McKenzie Valve & Machining LLC

MCKENZIE 2” RISING STEM ANGLE VALVE
FOR PRESSURE CAR APPLICATIONS

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McKenzie Valve and Machining, LLC provides this document for use by personnel involved with the transportation of commodities in railroad tank cars and the maintenance and repair of tank car valves. The information contained in this document is intended to aid in the use of this product in a manner that promotes personal safety and environmentally friendly loading and unloading of tank cars.

This document is intended to be used ONLY by personnel trained in the mechanical requirements to operate valves and the procedures for loading and unloading tank cars as required by the American Association of Railroads (AAR), U.S. Department of Transportation Federal Railroad Administration, Transport Canada, Canadian Transportation Agency, Ministry of Communications and Transport (Mexico) and Railway Transportation Regulatory Agency (Mexico) or other jurisdictional agencies.

McKenzie Valve and Machining, LLC provides warnings for potential hazards known to McKenzie Valve and Machining, LLC. These warnings are not intended to override practices and protocols required by the tank car owner or the shipper of the tank car commodity or jurisdictional agencies.

This document provides detailed instructions regarding the disassembly, inspection, and reassembly of the McKenzie 2” Rising Stem Angle Valve. No deviations to these instructions are recommended by McKenzie Valve and Machining, LLC.

https://www.mckenzievalve.com/warranty

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Table of Contents

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1. PURPOSE

1.1. This document provides generic instructions for the installation, operation, maintenance, assembly and testing of the McKenzie 2” Rising Stem Angle Valve for pressure cars.

2. SCOPE

2.1. This document applies to McKenzie 2” Rising Stem Angle Valves.

3. WARNINGS

3.1. This document contains images indicating potential hazards to be avoided using ANSI Z535 requirements.

3.2. The Danger hazard is indicated by this symbol 

and indicates a hazard situation, that if not avoided will result in death or severe injury.

3.3. The Warning hazard is indicated by this symbol 

and indicates a hazard situation, that if not avoided could result in death or severe injury.

3.4. The Caution hazard is indicated by this symbol 

and indicates a hazard situation, that if not avoided could result in minor or moderate injury.

4. THE MCKENZIE 2” RSV

4.1. The McKenzie 2” RSV is shown in Figure 1 and the components are listed in Table 1.

4.2. Valve components are listed in this manual with their symbol number in parentheses. Example: Body (1).

4.3. All references to clockwise or counterclockwise are as view from the top of the valve.

4.4. Features and Benefits

- 2 Piece Body
- SS and DI Body Construction
- CS, SS, and Nitronic 60 Plugs
- O-ring options available
- Live Loaded Adjustable Packing
- Easy Internal Inspection during cleaning

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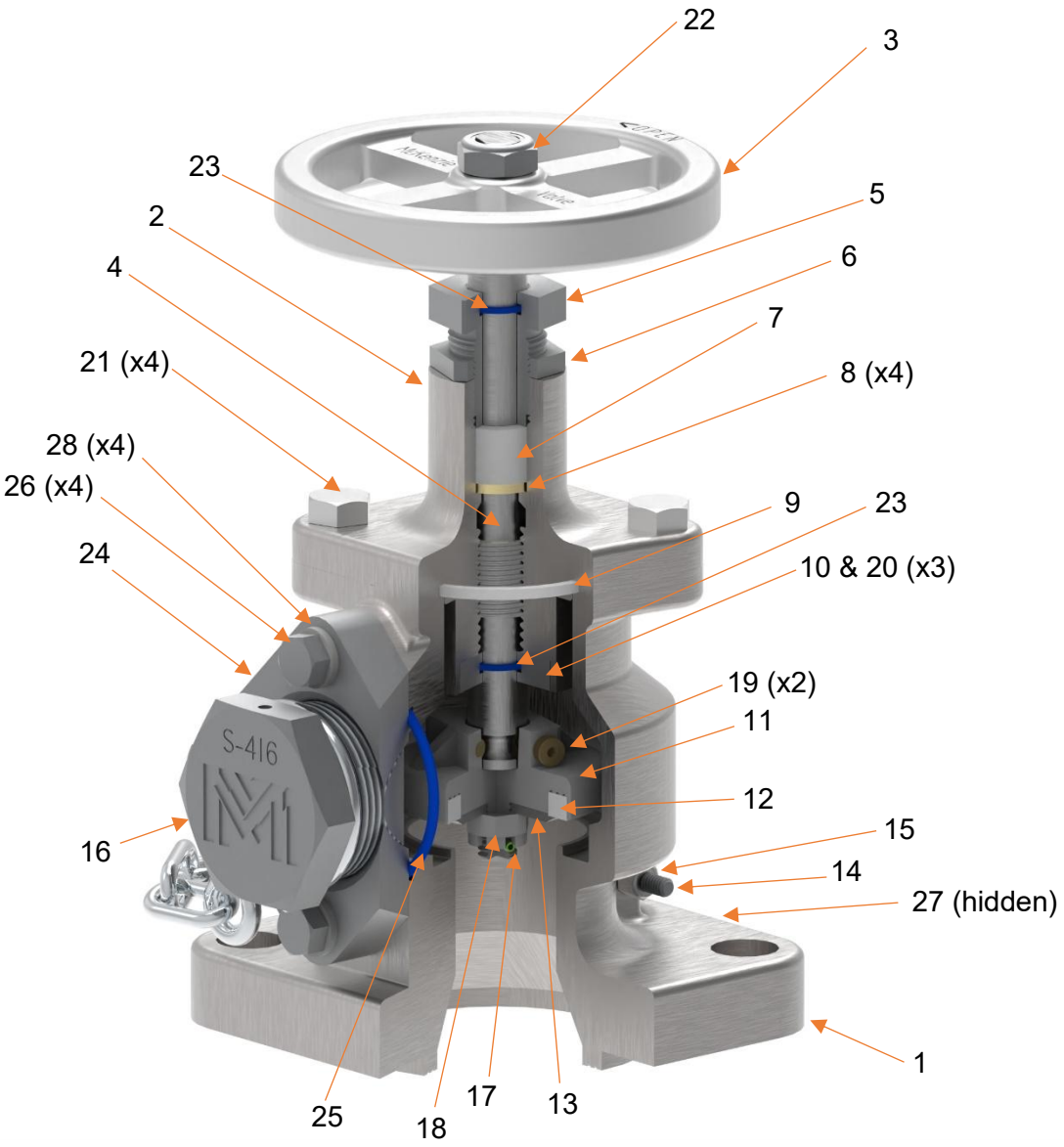

Figure 1 - 2” Rising Stem Angle Valve Component Symbols

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TABLE 1 - BILL OF MATERIAL			
SYM.	REQ.	DESCRIPTION	MATERIAL
1	1	BODY	DUCTILE IRON
			CF8M
2	1	BONNET	DUCTILE IRON
			CF8M
3	1	HANDWHEEL	ALUMINUM
4	1	STEM	316 SST
5	1	BUSHING	316 SST
6	1	JAM NUT	316 SST
7	1	PACKING	TEFLON®
8	4	BELLEVILLE WASHER	50CrV
9	1	BODY SEAL	TEFLON®
10	1	WIPER	316 SST
11	1	POPPET	316 SST
12	1	SEAT	TEFLON®
13	1	WASHER	316 SST
14	1	TRUSS HEAD MACHINE SCREW ¼-20 X 1-1/2	18-8 SST
15	1	LOCKNUT ¼-20 UNC 2B	18-8 SST
16	1	PLUG & CHAIN ASSY	SST
17	1	ROLL PIN 1/8 X ¾	18-8 SST
18	1	CASTLE NUT ½-13 UNC 2B	304 SST
19	2	SHOULDER SOCKET HEAD CAP SCREW ¼ X 1-10-24 UNC	18-8 SST
20	3	FLAT SKT HEAD CAP SCREW 8-32 UNC	18-8 SST
21	4	REG HEX BOLT ½-13 X 1 UNC 2A	316 SST
22	1	LOCKNUT 5/8-18 UNF-3B	CS
23	2	O-RING 2-116	NITRILE
24	1	OUTLET FLANGE	DUCTILE IRON
			CF8M
25	1	O-RING 2-230	NITRILE
26	4	REG HEX BOLT 7/16-14 X 1-1/4 UNC 2A	304 SST
27	1	NAMEPLATE	304 SST
28	4	LOCK WASHER	316 SST

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5. INSTALLATION TOOLING

A. Wrench for tightening inlet flange bolting – 1-1/4 Hex.

B. Wrench for tightening the outlet pipe plug – 2-1/2 Hex.

C. Tools for measuring the Tank Car flange groove.

D. Tools for cleaning the Tank Car flange groove.

5.1. Installing the valve

5.1.1. If replacing an existing valve, this procedure is contingent that the valve to be replaced has been removed from the tank car.

5.1.2. The technician(s) installing the valve are using PPE appropriate for the site conditions.

5.1.3. The McKenzie 2” RSV has a tongue flange per AAR C-III Appendix E, Figure E.18.8.

5.1.4. Inspect the groove in the flange on the tank car.

5.1.4.1. Make certain that the groove is free of any debris.

5.1.4.2. Make certain that the dimensions of the groove meet the dimensions of AAR C-III Appendix E, Figure E.18.8.

5.1.4.3. Inspect for any nicks or gouges inside the groove.

5.1.4.4. Correct any dimensional or damage issues before proceeding with installing the valve.

5.1.5. Install the gasket into the groove. The gasket must not bind when inserted into the groove.

5.1.6. Determine the proper orientation of the valve outlet.

5.1.7. With the valve in the proper orientation, align the bolt holes on the inlet flange of the valve with the studs or tapped holes (if bolts are used) and lower the valve onto the flange.

5.1.8. Install the stud nuts or bolts.

5.1.9. Torque the nuts or bolts to the requirements of the gasket manufacturer.

5.1.10. Remove the outlet pipe plug (16).

5.1.11. Apply lubricant, Teflon® tape, or other substances required by the tank car owner, shipper, or jurisdictional authority to the threads of the pipe plug.

5.1.12. Thread the pipe plug into the outlet flange (24) hand tight and then tighten an additional

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three turns.

5.1.13. Open the valve by turning the handwheel counterclockwise.

5.1.14. Close the valve by turning the handwheel clockwise. When the valve is seated (Seat (11) is contacting the body (1)) turning the handwheel will require more force. At this point, turn the handwheel an addition 1/8 turn clockwise. NOTE: The handwheel is to only be turned by hand. No wrenches or other tools are to be used to turn the handwheel.

5.1.15. This completes the installation of the valve.

5.1.16. Prior to loading the tank car, the valve and the inlet gasket should be checked for leakage per the requirements of the tank car owner, shipper or jurisdictional authority.

6. TROUBLE SHOOTING

Always use the proper PPE for the site and potential hazards of the tank car commodity. Review the tank car stencils for any DANGER or WARNING information.

6.1. Inlet gasket leak

6.1.1. Vent the tank car of all pressure.

6.1.2. Check the bolting torque to the gasket manufacturer’s specification.

6.1.3. If the bolting torque is to specification, check with the gasket manufacturer for recommendations.

6.1.4. If the leakage cannot be eliminated by using the gasket manufacturer’s recommendation,

6.1.4.1. Remove the inlet flange bolting.

6.1.4.2. Remove the valve.

6.1.4.3. Remove and inspect the gasket per the gasket manufacturer’s recommendation.

6.1.4.4. Follow steps 5.1.4 to 5.1.16

6.2. Packing leakage

6.2.1. Vent the tank car of all pressure.

6.2.2. Loosen jam nut (6) by turning two or more turns counterclockwise.

6.2.3. Tighten bushing (5) to 40 ft-lbs by turning clockwise.

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6.2.4. Turn jam nut (6) clockwise until contact with bonnet (2) is established. Turn the jam nut (6) clockwise to secure it to the bonnet (2) and bushing (5).

6.2.5. With the valve open and the outlet pipe plug (16) installed, check the packing for leakage using a leak detection fluid or other appropriate method.

6.2.6. If the leakage continues, repeat steps 6.2.1 to 6.2.5 but increase the torque value in 6.2.3 to 50 ft-lbs.

6.2.7. If leakage continues, the valve will need to have maintenance performed per Sections 9-12.

6.3. Valve body (1) – bonnet (2) joint leakage

6.3.1. Vent the tank car of all pressure.

6.3.2. Check that the torque of the four bolts (21) is 45 ft-lbs.

6.3.3. If bolts (21) were torqued to 45 ft-lbs. or greater while the leakage was occurring, the valve will have to have maintenance performed per Section 10.

6.4. Valve body (1) – outlet flange (24) joint leakage

6.4.1. Vent the tank car of all pressure.

6.4.2. Check that the torque of the four bolts (26) is 30 ft-lbs.

6.4.3. If bolts (21) were torqued to 30 ft-lbs. or greater while the leakage was occurring, the valve will have to have maintenance performed per Section 10.

6.5. Pipe plug (16) to body (1) leakage

6.5.1. Vent the tank car of all pressure.

6.5.2. Remove the pipe plug (16) by turning counterclockwise.

6.5.3. Inspect the 2” NPT (National Tapered Pipe Threads) threads on the pipe plug (16) and outlet flange (24).

6.5.4. Replace pipe plug (16) and/or the outlet flange (24) if their NPT threads are damaged.

6.5.5. If the outlet flange (24) NPT threads are damaged, replace with a new part and o-ring (25) per the ASSEMBLY 11.52 to 11.58.

6.5.6. Install and tighten the pipe plug (16) per INSTALLATION 5.1.11 and 5.1.12.

6.5.7. With the valve in the open position, pressurize the valve and check for leakage.

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6.5.8. If leakage is detected repeat steps 6.5.1 to 6.5.7.

6.6. Valve will not open or close.

6.6.1. Vent the tank car of all pressure.

6.6.2. Remove the inlet nuts or bolts.

6.6.3. Remove the valve.

6.6.4. The valve may be either replaced in kind or maintenance performed per the DISSASSEMBLY, MAINTENANCE and ASSEMBLY sections of this manual.

7. DISASSEMBLY AND ASSEMBLY TOOLING

7.1. Fixtures

7.1.1. Bonnet fixture. See 9.14 and 11.36.

7.1.2. Poppet fixture. See 9.28 and 11.27.

7.1.3. Body fixture. See 9.1 and 11.43.

7.2. Wrenches

7.2.1. Lock nut (15) – 7/16” hex.

7.2.2. Plug and chain (16) – 2-1/2” hex.

7.2.3. Castle head nut (18) – 3/4" hex.

7.2.4. Socket head cap screw (19) – 1/8” hex.

7.2.5. Socket head cap screw (20) – 3/32” hex.

7.2.6. Body bolts (21) - 7/8” hex.

7.2.7. Outlet flange bolts (26) - 5/8” hex.

7.2.8. Machine screw (14) – flat blade screwdriver.

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8. LUBRICANTS AND THREAD LOCKERS

Below are listed the lubricants and thread locker used by McKenzie Valve and Machining unless otherwise noted on the valve’s drawing. It is the user’s responsibility to make certain that the appropriate lubricants and thread lockers are compatible with the intended service are used.

8.1. Stem and fastener threads - Loctite LB 8150.

8.2. Gaskets and o-rings – Molykote 111.

8.3. Thread Locker – Loctite 248 (stick) or Loctite 242 (liquid).

9. DISASSEMBLY

9.1. Place the valve in a fixture

9.2. Refer to Figure 2.

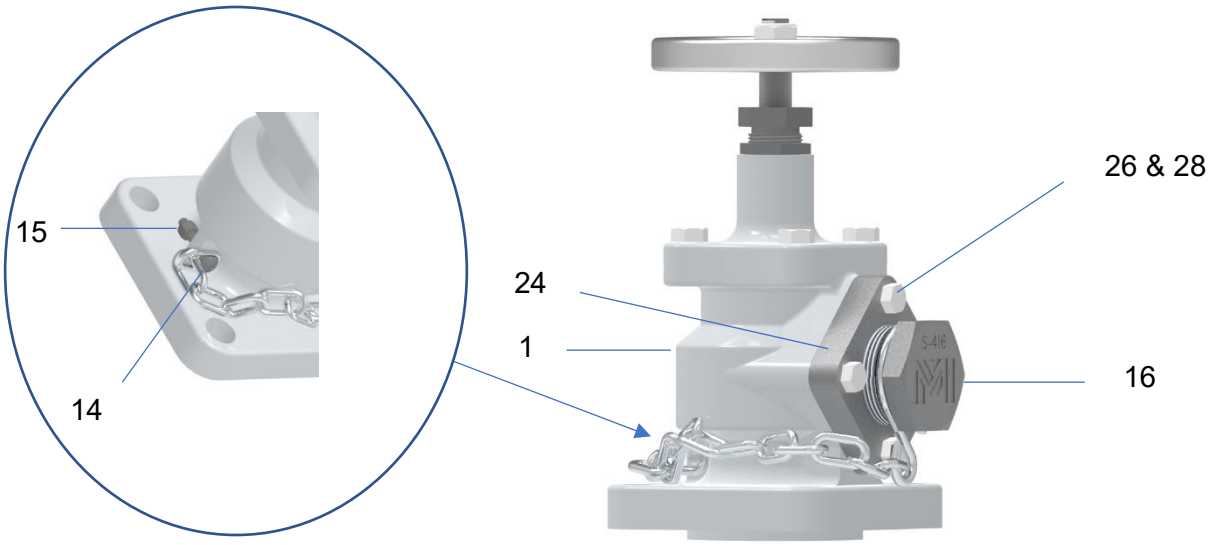

Figure 2

9.3. Remove the chain of the plug and chain (16) from the body (1) as shown in Figure 2 by removing the locknut (15) from the machine screw (14) and removing the machine screw (14).

9.4. Remove the plug of plug and chain (16) from the outlet flange (24) by turning counterclockwise.

9.5. Remove the four cap screws (26) and washers (28) from the valve body (1) by turning counterclockwise.

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9.6. Remove the outlet flange (24) from the body (1).

9.7. Refer to Figure 3

9.8. Remove the o-ring (25) from the body (1).

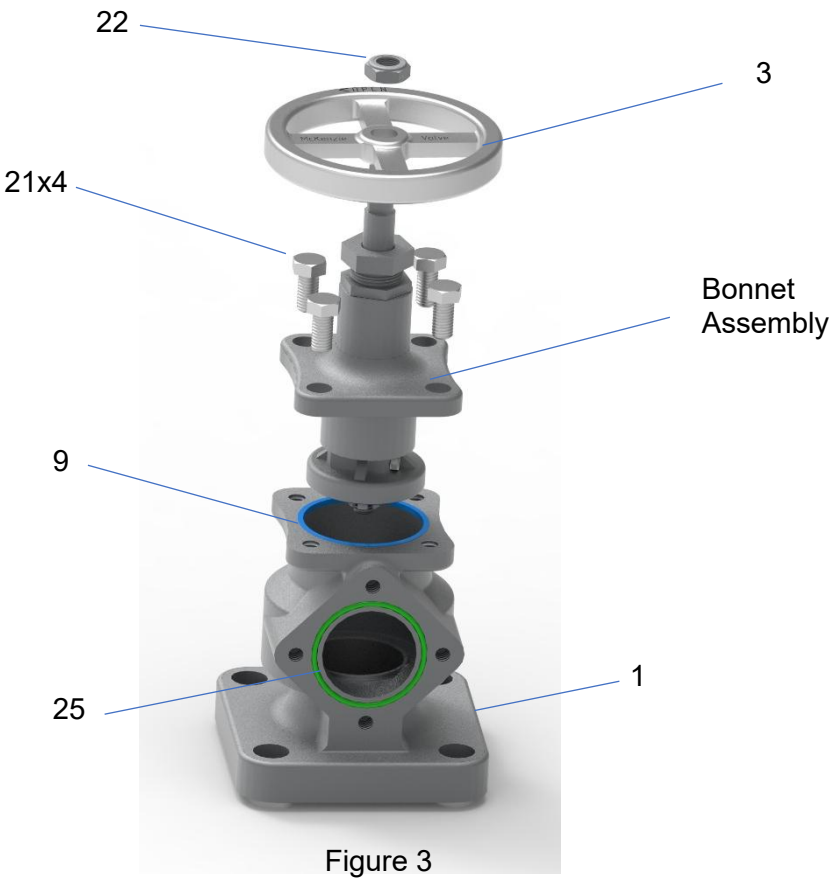

Figure 3

9.9. While holding the handwheel (3) remove lock nut (22) by turning counterclockwise.

9.10. Remove the handwheel (3).

9.11. Remove the four cap screws (21) by turning counterclockwise.

9.12. Remove the bonnet assembly.

9.13. Remove and discard the body seal (9).

9.14. Place the bonnet assembly in a fixture with the poppet assembly pointing up.

9.15. Refer to Figure 4.

9.16. Remove the two shoulder head cap screws (19) by turning counterclockwise. Note: These cap screws were installed with Loctite 242 or 248 and may require heating the threads to remove them.

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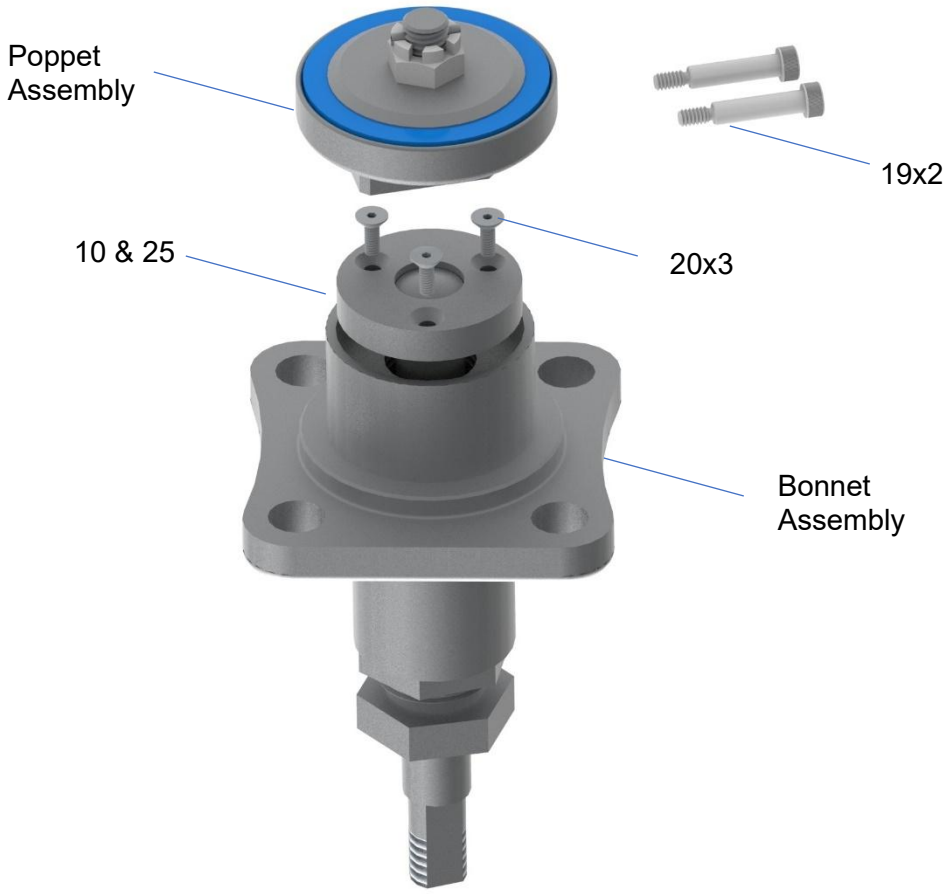

Figure 4

9.17. Remove the poppet assembly.

9.18. Remove the three flat head socket cap screws (20) by turning counterclockwise. Note: These cap screws were installed with Loctite 242 or 248 and may require heating to remove.

9.19. Remove the wiper (10) and o-ring (25).

9.20. Reposition the bonnet in the fixture with the threaded end of the stem pointing up.

9.21. Refer to Figure 5.

9.22. Loosen jam nut (6) by turning counterclockwise 1 to 2 turns.

9.23. Remove bushing (5), o-ring (25) and jam nut (6) from bonnet (2) by turning bushing (5) counterclockwise.

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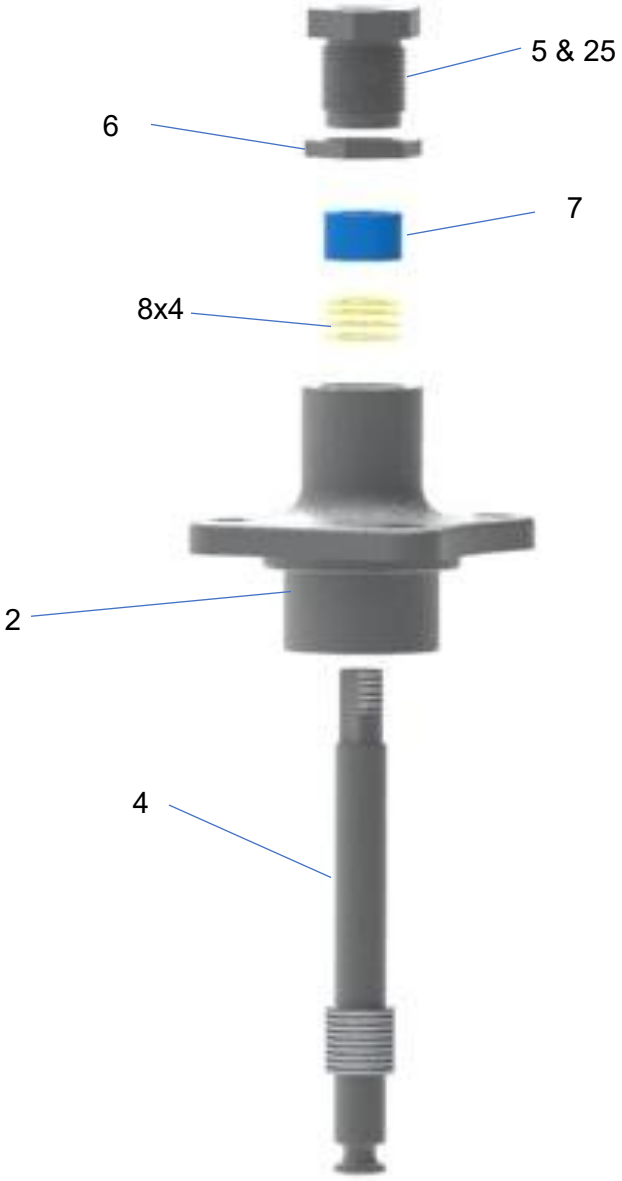

Figure 5

9.24. Remove stem (4) from the bonnet (2) by turning counterclockwise and unthreading from the bonnet (2).

9.25. Remove packing (7) from bonnet (2).

9.26. Remove the four Belleville washers (8) from the bonnet (2).

9.27. Remove the bonnet (2) from the fixture.

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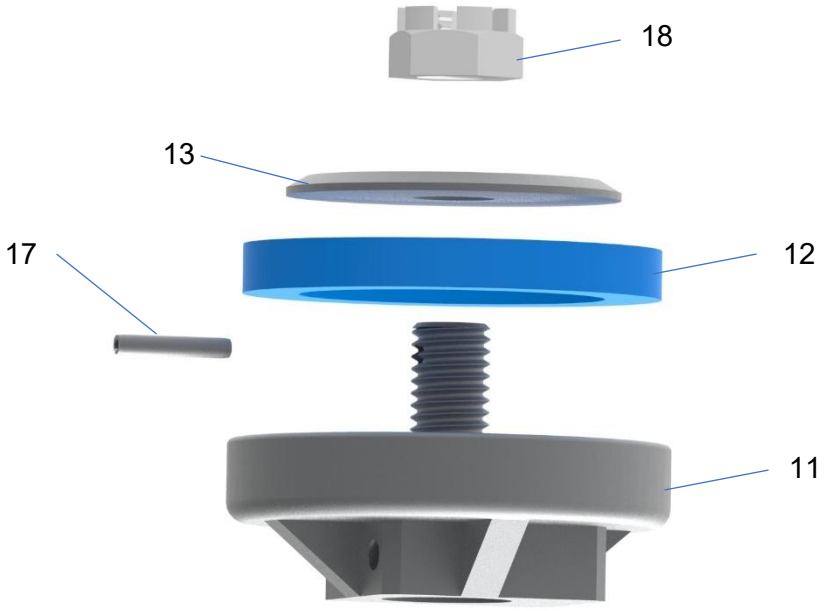

Figure 6

9.28. Place the poppet assembly into a fixture.

9.29. Refer to Figure 6.

9.30. Remove and discard roll pin (17).

9.31. Remove castle nut (18) by turning counterclockwise.

9.32. Remove washer (13).

9.33. Remove seat (12).

9.34. This completes the disassembly of the valve.

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10. INSPECTION and MAINTENANCE

NOTE 1: All components listed below for inspection and maintenance must be cleaned and safe for handling before starting. Procedures used for cleaning and, if required, decontamination, must meet the standards of the tank car owner, shipper, and jurisdictional authority.

NOTE 2: If sandblasting is used to clean parts for inspection, do not blast sealing surfaces, threads, stem (4), bushing (5), or the stem hole in the poppet (11).

10.1. Body (1).

10.1.1. Inspect the body for cracks using a method listed in AAR MSRP C-III [M-1002] Appendix T. Replace the body if any cracks are detected.

10.1.2. Inspect the inlet flange tongue for any dents, gouges or other damage that may affect sealing of the gasket to the valve and the tank car. Replace the body if damage to the flange tongue cannot be repaired.

10.1.3. Inspect the threads at the body-bonnet flange and the body-outlet flange. Replace the body (1) if there is visual evidence of damage to the threads.

10.1.4. Inspect the body seal groove at the body-bonnet flange. Replace the body (1) if there is visual evidence of damage to the groove.

10.1.5. Inspect the o-ring groove at the body-outlet flange. Replace the body (1) if there is visual evidence of damage to the groove.

10.1.6. Inspect the internal sealing surface where the poppet (11) seals against the body (1) for pitting, gouges, or other damage that would affect sealing. Replace the body (1) if damage to the sealing surface cannot be repaired by polishing.

10.2. Bonnet (2).

10.2.1. Inspect the bonnet for cracks using a method listed in AAR MSRP C-III [M-1002] Appendix T. Replace the bonnet if any cracks are detected.

10.2.2. Inspect the bonnet (2)-bushing (5) threads for any damage. Replace the bonnet (2) if the threads are damaged.

10.2.3. Inspect the packing gland (internal diameter of the bonnet below the bushing threads) for any

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damage. Replace the bonnet if the packing gland is damaged.

10.2.4. Inspect all threads on the bonnet (2). Replace the bonnet (2) if any threads are damaged.

10.3. Handwheel (3).

10.3.1. Visually inspect the handwheel for any cracks or evidence of mechanical damage to the rim or spokes of the handwheel (3). Replace the handwheel if any cracks or damage is noted.

10.4. Stem (4).

10.4.1. Inspect the 5/8-18 UNF threads for damage. Replace the stem (4) if damage is noted.

10.4.2. Inspect the 0.750” diameter for any signs of wear or galling. Replace the stem (4) if any wear or galling exceeds 0.001”.

10.4.3. Inspect the 1-5 Acme threads for any signs of galling. Replace the stem (4) if galling is noted.

10.4.4. Inspect the spherical radius for any signs of galling. Raised surfaces due to galling not exceeding 0.005” may be repaired by polishing the area. Replace the stem (4) for galling damage exceeding 0.005”.

10.5. Bushing (5).

10.5.1. Inspect the o-ring groove for damage. Replace the bushing (5) if damage is present.

10.5.2. Inspect the internal diameter of the bushing (5). Replace the bushing for any signs of galling. Replace the bushing (5) for wear exceeding 0.005”.

10.5.3. Inspect the threads. Replace the bushing (5) if damage to the threads is noted.

10.6. Jam Nut (6).

10.6.1. Inspect the jam nut (6) threads for damage. Replace the jam nut (6) if the threads are damaged.

10.7. Belleville washer (8).

10.7.1. Place the Belleville washer on a flat surface. Measure distance from the flat surface to the top of the Belleville washer. Replace the Belleville washer if the measured height is less than 0.055.”

10.8. Wiper (10).

10.8.1. Inspect the wiper (10) for galling on the internal diameter. Replace the wiper if signs of galling are noted.

10.8.2. Inspect the o-ring groove for damage. Replace the wiper (10) if damage is noted to the groove.

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10.9. Poppet (11)

10.9.1. Inspect the threads in the poppet for damage. Replace the poppet (11) if the threads are damaged.

10.9.2. Inspect the spherical radius surface for wear or galling. Wear or galling less than 0.005” can be removed by polishing. Replace the poppet if the wear or galling exceeds 0.005.”

10.10. Fasteners (14), (15), (18), (19), (20), (21), (22), and (24).

10.10.1. Inspect all fasteners for thread damage and evidence of yielding/necking. Replace all fasteners that have thread damage or evidence of yielding.

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11. ASSEMBLY

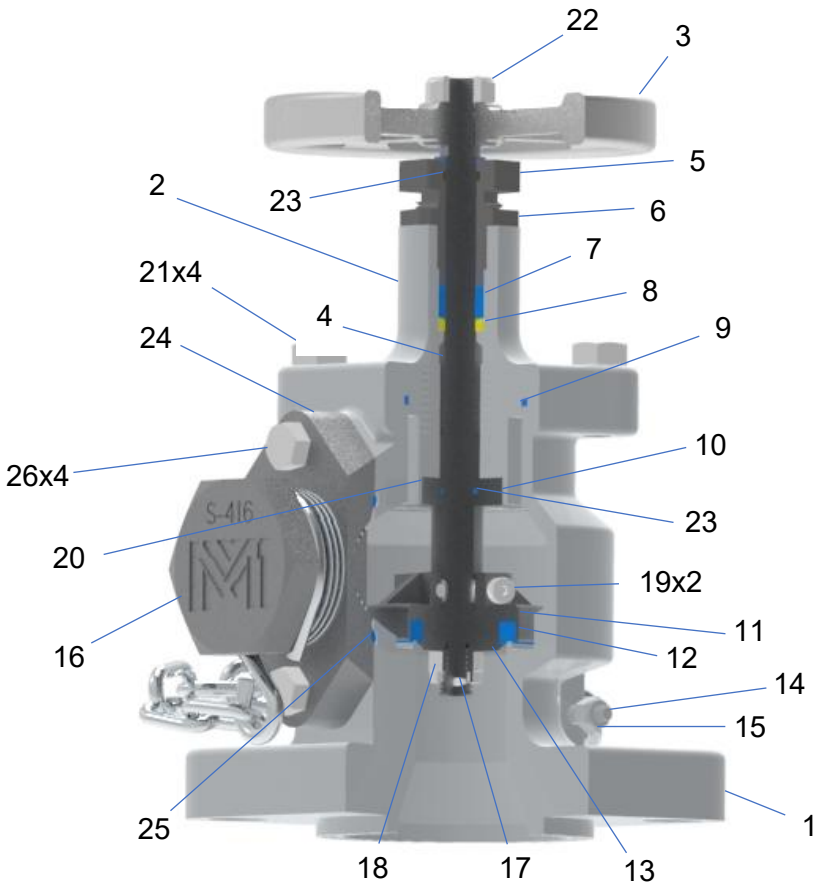

Figure 7 - 2” Rising Stem Angle Valve Component Symbols

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TABLE 2 - BILL OF MATERIAL			
SYM.	REQ.	DESCRIPTION	MATERIAL
1	1	BODY	DUCTILE IRON
			CF8M
2	1	BONNET	DUCTILE IRON
			CF8M
3	1	HANDWHEEL	ALUMINUM
4	1	STEM	316 SST
5	1	BUSHING	316 SST
6	1	JAM NUT	316 SST
7	1	PACKING	TEFLON®
8	4	BELLEVILLE WASHER	50CrV
9	1	BODY SEAL	TEFLON®
10	1	WIPER	316 SST
11	1	POPPET	316 SST
12	1	SEAT	TEFLON®
13	1	WASHER	316 SST
14	1	TRUSS HEAD MACHINE SCREW ¼-20 X 1-1/2	18-8 SST
15	1	LOCKNUT ¼-20 UNC 2B	18-8 SST
16	1	PLUG & CHAIN ASSY	SST
17	1	ROLL PIN 1/8 X ¾	18-8 SST
18	1	CASTLE NUT ½-13 UNC 2B	304 SST
19	2	SHOULDER SOCKET HEAD CAP SCREW ¼ X 1-10-24 UNC	18-8 SST
20	3	FLAT SKT HEAD CAP SCREW 8-32 UNC	18-8 SST
21	4	REG HEX BOLT ½-13 X 1 UNC 2A	316 SST
22	1	LOCKNUT 5/8-18 UNF-3B	CS
23	2	O-RING 2-116	NITRILE
24	1	OUTLET FLANGE	DUCTILE IRON
			CF8M
25	1	O-RING 2-230	NITRILE
26	4	REG HEX BOLT 7/16-14 X 1-1/4 UNC 2A	304 SST
27	1	NAMEPLATE	304 SST
28	4	LOCK WASHERS	316 SST

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11.1. Refer to Figure 7 and Table 2 for the components referenced below.

11.2. All parts shall be visually inspected prior to assembly and cleaned as necessary to remove dirt, dust, or grease.

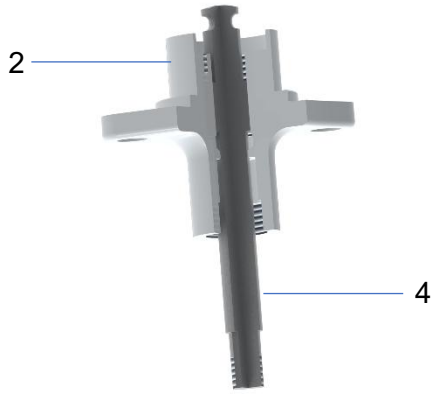

Figure 8 – Bonnet (2) and Stem (4)

11.3. Place the bonnet (2) in a suitable fixture with the top of the bonnet (2) pointing vertically down as per Figure 8.

11.4. Apply a light coating of Loctite LB 8150 lubricant to the ACME threads on the stem (4).

11.5. Hold the stem (4) with the threaded end down and insert the stem (4) into the bonnet (2) until the ACME threads contact the bonnet (2). Turn the stem (4) clockwise and engage the ACME threads with the bonnet (2). Continue turning the stem (4) until the ACME threads bottom out in the bonnet (2).

11.6. Apply a very thin film of Molykote 111 sealant to the o-ring (23).

11.7. Insert the o-ring (23) into wiper (10).

11.8. Place the wiper/o-ring assembly (10 & 23) over the stem (4) and into bonnet (2) as shown in Figure 9 with the countersinks in the wiper (10) facing upward.

11.9. Align the three holes in the wiper (10) with the three tapped holes in the bonnet (2).

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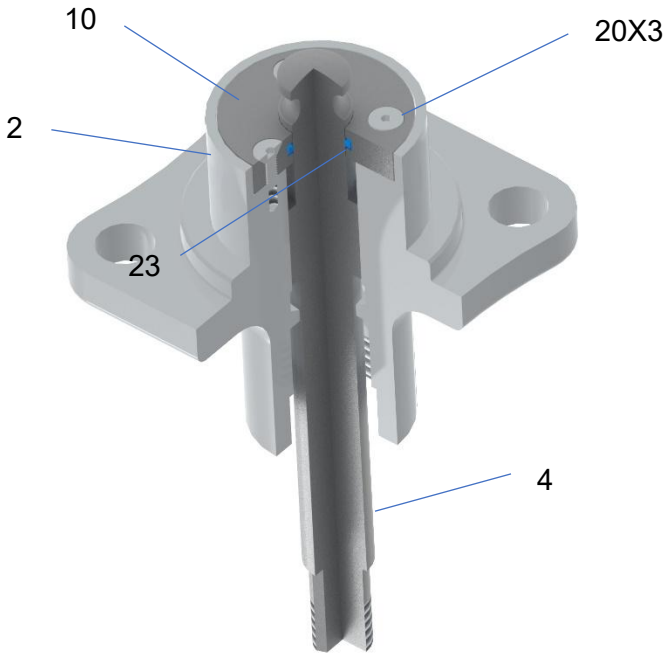

Figure 9

11.10. Apply Loctite 248 or 242 to the threads of the three socket head cap screws (20).

11.11. Attach the wiper (10) to the bonnet (2) using three socket head cap screws (20).

11.12. Torque the socket head cap screws (20) to 16 in-lbs.

11.13. Remove the bonnet (2) from the fixture.

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11.14. Place the bonnet (2) in a fixture with the top of the bonnet (2) vertically up as shown in Figure 10.

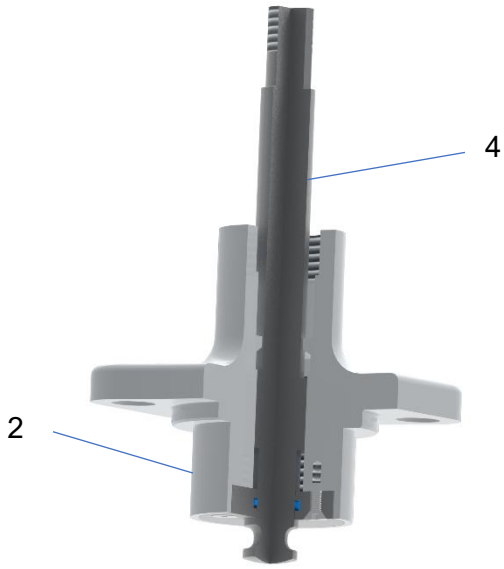

Figure 10

11.15. Assemble the four Belleville washers (8) as shown in Figure 10A. The Belleville washers must nest to each other. Do not assemble the Belleville washers as shown in Figure 10B.

CORRECT

Figure 10A

INCORRECT

Figure 10B

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11.16. Insert the 4 Belleville washers over the stem (4) and into the bonnet (2) as shown Figure 11.

11.17. Apply a light film of Molykote 111 to the packing (7).

11.18. Insert the packing (7) over the stem (4) and into the bonnet (2) as shown in Figure 11.

11.19. Apply a light film Molykote 111 to o-ring (23).

11.20. Insert o-ring (23) into bushing (5) as shown in Figure 11.

11.21. Apply a light coating of Loctite LB 8150 lubricant to the threads of bushing (5).

11.22. Thread jam nut (6) onto the threads of bushing (5) as shown in Figure 11.

11.23. Insert the bushing assembly (5, 6 & 23) over stem (4) and thread into the bonnet (2) until fully seated on the packing (7).

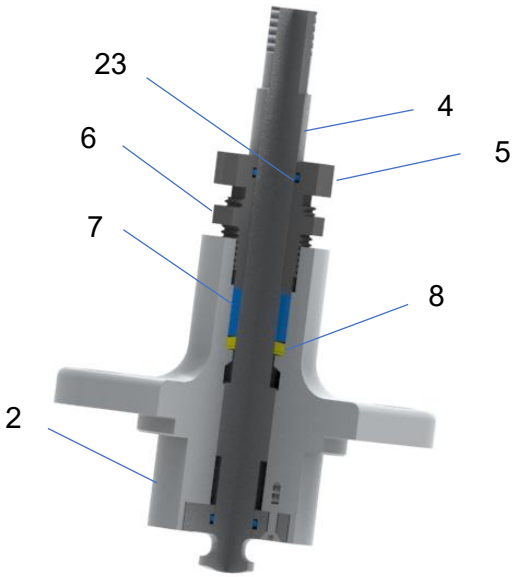

Figure 11

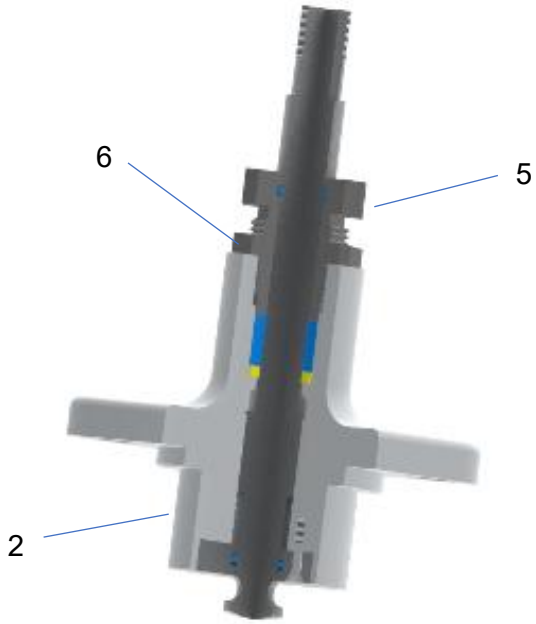

Figure 12

11.24. Refer to Figure 12.

11.25. Torque bushing (5) to 50 ft-lbs.

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11.26. While holding the bushing (5) secured to the bonnet (2) thread the locknut (6) toward the bonnet (2) until contact is made with the bonnet (2). Tighten jam nut (6) securely.

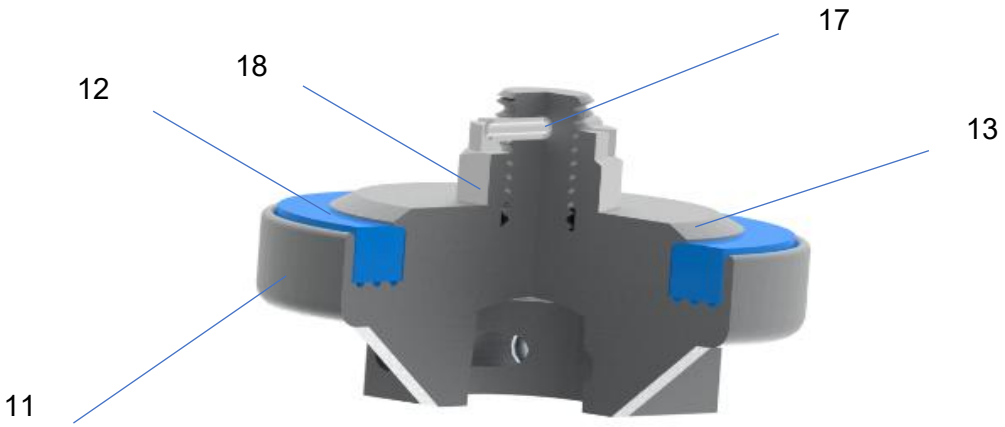

Figure 13

11.27. Refer to Figure 13 and install poppet (11) in a fixture with the poppet threads pointing up.

11.28. Apply a very thin film of Molykote 111 to seat (12).

11.29. Insert the seat (12) into poppet (11).

11.30. Insert washer (13) over the threads of poppet (11).

11.31. Apply a light coating Loctite LB 8150 Lubricant to the threads of the poppet (11).

11.32. Thread the castle head nut (18) onto the threads of poppet (11). The castellations must face outward.

11.33. Torque the nut (18) to 30 ft-lbs and then turn the nut clockwise to align a slot in the nut (18) with the drilled hole in the poppet (11) threads.

11.34. Insert roll pin (17) through a set of slots in nut (18) and the hole in the poppet (11). Equally space the roll pin (17) within the castle nut slots.

11.35. Remove the poppet assembly from the fixture.

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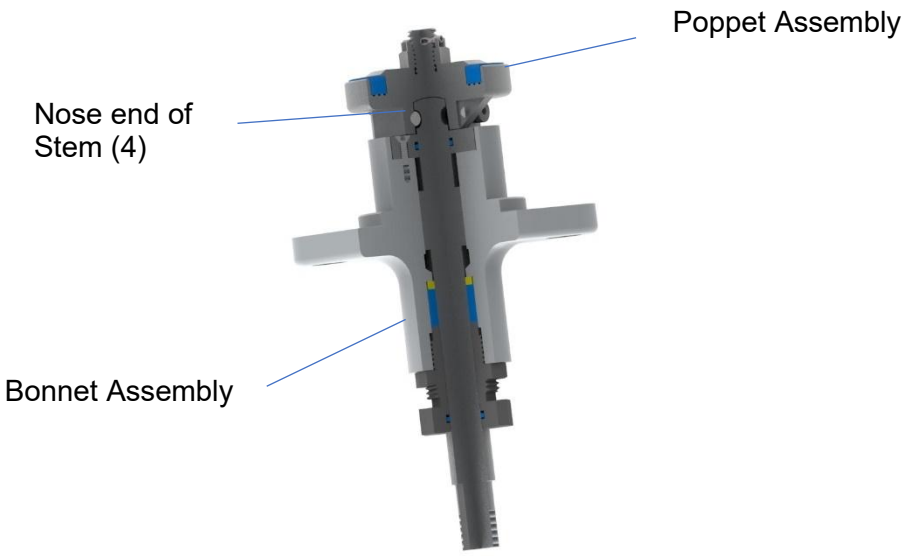

Figure 14

11.36. Refer to Figure 14. Place the Bonnet assembly into a fixture with the nose end of the stem (4) pointing up.

11.37. Place the poppet assembly onto the end of the stem (4) as shown in Figure 14.

11.38. Refer to Figure 15.

11.39. Apply Loctite 248 or 242 to the threads of the two cap screws (19).

11.40. Thread the two cap screws (19) into the poppet assembly. Torque the cap screws to 22 in-lb.

11.41. Remove the assembly from the fixture.

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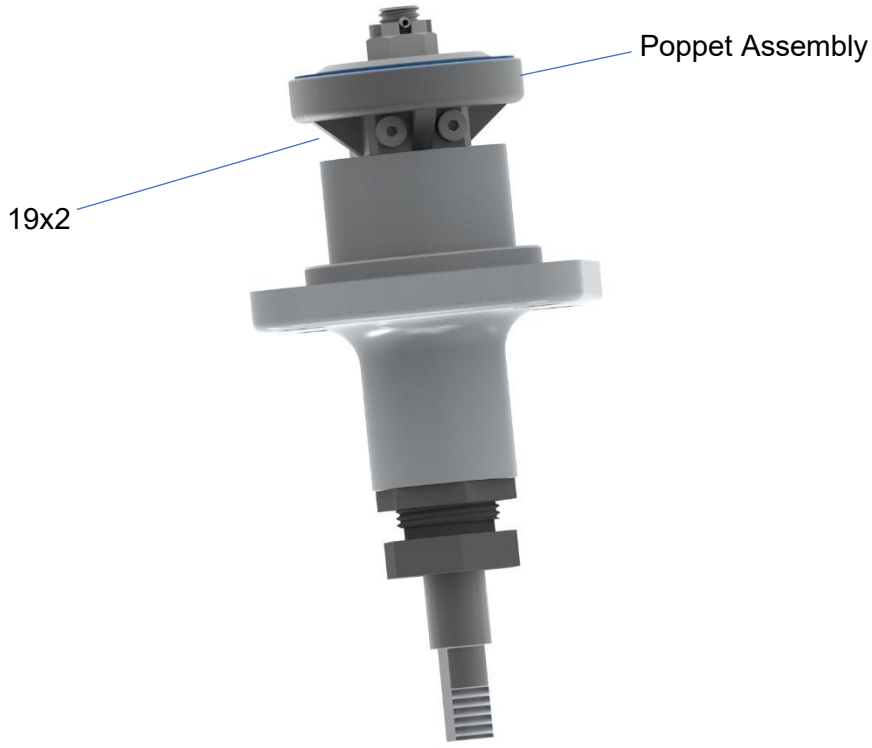

Figure 15

11.42. Refer to Figure 16.

11.43. Place the body (1) into a fixture with the inlet down as shown in Figure 16.

11.44. Apply a very thin film of Molykote 111 to the body seal (9).

11.45. Insert the body seal (9) into the body (1).

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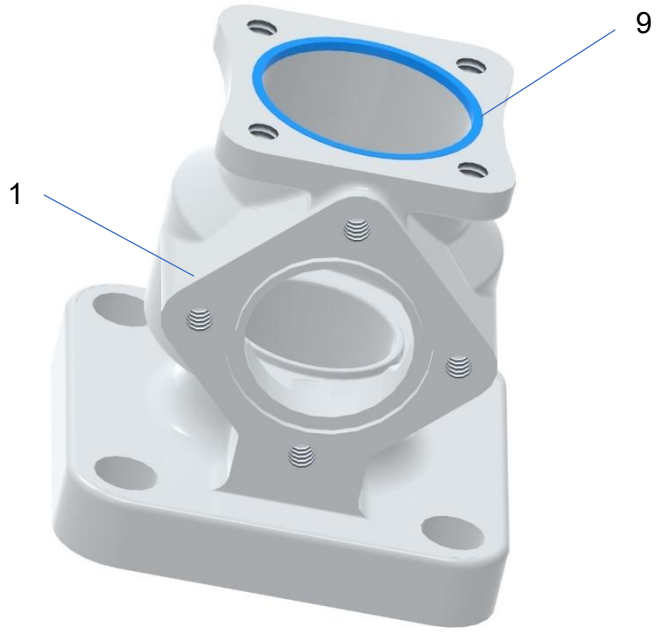

Figure 16

11.46. Refer to Figure 17.

11.47. Place the bonnet and poppet assembly into the body (1) and align the four holes in the bonnet (2) and body (1).

11.48. Apply a light coating of Loctite LB 8150 lubricant to the threads of the four hex head bolts (21).

11.49. Insert the four bolts (21) through the bonnet (2) flange holes and thread into the body (1).

11.50. Using a crisscross pattern torque the bolts (21) to initially 20 ft-lbs. and finally to 45 ft-lbs.

11.51. Place handwheel (3) onto the stem per Figure 16.

11.52. Thread locknut (22) onto the stem and torque to 50 ft-lbs.

11.53. Apply a thin film of Molykote 111 to o-ring (25).

11.54. Insert o-ring (25) into the groove as shown in Figure 17.

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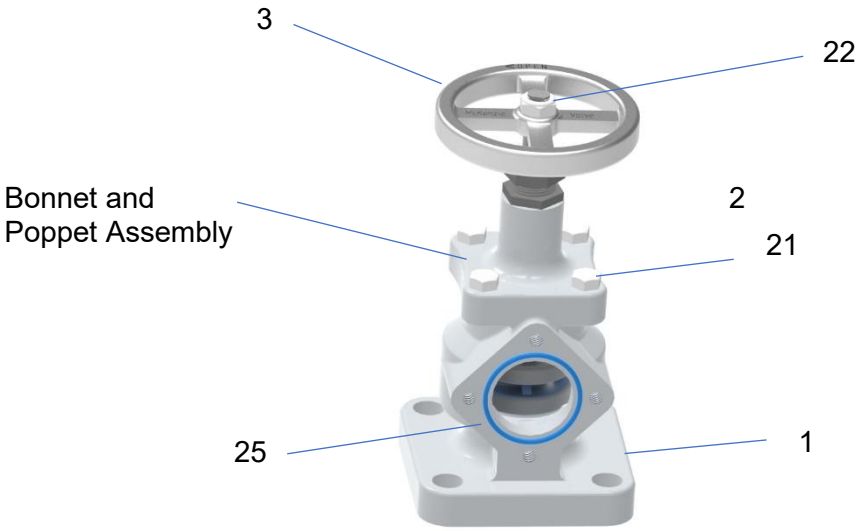

Figure 17

11.55. Refer to Figure 18.

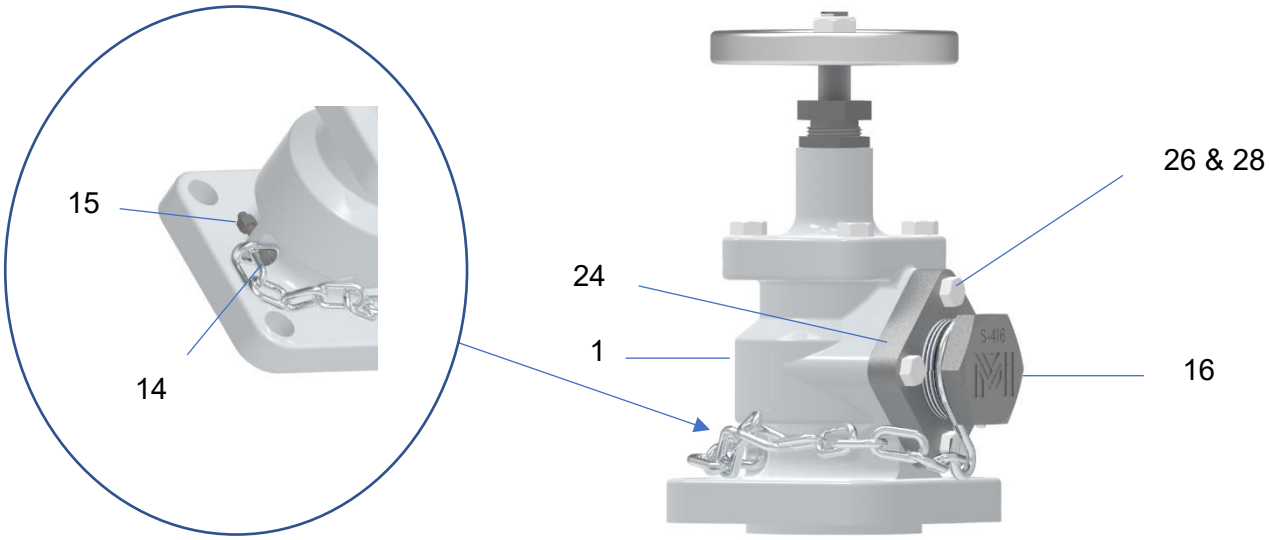

Figure 18

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11.56. Apply a light coating of Loctite LB 8150 lubricant to the threads of the 4 cap screws (26).

11.57. Place the outlet flange (24) onto the body (1) and align the four holes in the outlet flange (24) with the tapped holes in body (1)

11.58. Insert the 4 washers (28) and cap screws (26) through the drilled holes in the outlet flange (24) and thread into the body (1).

11.59. Using a crisscross pattern torque the bolts initially to 15 ft-lbs. and finally to 30 ft-lbs.

11.60. Thread the plug of plug and chain (16) into the outlet flange (24). Tighten the plug by hand.

11.61. Attach the chain of the plug and chain (16) to the body (1) as shown in Figure 18 using machine screw (14) and locknut (15). Tighten the locknut until at least three threads of the machine screw (14) are visible past the top of the locknut (15).

11.62. Remove the valve from the fixture. The valve is ready for testing.

12. VALVE TESTING

NOTE: THE VALVE AND THE TEST EQUIPMENT WILL BE PRESSURIZED DURING THE TESTING. FLUIDS UNDER PRESSURE CAN RELEASE ENERGY THAT MAY BE HARMFUL IF THE PRESSURIZED COMPONENT(S) FAIL. MAKE CERTAIN THAT ALL TEST EQUIPMENT IS RATED FOR THE TEST PRESSURE AND TEMPERATURE AND FOLLOW THE MANUFACTURER’S AND SITE INSTRUCTIONS FOR OPERATING THE TEST EQUIPMENT.

12.1. Scope

12.1.1. This section details bubble leak testing for the McKenzie 2” Rising Stem Angle Valve.

12.1.2. All personnel conducting the test shall meet the requirements of AAR MSRP C-III [M-1002] Appendix T.

12.1.3. Testing shall be conducted to the requirements of AAR MSRP C-III [M-1002] Appendix T.

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12.2. Test Equipment

12.2.1 Pressure Gages

12.2.1.1 Dial indicating (analog) gauges used to monitor test pressures shall be per AAR MSRP Section C-III, Appendix D. Gauges preferably shall have a four (4) inch minimum face and shall be graduated over a range of approximately twice the test pressure.

12.2.1.2 The use of digital gauges is permitted provided the test pressure is within the manufacturer’s range.

12.2.1.3 Calibration of the pressure gages used to monitor test pressure shall be in accordance with AAR MSRP C-III [M-1002] Appendix T.

12.2.1.4 All testing shall be performed using two (2) inline gauges and an air regulator. If there is a difference of more than 2% of the span between the 2 gauges, both gauges shall be checked for calibration.

12.2.2 Test Liquids

12.2.2.1 Liquid fluid solutions shall meet the requirements of MSRP C-III Appendix T.

12.2.3 Gas Medium

12.2.3.1 The gas medium used for the liquid film bubble leak test of the seats shall be air or nitrogen, concentration not applicable.

12.3 Test Procedure

All testing required in this section shall be documented and traceable to the valve serial number and retained per the quality requirements of the organization performing the testing.

12.3.1 Test Preparation

12.3.1.1 Test areas shall be free of oil, grease, and other contaminants, which might mask a leak.

12.3.1.2 The Bubble Leak Technician shall ensure there is sufficient

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lighting available at the inspection surface. When sufficient lighting is not available, the use of auxiliary lighting (e.g., flashlights or flood lamps) is required.

12.3.1.3 The eyes of the Bubble Leak Technician shall be within 24” (2 feet) of the examination surface.

12.3.1.4 The angle of view should be no less than 30 degrees with the plane of the surface being examined. Use of a mirror shall be required when viewing angle is less than 30 degrees of access is limited.

12.3.1.5 Component test area temperature shall be between the applicable test solution range of paragraph 12.2.2. Locally heating or cooling of the test area is acceptable.

12.3.2 Seat Leakage Test

12.3.2.1 Mount the valve to the test stand

12.3.2.2 Close the valve using the handle and turning clockwise. Once the poppet seat contacts the body seat, turn by hand only an additional 1/8 turn.

12.3.2.3 Apply air to the valve at a pressure equal to or greater than the tank car rated press but not to exceed 600 psig.

The tolerance for the pressure is +10/-0 psig. Allow 5 seconds minimum soak time.

12.3.2.4 Verify that there is no audible leakage from the valve inlet gasket or valve seat before proceeding.

12.3.2.5 Apply leak detection solution to the valve seat through the 2” NPT (National Tapered Pipe Threads) outlet on the valve body.

12.3.2.6 Observe the seat for leakage for 1-minute minimum dwell time.

12.3.2.7 If no leakage is observed, the valve is acceptable.

12.3.3 External Leakage Test:

12.3.3.1 Install the 2” NPT plug attached to the valve. Hand tighten the plug and then using a wrench tighten the plug three turns.

12.3.3.2 Apply air to the valve at a pressure equal to or greater than the tank car

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rated press but not to exceed 600 psig.

The tolerance for the pressure is +10/-0 psig. Allow 5 seconds minimum soak time.

12.3.3.3 Verify that there is no visible leakage from the valve exterior surfaces before proceeding.

12.3.3.4 Apply leak detection solution to the valve stem – bushing interface, the bushing – bonnet interface, the body and bonnet exterior surfaces and the body – bonnet joint.

12.3.3.5 Observe the stem – bushing and bushing – bonnet interfaces, body – bonnet joint, body-outlet flange joint and the exterior surfaces of the body and bonnet for leakage.

12.3.3.6 If no leakage is observed, the valve is acceptable.

12.3.3.7 If leakage is noted, the valve is not acceptable and must be repaired.

12.3.3.8 Vent all pressure from the valve.

12.3.3.9 Remove the valve from the test stand.

12.4 This completes the testing of the valve.

13. OPERATION

13.1. Inspect the valve to verify there is no leakage. Do not open the valve if leaks exist and contact your safety department for their leak containment procedure.

13.1.1. The packing around the stem is adjustable and must receive periodic inspection and adjustment to prevent leaks from wear. Refer to Section 6.2 for adjustment details.

13.2. Begin operation by removing the 2” NPT plug, then securely attaching the loading/unloading equipment to the 2” NPT connection on the valve.

12.5 Once a leak-tight connection is made, open the valve by turning the handwheel counterclockwise until the while hits its stop.

12.6 Load or unload the amount of commodity desired.

12.7 Close the valve by turning the handwheel clockwise. Once the poppet seat contacts the body seat,

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turn by hand only an additional 1/8 turn.

12.8 Install the 2” NPT plug hand tight and then using a wrench tighten the plug three turns.

12.9 Inspect to ensure valve is leak-tight, then operation is complete.

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