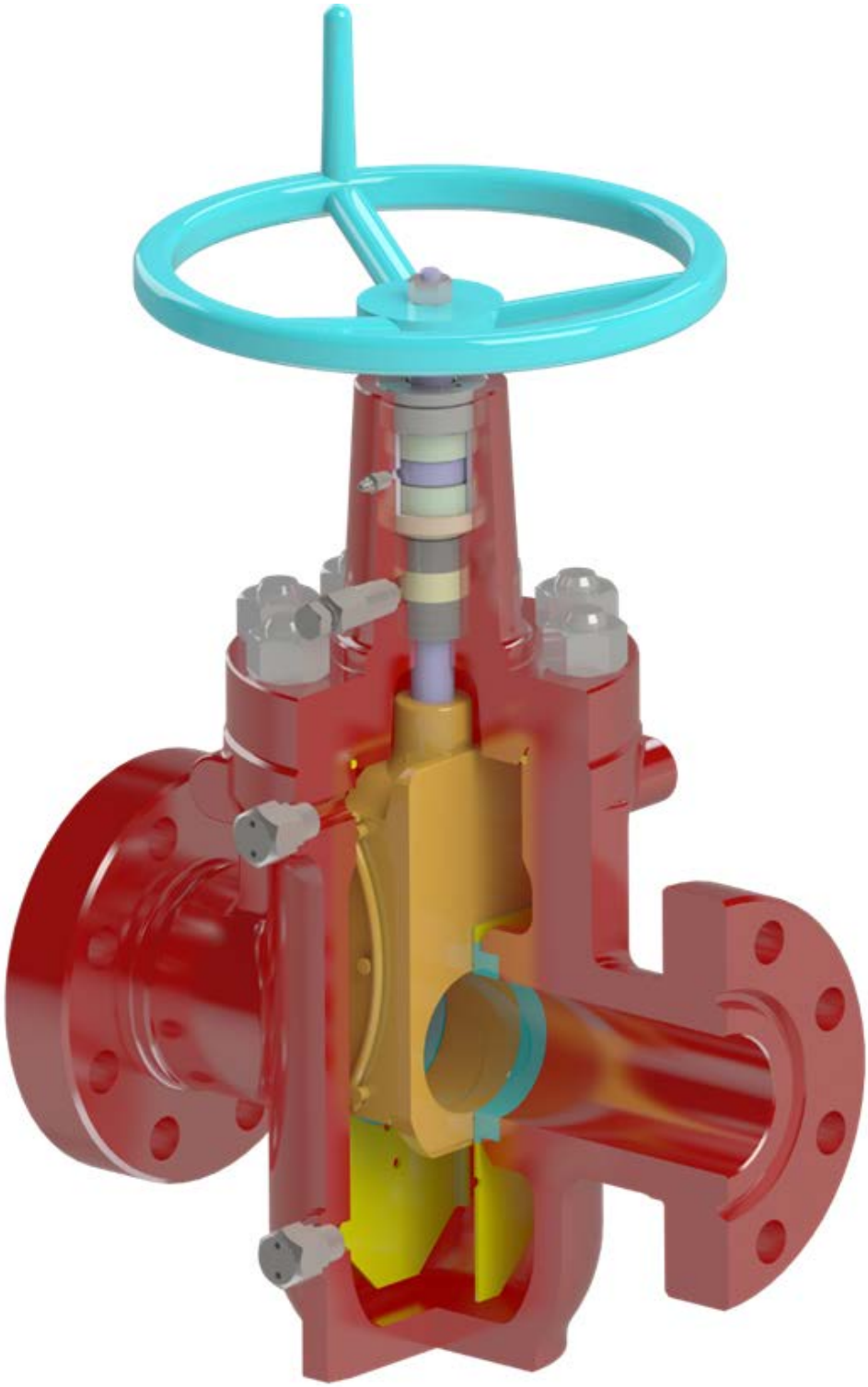
Temp. Class	Temperature Range			
	℃		°F	
	min.	max.	min.	max.
K	–60	82	–75	180
L	–46	82	–50	180
N	–46	60	–50	140
P	–29	82	–20	180
S	–18	60	0	140
T	–18	82	0	180
U	–18	121	0	250
V	2	121	35	250
X	–18	180	0	350
Y	-18	350	0	650

NOTE

Minimum temperature is the lowest ambient temperature to which the equipment can be subjected. Maximum temperature is the highest temperature of the fluid that can directly contact the equipment.

EXPANDING GATE VALVE

Operating & Service Manual



Source Manufacturing (Shanghai) Co., Ltd
988 Xiang Jing Road, Songjiang District
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Email: sales@source-mfg.com

Operating & Service Manual

for Expanding Gate Valve, Non-rising Stem

Date: Sep. 2018

OPS-806 Rev.02

Information provided in this Recommended Procedure is of general nature based on accepted operating practices. Source Manufacturing or its agents makes no representation, warranty or guarantee in connection with this recommended procedure and expressly disclaims any liability or responsibilities when any p- art of this recommended procedure is adopted. The user is the best judge when applying this procedure base on specific equipment installation and the opera- ting conditions.

Table of Content

1 General Information

The expanding gate valve is a unidirectional non-rising stem manual operated valve incorporating an expanding gate and seats design. The parallel expanding gate design provides a tight mechanical seal which is normally unaffected by pressure fluctuations or variations. The gate assembly uses an wedge face which is collapsed during travel. When closed, a stop causes any further downward travel to force the faces of the gate assembly outward to effect a positive line flow seal. When opened, a stop causes any further upward travel to force bottom faces to expand and seal against the seats to isolate flow from the valve body cavity.

The bonnet is bolted to the valve body and pressure integrity is achieved by means of a metal ring gasket.

Pressure energized stem packing set are used to isolate pressure in the valve cavity.

The bearing spacer is sandwiched by thrust bearing assembly to provide a sturdy low operating torque gate valve.

The bonnet is equipped with an injection fitting for packing injection and a standard grease zerk (1/8”) for lubrication of the stem bearing assembly. The body is equipped with two 1/2” vent/grease fittings which can be also used for body lubrication pressure relief.

The gate valve is not designed to be used as a throttle valve.

ALL OPERATORS AND MAINTENANCE PERSONNEL SHOULD BE THOROUGHLY TRAINED IN THE SAFE OPERATION, MAINTENANCE, AND INSPECTION OF THIS EQUIPMENT.

2 Installation

2.1 Unpacking

a) The valve is shipped in full open position with flange end protectors installed. This is to preclude debris from falling into valve cavity.

b) Remove flange protectors and thoroughly inspect interior of valve and end connections for damage or foreign material.

c) Install loose items such as hand wheels, etc. if separated from valve assembly.

2.2 Handling

Proper lifting equipment should be provided to handle the valve.

⚠CAUTION:

Do not use hand-wheels of the valve to lift the valve. Avoid damaging the end connection faces and fittings during handling.

2.3 Installation

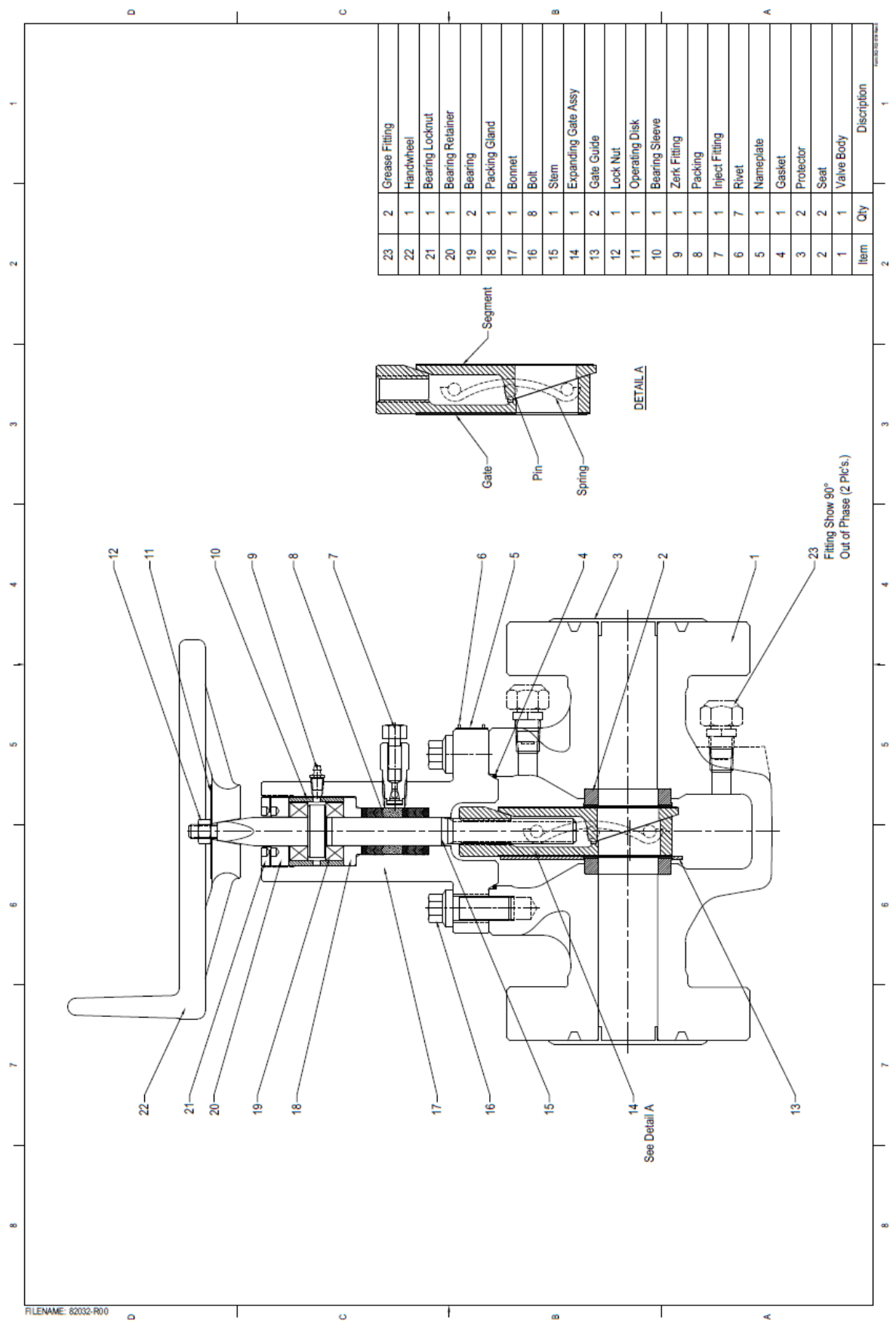
a) Install the valve in the open position with the preferred upstream pressure side. The preferred upstream pressure side is the right hand flange when looking at the lettered and fitting side of the body. This flange is painted yellow as shown.

b) Flanged end valves should be installed using the appropriate gasket (not supplied) and conventional flange installation procedures.

c) Prior to operating the valve from the open position, the conduit should be thoroughly flushed to prevent foreign material from damaging sealing surfaces.

Assembly Drawing

Assembly drawing, see next page


Item | Qty | Discription
1 | 1 | Valve Body
2 | 2 | Seat
3 | 2 | Protector
4 | 1 | Gasket
5 | 1 | Nameplate
6 | 7 | Rivet
7 | 1 | Inject Fitting
8 | 1 | Packing
9 | 1 | Zerk Fitting
10 | 1 | Bearing Sleeve
11 | 1 | Operating Disk
12 | 1 | Lock Nut
13 | 2 | Gate Guide
14 | 1 | Expanding Gate Assy
15 | 1 | Stem
16 | 8 | Bolt
17 | 1 | Bonnet
18 | 1 | Packing Gland
19 | 2 | Bearing
20 | 1 | Bearing Retainer
21 | 1 | Bearing Locknut
22 | 1 | Handwheel
23 | 2 | Grease Fitting
Segment
Gate
Pin
Spring
DETAIL A
Fitting Show 90° Out of Phase (2 Plc's.)
See Detail A
FILENAME: 82032-R00

3 Operation

Turn the hand-wheel clockwise to CLOSE the valve until it becomes tight. Tighten securely to mechanically energize the seal. DO NOT BACK OFF THE HAND-WHEEL.

Turn the hand-wheel counter-clockwise to OPEN the valve until segment is stopped by the bonnet.

If necessary, with the valve fully CLOSED, cavity pressure can be relieved through the body vent fitting.

WARNING:

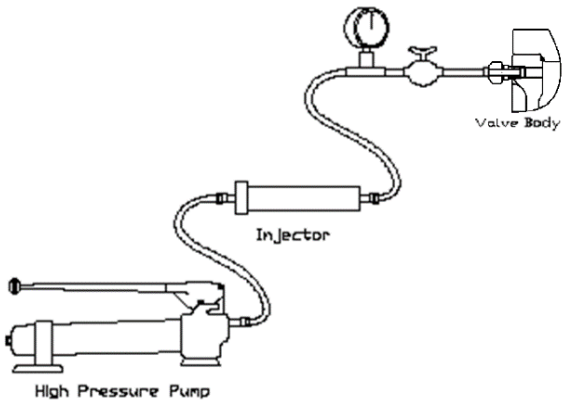
Always wear approved safety gear and face away from the vents when relieving pressure from the valve.

4 Maintenance

Periodic maintenance is required for the expanding gate valves to promote trouble-free service and long life. Visually inspect every six months for any leakage, abnormal sound and bolt loosened, see Trouble Shooting for temporary solution to problems. Operate the valve once a month where practicable. A full open and close cycle is preferable, operate a partial cycle as a minimum. Stem bearing lubricated once a year.

4.1 Valve Cavity Lubrication

The valve cavity to be lubricated on a regular basis to ensure continuous smooth operation of the valve. Generally, lubrication may be carried out after valve draining. Whenever possible lubrication should only be done after the valve is isolated from the pressure. Approximately one pound of grease per inch of valve bore size will sufficiently lubricate the valve body. It is not necessary to completely fill the valve body.



Lubrication of Valve Cavity
Under Line Pressure

Lubrication Procedure with Isolated Line Pressure

a) Fully close or open valve, remove cap on grease fitting located on the valve body and install pressure releasing tool to one fitting and grease pump to the other.

b) Use pressure releasing tool to bleed off any pressure trapped in the valve cavity and leave stringer in

this position.

c) Inject grease into the valve cavity through the other body grease fitting.

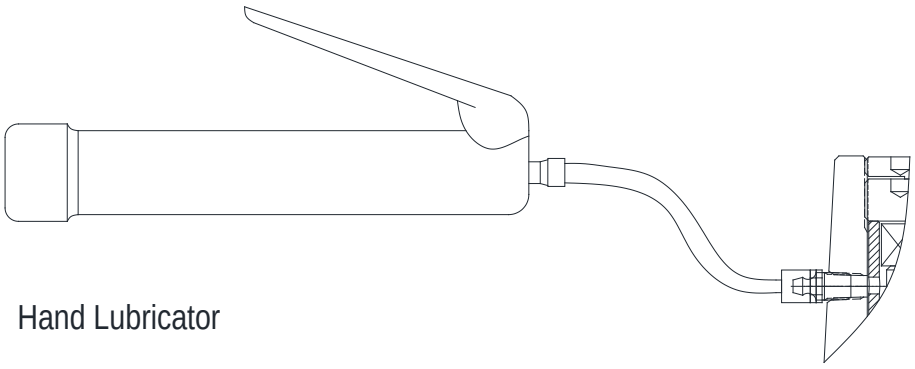
d) Once completion of lubrication, remove releasing tool and grease pump. Re-install grease fitting caps securely on the both fittings.

⚠CAUTION:

Lubricating pressure must not exceed the rated working pressure of the valve being lubricated. A pressure gage should be used to motitor the lubricating pressure.

4.2 Stem Bearing Assembly Lubrication

Regular lubrication of the stem bearing assembly is essential to maintain a trouble free and smooth operation of a valve. A small amount of good lithium based bearing grease is injected to bearing housing through the grease zerk located on the bonnet with a hand held lubricator. DO NOT overfill.



Hand Lubricator

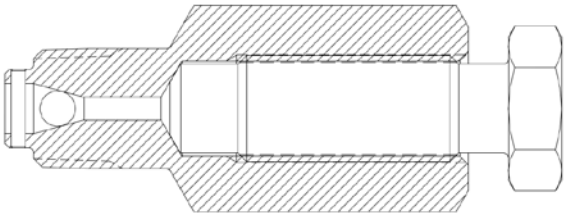
4.3 Stem Packing Maintenance

In the event of stem packing leakage, injectable packing may be injected into stem packing box through the injection fitting located on bonnet.
Caution shall be taken if this procedure is being done while the valve is in service and under pressure.

Packing Injection Procedure

a) Remove the hex head fitting stringer, insert injectable packing stick into injection fittings.

b) Run stringer all the way in against the stem packing fitting then back out when in terms of ensuring the ball check has seated. Discontinuous operation may be required to evenly distribute the sealant, generally once the pressure rises above valve rated pressure, hold for 2 or 3 minutes.



Inject Fitting

c) If necessary, repeat injection of the injectable packing until sufficient to eliminate leakage.

WARNING:

Always face away from the fittings during packing injection.

CAUTION:

Over pressurizing the injectable packing will distort packing, making the valve difficult to operate.

4.4 Draining

Routine draining will reduce damage to valve caused by accumulation of foreign material in the valve body. It is advisable to periodically drain the valve where practicable.

Draining Procedure

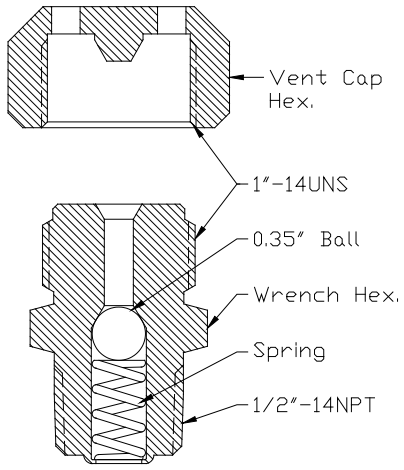
a) Fully close or open valve, remove the safety cap on the grease fitting in the bottom of the body.

b) Back out the stringer of pressure releasing tool until it stops, install the pressure releasing tool to grease fitting.

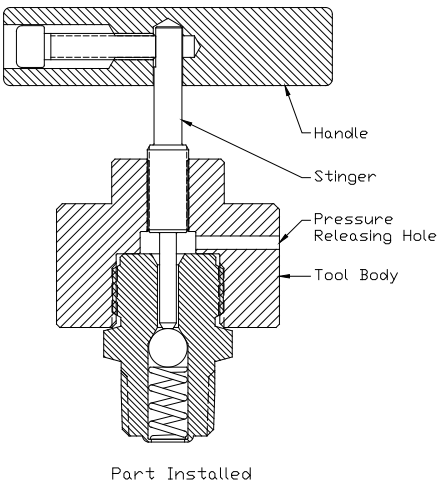
c) Screw the stringer until it contacts ball check, then 1/2 turn further to drain the body.

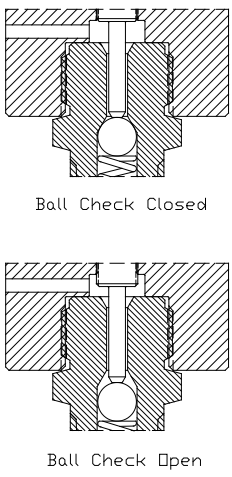
d) If insufficient draining, it may be necessary to repeat the procedure.

e) Once completion, back out the stringer of releasing tool and ensure ball check in grease fitting to reseat, replace safety cap on the fitting.



Grease Fitting





Pressure Releasing Tool

5 Troubleshooting

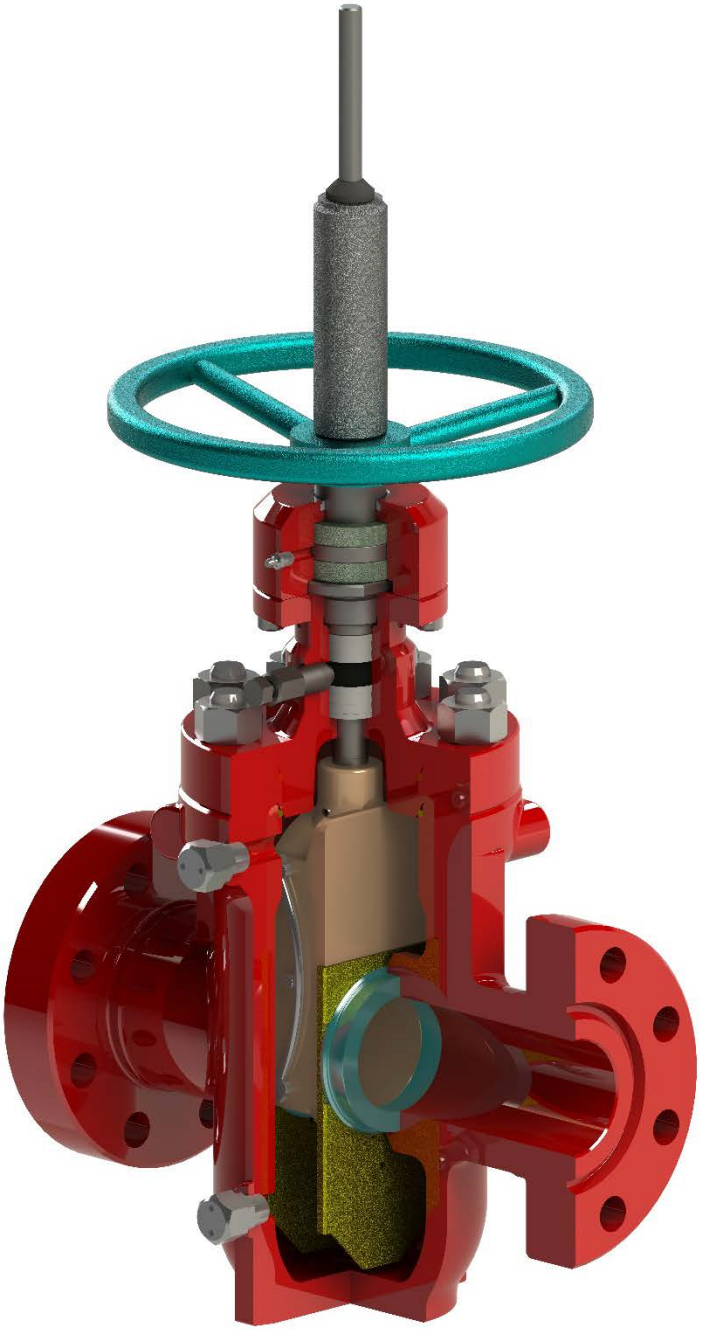
No.	Trouble	Possible Reason	Trouble Shooting
1	Stem packing leakage	Damage packing	Tighten the packing gland nuts on follower plate or inject stem packing
2	Grease fitting leakage	Fitting screw loose	Tighten the screw
3	Leakage in bonnet flange	Bonnet bolts loose	Tighten bonnet bolts as necessary
		Damage to gasket	Replace the gasket
4	Valve seats not seal	The valve is not fully closed	Fully close the valve
		Damage to seat sealing surface	Replace the damaged seat
5	The gate will not close	Foreign material accumulated in bottom of valve cavity	Drain the foreign material through grease fitting in the bottom of body
6	Difficult to open or close	Dry stem	Inject lubricant as necessary
		Valve has not been opened or closed for a long time, the seats and gate tied tightly	Open and close the valve rapidly several times till the gate is loosened, then open or close the valve to required position.
7	Imbalance of operation	Dry bearing	Inject lubricant as necessary
		Damage to bearing	Replace the damaged bearing

6 Approval Record & Revision History

Revision	Date	Record of Changes (Only last three revision histories are recorded)
00	2015/06/25	Initial Release
01	2017/12/20	Re-edit
02	2018/09/29	Correct Typo Error

EXPANDING GATE VALVE

Operating & Service Manual



Source Manufacturing (Shanghai) Co., Ltd
988 Xiang Jing Road, Songjiang District
Shanghai 201611, P.R.China Tel: 86 21 57775088 Fax: 86 21 57775068
Email: sales@source-mfg.com

Operating & Service Manual

for Expanding Gate Valve

Date: Sep. 2018

OPS-811 Rev.00

Information provided in this Recommended Procedure is of general nature based on accepted operating practices. Source Manufacturing or its agents makes no representation, warranty or guarantee in connection with this recommended procedure and expressly disclaims any liability or responsibilities when any p- art of this recommended procedure is adopted. The user is the best judge when applying this procedure base on specific equipment installation and the opera- ting conditions.

Table of Content

1 General Information

The expanding gate valve is a unidirectional rising stem manual operated valve incorporating an expanding gate and seats design. The parallel expanding gate design provides a tight mechanical seal which is normally unaffected by pressure fluctuations or variations. The gate assembly uses an wedge face which is collapsed during travel. When closed, a stop causes any further downward travel to force the faces of the gate assembly outward to effect a positive line flow seal. When opened, a stop causes any further upward travel to force bottom faces to expand and seal against the seats to isolate flow from the valve body cavity.

The bonnet is bolted to the valve body and pressure integrity is achieved by means of a metal ring gasket. Pressure energized stem packing set are used to isolate pressure in the valve cavity.

The stem nut is sandwiched by thrust bearing assembly to provide a sturdy low operating torque gate valve.

The bonnet is equipped with an injection fitting for packing injection. Bearing housing is equipped with a standard grease zerk (1/8”) for lubrication of the stem bearing assembly. The body is equipped with two 1/2” vent/grease fittings which can be also used for body lubrication pressure relief.

The gate valve is not designed to be used as a throttle valve.

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2 Installation

2.1 Unpacking

a) The valve is shipped in full closed position with flange end protectors installed.

b) Remove flange protectors and thoroughly inspect interior of valve and end connections for damage or foreign material.

2.2 Handling

Proper lifting equipment should be provided to handle the valve.

⚠CAUTION:

Do not use hand-wheels of the valve to lift the valve. Avoid damaging the end connection faces and fittings during handling.

2.3 Installation

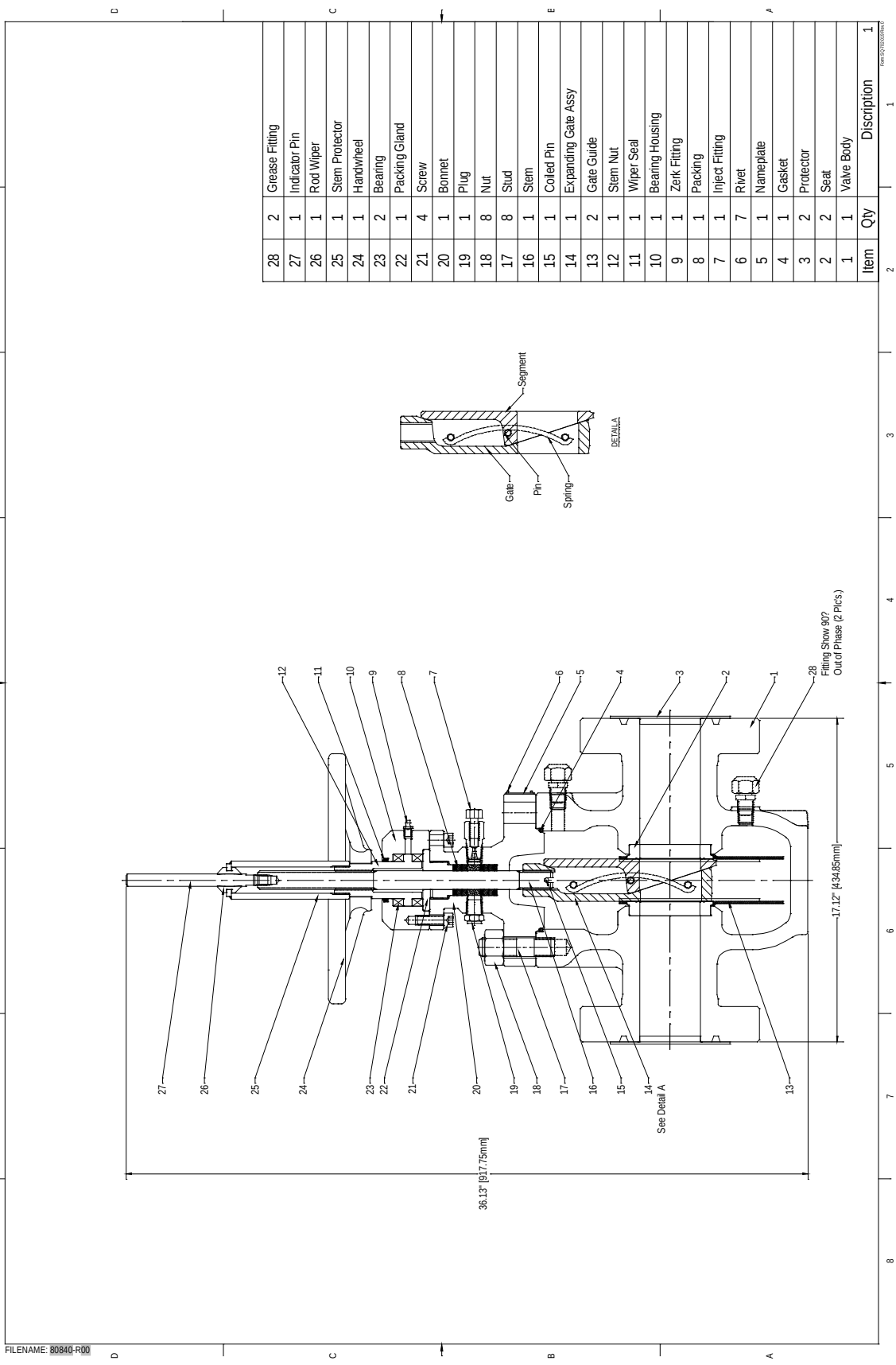
a) Install the valve in the open position with the preferred upstream pressure side. The preferred upstream pressure side is the right hand flange when looking at the lettered and fitting side of the body. This flange is painted yellow as shown.

b) Flanged end valves should be installed using the appropriate gasket (not supplied) and conventional flange installation procedures.

c) Prior to operating the valve from the open position, the conduit should be thoroughly flushed to prevent foreign material from damaging sealing surfaces.

Assembly Drawing

Assembly drawing, see next page


Item | Qty | Discription
1 | 1 | Valve Body
2 | 2 | Seat
3 | 2 | Protector
4 | 1 | Gasket
5 | 1 | Nameplate
6 | 7 | Rivet
7 | 1 | Inject Fitting
8 | 1 | Packing
9 | 1 | Zerk Fitting
10 | 1 | Bearing Housing
11 | 1 | Wiper Seal
12 | 1 | Stem Nut
13 | 2 | Gate Guide
14 | 1 | Expanding Gate Assy
15 | 1 | Coiled Pin
16 | 1 | Stem
17 | 8 | Stud
18 | 8 | Nut
19 | 1 | Plug
20 | 1 | Bonnet
21 | 4 | Screw
22 | 1 | Packing Gland
23 | 2 | Bearing
24 | 1 | Handwheel
25 | 1 | Stem Protector
26 | 1 | Rod Wiper
27 | 1 | Indicator Pin
28 | 2 | Grease Fitting
Segment
Gate
Pin
Spring
DETAIL A
Fitting Show 90? Out of Phase (2 Plc's.)
17.12" [434.85mm]
See Detail A
36.13" [917.75mm]
FILENAME: 80840-R00

3 Operation

Turn the hand-wheel clockwise to CLOSE the valve until it becomes tight. Tighten securely to mechanically energize the seal. DO NOT BACK OFF THE HAND-WHEEL.

Turn the hand-wheel counter-clockwise to OPEN the valve until segment is stopped by the bonnet.

If necessary, with the valve fully CLOSED, cavity pressure can be relieved through the body vent fitting.

WARNING:

Always wear approved safety gear and face away from the vents when relieving pressure from the valve.

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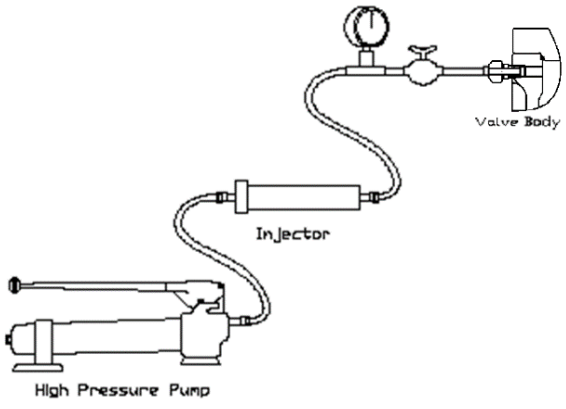


Lubrication of Valve Cavity
Under Line Pressure

Lubrication Procedure with Isolated Line Pressure

a) Fully close or open valve, remove cap on grease fitting located on the valve body and install pressure releasing tool to one fitting and grease pump to the other.

b) Use pressure releasing tool to bleed off any pressure trapped in the valve cavity and leave stringer in this position.

c) Inject grease into the valve cavity through the other body grease fitting.

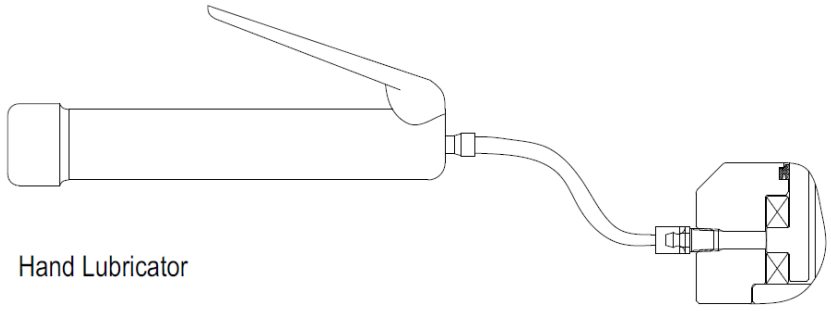
d) Once completion of lubrication, remove releasing tool and grease pump. Re-install grease fitting caps securely on the both fittings.

⚠CAUTION:

Lubricating pressure must not exceed the rated working pressure of the valve being lubricated. A pressure gage should be used to motitor the lubricating pressure.

4.2 Stem Bearing Assembly Lubrication

Regular lubrication of the stem bearing assembly is essential to maintain a trouble free and smooth operation of a valve. A small amount of good lithium based bearing grease is injected to bearing housing through the grease zerk located on the bonnet with a hand held lubricator. DO NOT overfill.



Hand Lubricator

4.3 Stem Packing Maintenance

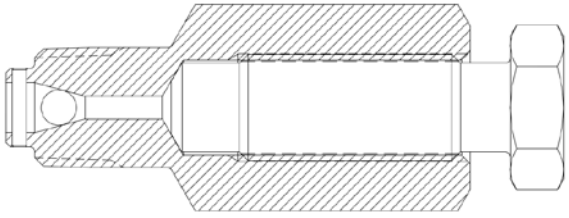
In the event of stem packing leakage, injectable packing may be injected into stem packing box through the injection fitting located on bonnet.

Caution shall be taken if this procedure is being done while the valve is in service and under pressure.

Packing Injection Procedure

a) Remove the hex head fitting stringer, insert injectable packing stick into injection fittings.

b) Run stringer all the way in against the stem packing fitting then back out when in terms of ensuring the ball check has seated. Discontinuous operation may be required to evenly distribute the sealant, generally once the pressure rises above valve rated pressure, hold for 2 or 3 minutes.



Inject Fitting

c) If necessary, repeat injection of the injectable packing until sufficient to eliminate leakage.

WARNING:

Always face away from the fittings during packing injection.

CAUTION:

Over pressurizing the injectable packing will distort packing, making the valve difficult to operate.

4.4 Draining

Routine draining will reduce damage to valve caused by accumulation of foreign material in the valve body. It is advisable to periodically drain the valve where practicable.

Draining Procedure

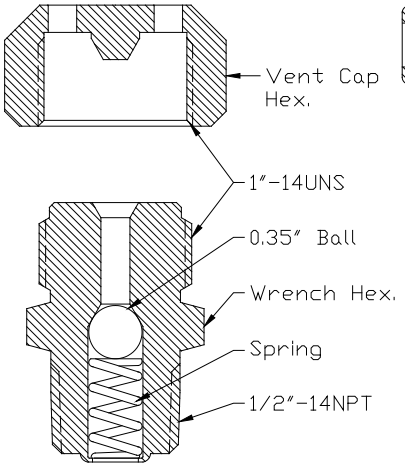
a) Fully close or open valve, remove the safety cap on the grease fitting in the bottom of the body.

b) Back out the stringer of pressure releasing tool until it stops, install the pressure releasing tool to grease fitting.

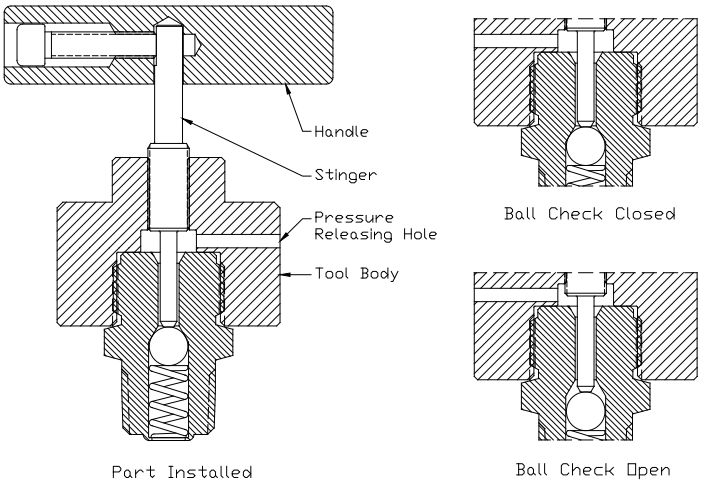
c) Screw the stringer until it contacts ball check, then 1/2 turn further to drain the body.

d) If insufficient draining, it may be necessary to repeat the procedure.

e) Once completion, back out the stringer of releasing tool and ensure ball check in grease fitting to reseat, replace safety cap on the fitting.



Grease Fitting



Pressure Releasing Tool

5 Troubleshooting

No.	Trouble	Possible Reason	Trouble Shooting
1	Stem packing leakage	Damage packing	Tighten the packing gland nuts on follower plate or inject stem packing
2	Grease fitting leakage	Fitting screw loose	Tighten the screw
3	Leakage in bonnet flange	Bonnet bolts loose	Tighten bonnet bolts as necessary
		Damage to gasket	Replace the gasket
4	Valve seats not seal	The valve is not fully closed	Fully close the valve
		Damage to seat sealing surface	Replace the damaged seat
5	The gate will not close	Foreign material accumulated in bottom of valve cavity	Drain the foreign material through grease fitting in the bottom of body
6	Difficult to open or close	Dry stem	Inject lubricant as necessary
		Valve has not been opened or closed for a long time, the seats and gate tied tightly	Open and close the valve rapidly several times till the gate is loosened, then open or close the valve to required position.
7	Imbalance of operation	Dry bearing	Inject lubricant as necessary
		Possible damage to stem nut or bearing	Replace the damaged parts

6 Approval Record & Revision History

Revision	Date	Record of Changes (Only last three revision histories are recorded)
00	2018/09/29	Initial Release