



OVERVIEW

Fields containing oil with high viscosity (also referred to as heavy oil) require Enhanced Oil Recovery (EOR) methods such as Steam Assisted Gravity Drainage (SAGD). The injection of steam into the reservoir requires reliable equipment suitable for elevated temperatures. The ValveWorks USA Extreme Temperature (XT) series consists of a lineup of gate valves with industry-leading sealing technology, reliable and proven designs that are engineered and manufactured to meet the requirements of 6A while providing optimal performance in elevated temperature environments up to 650°F (345°C).

This series of gate valves offers the user several options depending on the specific application including achieving a positive seal at wellbore/flowline pressures ranging from zero to 15,000 PSI. XT series gate valves are full-bore valves. This allows for downhole tools to be passed through the wellhead and reduces turbulent flow. XT series valves are similar to each other in design with only slight variations across the lineup, offering a high percentage of parts interchangeability, giving you an efficiency-driven advantage in the management and maintenance of your gate valve fleet and providing optimal lifecycle management integrity.

This brochure provides an in-depth look at the details of this series of gate valves and explains the features, benefits, characteristics, dimensional & technical data and other valuable information needed to determine which valve provides an optimal solution for your specific application.

TABLE 1 - PRODUCT FEATURES

	MODEL XT1DS	MODEL XT1SG	MODEL XT1RC DS	MODEL XT1RC SG	MODEL XT2
FLOW DIRECTION	UNIDIRECTIONAL ^a	BIDIRECTIONAL	UNIDIRECTIONAL ^a	BIDIRECTIONAL	BIDIRECTIONAL
AVAILABLE BORE SIZES^b & RATED WORKING PRESSURES (psi)	2 1/16" 2K,3K,5K 2 9/16" 2K,3K,5K 3 1/8" 2K,3K,5K 4 1/16" 2K,3K,5K 5 1/8" 2K,3K,5K	2 1/16" 2K,3K,5K 2 9/16" 2K,3K,5K 3 1/8" 2K,3K,5K 4 1/16" 2K,3K,5K 5 1/8" 2K,3K,5K	2 1/16" 2K,3K,5K 2 9/16" 2K,3K,5K 3 1/8" 2K,3K,5K 4 1/16" 2K,3K,5K 5 1/8" 2K,3K,5K	2 1/16" 2K,3K,5K 2 9/16" 2K,3K,5K 3 1/8" 2K,3K,5K 4 1/16" 2K,3K,5K 5 1/8" 2K,3K,5K	1 13/16" 10K,15K 2 1/16" 5K,10K,15K 2 9/16" 5K,10K,15K 3 1/8" 3K,5K 3 1/16" 10K,15K 4 1/16" 3K,5K,10K
AVAILABLE PSL^c	1,2	1,2	1,2,3,3G	1,2,3,3G	1,2,3,3G
AVAILABLE PR	1,2,2F	1,2,2F	1,2,2F	1,2,2F	1,2,2F
MATERIAL CLASSES	AA,BB,CC,DD,EE,FF	AA,BB,CC,DD,EE,FF	AA,BB,CC,DD,EE,FF,HH	AA,BB,CC,DD,EE,FF,HH	AA,BB,CC,DD,EE,FF,HH
VALVE BODY	CAST	CAST	FORGED	FORGED	FORGED
GATE TYPE	EXPANDING ^d	SLAB	EXPANDING ^d	SLAB	SLAB
SEALING ACTION	MECHANICAL	PRESSURE-ENERGIZED	MECHANICAL	PRESSURE-ENERGIZED	PRESSURE-ENERGIZED
OPERATION TYPE	MANUAL ^e	MANUAL ^e	MANUAL ^e	MANUAL ^e	MANUAL ^e
BORE TYPE	FULL-BORE	FULL-BORE	FULL-BORE	FULL-BORE	FULL-BORE
GATE / SEAT SEAL	METAL TO METAL	METAL TO METAL	METAL TO METAL	METAL TO METAL	METAL TO METAL
STEM TYPE	NON-RISING	NON-RISING	NON-RISING	NON-RISING	NON-RISING
STEM PACKING TYPE	GRAFOIL®-V	GRAFOIL®-V	GRAFOIL®-V	GRAFOIL®-V	SPRING-ENERGIZED
REPACKING	YES ^f	YES ^f	YES ^f	YES ^f	YES ^g
THRUST BEARINGS	2 ^h	2 ^h	2 ^h	2 ^h	2 ^h
BODY LUBRICATION FITTINGS	2	2	2	2	1
BODY / BONNET CONNECTION	BOLTED	BOLTED	BOLTED	BOLTED	BOLTED
END CONNECTIONS	FLANGED (RTJ)	FLANGED (RTJ)	FLANGED (RTJ)	FLANGED (RTJ)	FLANGED (RTJ)
TEMPERATURE RANGE	-50°F (-46°C) THRU 650°F (345°C)	-50°F (-46°C) THRU 650°F (345°C)	-50°F (-46°C) THRU 650°F (345°C)	-50°F (-46°C) THRU 650°F (345°C)	-20°F (-29°C) THRU 350°F (180°C)

a) Equipped with a non-sealing seat on the upstream side. See engineering note titled "Model XT1DS & Model XT1RC DS" for details.

b) 2 1/16" x 1 13/16", 3 1/8" x 3 3/16", 4 1/16" x 4 1/8", and 4 1/16" x 4 1/4" available upon request. (Excluding 10K & 15K)

c) Product Specification Level

d) See engineering note titled "Expanding Gate Assembly Operation Explained" for details.

e) Also referred to as "HANDWHEEL OPERATED"

f) Stuffing box can be repacked via injectable packing while the valve is in service up to the rated working pressure.

g) Stuffing box can be repacked via back seat while the valve is in service up to the rated working pressure.

h) Valve bonnet equipped with grease port(s) and fitting(s) for bearing lubrication.



ENGINEERING NOTES

Expanding Gate Assembly Operation Explained – The expanding gate assembly consists of two main components: the gate (major) and the segment (minor). These components are assembled together using precision machined pins and high-quality, precision formed and treated Nickel-Chromium alloy springs. When the valve is manually operated, the gate and segment act one against the other by means of a dual expanding wedge when the valve is either fully opened or fully closed. This expansion effect of the gate assembly against the valve seats, through parallel faces of the gate assembly, provides a strong and positive seal against pulsations and vibrations created by flow conditions. This is advantageous when attempting to accomplish a positive seal in both high and low pressure conditions.

Model XT1DS & Model XT1RC DS – These models are unidirectional gate valves equipped with an expanding gate assembly and a sealing seat in the downstream seat pocket. The upstream seat pocket is equipped with a non-sealing seat assembly. This allows pressure to bypass the upstream seat, equalize throughout the valve body, and only seal against the downstream seat assembly as the original Model M was intended. All model XT1DS valves are marked with a flow direction arrow for accurate installation.

NOTE: When bidirectional operation is required, a slab gate valve is necessary. XT1 Series expanding gate valves (Model XT1DS and Model XT1RC DS) are not designed for bidirectional operation.

Pressure Testing – XT1 series gate valves are not intended to be tested through the body lubrication fittings. These fittings are designed for lubrication purposes only. Shell tests and gate/seat tests shall be conducted from the end/outlet connection by qualified personnel only.

TABLE 2 - TEMPERATURE RATINGS

CLASSIFICATION	OPERATING TEMPERATURE RANGE
L	-50°F (-46°C) TO 180°F (82°C)
P	-20°F (-29°C) TO 180°F (82°C)
X	-0°F (-18°C) TO 350°F (180°C)
Y	-0°F (-18°C) TO 650°F (345°C)

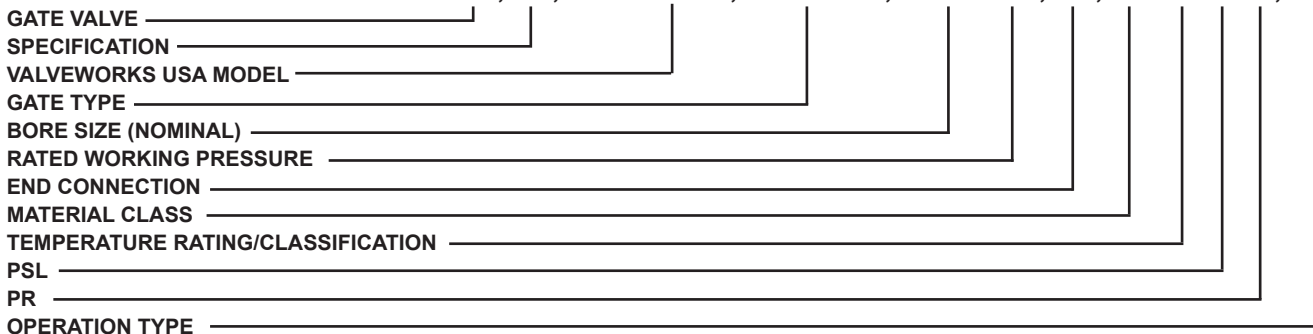
TABLE 3 - MATERIAL REQUIREMENTS

MATERIAL CLASS		MINIMUM MATERIAL REQUIREMENTS	
		BODY, BONNET, END & OUTLET CONNECTIONS	PRESSURE-CONTROLLING PARTS & STEMS
AA	GENERAL SERVICE	CARBON OR LOW-ALLOY STEEL	CARBON OR LOW-ALLOY STEEL
BB	GENERAL SERVICE	CARBON OR LOW-ALLOY STEEL	STAINLESS STEEL
CC	GENERAL SERVICE	STAINLESS STEEL	STAINLESS STEEL
DD	SOUR SERVICE ^a	CARBON OR LOW-ALLOY STEEL ^b	CARBON OR LOW-ALLOY STEEL ^b
EE	SOUR SERVICE ^a	CARBON OR LOW-ALLOY STEEL ^b	STAINLESS STEEL ^b
FF	SOUR SERVICE ^a	STAINLESS STEEL ^b	STAINLESS STEEL ^b
HH	SOUR SERVICE ^a	CRA ^{acd}	CRA ^{acd}

a) As defined by ISO 15156 (all parts) (NACE MR0175; See Clause 2).
 b) In accordance with ISO 15156 (NACE MR0175; See Clause 2).
 c) CRA required on retained-fluid wetted surfaces only.
 d) CRA as defined in Clause 3; ISO 15156 (all parts) (NACE MR0175; See Clause 2) definition of CRA does not apply.

VALVEWORKS USA DESCRIPTION KEY

GV , 6A , MOD XT1DS , EXP GATE , 2 1/16" 5M , FE , DD - X - 1 - 2 , HWO

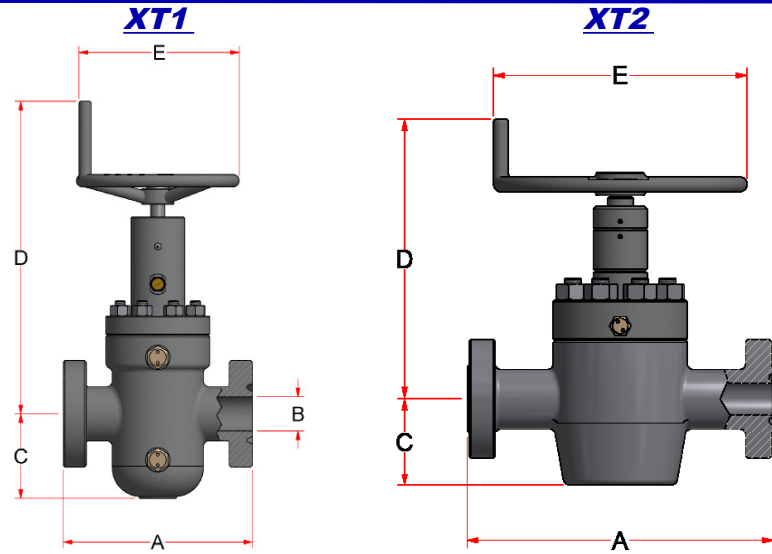


ABBREVIATION KEY

- | | | |
|--|-----------------------------------|---------------------------------|
| XT1SG = MODEL XT1 SLAB GATE | SG = SLAB GATE | LC = CASING (LONG THREAD) |
| XT1DS = MODEL XT1 DIRECTIONAL SEAL | FE = FLANGED END | EU = TUBING, EXTERNAL UPSET |
| XT1RC SG = MODEL XT1 ROUND CAVITY SLAB GATE | RTJ = RING TYPE JOINT | CRA = CORROSION-RESISTANT ALLOY |
| XT1RC DS = MODEL XT1 ROUND CAVITY DIRECTIONAL SEAL | PSL = PRODUCT SPECIFICATION LEVEL | XYL = XYLAN® |
| XT2 = MODEL XT2 SLAB GATE | PR = PERFORMANCE REQUIREMENT | HF = HARDFACED |
| HWO = HANDWHEEL OPERATED (MANUAL) | LP = LINE PIPE | |
| EXP = EXPANDING | STC = CASING (SHORT THREAD) | |

DIMENSION TABLE KEY

- A** FACE TO FACE
- B** VALVE BORE SIZE (NOMINAL)
- C** BORE CENTERLINE TO BOTTOM
- D** BORE CENTERLINE TO TOP
- E** HANDWHEEL DIAMETER
- NT** NUMBER OF TURNS
- RJ** RING JOINT
- TS** THREAD SIZE
- BSS** BONNET STUD SIZE
- N** NUMBER OF STUDS
- WT** APPROXIMATE WEIGHT
- HT** HANDWHEEL OPERATING TORQUE



XT1 FLANGED GATE VALVES

SIZE	WP (PSI)	A	B	C	D	E	NT	RJ	BSS	N	WT (LBS)	HT (FT-LBS)
2 1/16	2K	11 5/8	2 1/16	5 1/4	19 1/2	10	14	R-23	5/8	8	120	32
	3K	14 5/8	2 1/16	5 1/2	19 5/8	13	14	R-24	7/8	8	180	40
	5K	14 5/8	2 1/16	5 1/2	19 5/8	13	14	R-24	7/8	8	180	57
2 9/16	2K	13 1/8	2 9/16	6 3/8	20 1/2	13	16 1/2	R-26	5/8	8	180	37
	3K	16 5/8	2 9/16	6 5/8	20 7/8	16	16 1/2	R-27	7/8	8	220	49
	5K	16 5/8	2 9/16	6 5/8	20 7/8	16	16 1/2	R-27	7/8	8	220	66
3 1/8	2K	14 1/8	3 1/8	7 5/8	22 7/8	13	20 3/4	R-31	7/8	8	220	48
	3K	17 1/8	3 1/8	7 5/8	23	16	20 3/4	R-31	1	8	300	65
	5K	18 5/8	3 1/8	7 5/8	23	16	20 3/4	R-35	1	8	340	90
4 1/16	2K	17 1/8	4 1/16	9 5/8	26 1/2	16	24 3/4	R-37	1	8	360	81
	3K	20 1/8	4 1/16	9 5/8	26 5/8	20	24 3/4	R-37	1 3/8	8	520	67
	5K	21 5/8	4 1/16	9 5/8	26 5/8	20	24 3/4	R-39	1 3/8	8	560	130
5 1/8	2K	22 1/2	5 1/8	11 3/4	30	24	30 1/4	R-41	1 3/8	8	770	150
	3K	24 1/8	5 1/8	11 3/4	30	24	30 1/4	R-41	1 3/8	8	810	210
	5K	28 5/8	5 1/8	11 3/4	30	24	30 1/4	R-41	1 3/8	8	940	366

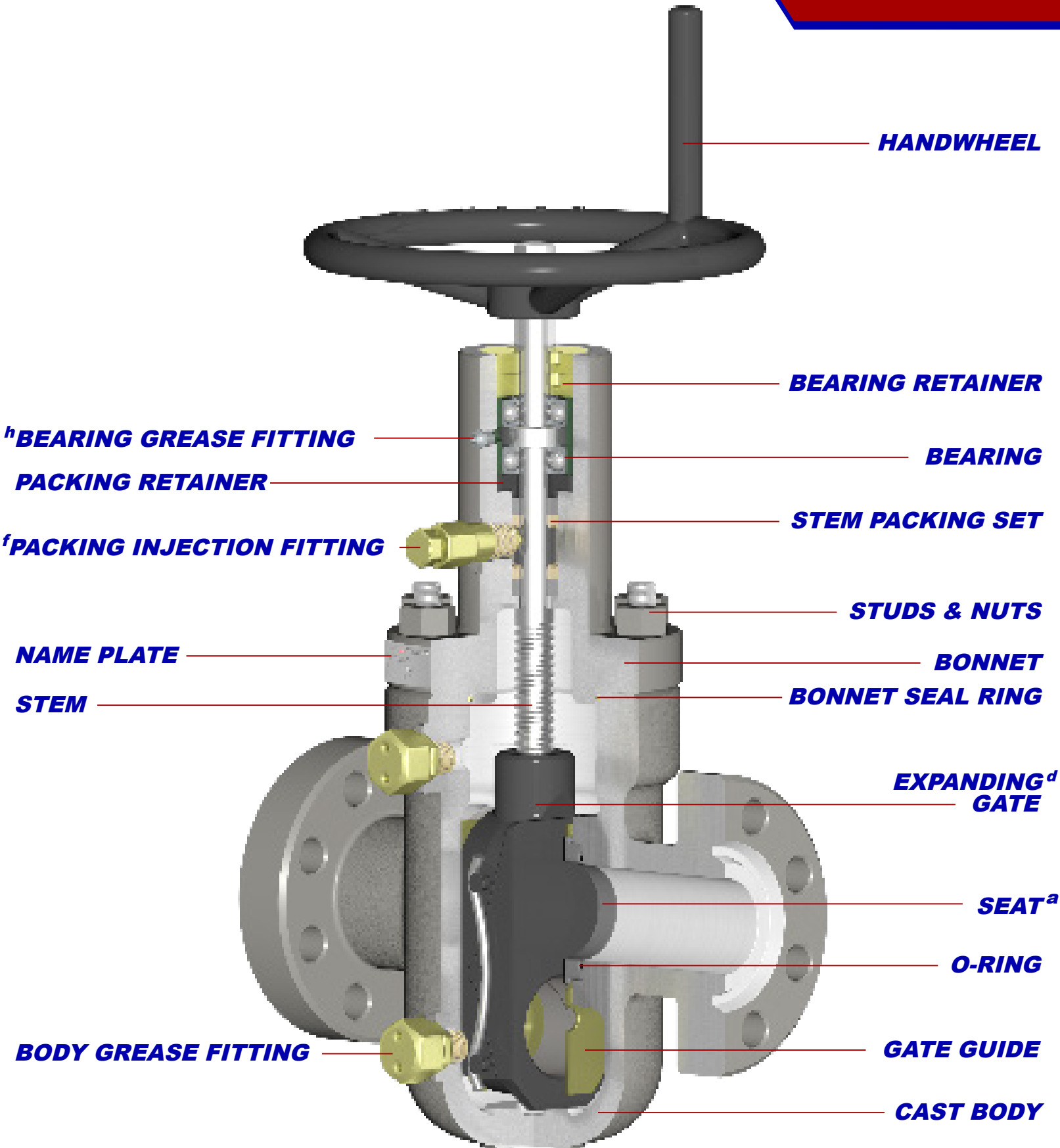
XT2 FLANGED GATE VALVES

SIZE	WP (PSI)	A	B	C	D	E	NT	RJ	BSS	N	WT (LBS)	HT (FT-LBS)
1 13/16	10K	18 1/4	1 13/16	5 13/16	18 13/16	16	11 3/4	BX-151	1-1/8	8	270	59
	15K	18	1 13/16	6 13/16	18 13/16	16	11 3/4	BX-151	1-1/4	8	275	89
2 1/16	5K	14 5/8	2 1/16	5 7/8	18 7/8	14	12	R-24	7/8	8	189	32
	10K	20 1/2	2 1/16	5 13/16	18 13/16	16	12 1/2	BX-152	1-1/8	8	275	66
	15K	19	2 1/16	6 1/8	18 13/16	16	12 1/2	BX-152	1-1/4	8	350	103
2 9/16	5K	16 5/8	2 9/16	6 5/16	19 1/2	16	16 1/4	R-27	1	8	275	49
	10K	22 1/4	2 9/16	6 7/8	19 5/8	20	16	BX-153	1-1/4	8	485	111
	15K	21	2 9/16	7 13/16	22 7/8	20	15 1/2	BX-153	1-1/8	12	520	221
3 1/8	3K	17 1/8	3 1/8	7 13/16	20 1/2	16	17 1/2	R-31	1 1/8	8	337	40
	5K	18 5/8	3 1/8	7 9/16	20 1/2	16	17 1/2	R-35	1 1/8	8	355	67
3 1/16	10K	24 3/8	3 1/16	8 1/8	22	23	17 1/2	BX-154	1-3/8	8	550	140
	15K	23 9/16	3 1/16	9 1/8	25 5/8	23	15 1/2	BX-154	1-3/8	12	914	308
4 1/16	3K	20 1/8	4 1/16	9 5/16	22	20	23 1/4	R-37	1 1/4	8	498	70
	5K	21 5/8	4 1/16	9 13/16	22	20	23 1/4	R-39	1 1/4	8	550	113
	10K	26 3/8	4 1/16	10 1/8	28 3/4	24	23 1/4	BX-155	1-5/8	8	950	258

*ALL DIMENSIONS ARE IN INCHES

ENGINEERED - DESIGNED - VERIFIED - QUALITY ASSURED - CERTIFIED - FIELD PROVEN - CREDIBLE - SUPPORTED

MODEL XT1DS - UNIDIRECTIONAL, EXPANDING GATE, CAST BODY



a) Equipped with a non-sealing seat on the upstream side. See engineering note titled "Model XT1DS & Model XT1RC DS" for details.

d) See engineering note titled "Expanding Gate Assembly Operation Explained" for details.

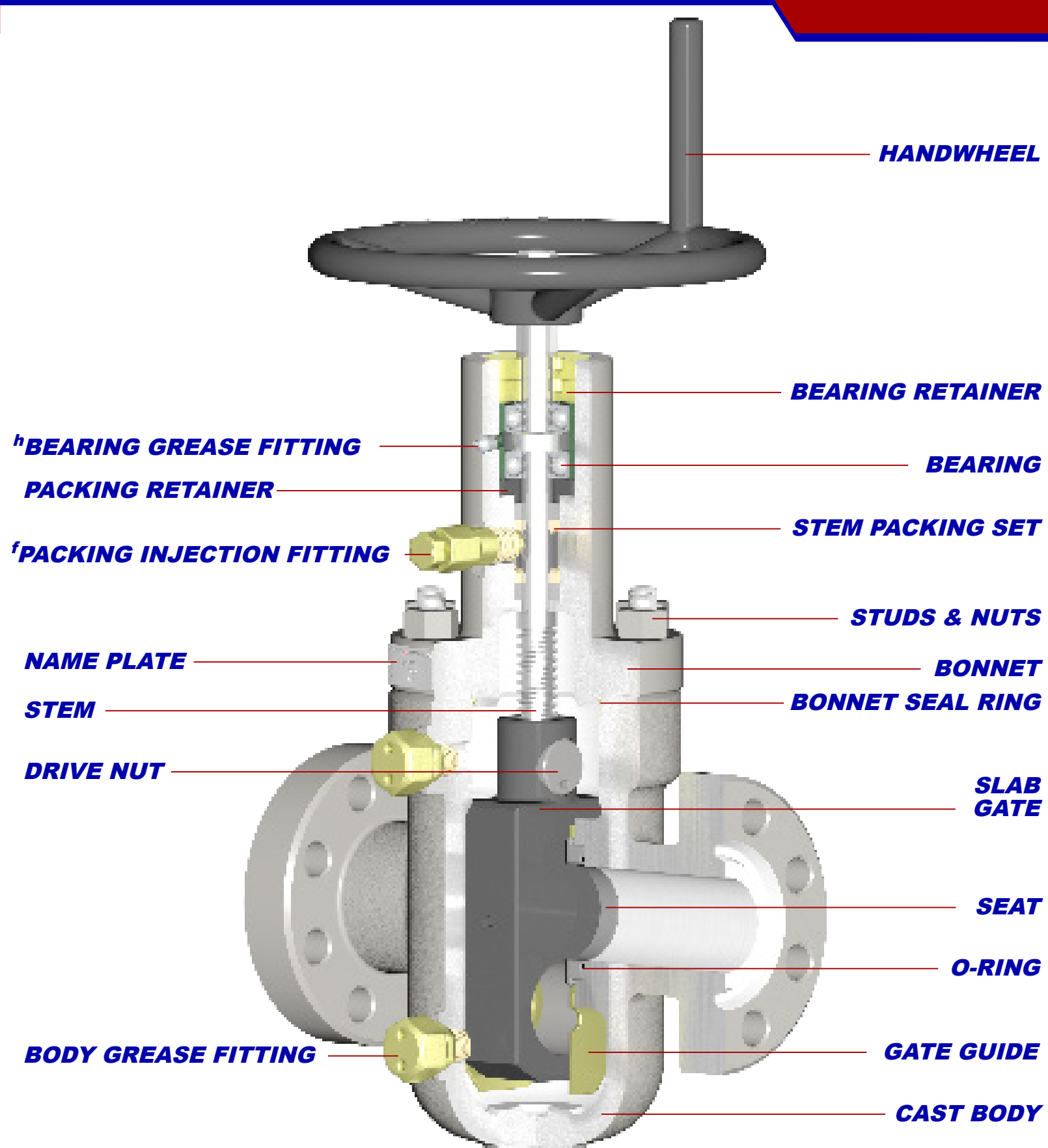
f) Stuffing box can be repacked via injectable packing while the valve is in service up to the rated working pressure.

h) Valve bonnet equipped with grease port(s) and fitting(s) for bearing lubrication.

*THE ACTUAL PRODUCT MAY VARY SLIGHTLY FROM SHOWN SCHEMATIC DUE TO ENGINEERING APPROVED VARIATION

ENGINEERED - DESIGNED - VERIFIED - QUALITY ASSURED - CERTIFIED - FIELD PROVEN - CREDIBLE - SUPPORTED

MODEL XT1SG - BIDIRECTIONAL, SLAB GATE, CAST BODY



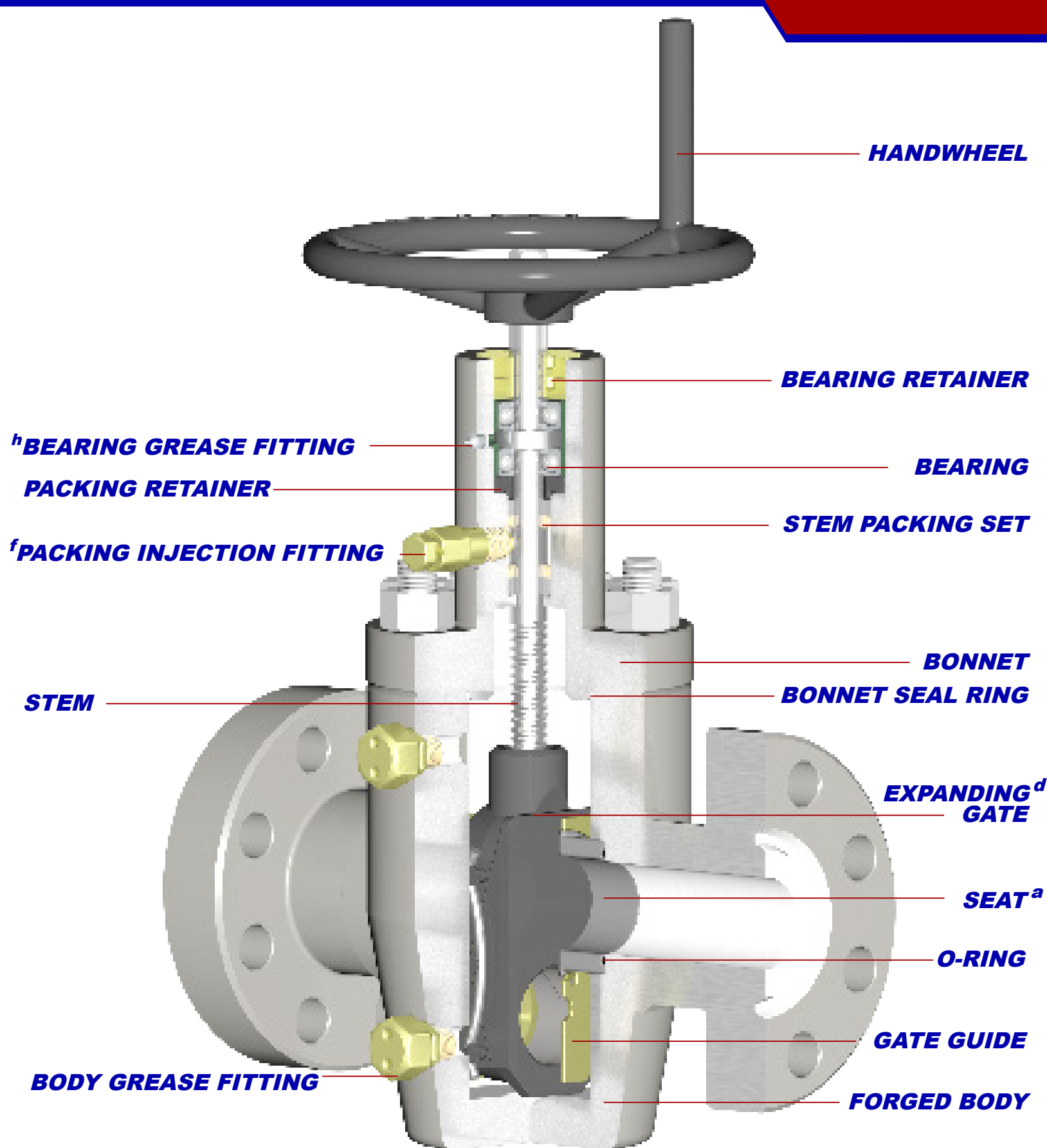
f) Stuffing box can be repacked via injectable packing while the valve is in service up to the rated working pressure.

h) Valve bonnet equipped with grease port(s) and fitting(s) for bearing lubrication.

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ENGINEERED - DESIGNED - VERIFIED - QUALITY ASSURED - CERTIFIED - FIELD PROVEN - CREDIBLE - SUPPORTED

MODEL XT1RC DS - UNIDIRECTIONAL, EXPANDING GATE, FORGED BODY



a) Equipped with a non-sealing seat on the upstream side. See engineering note titled "Model XT1DS & Model XT1RC DS" for details.

d) See engineering note titled "Expanding Gate Assembly Operation Explained" for details.

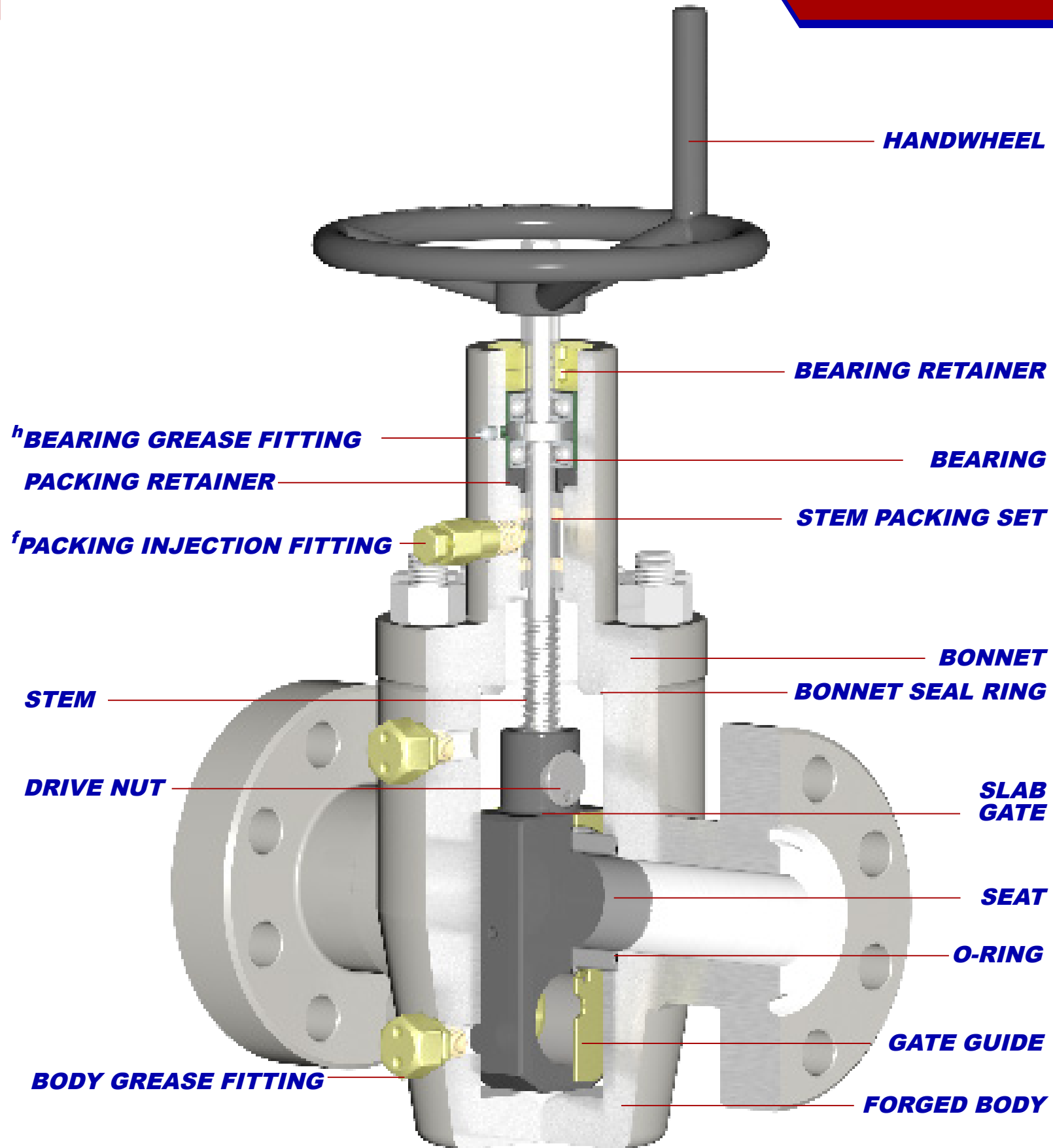
f) Stuffing box can be repacked via injectable packing while the valve is in service up to the rated working pressure.

h) Valve bonnet equipped with grease port(s) and fitting(s) for bearing lubrication.

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MODEL XT1RC SG - BIDIRECTIONAL, SLAB GATE, FORGED BODY



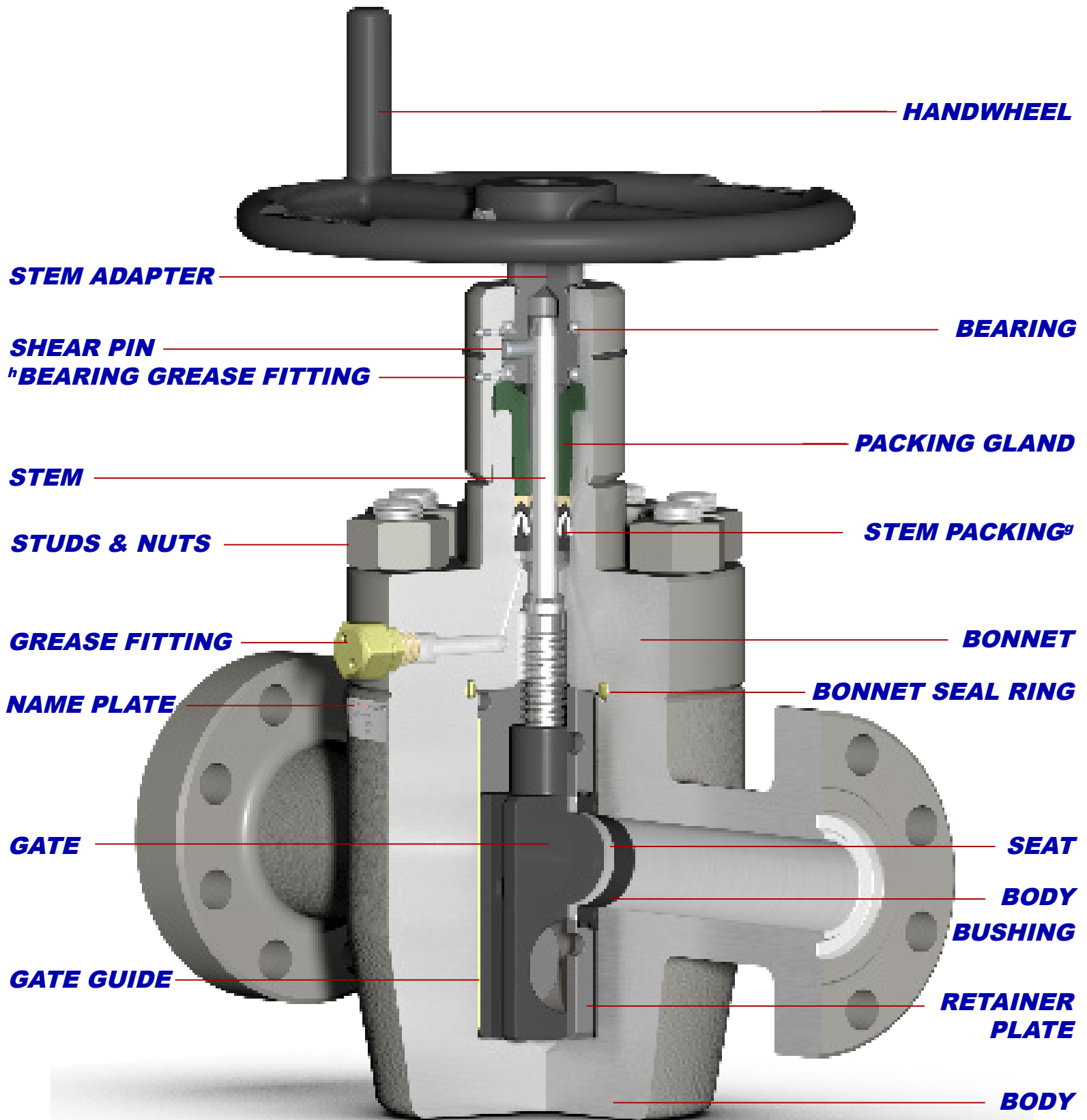
f) Stuffing box can be repacked via injectable packing while the valve is in service up to the rated working pressure.

h) Valve bonnet equipped with grease port(s) and fitting(s) for bearing lubrication.

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ENGINEERED - DESIGNED - VERIFIED - QUALITY ASSURED - CERTIFIED - FIELD PROVEN - CREDIBLE - SUPPORTED

MODEL XT2 - BIDIRECTIONAL, SLAB GATE, FORGED BODY



g) Stuffing box can be repacked via back seat while the valve is in service up to the rated working pressure.

h) Valve bonnet equipped with grease port(s) and fitting(s) for bearing lubrication.

*THE ACTUAL PRODUCT MAY VARY SLIGHTLY FROM SHOWN SCHEMATIC DUE TO ENGINEERING APPROVED VARIATION

ENGINEERED - DESIGNED - VERIFIED - QUALITY ASSURED - CERTIFIED - FIELD PROVEN - CREDIBLE - SUPPORTED