MUD GATE VALVES

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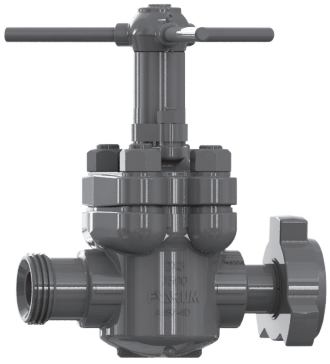
MUD GATE VALVES

Introduction

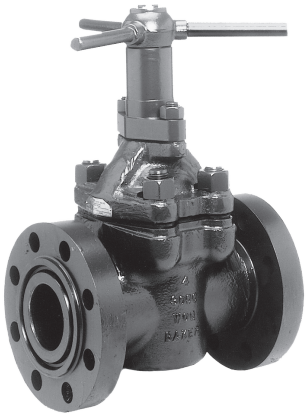
FET Mud Gate Valves conform to API Flange dimensions and pressure ratings. They are designed for dependable service in high pressure systems and in pump and standpipe manifold systems. The seats are designed to provide a positive, tight shut off every closing cycle, even after long exposure to abrasion and scoring. Twin metal wear inserts, encapsulated in an elastomer, form a cylindrically shaped plug made up of a gate slot and two flowports. Once closed, line pressure forces the gate up against the downstream port seals which are tested up to 7,500 psi. The 4 in. 5000 Working Pressure (WP) thru 5 x 4 in. 7500 WP valve has a transparent stem cover which protects and reveals gate open/close position. Stem packing is self-adjusting on all sizes.

2 inch Screwed End
2000-5000 WP

5-1/8 inch Flanged End
7500 WP



Hammer Union End
7500 WP



3 inch Flanged End
2000-5000 WP

3 inch Weld End
2000-5000 WP

GENERAL INFORMATION

General Application

- Water, oil, and gas lines
- Wellheads
- Pipelines and manifolds
- Abrasive drilling mud
- Sour gas and crude oil
- Up to 7,500 psi and temperature range of -40°F to 400°F

Standard Trim Includes

- A487 Steel Body and Bonnet
- Stainless Steel (410 SS) Stem and Gate
- Ca6NM HSN Seats
- 90 Durometer A Buna-N Seals

Sizes

- Full Port - 2 in., 3 in., 4 in., 4-1/16 in., and 5-1/8 in.
- Regular Port - 5 x 4 in., 6 x 4 in., and 6 x 5 in.

Material Traceability*

* Certification provided upon request at additional charge.

- DNV
- Lloyd's of London Type Approval
- PSL 1 and 2

Connections

- Screwed End
- Weld End
- Ring Type Joint (RTJ), Flanged End
- Integral Hammer Union

Testing and Pressure Ratings

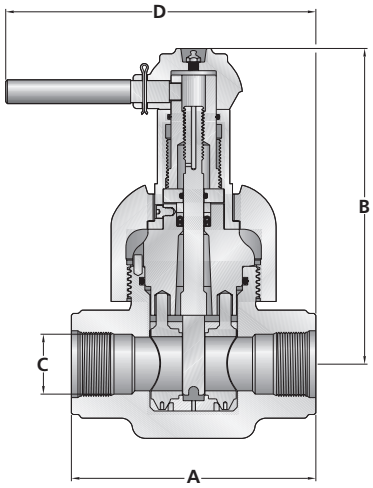
All Mud Gate Valves are hydrostatically tested.

Working Pressure (WP)	Shell Test Pressure
3000 WP	4,500 psi Test
5000 WP	7,500 psi Test
7500 WP	11,250 psi Test

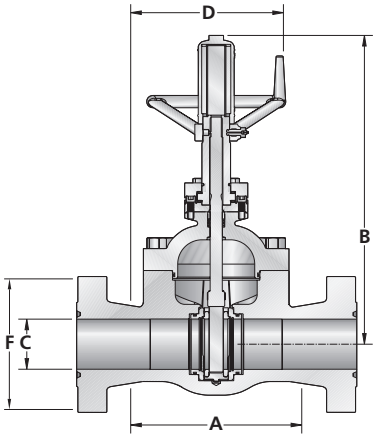
DIMENSIONS AND PRESSURE RATINGS
3000 AND 5000 WP

Pressure Rating		3000 WP 6000 PSI Test			5000 WP 10000 PSI Test				
Size		2	3	4 4-1/16	2	3	4 4-1/16	5x4	6x4
		inch	inch	inch	inch	inch	inch	inch	inch
A	Screwed End	9	11	13	9	11	13	13	N/A
	Weld End	9	11	13	9	11	13	13	13
	Flanged End	11-5/8	14-1/8	16-3/8	12-1/8	15-5/8	18	29	N/A
B	(Open)	13	18	21-1/4	13	18	24-5/8	24-5/8	24-5/8
C	(Seat Bore)	2	3	4	2	3	4	4	4
D	(Handle Diameter)	14	19	23	14	19	23	23	23
F	(Flange Diameter)	8-1/2	9-1/2	11-1/2	8-1/2	10-1/2	12-1/4	14-3/4	N/A
	Flange Bolts (Qty)	(8)	(8)	(8)	(8)	(8)	(8)	(8)	N/A
	Size	7/8	7/8	1-1/8	7/8	1-1/8	1-1/4	1-1/2	N/A
	Ring No. (RTJ)	R24	R31	R37	R24	R35	R39	R44	N/A

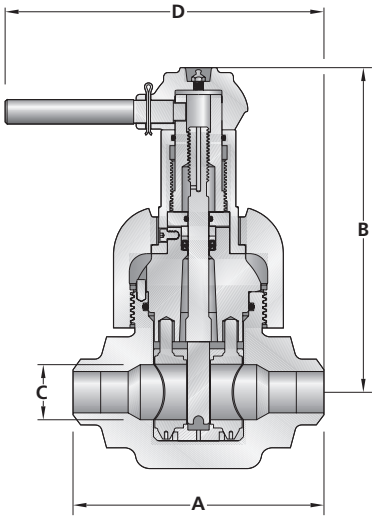
N/A = Not Available.



A Screwed-End Body



Flanged-End Body



Weld-End Body

Note: These diagrams are for dimensional purposes only. For actual product illustrations, refer to pages 14, 16, and 20.

MATERIALS NUMBER SCHEME

BASE MATERIAL NUMBER
1st to 3rd Digits
Full Port - 930
API 6A ID - 932
Regular Port - 934

SIZE
5th Digit
(2 in. - 1)
(3 in. -3) (4 in., 4-1/16 in. - 4)
(5 x 4 in. - 4), (5-1/8 in., 6 x 4 in. - 5)
(6 x 5-1/8 in. - 8)

GATE/STEM MATERIAL
7th Digit
410/410 SS Stem - 7•

BODY MATERIAL
9th Digit
No Coating - 0

XXX X | X X X X | X

WORKING PRESSURE
4th Digit
3000 - 5
5000 - 6
7500 - 8

END CONNECTION
6th Digit
Screwed LP-0, NUE-1, EUE-2, Short/Long Casing Thread-E
Weld: XXH-4*, SCH 160-5
Flanged: RTJ-7
Hammer Union: 1002 - N
1502 - P

SEAT MATERIAL
8th Digit

	5	4
Insert Ca6NM	Viton®	HSN

• 7,500 WP only.
* 7,500 WP is available in SCHXXH only.

Digit	Code 10th Digit Description	Digit	Code 11th Digit Description	Digit	Code 12th Digit Description
D	Statement of Compliance Mill Certs Hydrostatic Test Report Charpy Impacts-Pressure Containing Part Hydrostatic Test Chart	2	PSL 2 Requirements	P	NACE MR0175 Documentation

MATERIAL NUMBER REPAIR KITS

Size	2	2 x 3, 3	4, 5X4, 6X4, 4-1/16	5-1/8, 6X5-1/8
	inch	inch	inch	inch
Working Pressure	3000 WP & 5000 WP	5000 WP & 7500 WP	5000 WP & 7500 WP	7500 WP
Major Repair Kit (Standard/H2S)	1188481	1026903	1026906	1026909
Minor Repair Kit (Standard/H2S)	1188480	1026894	1026897	1026900
Major Repair Kit, (FKM)	N/A	1026904	1026907	1026910
Minor Repair Kit, (FKM)	N/A	1026895	1026902	1026901

Minor Standard/H2S Service Rubber Repair Kit Includes:

2 in, 2X3 in. and 3 in. 2-7500 WP

(1) Stem Screw Seal
(1) Secondary Seal
(1) Stem Seal Assembly
(1) Bonnet Seal
(1) Seat

4 in, 5X4 in. 2-7500 WP, and 6X4 in. 5000 WP

(1) Stem Screw Seal
(1) Secondary Seal
(1) Stem Seal Assembly
(1) Bonnet Seal
(1) Seat

5-1/8 in. and 6X5-1/8 in. 7500 WP

(1) Seat
(2) Seat Seal
(1) Bonnet Seal
(1) Stem Seal Assembly
(1) Packing Retainer Seal
(1) Bonnet Cap Seal
(1) Locking Cap Screw Seal
(2) Bearing (5K and 7K psi only)

Major Standard/H2S Service Repair Kit Includes:

2 inch, 2 x 3 inch, and 3 inch 2-7500 WP

(1) Gate
(1) Stem
(1) Seat
(1) Bonnet Seal
(1) Secondary Seal
(1) Stem Screw Seal
(1) Stem Seal Assembly

4 inch, 5 x 4 inch, 6 x 4 inch 2-5000 WP, and 4 inch, 5 x 4 inch 7500 WP

(1) Gate
(1) Stem
(1) Seat
(1) Bonnet Seal
(1) Secondary Seal
(1) Stem Screw Seal
(1) Stem Seal Assembly
(2) Bearing (5,000 and 7,500 psi only)
(1) Key

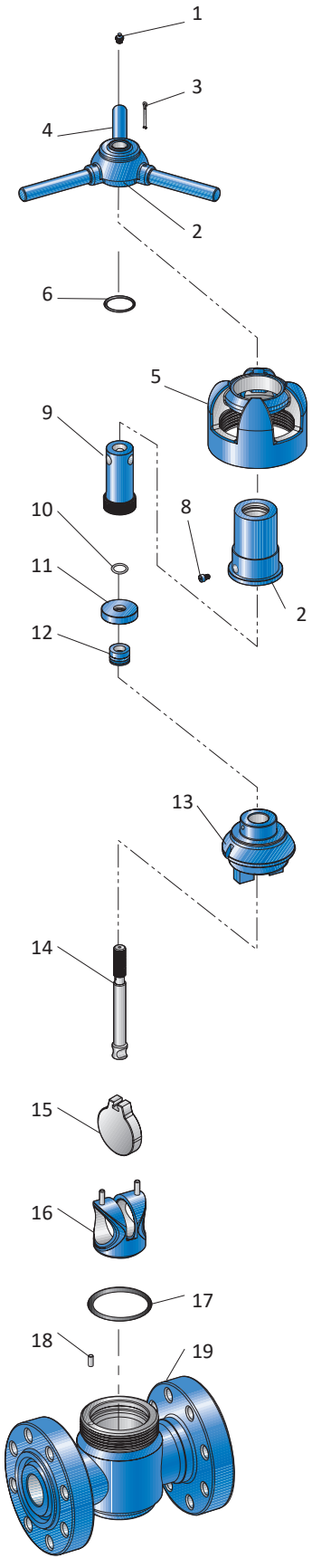
5-1/8 inch and 6 x 5-1/8 inch 7500 WP

(2) Wear Ring
(1) Gate
(1) Stem
(1) Seat
(2) Seat Seal
(1) Bonnet Seal
(1) Stem Seal Assembly
(1) Packing Retainer Seal
(1) Bonnet Cap Seal
(1) Locking Cap Screw Seal
(1) Bearing (5K and 7.5K psi only)

PARTS AND WEIGHTS

2 inch - 3000 and 5000 WP

Item No.	Description			2 inch	
				3000 WP	5000 WP
1	Lube Fitting Steel			WWW00C000 (0.1 lb)	
2	Hub Assembly Steel			051888000 (5 lb)	
3	Pin, Lock Handle Steel			WWLC16204 (0.1 lb)	
4	Lock Handle Steel			051888400 (2 lb)	
5	Coupling WCB Steel			051888809 (10 lb)	
6	Stem Screw Seal	90 D HSN	H30	51300-224-090-H 51300-224-090-F (0.5 lb)	
		75 D Viton®	V35		
7	Screw Housing Steel			051882500 (4 lb)	
8	Lock Screw Steel			WWG11B080 (0.1 lb)	
9	Stem Screw Steel			051882400 (2 lb)	
10	Secondary Seal Buna-N	90 D HSN	H30	51300-210-090-H 51300-210-090-V (0.2 lb)	
		90 D Viton®	V40		
11	Retainer Steel			051882600 (0.5 lb)	
12	Stem Seal Assembly			105312722 (0.2 lb)	
13	Bonnet (AISI 1029 Steel)	None	9	05188892X (8 lb)	
14	Stem 410 SS			051816009DQ (1.5 lb)	
15	Gate 410 SS			051815909DQ (2.3 lb)	
16	Seat			051820444 (1.5 lb)	
	Ca6NM	85 D HSN	81		
		90 D Viton®	82		
17	Bonnet Seal			51300-342-090--H 51300-342-090-V (0.1lb)	
		90 D HSN	H40		
		90 D Viton®	V40		
18	Index Pin Steel			WWLA1B0S4 (0.1 lb)	
19	Body	Uncoated Steel		051884709 (27 lb) 051885809 (26 lb)	
	Screwed End	LP			
		EUE			
	Flanged End	RTJ		051887420 (67 lb)	051887739 (79 lb)
	Weld End			O/A	
		SCH 80	1		
		SCH XXH	2		
		SCH 160	5		
	Grooved End	SCH 80		N/A	
	Body Coatings Change last digit to:			–	
		None	9		
		Baker 10	6		
		Baker 11	7		
		Baker 12	8		



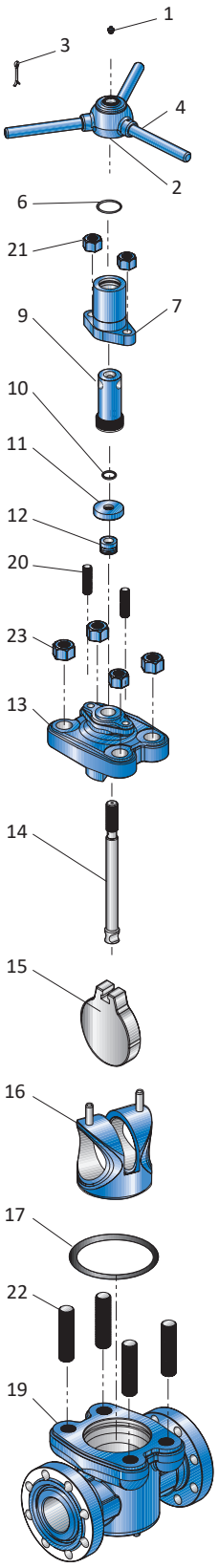
O/A = On Application.

PARTS AND WEIGHTS

3 inch, 4 inch and 4-1/16 inch - 3000 WP

Item No.	Description			3 inch	4 inch	4-1/16 inch
				3000 WP		
1	Lube Fitting, Steel			WWW00C000 (0.1 lb)		
2	Hub Assembly Steel			051888100 (7.5 lb)	051888200 (7.5 lb)	
3	Pin, Lock Handle, Steel			WWLC16204 (0.1 lb)		
4	Lock Handle Steel			051888500 (2 lb)	051888600 (2.5 lb)	
6	Stem Screw Seal	90 D HSN	H30	WWB226P41 WWB226V35 (0.1 lb)	51300-227-090-H V227-75 (0.1 lb)	
		75 D Viton®	V40			
7	Screw Housing Steel			051884000 (5 lb)	051883300 (7 lb)	
9	Stem Screw Steel			051883900 (3 lb)	051883100 (4 lb)	
10	Secondary Seal	90 D HSN	H30	WWB212HN2 WWB212V40 (0.2 lb)	51300-214-090-H 51300-214-090-V (0.2 lb)	
		90 D Viton®	H40			
11	Retainer Steel			051883800 (0.5 lb)	051882700 (0.5 lb)	
12	Stem Packing Seal Assembly			105312732 (0.5 lb)	105312742 (0.5 lb)	
13	Bonnet (A-487 Steel)			051889239 (29 lb)	051889339 (37 lb)	052092120 (37 lb)
14	Stem 410 SS			051818708 (2 lb)	051820709DQ (2 lb)	
15	Gate 410 SS			051818808 (5 lb)	051997700DQ (9 lb)	
16	Seat			0518206XX (6 lb)	1024613 (8 lb)	
	Ca6NM	85 D HSN	81			
		90 D Viton®	82			
17	Bonnet Seal			WWB433H2N WWB433V40 (0.2 lb)	51300-439-090-H 51300-439-090-V (0.2 lb)	
		90 D HSN	H40			
		90 D Viton®	V40			
19	Body Screwed End	Uncoated Steel LP		051884539 (70 lb)	051884639 (80 lb)	N/A N/A
		NUE		051885239 (70 lb)	051885339 (80 lb)	N/A N/A
		EUE		051922929 (70 lb)	N/A N/A	N/A N/A
		Long/Short Casing Thread		N/A N/A	N/A N/A	052092220 (80 lb)
	Flanged End	RTJ		O/A O/A	O/A O/A	N/A N/A
	Weld End	SCH 80	1	O/A O/A	O/A O/A	N/A N/A
		SCH XXH	2			
		SCH 160	5			
	Grooved End	SCH 80	N/A	O/A	O/A	N/A
20	Bonnet Stud (2 Required) A-320-L7 Steel	Each		WWHS1S2S6 (1.5 lb)	WWHS1W3H6 (1.5 lb)	
21	Bonnet Stud Nut (2 Required) A-320-L7 Steel	Each		WWJA1S10Z (0.5 lb)	WWJA1W10Z (0.5 lb)	
22	Body Stud (4 Required) A-320-L7 Steel	Each		WWHS203H6 (2 lb)	WWHS284H6 (2 lb)	
23	Body Stud Nut (4 Required) A-320-L7 Steel	Each		WWJA2010Z (1 lb)	WWJA2810Z (1 lb)	
24	Bleeder Plug			N/A N/A	N/A N/A	WWS120HFS (1 lb)

N/A = Not Available.; O/A = On Application; Bleeder Plug not shown. Refer to page 16 for product illustration.

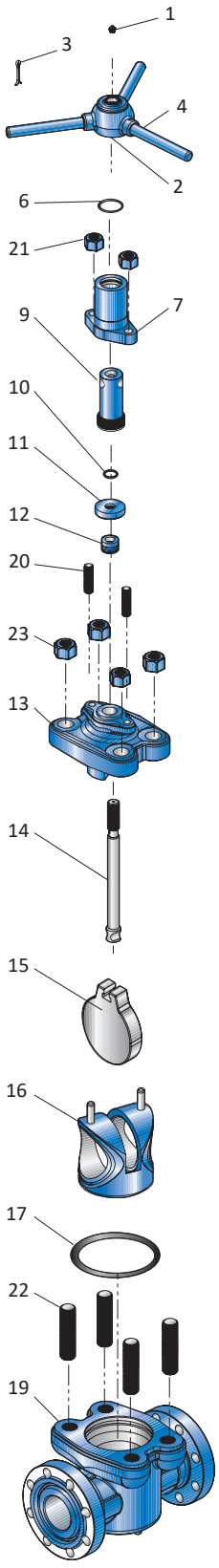


PARTS AND WEIGHTS

3 inch - 5000 WP

Item No.	Description			3 inch 5000 WP
1	Lube Fitting Steel			WWW00C000 (0.1 lb)
2	Hub Assembly Steel			051888100 (7.5 lb)
3	Pin, Lock Handle Steel			WWLC16204 (0.1 lb)
4	Lock Handle Steel			051888500 (2 lb)
6	Stem Screw Seal	70 D HSN	H30	WWB226H30 WWB226V35 (0.1 lb)
		75 D Viton®	V35	
7	Screw Housing Steel			051884000 (5 lb)
9	Stem Screw Steel			051883900 (3 lb)
10	Secondary Seal	90 D HSN	H30	WWB212H2N WWB212V40 (0.2 lb)
		90 D Viton®	V40	
11	Retainer Steel			051883800 (0.5 lb)
12	Stem Seal Assembly			105312732 (0.5 lb)
13	Bonnet (A-487 Steel)			052068639
14	Stem 410 SS			051818708 (2 lb)
15	Gate 410 SS			051818808 (5 lb)
16	Seat			
	Ca6NM	85 D HSN 90 D Viton®	81	1024578 1024660 (6 lb)
17	Bonnet Seal	90 D HSN	H40	WWB433HN2 WWB433V40 (0.2 lb)
		90 D Viton®	V40	
19	Body Screwed End	Uncoated Steel LP		051884839 (74 lb)
		NUE		051885439 (74 lb)
		EUE		N/A
	Flanged End	RTJ		051887839 (110 lb)
	Weld End			0518866X9
		SCH 80	1	O/A
		SCH XXH	2	(73 lb)
		SCH 160	5	(73 lb)
	Grooved End	SCH 80		N/A N/A
20	Bonnet Stud (2 Required) A-320-L7 Steel	Each		WWHS1S2S6 (1.5 lb)
21	Bonnet Stud Nut (2 Required) A-320-L7 Steel	Each		WWJA1S10Z (0.5 lb)
22	Body Stud (4 Required) A-320-L7 Steel	Each		WWHS2D586 (3 lb)
23	Body Stud Nut (4 Required) A-320-L7 Steel	Each		WWJA2D10Z (1.5 lb)

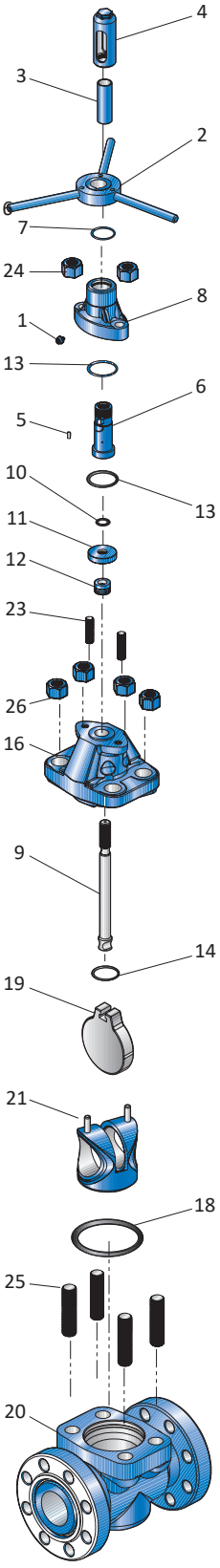
N/A = Not Available; O/A = On Application. Refer to page 16 for product illustration.



PARTS AND WEIGHTS

4 inch, 4-1/16 inch, 5x4 inch and 6x4 inch - 5000 WP

Item No.	Description			4 inch	4-1/16 inch	5 x 4 inch	6 x 4 inch
				5000 WP			
1	Lube Fitting, Steel			WWW00C000 (0.1 lb)			
2	Handle Assembly, Steel			051888300 (11 lb)			
3	Tube, Clear Acrylic			051889600 (0.2 lb)			
4	Stem Cap Ductile Iron			051889700 (2.5 lb)			
5	Key Steel			WWW00A000 (0.5 lb)			
6	Stem Screw Steel			051883200 (5 lb)			
7	Stem Screw Seal Steel	70 D HSN 75 D Viton®	H30 V35	WWB226HN2 WWB226V40 (0.1 lb)			
8	Screw Housing, Steel			051883400 (8 lb)			
9	Stem 410 SS			051820207DQ (3 lb)			
10	Secondary Seal	90 D HSN 90 D Viton®	H30 V40	51300-214-090-H WWB214V40 (0.2 lb)			
11	Retainer Steel			051882800 (1 lb)			
12	Stem Packing Seal Assembly			105312742 (0.5 lb)			
13	Bearing (2 Required) Teflon®/Phenolic	Each		051883000 (0.1 lb)			
14	Down Stop Ring, 303SS			051882900 (0.5 lb)			
16	Bonnet (A-487 Steel)			052096729 (61 lb) (63 lb) (65 lb) (68 lb)	051889539 (61 lb) (63 lb) (65 lb) (68 lb)	052096729 (61 lb) (63 lb) (65 lb) (68 lb)	
18	Bonnet Seal	90 D HSN 90 D Viton®	H40 V40	51300-439-090-H WWB439V40 (0.2 lb)			
19	Gate 410 SS			051818890DQ (9 lb)			
20	Body Screwed End	Uncoated Steel LP		051884939 (130 lb)	N/A –	N/A –	N/A –
		NUE		051885539 (130 lb)	N/A –	N/A –	N/A –
		Long/Short Casing Thread		N/A –	052098220 –	N/A –	
	Flanged End	RTJ		051887939 (230 lb)	N/A –	051964239 (485 lb)	N/A –
	Weld End	SCH XXH SCH 160	2 5	0520763X9 (134 lb) (132 lb)	N/A – –	0519994X9 (134 lb) (132 lb)	0519310X9 (134 lb) (132 lb)
21	Seat						
	Ca6NM	70 D HSN 90 D Viton®	81 82	1024613 1024614 (8 lb)			
23	Bonnet Stud (2 Required) A-320-L7 Steel	Each		WWHS1W3H6 (1.5 lb)			
24	Bonnet Stud Nut (2 Required) A-320-L7 Steel	Each		WWJA1W10Z (0.5 lb)			
25	Body Stud (4 Required) A-320-L7 Steel	Each		WWHS2S606 (4 lb)			
26	Body Stud Nut (4 Required) A-320-L7 Steel	Each		WWJA2S10Z (2 lb)			



MATERIALS SPECIFICATIONS

Item	2000/3000/5000 WP 2 inch, 3 inch, 4 inch, 4-1/16 inch, 5 x 4 inch and 6 x 4 inch
Body	
Screwed/Grooved	A-487 Cast Steel
Weld	A-487 Cast Steel
Flanged	A-487 Cast Steel
Bonnet	A-487 Cast Steel
Coupling	A-487 Cast Steel
Stem	410 Stainless Steel
Seat	
Elastomer	85 Durometer HSN
Insert	Ca6NM
Gate	410 Stainless Steel
Studs	A320-L7 Steel ZN Plt
Nuts	A194 2H Steel ZN Plt

Optional Trims	
Seat	
Elastomer	90 Durometer A Fluoroelastomer
Insert	Ca6NM
Studs	A-193-B7M
Nuts	A-194-2HM Steel

ELASTOMER PROPERTIES AND SELECTION

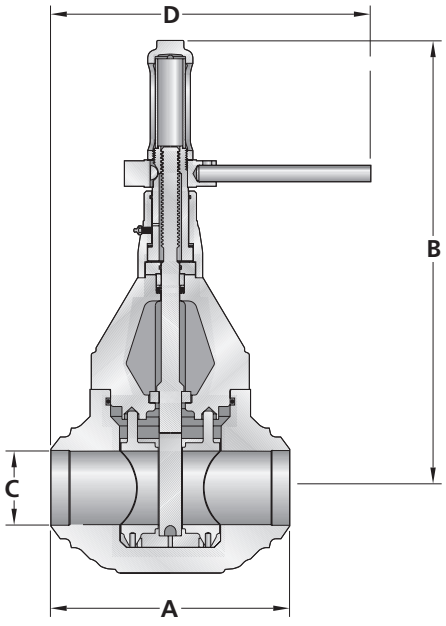
Properties		Base Elastomer	
		Fluoroelastomer (FKM)	HSN
Durometer A		90	85
Temperature Range, Fahrenheit	High	+400	+300
	Low	-20	-25
Hydrogen Sulfide, H2S	Hot	Good	Best
	Cold	Good	Best
Carbon Dioxide, CO2	Wet	Fair	Best
	Dry	Fair	Best
Dilute Acidics		Good	Good
Dilute Caustics		Good	Good
Sour Oil and Gas		C/E	C/E
Salt Water		Good	Good
Oil		Good	Good
Sweet Gas		Good	Good

C/E - Consult Engineering.
PC - Peroxide Cured.

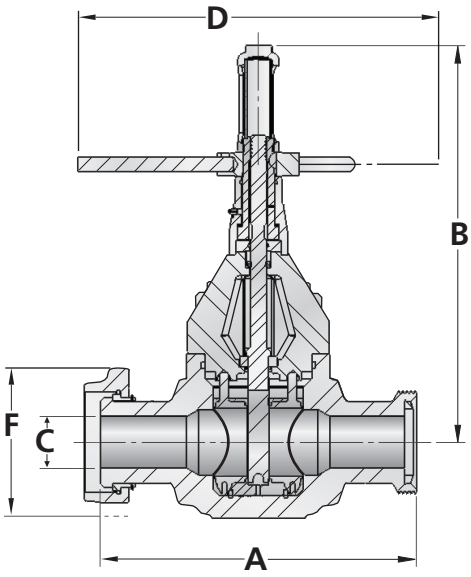
DIMENSIONS AND PRESSURE RATING 7500 WP

	Pressure Rating	7.5 KSI MAX. WP & 11.25 KSI TEST PRESSURE											
Dim	Size (in.)	2 x 3	3	4	4	5 x 4	5 x 4	5 x 4	5 x 4	5 x 4	5 x 4	5 1/8	6 x 5-1/8
Material	Cast	●	●	●	●	●		●		●		●	●
	Forged						●		●		●		
A	Screwed End	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Weld End	11	11	13	13	13	13	16	16	N/A	N/A	N/A	18
	Flanged End	18-3/8	24-3/8	26-3/8	26-3/8	SEE NOTE (1)				N/A	N/A	29	N/A
	Hammer Union	FIG-1502	NA	FIG-1002								N/A	TBD
		WELDED		WELDED						INTEGRAL			
		17-7/8		19-1/4	19-1/4	20-1/4		23-1/4		23-1/4			
B	(Open)	13	18	24-5/8	24-5/8	24-5/8	24-5/8	24-5/8	24-5/8	24-5/8	24-5/8	31-3/4	31-3/4
C	(Seat Bore)	2	3	4	4	4	4	4	4	4	4	5-1/8	5-1/8
D	(Handle Diameter)	14	19	23	23	23	23	23	23	23	23	24	24
F	(Flange Diameter)	8-1/2	10-1/2	12-1/4	12-1/4	SEE NOTE (1)						14-1/16	SEE NOTE (1)
	Flange Bolts (Qty)	8										12	
	Size	7/8	1-1/8	1-1/4	1-1/4							1-1/8	
	Ring No. (RTJ)	BX-152	BX-154	BX-155	BX-155							BX-169	

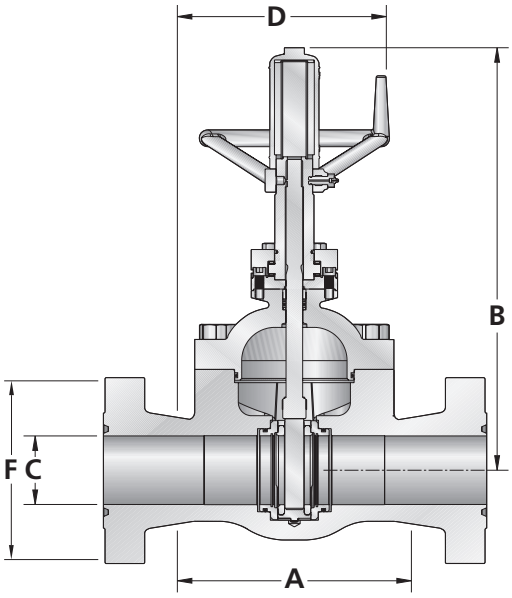
Notes:
1.0 - TBD (BASED ON FLANGE SIZE AND PRESSURE CLASS)



Weld-End Body



Hammer Union End

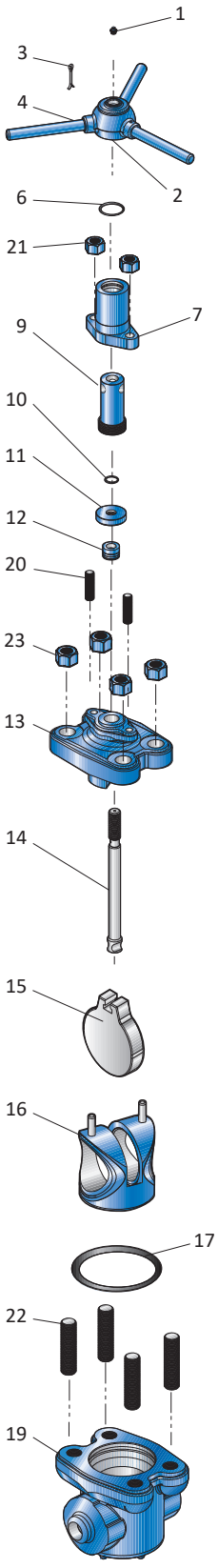


Flanged End

PARTS AND WEIGHTS

2 inch (2 X 3 inch), and 3 inch - 7500 WP

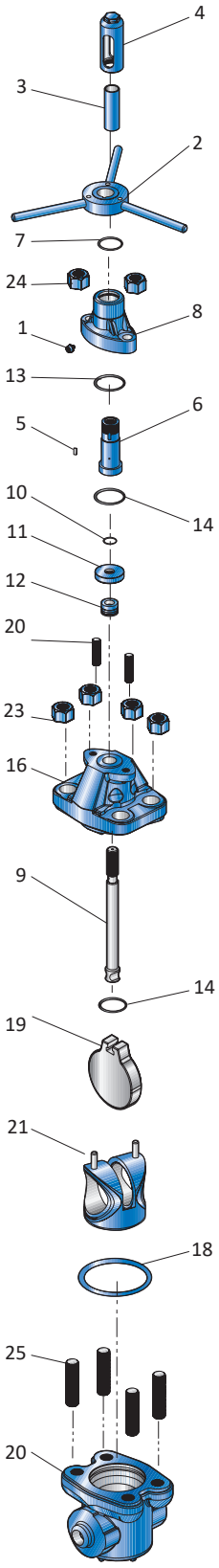
Item No.	Description			2 inch	3 inch
				7500 WP	
1	Lube Fitting, Steel			WWW00C000 (0.1 lb)	
2	Hub Assembly Steel			051888100 (0.5 lb)	
3	Pin, Lock Handle, Steel			WWLC16204 (0.1 lb)	
4	Lock Handle, Steel			051888500 (1.5 lb)	
6	Stem Screw Seal, HSN			WWB226HN2 (0.1 lb)	
7	Screw Housing, Steel			051884000 (5 lb)	
9	Stem Screw, Steel			051883900 (3 lb)	
10	Secondary Seal, HSN			WWB212HN2 (0.2 lb)	
11	Retainer, Steel			051883800 (0.5 lb)	
12	Stem Seal Assembly			105312732 (0.5 lb)	
13	Bonnet (A487-4D Steel)	Uncoated Steel		052068639 (20 lb)	
14	Stem, 410 SS			051818709DQ (2 lb)	
15	Gate, 410 SS			051818800DQ (5 lb)	
16	Seat, Steel	HSN	SS	1024578	
		Viton®	SS	1024660	
17	Bonnet Seal	HSN	H40	WWB433HN2 WWB433V40 (0.2 lb)	
		Viton®	V35		
19	Body Weld End RTJ Flange	Uncoated Steel SCH XXH		052068829 (73 lb) 052144529 (129 lb)	051886629 (73 lb) 052132029 (206 lb)
20	Bonnet Stud (2 Required) A-320-L7 Steel	Each		WWHS1S2S6 (0.5 lb)	
21	Bonnet Stud Nut (2 Required) A-320-L7 Steel	Each		WWJA1S10Z (0.5 lb)	
22	Body Stud (4 Required) A-320-L7 Steel	Each		WWHS2D586 (1.5 lb)	
23	Bonnet Stud Nut (4 Required) A-320-L7 Steel	Each		WWJA2D10Z (1.5 lb)	



PARTS AND WEIGHTS

4 inch and 5 X 4 inch - 7500 WP

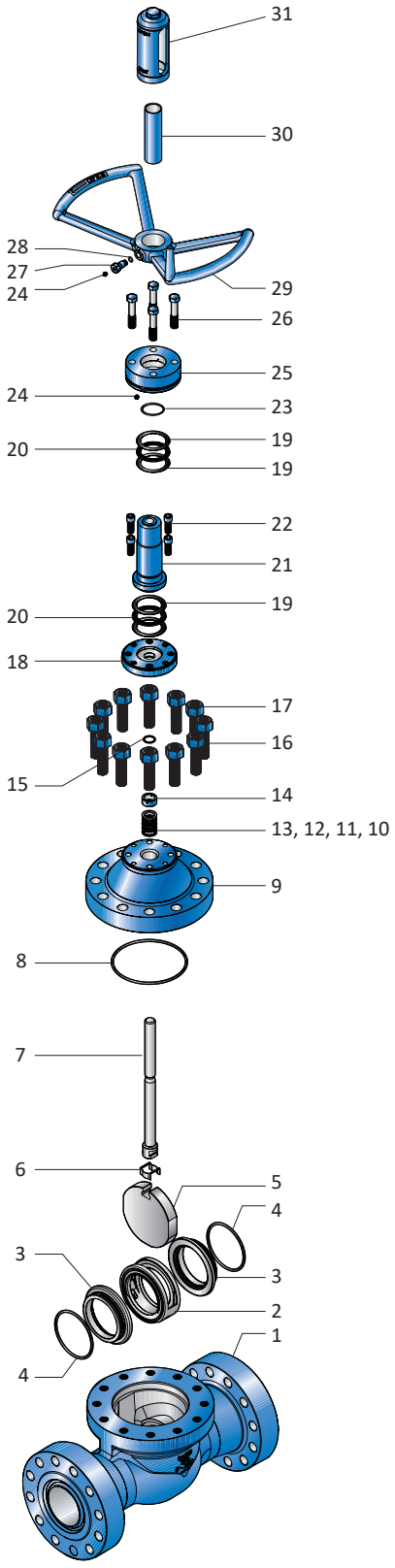
Item No.	Description			4 inch	5 x 4 inch
				7500 WP	
1	Lube Fitting, Steel			WWW00C000 (0.1 lb)	
2	Handle Assembly, Steel			051888300 (0.5 lb)	
3	Tube, Clear Acrylic			051889600 (0.2 lb)	
4	Stem Cap, Ductile Iron			051889700 (2.5 lb)	
5	Key, Steel			WWW00A000 (0.5 lb)	
6	Stem Screw, Steel			051883200 (5 lb)	
7	Stem Screw Seal			WWB226HN2	
		70 D HSN	H30	(0.1 lb)	
		70 D Viton®	V40	(0.1 lb)	
8	Screw Housing, Steel			051883400 (8 lb)	
9	Stem, 410 Stainless Steel			051820207DQ (3 lb)	
10	Secondary Seal			WWB214HN2	
		90 D HSN	H40	(0.2 lb)	
		90 D Viton®	V40	(0.2 lb)	
11	Retainer, Steel			051882800 (1 lb)	
12	Stem Seal Assembly			105312742	
13	Bearing (2 Required) Teflon®/Phenolic	Each		051883000 (0.1 lb)	
14	Down Stop Ring, 303 Stainless Steel			051882900 (0.5 lb)	
16	Bonnet (A-487 Steel)	Uncoated Steel		051889539 (61 lb)	
18	Bonnet Seal			WWB439HN2	
		90 D HSN		(0.2 lb)	
		98 D Viton®	V40	(0.2 lb)	
19	Gate 410 SS			051997700DQ (9 lb)	
20	Body Weld	Uncoated Steel SCH XXH		052076329 (134 lb)	051999429 (134 lb)
21	Seat, Steel	HSN	SS	1024613	
		Viton®	SS	1024614	
23	Bonnet Stud (2 Required) A-320-L7 Steel	Each		WWHS1W3H6 (1.5 lb)	
24	Bonnet Stud Nut (2 Required) A-320-L7 Steel	Each		WWJA1W10Z (1.5 lb)	
25	Body Stud (4 Required) A-320-L7 Steel	Each		WWHS2S606 (0.5 lb)	
26	Body Stud Nut (4 Required)			WWJA2S10Z (2 lb)	



PARTS AND WEIGHTS

5-1/8 inch and 6 X 5-1/8 inch - 7500 WP

Item No.	Description			5-1/8 inch	6 x 5-1/8 inch
				7500 WP	
1	Body Steel			052114229 Flanged 543	052114129 XXH 280
2	Seat	NBR90	SS	1021363	
		HSN90	SS	1024681	
		Viton®	SS	1024682	
3	Wear Ring Alloy Steel/Nickel Coat			052115100 (5 lb)	
4	O-ring Seal, HSN	90 DPC		WWB435HN2 (0.10 lb)	
5	Gate, 410 SS			052115200DQ (20 lb)	
6	Gate Clip, Stainless Steel			052115700 (0.10 lb)	
7	Stem, 410 Stainless Steel			052115400DQ (7 lb)	
8	Bonnet Seal	90 D HSN		WWB446HN2 WWB446V40 (0.1 lb)	
		90 D Viton®	V40		
9	Bonnet (A-487 Steel) Coatings:	None		052114029 (113 lb)	
10 Thru 14	Stem Seal Assembly			105312752	
15	O-ring Seal	90 HSN	P41	WWB218HN2 WWB218V40 (0.10 lb)	
		90 D Viton®	V40		
16	Body Stud A-320-L7 Steel	(12 Required)		WWHS24506 (1.25 lb)	
17	Body Stud Nut A-194-7L Steel	(12 Required)		WWJB2440Z (0.55 lb)	
18	Packing Retainer, Steel			052115500 (7.5 lb)	
19	Thrust Washer, Steel	(4 Required)		WWEAS5710 (0.5 lb)	
20	Needle Thrust Bearing, Steel	(2 Required)		WWEAXK751 (0.15 lb)	
21	Screw Housing, Steel			052115600 (14 lb)	
22	Socket Hex Head Cap Screw	(4 Required)		WWG11M1S0 (.20 lb)	
23	O-ring Seal HSN			WWB334HN2 (.10 lb)	
24	Lube Fitting, Steel			WWW00C000 (0.1 lb)	
25	Bonnet Cap, Steel			052115900 (11.5 lb)	
26	Bonnet Hex Head Cap Screw A-194-2H Steel	(4 Required) Each		WWG31S508 (.20 lb)	
27	Handwheel Locking Screw			052115000 (.25 lb)	
28	O-ring Seal HSN			WWB111HN2 (.10 lb)	
29	Handwheel, Steel			0521145B0 (26 lb)	
30	Tube, Clear Acrylic			052114900 (.25 lb)	
31	Stem Cap, Carbon Steel			0521148B0 (8 lb)	



REPAIR INSTRUCTIONS
2 inch - 3000 WP and 5000 WP Gate Valve

TOOLS REQUIRED FOR ASSEMBLY

- Hammer and mandrel or metal bar
- Drill and #44 bit
- Adjustable pipe wrench
- Torque, impact or socket wrench and socket
- Grease gun and grease, molybdenum disulfide base
- Grinder with flapper wheel
- Pressure test facility and fixtures
- 5/16 in. Nut Driver
- Vise Grips

Assembly Procedures

a. Slide the threaded end of the Stem (14) through the Bonnet Bore (13), from the underside and place the Stem Seal Assembly (12) over the Stem. This assembly consists of the Seal Rings, a flat-backed follower ring and a Bushing, which are placed over the end of the Stem in that order. Slide the Retainer (11) with an O-ring Seal (10) in- side, over the Stem. Observe that the lips of the O-ring Seal do not get curled back. Seat the Stem Seal Assembly into its counter bore in the Bonnet.

b. Engage the Stem Screw (9) in the Screw Housing (7) about half its total travel and place the Screw Housing on the Bonnet and Stem.

c. Using vice grips, attach to Tee-Head of Stem, then rotate clockwise until Stem is above lugs so the gate can be attached. Remove vice grips and attach gate to Tee-Head. Rotate the gate to the opening between the lugs. Place the assembly on its side with the lock set screw facing up and using the lock set screw as a marker, turn counter clock- wise three times at 360° each.

d. Install lock screw, tighten, and then install the seat onto the gate. Install the Bonnet seal and Item No. pin into the body. Grease the outside of the seat and the inside of the body. Install the Bonnet assembly into the body. Install the coupling over the Bonnet and tighten onto the body with a pipe wrench. Install the handle hub on the Stem Screw and insert the lock handle retainer lock with the lock handle pin. Do not spread the cotter pin at this time. Close the gate valve until the hub is resting on the top of the Screw Housing. At this point, mark the gate with a pencil at the bottom of the seat bore. Raise the bottom of the gate by turning the handle counter clockwise until half open. Measure the mark on the gate to verify the gate is fully down at 5/16 in. to 7/16 in. If the distance is correct, then fully open the gate valve, spread the cotter and insert the drift bar pin. If correct, go to step F.

e. If not correct, then remove the handle and coupling from Bonnet assembly. Remove Bonnet assembly from the body. Remove the lock screw from the Stem Screw Housing and adjust the timing by rotating the Stem Screw clockwise to increase distances or counter clockwise to decrease distances. Repeat step D.

f. When the Baker Mud Gate Valve is assembled in the manner described, the Hub is stopped by the Screw Housing at the proper down position of the Gate. By this design, over tightening is impossible and maximum sealing efficiency is assured.

REPAIR INSTRUCTIONS

3 inch, 4 inch, and 4-1/16 inch - 3000 WP and 3 inch - 5000 WP Gate Valve

Tools Required for Assembly

- Hammer and mandrel or metal bar
- Drill with #44 Drill Bit
- API adjustable pipe wrench
- Torque, impact or socket wrench and socket
- Screwdriver
- Pressure test facility and fixtures
- Grease gun and grease, molybdenum disulfide base
- Grinder with flapper wheel
- 5/16 in. Nut Driver
- Vise Grips

Assembly Procedures

a. Slide the threaded end of the Stem (14) through the Bonnet Bore (13) from the underside and place the Stem Seal Assembly (12) over the Stem. This assembly consists of the Seal Rings, a flat-backed follower Ring and a Bushing which are placed over the end of the Stem in that order. Slide the Retainer (11) with O-ring Seal (10) inside over the Stem. Observe that the lips of the Ring do not get curled back. Seat the Stem Seal Assembly into its counter bore in the Bonnet. Install Bonnet Studs (20).

b. Engage the Stem Screw (9) in the Screw Housing(7) about half [1/2] its total travel and place the Screw Housing on the Bonnet and Stem. Replace Nuts (21).

c. Rotate the Stem Screw clockwise until it bottoms on the Retainer, then back it up approximately 45 degrees. Engage the Gate (15) on the Tee-Head of the Stem and turn them together counter clock- wise until the Gate touches the underside of the Bonnet Lugs. Align the Gate with the opening be- tween the Lugs and retract it into the Bonnet by turning the Stem Screw counter clockwise. Place the Hub (2) on the Stem Screw, insert the Lock Handle (4), and retain it with the Lock Handle Pin (3).

Assembly and Timing Procedures

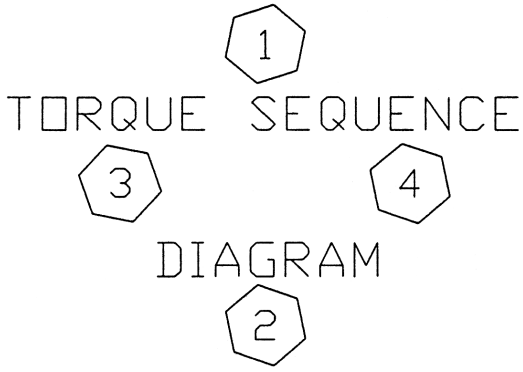
d. Install the Seat (16) onto the Gate and grease the outside of the seat. Install Body Studs and Bonnet Seal, then grease the inside of the Body. Install the Bonnet assembly into the Body. Place Stud Nuts and tighten per appropriate torque. Close the gate fully by turning the handle clockwise. Make sure the Hub Assembly sits flush on the Screw Housing. Also, make pencil marks on the Gate even with the bottom of the Seat Bore. Open the gate by turning the handle counter clockwise and measure distance from mark to the bottom of the Gate. This distance should fall within the following limits for each valve size:

3 in.	**4 in.**
3/8 in. - 1/2 in.	7/16 in. - 9/16 in.

If either the distance is not correct, or the Hub is not flush with the Screw Housing, open the gate fully, loosen the Bonnet Stud Nuts and remove. Turn the handle clockwise while raising the Stem Screw Assembly above the Bonnet Studs. Turn the Stem Screw assembly clockwise or counter clockwise, as appropriate to correct timing. Turn the handle counter clockwise to lower the Stem Screw Assembly back down on the retainer. Re- place the Nuts and hand tighten. Recheck the gate timing. If still not timed, repeat timing process. If timing is correct, tighten the Bonnet Nuts to appropriate torque.

e. When the Forum Gate Valve is assembled in the manner described, the Hub is stopped by the Screw Housing at the proper down position of the Gate. By this design, over tightening is impossible and maximum sealing efficiency is assured.

Stud Diameter inch	Torque ft-lbf
1/2	60
5/8	89
3/4	107
7/8	162
1	244
1-1/8	322
1-1/4	410
1-3/8	510
1-1/2	615



REPAIR INSTRUCTIONS

4 inch, 4-1/16 inch, 5 X 4 inch, and 6 X 4 inch - 5000 WP Gate Valve

Tools Required for Assembly

- Hammer and mandrel or metal bar
- Drill with #44 Drill Bit
- Adjustable pipe wrench
- Torque, impact or socket wrench and socket
- Screwdriver
- Pressure test facility and fixtures
- Grease gun and grease, molybdenum disulfide base
- Grinder with flapper wheel
- 5/16 in. Nut Driver
- Vise Grips

Assembly Procedures

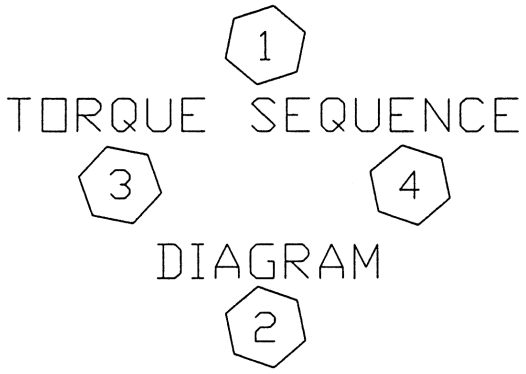
a. Slide the threaded end of the Stem (9) through the Bonnet Bore (16), from the underside and draw the Stem Head part way up into the Bonnet. Put the Down Stop Ring (14) over the bottom of the Stem Head. Lower the Stem so that the Down Stop Ring shoulders on the inside of the Bonnet and slide the Gate (19) onto the Tee-Head of the Stem.

b. Place the Stem Seal Assembly (12) over the Stem. This assembly consists of three [3] Seal Rings, a flat backed follower ring and a Bushing which are placed over the end of the Stem in that order. Carefully work down the Seal and follower over the Stem threads. Observe that the lips of the ring do not get curled back. After the Bushing, place the Retainer (11) with O-ring Seal (10) down over the Stem with flat side up.

c. Follow the Retainer with a Bearing (13) and the Stem Screw (6). Note that the Bearing must be concentric with the Stem Screw before further assembly. It can be held in place by turning the Stem Screw counter clockwise until the Stem Head seats against the Bonnet. Place another Bearing down over the Stem Screw and follow it with the Screw Housing (8), with O-ring Seal (7) inside, and tighten Nuts (24). Place the Key (5) into its slot in the Stem Screw and replace the Handle (2), Tube (3), and Stem Cap (4) in that order.

d. Slide the Gate (19) onto the Stem, turn it one quarter of a turn, to line it up with the slot in the Bonnet and draw it up all the way into the Bonnet by turning the Handle counter clockwise. Replace the Bonnet Seal (18) and install Seat and Bonnet Assembly in the body. Tighten Nuts (26) per torque requirement, and repack the Screw Housing (8) with general purpose grease through Fitting (1).

Stud Diameter inch	Torque ft-lbf
1/2	60
5/8	89
3/4	107
7/8	162
1	244
1-1/8	322
1-1/4	410
1-3/8	510
1-1/2	615
1-3/4	830



REPAIR INSTRUCTIONS
2 inch (2 X 3 inch), and 3 inch - 7500 WP Gate Valve

Tools Required for Assembly

- Hammer and mandrel or metal bar
- Drill with #44 Drill Bit
- API adjustable pipe wrench
- Torque, impact or socket wrench and socket
- Screwdriver
- Pressure test facility and fixtures
- Grease gun and grease, molybdenum disulfide base
- Grinder with flapper wheel
- 5/16 in. Nut Driver
- Vise Grips

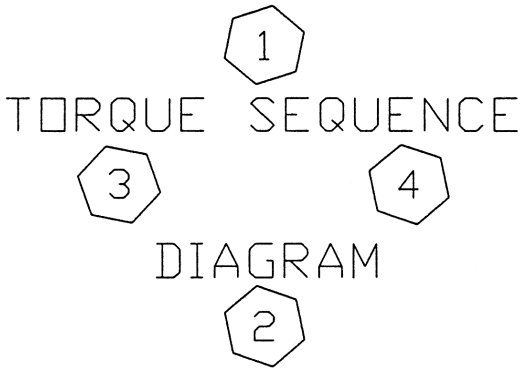
Assembly Procedures

a. Slide the threaded end of the Stem (14) through the Bonnet Bore from the underside and place the Stem Seal Assembly (12) over the Stem. This assembly consists of the Seal Rings, a flat-backed fol- lower Ring, and a Bushing which are placed over the end of the Stem in that order. Slide the Retainer (11) with O-ring Seal (10) inside of the Stem. Ob- serve that the lips of the ring do not get curled back. Set the Stem Seal Assembly into its counterbore in the Bonnet. Install Bonnet Studs (20).

b. Engage the Stem Screw (9) in the Screw Housing (7) about half (1/2) its total travel and place the Screw Housing on the Bonnet and Stem. Replace Nuts (21).

c. Rotate the Stem Screw clockwise until it bottoms on the Retainer, then back it up approximately 45 degrees. Engage the Gate (15) on the Tee-Head of the Stem and turn them together counter clockwise until the Gate touches the underside of the Bonnet Lugs. Align the Gate with the opening between the Lugs and retract it into the Bonnet by turning the Stem Screw counter clockwise. Place the Hub (2) on the Stem Screw, insert the Lock Handle (4), and retain it with the Lock Handle Pin (3).

Stud Diameter	Torque
inch	ft-lbf
1/2	60
5/8	89
3/4	107
7/8	162
1	244
1-1/8	322
1-1/4	410
1-3/8	510
1-1/2	615



Assembly amd Timing Procedures

d. Install the Seat (16) onto the Gate and grease the outside of the Seat. Install Body Studs and Bonnet on Seat and Valve Body, then lubricate the inside of the Body.

Note: Use a mixture of 25% Dixon #635 Lubrication Flake Graphite and 75% 10 weight oil for lubrication on Seat and Valve Body Bore prior to installing Seat into Body).

e. Install the bonnet assembly into the Body. Replace Body Nut and tighten per appropriate torque. Close the Gate fully by turning the handle clockwise. Make sure the Hub sits flush on the Screw Housing. Also, make pencil marks on the Gate even with the bottom of the Seat Bore. Open the Gate by turning the handle counter clockwise and measure distance from mark to the bottom of the Gate. This distance should fall within the following limits: (3/8 in. - 1/2 in.)

f. If either the distance is off, or the Hub is not flush with the Screw Housing, open the Gate fully, loosen the Bonnet Nut and remove. Turn the handle clock- wise while raising the Stem Screw Assembly above the Bonnet Studs. Turn the Stem Screw Assembly clockwise or counter clockwise, as appropriate to correct timing. Turn the handle counter clockwise to lower the Stem Screw Assembly back down on the Retainer. Replace the Nuts and hand tighten, re- check the gate timing. If still not timed, repeat timing process. If timing is correct, tighten the bonnet nuts to appropriate torque and forward to the testing area.

g. When the Forum Gate Valve is assembled in the manner described, the Hub is stopped by the Screw Housing at the proper down position of the Gate. By this design, overtightening is impossible and maxi- mum sealing efficiency is assured.

REPAIR INSTRUCTIONS
4 inch and 5 X 4 inch - 7500 WP Gate Valve

Tools Required for Assembly

- Hammer and mandrel or metal bar
- Drill with #44 Drill Bit
- Adjustable pipe wrench
- Torque, impact or socket wrench and socket
- Grease gun and grease, molybdenum disulfide base
- Grinder with flapper wheel
- Pressure test facility and fixtures
- 5/16 in. Nut Driver
- Vise Grips
- Screwdriver

Assembly Procedures

a. Slide the threaded end of the Stem (9) through the Bonnet (16) bore, from the underside of the Bonnet, until the Tee Slot on the Stem is half way into the Bonnet Cavity.

b. Slide the Down Stop Ring (14) over the Tee Slot of the Stem and then lower the Stem until the Down Stop Ring shoulders on the Bonnet.

c. Slide the Gate (19) onto the Tee Slot of the Stem, align with Bonnet slot and raise the Stem/Gate assembly into the Bonnet until it tops-out.

d. Place Stem Seal Assembly (12) over the threaded part of the Stem. The assembly consists of three [3] Seal Rings, a flat-backed follower ring and a bushing.

Note: Carefully work the seals over the Stem threads making sure the seals do not tear or curl.

e. After the bushing, place Secondary (O-ring) Seal (10) into the Retainer (11) and slide onto the Stem so that it rests on the bushing.

f. Place a Bearing (13) on top of the retainer.

g. Thread Stem Screw (6) onto the Stem until the Stem Screw bottoms-out on the bearing and the Gate is completely topped-out in the Bonnet cavity.

h. Place another bearing (13) over the Stem Screw.

i. Place Stem Screw (O-ring) Seal (7) into the Screw Housing (8). Put Screw Housing over the Stem Screw aligning on the Bonnet Studs (23).

j. Tighten Bonnet Stud Nuts (24) on the Bonnet Studs to hold the Screw Housing in place.

k. Place Key (5) into its slot in Stem Screw, put on the Handle Assembly (2), Sight Tube (3), and Stem Cap (4) in that order.

l. Lower the Gate, by turning handle clockwise, until the Stem threads show about one inch in the Sight Tube.

m. Place Bonnet Seal (18) into Body (20) Groove, and thread the Body Studs (25) into Body.

n. Liberally lubricate Gate. Spread the Seat (21) apart using the pegs and put the Seat onto the Gate.

o. Slide the Seat onto the Gate until the pegs locate into the Bonnet holes.

p. Lubricate the outside of the Seat and the inside of the Body with mixture of 25% Dixon #635 Lubricating Flake Graphite and 75% 10 Weight Oil.

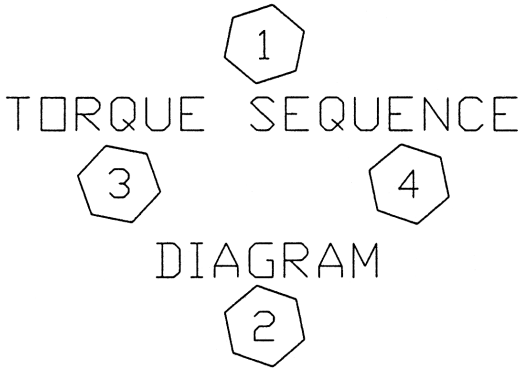
q. Slide the Seat/Bonnet Assembly into the Body about one to two inches. Raise the Gate until about one inch is still in the Seat.

r. Slide the Seat completely into the Body. Make sure that the Seat is going in straight, otherwise the Seat will tear.

s. Tighten the Body Stud Nuts (26) to the required torque.

t. Lube the Stem with general purpose grease via the Lube Fitting (1).

Stud Diameter	Torque
inch	ft-lbf
1/2	60
5/8	89
3/4	107
7/8	162
1	244
1-1/8	322
1-1/4	410
1-3/8	510
1-1/2	615
1-3/4	830



REPAIR INSTRUCTIONS
5-1/8 IN., AND 6 X 5-1/8 IN. - 7500 WP GATE VALVE

Tools Required for Assembly

- Impact wrench/torque wrench (capable of 700 ft-lbs)
- 5/8 in. Allen Wrench
- Standard shop tools
- Grease gun with grease

Assembly Procedures

a. Slide the threaded end of the Stem (7) through the bore of the Bonnet (9), opposite the stem seal bore.

b. Place the Stem Seal Assembly (10-14) over the Stem (7) and install into the stem seal bore (gland) in the Bonnet (9). Install in the following order, with the chevron side of the seals facing into the stem seal bore:
   - Bottom Adapter (10)
   - Pressure Ring (11)
   - Seal Ring (12)
   - Pressure Ring (11)
   - Top Adapter (13)
   - Gland Ring (14)

c. Install the O-ring (15) into the Packing Retainer (18) by applying grease to the O-ring groove. Install the Packing Retainer (18) over the Stem (7) and onto the Bonnet (9). Install four [4] Socket Head Cap Screws (22) and fully tighten.

d. Grease two [2] Needle Bearings (20). Place one [1] Thrust Washer (19) onto the Packing Retainer (18) followed by one [1] Needle Bearing (20) and one [1] Thrust Washer (19).

e. Place the Stem Screw Housing (21) onto the Thrust Washers (19) and Needle Bearing (20). Insert one [1] Thrust Washer (19) onto the Stem Screw Housing (21) followed by one [1] Needle Bearing (20) and one [1] Thrust Washer (19).

f. Install O-ring (23) onto the Stem Screw Housing (21). Install the Bonnet Cap (25) onto the Stem Screw Housing (21). Install four [4] Bonnet Hex Head Cap Screws (26) through the Bonnet Cap (25), Packing Retainer (18), and into the Bonnet (9). Fully tighten the Bonnet Hex Head Cap Screws (26).

g. Install the Handwheel (29) onto the Stem Screw Housing (21). Install O-ring (28) onto the Handwheel Locking Screw (27). Install the Handwheel Locking Screw (27) through the Handwheel (29) and into the Stem Screw Housing (21) and fully tighten.

h. Install the Clear Acrylic Tube (30) over the stem threads. Install the Stem Cap (31) onto the Stem Screw Housing (21) and fully tighten.

i. Install the Gate Clip (6) onto the Stem (7). Install the Gate (5) onto the Stem (7) and bend the tabs of the Gate Clip (6) down and towards the Gate (5).

j. Retract the Stem (7) until it bottoms on the Bonnet (9). Install O-ring (8) onto the Bonnet (9).

k. Install O-ring (4) onto the Wear Ring (3). Repeat for the second O-ring and wear ring. Install two [2] Wear Rings (3) into the Body (1). Install the Seat (2) into the Wear Rings (3) by collapsing the top of the Seat (2), aligning the boss on the Seat (2) with the bore in the Body (1). Release the Seat (2) and the Seat (2) will lock into place.

l. Lightly grease the Body Studs (16) and install the Body Studs (16) into the Body (1). Install the bonnet assembly onto the Body (1). Install the Body Stud Nuts (17) onto the Body Studs (16) and torque to 688 ft-lbs. Torque evenly in a criss-cross fashion.

m. Install the Lube Fittings (24). Apply grease to both fittings.

OUR CORE VALUES

No One Gets Hurt

The safety of our employees and customers is our first priority coupled with a healthy respect for the environment.

Integrity

In everything we do, in every interaction, both internally and externally, we strive to operate with the utmost integrity and mutual respect.

Customer Focused

Our products enhance our customer's performance and we listen to their needs and work with them to solve their challenges.

Good Place To Work

We are committed to creating a workplace that fosters innovation, teamwork and pride. Every team member is integral to our success and is treated equally and fairly.

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