



OVERVIEW

The ValveWorks USA FM Series consists of a lineup of gate valves with reliable, proven designs that are engineered and manufactured to meet the requirements of 6A, and where a 4 1/16", 5 1/8", 7 1/16" bore is required. This series of gate valves offers the user several options depending on the specific application.

FM Series gate valves are full bore, through conduit valves. This allows for downhole tools to be passed through the well-head and / or Christmas tree and reduces turbulent flow. FM 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 life cycle 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 FM1	MODEL FM2	MODEL FM3
FLOW DIRECTION	BIDIRECTIONAL	BIDIRECTIONAL	BIDIRECTIONAL
AVAILABLE BORE SIZES & RATED WORKING PRESSURES (psi)	7 1/16" 10K, 15K	4 1/16" 15K	5 1/8" 10K, 15K
AVAILABLE PSL^a	1,2,3,3G	1,2,3,3G	1,2,3,3G
MATERIAL CLASSES	EE,FF,HH	EE,FF,HH	EE,FF,HH
VALVE BODY	FORGED	FORGED	FORGED
GATE TYPE	SLAB	SLAB	SLAB
SEALING ACTION	PRESSURE ENERGIZED	PRESSURE ENERGIZED	PRESSURE ENERGIZED
OPERATION	MANUAL ^b	MANUAL ^b	MANUAL ^b
BORE TYPE	THRU-CONDUIT ^c	THRU-CONDUIT ^c	THRU-CONDUIT ^c
GATE / SEAT SEAL	METAL TO METAL	METAL TO METAL	METAL TO METAL
STEM TYPE	RISING	RISING	RISING
STEM PACKING TYPE	OPTI-SEAL	OPTI-SEAL	OPTI-SEAL
REPACKING	YES ^d	YES ^d	YES ^d
BEARINGS	3 ^e	3 ^e	3 ^e
BODY LUBRICATION FITTINGS	2	2	2
BODY / BONNET CONNECTION	BOLTED	BOLTED	BOLTED
BALANCE STEM	YES	YES	YES
END CONNECTIONS	FLANGED (RTJ) OR STUDDED	FLANGED (RTJ)	FLANGED (RTJ)
TEMPERATURE RANGE	-75°F (-60°C) THRU 250°F (121°C)	-75°F (-60°C) THRU 250°F (121°C)	-75°F (-60°C) THRU 250°F (121°C)

a) Product Specification Level

b) Ball Screw Operated (BSOP) - Manual gate valve with torque reduction operator. See engineering note titled "Ball Screw Operated (BSOP)" for details.

c) Also referred to as "FULL OPENING"

d) Repacking is achieved via stem backseat method.

e) Ball screw housing equipped with grease port(s) and fitting(s) for bearing lubrication.



ENGINEERING NOTES

Pressure Testing – FM 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.

Ball Screw Operated (BSOP) – FM Series gate valves are offered with a ball screw operator, which greatly reduces the operating torque when opening and / or closing the valve.

TABLE 2 - TEMPERATURE RATINGS

TEMPERATURE CLASSIFICATION	OPERATING RANGE
K	-75°F (-60°C) TO 180°F (82°C)
L	-50°F (-46°C) TO 180°F (82°C)
N	-50°F (-46°C) TO 140°F (60°C)
P	-20°F (-29°C) TO 180°F (82°C)
S	0°F (-18°C) TO 140°F (60°C)
T	0°F (-18°C) TO 180°F (82°C)
U	0°F (-18°C) TO 250°F (121°C)
V	35°F (2°C) TO 250°F (121°C)

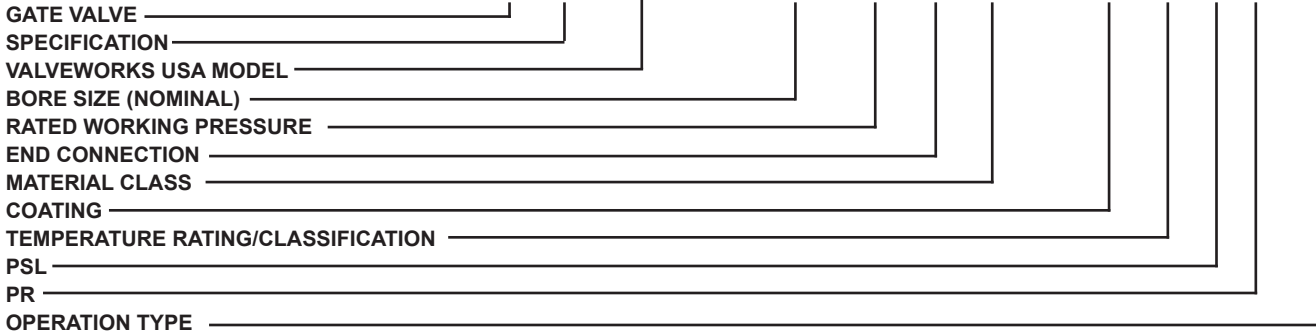
TABLE 3 - MATERIAL REQUIREMENTS

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 ^{bcd}	CRA ^{bcd}

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-FM1 , 7 1/16" 10M , FE , EE(0,5) HF - KU - 3 - 2 , BSOP

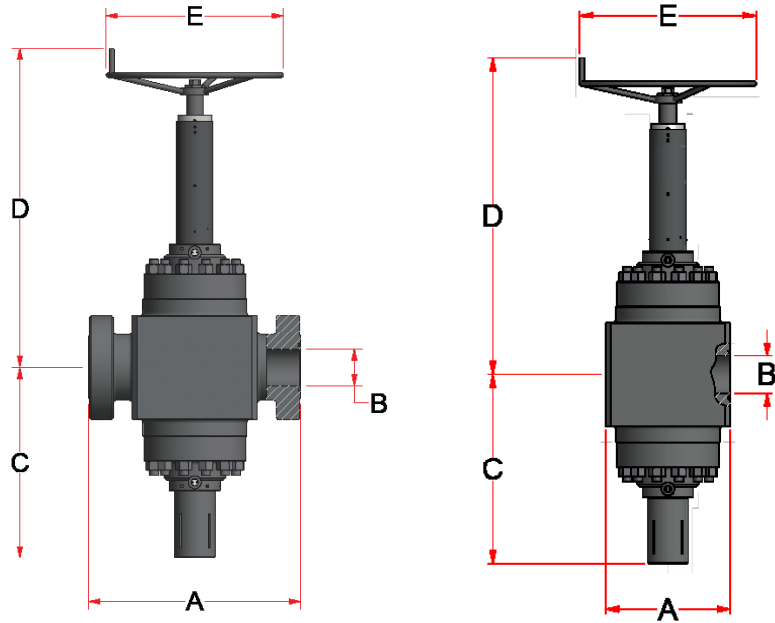


ABBREVIATION KEY

- BSOP = BALL-SCREW OPERATED
- SG = SLAB GATE
- FE = FLANGED END
- STD =STUDDED END
- RTJ = RING TYPE JOINT
- D/O = DIRECT OPERATING
- R/A = REVERSE ACTING
- KU = TEMP. CLASS K/U (-75F TO 250F)
- LU = TEMP. CLASS L/U (-50F TO 250F)
- PU = TEMP. CLASS P/U (-20F TO 250F)
- PSL = PRODUCT SPECIFICATION LEVEL
- PR = PERFORMANCE REQUIREMENT
- CRA = CORROSION-RESISTANT ALLOY
- HF = HARDFACED TUGSTON CARBIDE

DIMENSION TABLE KEY

- A** END TO END
- B** VALVE BORE SIZE
- C** BORE CENTERLINE TO BOTTOM
- D** BORE CENTERLINE TO TOP
- E** HANDWHEEL DIAMETER
- NT** NUMBER OF TURNS
- RJ** RING JOINT
- BSS** BONNET STUD SIZE
- WT** APPROXIMATE WEIGHT
- AG** APROX. AMOUNT OF GREASE



FLANGED GATE VALVES

SIZE	WP (PSI)	A	B	C	D	E	NT	RJ	BSS	WT (LBS)	AG (GAL)
4 1/16	15K	29	4 1/16	26	54 1/4	28	9 5/8	BX-155	1	2050	1.50
5 1/8	10K	29	5 1/8	26	52 1/8	28	11 3/4	BX-169	1 3/8	1331	1.72
5 1/8	15K	35	5 1/8	28 1/8	56 1/4	34	13	BX-169	1 3/4	2331	2.30
7 1/16	10K	35	7 1/16	36 1/2	61 1/4	34	17 3/4	BX-156	1 3/4	4420	6.87
7 1/16	15K	40 5/8	7 1/16	36 1/2	61 1/4	34	17 3/4	BX-156	2	5410	6.87

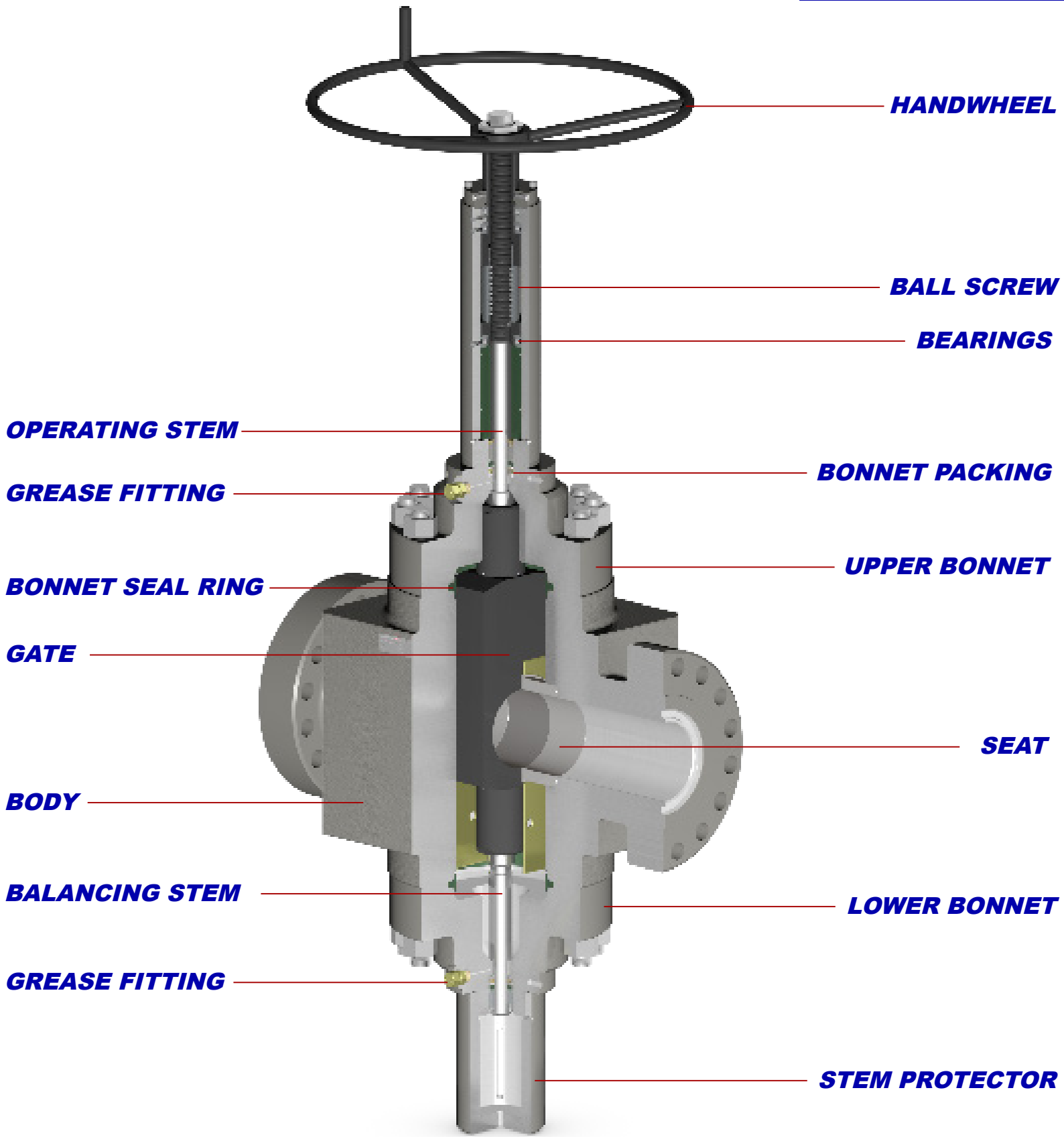
STUDED GATE VALVES

SIZE	WP (PSI)	A	B	C	D	E	NT	RJ	BSS	WT (LBS)	AG (GAL)
7 1/16	10K	24	7 1/16	36 1/2	61 1/4	34	17 3/4	BX-156	1 3/4	4630	6.87
7 1/16	15K	24	7 1/16	36 1/2	61 1/4	34	17 3/4	BX-156	2	4690	6.87

*ALL DIMENSIONS ARE IN INCHES

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

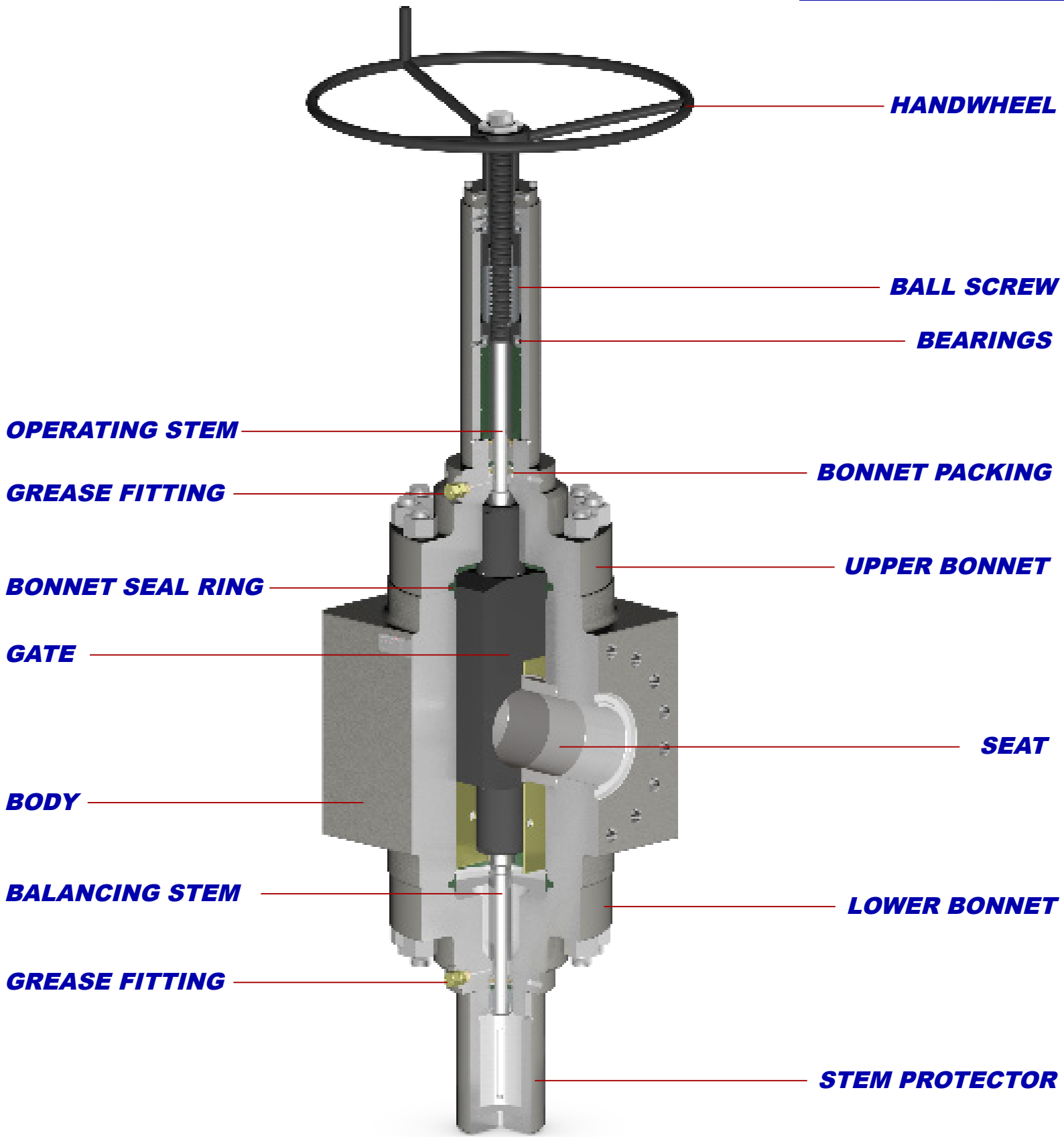
MODEL FM1 - BIDIRECTIONAL, SLAB GATE, FLANGED BODY



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

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

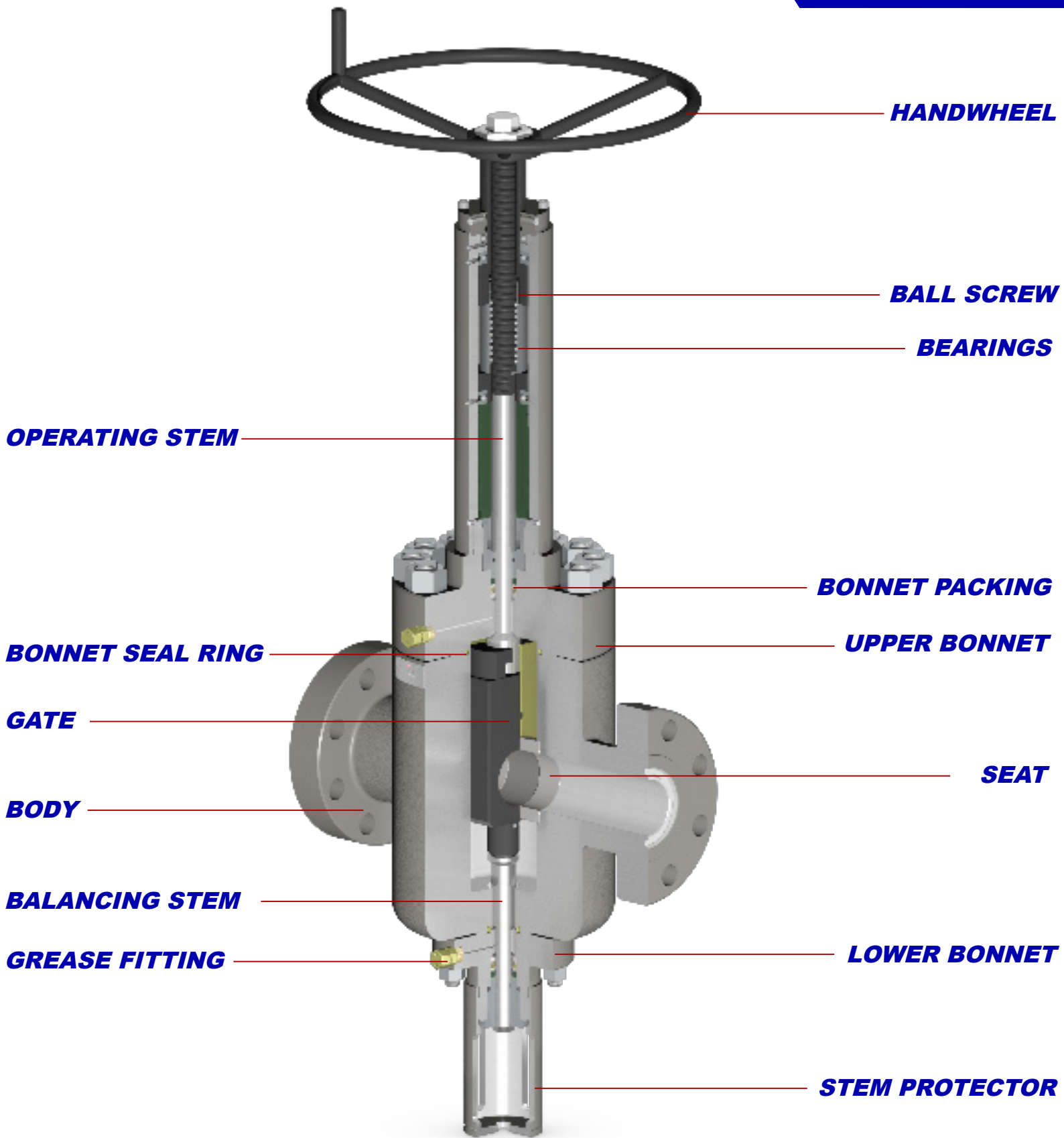
MODEL FM1 - BIDIRECTIONAL, SLAB GATE, STUDDED BODY



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

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

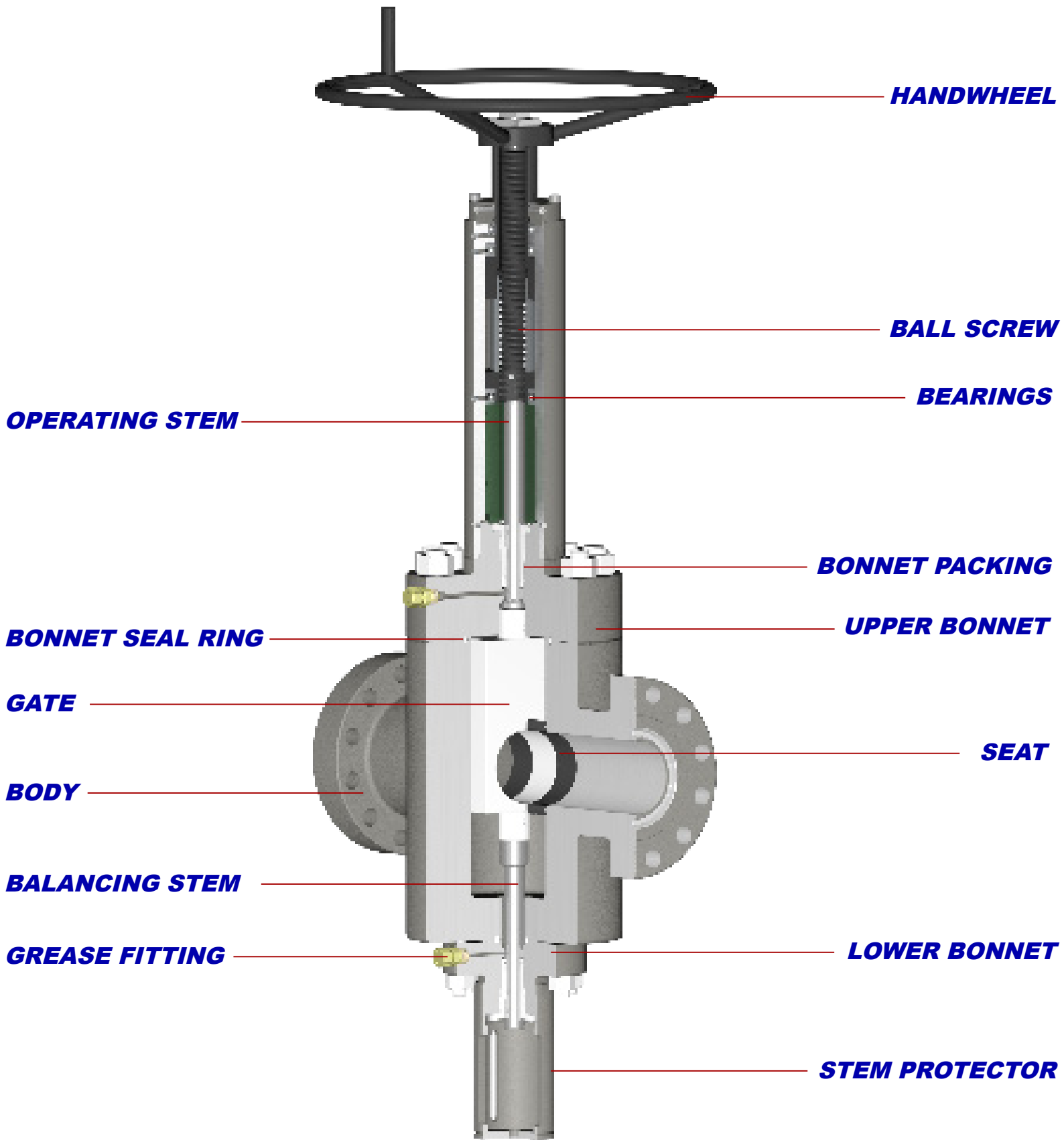
MODEL FM2 - BIDIRECTIONAL, SLAB GATE, FLANGED BODY



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

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

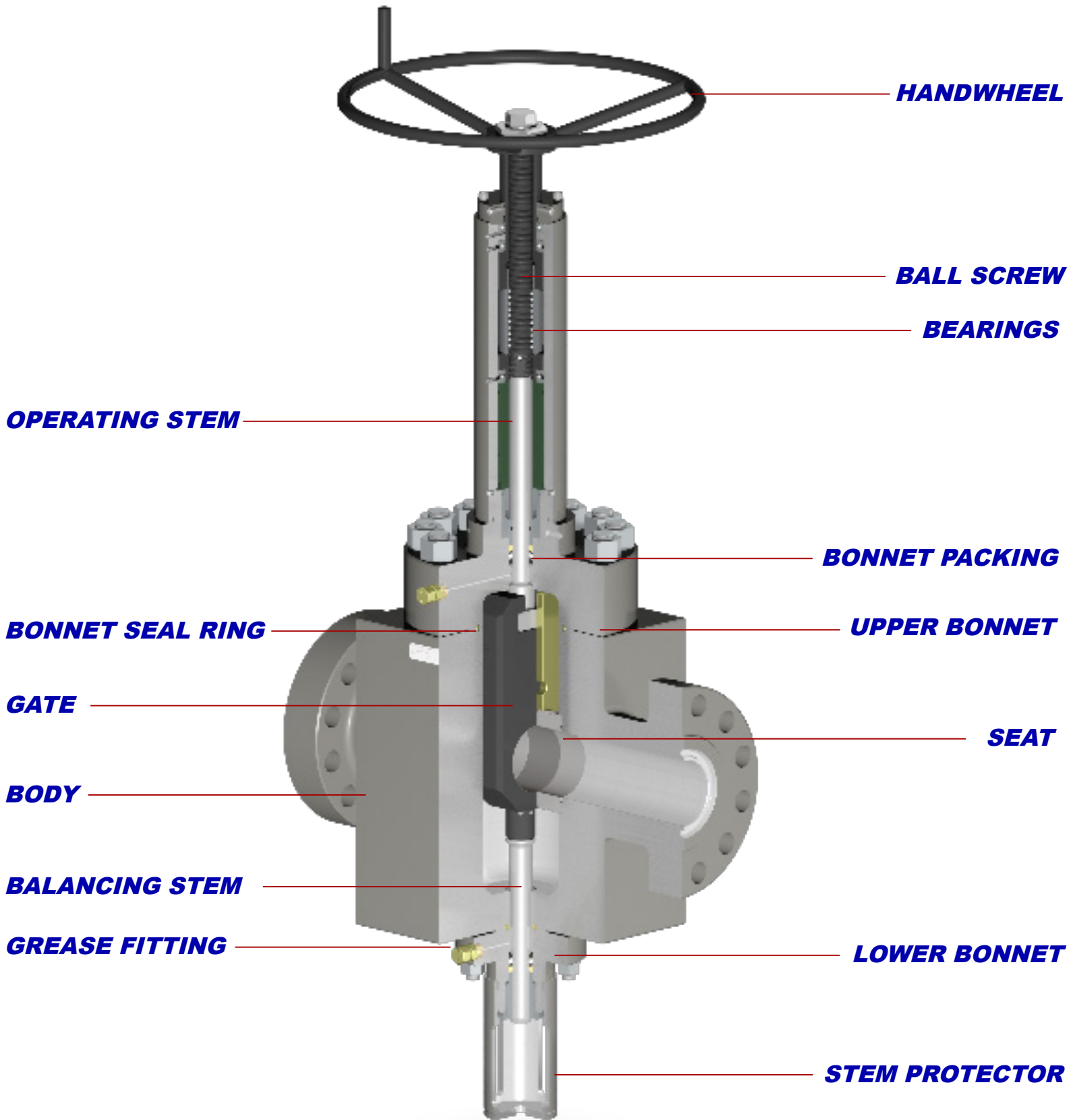
MODEL FM3 10K - BIDIRECTIONAL, SLAB GATE, FLANGED BODY



*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 FM3 15K - BIDIRECTIONAL, SLAB GATE, FLANGED BODY



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

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