

### BALL VALVE REBUILDING:

Guidelines for Rebuild of McKenzie Valve / Union Tank Car Ball Valves

[www.mckenzievalve.com](http://www.mckenzievalve.com)

- This procedure only applies to ball valves that use the repair kit numbers listed in the middle column of the table below.
- Exercise normal safety precautions for commodity involved.
- Before disassembly, cycle valve several times to relieve any residual pressure.
- Use OEM provided replacement parts only

Valve Type	Repair Kit	Soft Parts to Discard
2" UFRA (Angle Ball Valve)	501731	O-ring, (2) seats, stem seal, retainer seal and packing.
2" or 3" Flanged	501732 / 501733	O-ring, (2) seats, stem seal, retainer seal and packing.
4" UZFFR (Low Profile Regular Port w/o O-Ring), 4" UFIRA (Internal Ball Valve Regular Port w/o O-Ring)	503406 / 504083	(2) stem seals, (2) seats, retainer seal and packing.
4" UFPFR (Low Profile Full Port (current model Double D and Square Stem)), 4" UFPFRG (Full Height Full Port)	505446 / 505447	(2) stem seals, (2) seats, retainer seal and packing.

- Disassemble

#### **4" UFPFR (Low Profile Full Port Ball Valve), 4" UFPFRG (Full Height Full Port Ball Valve), 4" UZFFR (Low Profile Regular Port), 4" UFIRA (Internal Ball Valve):**

1. Fasten valve to suitable table / bench
2. Remove retainer fasteners
3. Remove retainer
4. Remove ball (must be in closed position)
5. Remove stem hex nut
6. Square Stem Design
  - Remove dowel pin from stem
  - Remove threaded sleeve from stem
7. Remove cam stop
8. Remove packing gland
9. Remove stem
10. Remove and discard all soft parts

#### **All Other Valves:**

1. Fasten valve to suitable table / bench
2. Remove retainer
3. Remove ball (must be in closed position)
4. Remove stem hex nut
5. Remove cam stop
6. Remove packing gland
7. Remove stem
8. Remove and discard all soft parts

- Inspect for galled threads, bent parts, wear, and corrosion damage. Inspect valve body for scratches in sealing surfaces and carefully remove any excess scale or debris.

- Pre-Assemble

#### **2" or 3" Flanged:**

Pre-assemble body and retainer with no seats or seals in place. Hand tighten to metal-to-metal fit. Apply mark across retainer and valve flange to note point of metal fit. Disassemble.

#### **All Other Valves:**

No Pre-Assembly Required

- Reassemble

**4" UFPFR (Low Profile Ball Valve), 4" UFPFRG (Full Height Ball Valve), 4" UZFFR (Low Profile Regular Port without O-Ring), 4" UFIRA (Internal Ball Valve without O-Rings):**

Install Garlock 3500 (tan) stem seal first (closest to the ball), then Grafoil® GHL (silver) on the stem then place stem in body. Install packing on threaded or square end of stem. Apply light coat of suitable silicone-base lubricant to Teflon seats and seals to facilitate assembly and initial operation. Wipe excess clean. Install one seat in valve body and one seat in retainer. Install large Teflon gasket ring on retainer. Place ball in valve body. Install packing gland, cam stop, threaded sleeve and dowel pin for square stem design and hex nut on stem. For UFPFR, UFPFRG, UZFFR, and UFIRA, torque stem hex nut to 125 ft-lb. Ensure ball is lined up in fully open position before installing and tightening retainer. Place retainer on valve body and install retainer cap screws. Tighten retainer cap screws evenly using criss-cross pattern until metal-to-metal fit achieved between retainer and valve body. For UFPFR, UFPFRG, and UZFFR, torque retainer cap screws to 100 ft-lb. For UFIRA, torque retainer cap screws to 480 in-lb. (Note: Torque tightening for retainer cap screws shall be completed in 3 evenly distributed stages, with the final stage being the final torque specification).

**All Other Valves:**

For valve assembly, reverse disassembly steps. Reassemble valve using new soft parts contained in kit. Apply light coat of suitable silicone-base lubricant to Teflon seats and seals to facilitate assembly and initial operation. Wipe excess clean.

- Ensure ball is lined up in fully open position before installation and tightening of retainer.

**2" UFRA (Angle Ball Valve)**

Apply light coat of anti-seize lubricant to threads of retainer. Wipe excess clean.

Tighten retainer until 270-300 in-lb. of torque required to rotate valve stem. NOTE: Metal-to-metal is not achieved between retainer and valve body. Tighten stem nut to 50 ft-lb.

**2" or 3" Flanged:**

Apply light coat of anti-seize lubricant to threads of retainer. Wipe excess clean.

Tighten retainer until metal-to-metal achieved between retainer and valve body by matching up previous marks.

**NOTE:** No torque value specified. For 2" valve, tighten stem nut to 50 ft-lb. For 3", tighten stem nut to 75 ft-lb.

- Open and close valve slowly to confirm it operates freely.
- Store valve for at least 15 hours in fully open position, then re-tighten valve retainer. Re-tighten valve stem nut. **Do not store valve in partially open position.**
- Test valve in closed position, and in open position with plug applied, at pressure to which it will be subjected in service.
- Repair kit 501734 / 507399 for 4" Internal Ball Valve / Reg. Port with O-Ring have been discontinued. Use repair kit 503406 / 504083.