



F20 MAINTENANCE MANUAL

INSTALLATION AND OPERATION
INSTRUCTIONS



GENERAL:

Milwaukee Ball valves have been designed and engineered to provide long lasting and trouble free service when used in accordance with the instructions and specifications herein.

The following instructions refer only to F201 series valves

Keep protective cover in place until moment of installation. Valve performance depends upon preventing of damage to ball surface. Upon removal of cover, make sure that the valve is completely open and free of obstruction.

STORAGE:

All manual valves are shipped in the fully open position with protective end caps (covers). Keep all protective packaging, flange covers, or end caps attached to the valves during storage. To avoid damage to the seat due to contact with the balls edge, leave the valve in the **fully open or closed position** during storage. It is recommended to keep the valves in a clean and dry environment until ready for use.

Before removing valve from pipeline NOTE that:

Media flowing through a valve may be corrosive, toxic, flammable, a contaminant or harmful nature. Where there is evidence of harmful fluids having flowed through the valve, the utmost care must be taken. It is suggested that the following minimal safety precautions be taken when handling valves.

1. Always wear eye shields.
2. Always wear gloves and overalls.
3. Wear protective footwear.
4. Wear protective headgear.
5. Ensure that running water is readily accessible.
6. Have a suitable fire extinguisher ready if media is flammable.
7. Be sure that you are aware of the fluid that has been passing through the valve before opening or dismantling any valve. Require MSDS information.

By checking line gauges ensure that no pressure is present at the valve.

Ensure that any media is released by operating valve slowly to half open position. Ideally, the valve should be decontaminated when the ball is in the half open position.

These valves, when installed, have body connectors which form an integral part of the pipeline and the valve cannot be removed from the pipeline without being dismantled.

Valves and accessories must not be used as a sole support of piping or human weight. Safety accessories such as safety relief (overpressure) valves are the responsibility of the system designer.

It is the user/system designer's responsibility to use insulation in high temperature applications.

INSTALLATION

The valve may be installed for flow or vacuum in either direction. Carefully exclude pipe sealants from the valve cavity. When installing, use standard gaskets suitable for the specific service. Tighten flange bolts or studs evenly.

OPERATION

Milwaukee valves provide tight shut off when used under normal conditions and in accordance with MV's published pressure/temperature chart. If these valves are used in a partially open (throttled) position seat life may be reduced.

valves have 1/4 turn operation closing in a clockwise direction. It is possible to see when the valve is open or closed by the position of the wrench handle. When the wrench is in line with the pipeline, the valve is open.

Any media which might solidify, crystallize or polymerize should not be allowed to stand in the ball valve cavities unless regular maintenance is provided..

TORQUE REQUIREMENTS

Torque ratings are subject to variations depending on the length of time between cycles and the media in the system.

Breakaway torque is that force which must be exerted to cause the ball to begin to open. Operating torque requirements will vary depending on the length of time between cycles, media in the system, line pressure and type of valve seat.

MAINTENANCE

With cantilever seats these valves have a long, trouble free life, and maintenance is seldom required. But, when necessary, valves *may be refurbished, using a small number of components, none of which require machining.*

Valves are designed for easy service and assembly in the field. The following checks will help to extend valve life, or reduce plant problems.

MV's Ball Valves utilize live-loaded stem seals featuring Belleville washers (disk springs) that maintain constant pressure on the packing area even under a wide range of pressure and temperature fluctuations. If stem leakage is evident proceed as follows:

STEM LEAKAGE*

Examine the disk springs (Belleville washers) for damage. If in good condition tighten the gland nut until disk springs are firmly compressed, then back nut off 1/16" of a turn. If damaged, dismantle the stem down to the gland, fit new disk springs with their outer edges touching, replace and retighten using gland nut. Further maintenance necessitates dismantling of the valve.

LEAKAGE AT END CAP JOINT*

Check for tightness at the End Cap connector. If loose, tighten End Cap. Excessive force will damage the End Cap. (Table A)

If there is still leakage it will be necessary to dismantle the valve and replace the body seals.

IN-LINE LEAKAGE

Check that valve is fully closed. If leakage occurs while the valve is in the closed position, a seat or ball sealant surface may be damaged and it will be necessary to disassemble the valve.

*NOTE: Stem leakage and leakage at the end cap joint, if not cured by simple means described above, may necessitate dismantling valve. If there is no stem leakage the stem assembly should not be touched

REBUILDING

Before rebuilding, check that all the correct components are available and that they are fit for reassembling. When rebuilding, cleanliness is essential to allow long valve life and provide cost effective maintenance. CAUTION: NO BODY OR STEM SEALS ARE REUSABLE. Care must be taken to avoid scratching the seats and seal during installation.

Note: Caution must be taken with valves that have been in hazardous media. They must be decontaminated before disassembly by relieving the line pressure and flushing the line with the valve in the partially open position. Protective clothing and face shields, gloves, etc. MUST BE USED for this operation.

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A DISASSEMBLY OF VALVE (Removed from line)

- 1.) With the valve in the open position, undo Body Bolt Nuts (#13) to separate valve Body (#1) and End Cap (#4).
- 2.) Once the Body (#1) and End Cap (#4) have been separated, remove the Body Seal (#9).
- 3.) Make sure the Ball is in the closed position, thus the Ball (#2) can be taken out easily from the Body (#1).
- 4.) Once the Ball (#2) is removed from the Body (#1), take out the Seats (#5).

B REMOVING STEM ASSEMBLY - 1" to 3"

- 1.) Remove Handle (#10) by removing Handle Nut (#16).
- 2.) Remove the Lock Tab and packing nut (#11), remove Belleville washers (#14)
- 3.) Push the Stem (#3) down into the body cavity to remove stem and Thrust Washer (#6) and remove packing assembly (#7) from packing bore.

B1 REMOVING STEM ASSEMBLY - 4" to 6"

- 1.) Remove Handle (#10) by removing Handle Nut (#19).
- 2.) Remove the Snap Ring (#11), Stop Plate (#16), loosen the 2 packing bolts (#18) and Belleville washers (#20)
- 3.) Push the Stem (#3) down into the body cavity to remove stem and Thrust Washer (#6) and remove packing assembly (#7) from packing bore.

C INSPECTION

- 1.) The ball and the surfaces of the seats should be free of pit marks and scratches. Light marring from the action of the ball against the seats is normal and will not affect the operation of the valve.
- 2.) The stem, thrust bearing, steam seal and surrounding body surfaces should be free of pit marks and scratches.

D REASSEMBLY

- 1.) Apply an adequate amount of lubricant, compatible with the media, around the Ball (#2), Seats (#5), Body Seal (#9), Stem (#3), and Thrust Washer (#6).
- 2.) For stem reassembly, disassembly procedure should be followed in reverse order.
- 3.) When stem assembly is complete, tighten Stem Nut (#11)
- 4.) Insert a Seat (#5) into the Body (#1) followed

by the Ball (#2) making sure the Stem (#3) in the close position so that stem slot engages with the tang at the base of the stem.

5.) Make sure Body Seal (#9) rests squarely on center seal surface of the body.

6.) Place the second Seat onto the End Cap (#4).
Make sure the seats rest firmly on the back surface of each recess.

7.) Insert and tighten Body studs (#12) and Body Nuts (#13) diagonally, in accordance to the cross pattern procedure.

8.) In the final assembly step ensure that body bolts are tightened accordingly to the torques values in Table A.

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TORQUE SPECS: Table A

F20 Bolting Torque Requirements					
Class 150			Class 300		
Valve Size	Bolt Size	Torque (ft-lbf)	Valve Size	Bolt Size	Torque (ft-lbf)
1	M8x1.25	6	1	M12x1.75	19
1 1/2	M12x1.75	19	1 1/2	M16x2.0	48
2			2		
2 1/2	M14x2.0	31	2 1/2	M20x2.5	94
3	M16x2.0	48	3	M24x3.0	163
4	M20x2.5	94	4		
6	M24x3.0	163	6	M30x3.5	324
8	M30x3.5	324	8	M27x3.0	239
10			10		
12	M36x4.0	567	12	M30x3.5	324

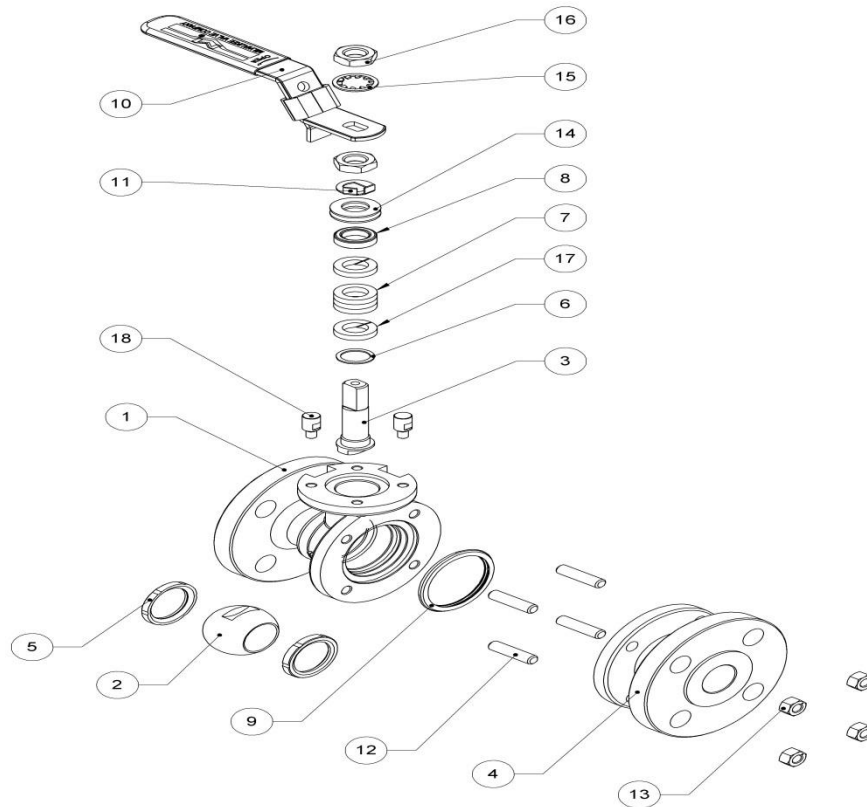
REPAIR KITS

Repair Kits are available from Milwaukee Valve Co., Inc. Table B below shows what the kits consist of. When ordering a Repair Kit, please be sure to specify the type, size and seating material of the valve

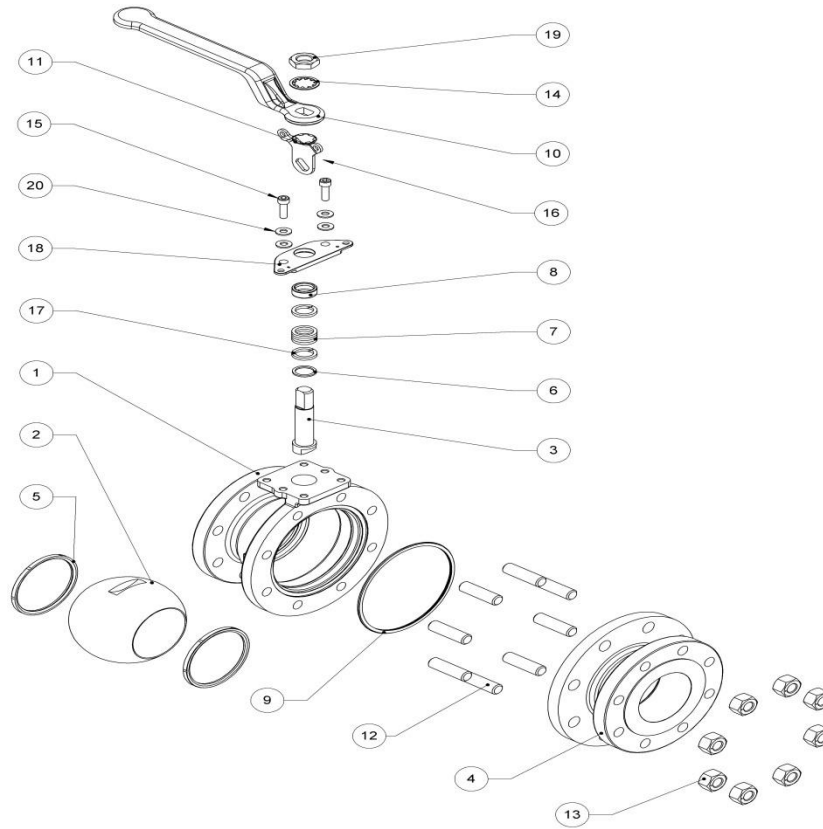
Kits Include: (1) Thrust washers, (1) packing set, (2) seats, (1) body seals, (1) snap ring

Product Number	Description
RKF20-N 100	1" F20 NXT REPAIR KIT
RKF20-N 112	1-1/2" F20 NXT REPAIR KIT
RKF20-N 200	2" F20 NXT REPAIR KIT
RKF20-N 212	2-1/2" F20 NXT REPAIR KIT
RKF20-N 300	3" F20 NXT REPAIR KIT
RKF20-N 400	4" F20 NXT REPAIR KIT
RKF20-N 600	6" F20 NXT REPAIR KIT

Yellow highlighted items are included in the repair kits shown on assembly drawings.



Item	Qty.	Description	F20 Class 150/300 1'-3"
1	1	Body	SS ATSM A351 GR CF8M CS ASTM A216 GR WCB
2	1	Ball	SS ASTM A351 GR CF8M
3	1	Stem	ASTM A479 Type 316
4	1	Tail Pieces	CS ASTM A216 GR WCB SS ASTM A351 GR CF8M
5	2	Seat Materials	NXT M-PTFE 03-MULTI FILLED/TFE/GRAPHITE 02-RPTFE
6	1	Thrust Washer	25% Glass Filled Reinforced Teflon
7	3	Graphite Packing	Graphite
8	1	Packing Gland	ASTM A479 Type 316
9	1	Body Seal	ASTM A240 TY 304 & Graphite
10	1	Handle Assy	Stainless Steel
10.1	1	Handle	ASTM A276 Type 304
10.2	1	Latch	ASTM A276 Type 304
11	1	Lock Tab	ASTM A276 Type 304
12	4	Body Stud	ASTM A194 GR8 Type 304
13	4	Body Stud Nut	ASTM A193 GR B8 Type 304
14	2	Belleville Washer	ASTM A276 Type 304
15	1	Lock Washer	ASTM A582 Type 303
16	2	Stem Nut	ASTM A194 GR8 Type 304
17	2	Packing End Ring	Graphite
18	2	Stop Pin	ASTM A276 Type 304



Item	Qty.	Description	F20 CLASS 150/300 4" 6"
1	1	Body	Stainless Steel A351 GR CF8M CS ASTM A216 GR WCB
2	1	Ball	SS ASTM A351 GR CF8M
3	1	Stem	ASTM A479 Type 316
4	1	Tail pieces	SS ASTM A351 GR CF8M CS ASTM A216 GR WCB
5	2	Seat Materials	NXT M-PTFE 03-MULTI FILLED/TFE/GRAPHITE 02-RPTFE
6	1	Thrust Washer	25% Glass Filled Reinforced Teflon
7	4	Graphite Packing	Graphite
8	1	Packing Gland	ASTM A479 Type 316
9	1	Body Seal	ASTM A240 TY 304 & Graphite
10	1	Handle Assy	Ductile Iron ASTM A536 GR. 65-45-12
11	1	Snap Ring	ASTM A276 Type 304
12	8	Body Stud	ASTM A193 GR B7 Type 4140
13	8	Body Stud Nut	ASTM A194 GR 2H Type CS
14	1	Lock Washer	ASTM A582 Type 303
15	2	Gland Bolt	ASTM A193 GR B8 Type 304
16	1	Stop	SS ASTM A240 TY304
17	2	Packing End Ring	Graphite
18	1	Packing Plate	SS ASTM A351 GR CF8M
19	1	Stem Nut	ASTM A194 GR8 Type 304
20	4	Belleville Washer	ASTM A276 Type 304

