



## M&H Valve Co.

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## **M&H VALVE RESILIENT SWING CHECK MAINTENANCE MANUAL**

### **I. SELECTION**

Check valves are for the prevention of backflow. Particular check valves perform additional services as follows:

1. Wafer check valves reduce the effect of water hammer (FM approved for such service).
2. Outside lever check valves may be fitted with a limit switch to detect flow.

#### **A. General Service By Product**

##### **1. Figure 59, 159 and 259 Check Valve**

For service in other than fire protection lines and other than a connection to a potable water system where there is the possibility of a pollutant in the user's system backflowing into the potable water system. The check valves should not be used if water hammer is a known problem.

- a. Standard Figure 59, 159 and 259 with brass to brass seating (not available above 12") – General service, cold water, and non-shock up to 200 psi. Allows backflow (when new) up to 1 oz/hr/in nominal size at 200 psi back pressure (possibly more at low back pressure).
- b. Figure 59, 159 and 259 - Resilient rubber to brass seating for General service, cold water, non-shock, at temperatures not exceeding 125°F. Provide drip tight sealing (when new). May allow some backflow at conditions of low backpressure (less than 5 ft H<sub>2</sub>O backpressure) preferred for service when water hammer check cannot be used. Not for steam service.
- c. Outside lever (lever & spring/lever & weight) – occasionally used where water hammer might be a problem. Occasionally fitted with limit switches to detect flow. Rarely arranged to counter balance disc and reduce head loss at low flows. Levers may be a safety hazard for personnel if the valve opens suddenly.

## B. General Selection Information

1. For swing check valves to function properly and not be a source of chatter and water hammer, there must be at least ½ psi differential across the valve under normal flow conditions. When in doubt, undersize check valves.
2. For service in normal environments (clear water) at temperatures less than 100°F, resilient seated valves will allow less backflow and minimize water hammer vice metallic seated valves.
3. For service other than clean water, consult the factory.
4. Levers may injure personnel and may be misused by persons to open the valve and allow backflow.

## II. INSTALLATION

All M&H AWWA check valves bolt between ASA 125# flanges.

### A. Swing Check Valves

#### 1. Orientation

- a. Swing check valves are always installed with the hinge pin parallel to the plane of the horizon and above the pipe centerline. Incorrect installation may result in binding, high head loss, and/or hanging open.
- b. Style 59, 159 and 259 check valves must be installed with the flow horizontal or the flow up.
- c. Outside lever swing check valves must be installed with the end of the lever that is fixed to the hinge pin higher than the opposite end. Failure to do this will certainly void the function of the check and may result in backflow.

#### 2. Lifting

Lift swing check valves with a sling around the body. Never lift valves by placing a bar or fork through the valve.

#### 3. Clearances

- a. Allow two pipe diameters clearance minimum from the top of the cover for removal of the disc without removing the valve from line.
- b. Allow a minimum of one pipe diameter on one side of the valve and two and a-half (2-1/2) pipe diameters on the opposite side for removal of the hinge pin.
- c. If space is limited, consult factory for space limitations with outside lever valves. Levers may be a safety hazard for personnel and lever valves should be installed where personnel will not normally be in the area or guards should be installed.

4. Start-up

The lines should be bled of air.

5. Gaskets

See page 7.

### **III SERVICE LIMITATIONS (Pressure Temperatures)**

All valves, all services 32°F minimum working temperature non-shock.

A. Style 59, 159 and 259 (Resilient Seated Checks)

1. Cold water service (125°F maximum)

Sizes: 2" to 12" - 200 psi maximum

Sizes: 14" to 24" - 150 psi maximum

B. Style 59, 159 and 259 (Metallic Seated Checks)

1. Cold water service (150°F maximum)

Sizes: 2" to 12" - 200 psi maximum

Sizes: 14" to 24" - 150 psi maximum

### **IV MAINTENANCE, CHECKING AND TESTING**

A. Swing Checks

Excepting misuse and severe service, maintenance should be limited to the following:

1. seating surfaces;
2. bearing surfaces (hinge pins, hinges and side plugs);
3. replacement of parts subject to corrosion; and
4. Lubrication and repacking of hinge pin stuffing boxes and o-ring stuffing boxes for outside lever valves.

Replacement of resilient disc rings (1. Above) and lubrication and repacking of stuffing boxes for outside lever valves (4. Above) are the only items subject to regular replacement maintenance or repair.

Replacement of parts subject to corrosion is unpredictable, as corrosion conditions are unknown and subject to many variables. Only the field service representative is qualified to judge when a part is corroded beyond use or safe limits and should be replaced; for replacement procedures see the section on replacing disc rings.

M&H Valve is not aware of a case where the bearing surfaces have been worn beyond use, but the possibility remains.

The field service representative must decide what item has worn and replace it.

1. Resilient Discs

a. When to replace

1. Replace resilient disc rings whenever leakage is judged excessive or at scheduled intervals.

b. Replacement parts (order from factory for correct size)

1. Disc ring
2. Cover gasket (advisable, but not always required, see Schedule Page 7 for sizes).
3. Anaerobic sealants low strength "Loctite" or equal.
4. O-ring or gasket for disc bolt (advisable, but not always required).

c. Special tools

None

d. Procedure (see 22 below for lever valves)

1. Remove cover.
2. Remove side plugs. Use an appropriate size socket or box wrench not an adjustable or pipe wrench.
3. Drive hinge pin out with wood dowel.
4. Lift hinge/disc assembly from valve ("V" notches in side of valve provide clearance for disc assembly).
5. Remove nut retaining disc plate. At this time, it might be advisable to remove the disc bolt and replace the o-ring or gasket on the disc ball.
6. Lift the disc plate off. If the disc plate sticks, try tapping the back of the disc assembly with a soft faced mallet. Pry it off only as a last resort.
7. Remove the resilient disc ring.

8. Clean the “pocket” where the disc ring seats in the disc holder.
9. Replace the resilient disc ring with a new one, seating it flat in the “pocket” in the disc holder. Do not use gasket sealant.
10. Clean the back of the disc plate.
11. Polish the seat ring in the valve body with crocus cloth or 600 grit wet/dry sandpaper (see Page 6).
12. If the disc bolt has been removed, lubricate the hole in the disc holder and the disc bolt with clean grease. Then carefully insert the disc bolt through the hinge and disc holder taking care not to twist or cut the o-ring.
13. Replace the disc holder on the hinge.
14. Replace the disc bolt nut and use a low strength anaerobic sealant. Do not over tighten the disc bolt nut. Tighten the nut only to the point that the disc plate makes a very slight impression into the resilient disc ring.
15. Drop the disc/hinge assembly in the valve and insert the hinge pin.
16. Replace the side plugs, starting by hand, and then tighten with 300 in-lb torque.
17. Inspect the cover sealing surfaces and clean if needed.
18. Inspect the cover gasket and replace if needed (order from M&H Valve or see Schedule on Page 7).
19. Tighten the cover bolts. Tightening two bolts at 180° snug, then tightening two bolts 90° to the first two and 180° to each other, finally tightening all bolts tight. (See Schedule on Page 7 for specific torque.)
20. Pressurize and bleed the valve, tightening any leaks. It may be necessary to loosen and retighten a few cover bolts.
21. Procedure for outside lever valves; same as for valves without outside lever except:
  - a. Remove spring or weight before removing cover.
  - b. Loosen setscrew on lever and remove lever and key.
  - c. Remove side plug packing gland.
  - d. Remove side plug opposite hinge pin.
  - e. If setscrews are used on hinge, remove them.
  - f. Lubricate extended hinge pin.
  - g. Back side plug stuffing box out of valve.
  - h. Drive the hinge pin out with a hardwood dowel. (It may be necessary to heat the hinge, but this should be avoided.)
  - i. Replace resilient disc ring as above.
  - j. Lubricate hinge pin and start hinge pin and key into the hinge.

- k. Replace the side plug (normally on left-hand side as seen facing valve inlet).
- l. Drive hinge pin in with a soft tool (make certain that key and key seats remain lined up).
- m. Replace set screws in hinge (if any).
- n. Repack or replace rings in the side plug stuffing box.
- o. Start packing gland into side plug stuffing box.
- p. Replace lever, lever key, and setscrew on extended hinge pin.
- q. Tighten side plug stuffing box. Tighten slowly and move lever frequently so as to not overtighten and cause valve to hang open.
- r. Replace cover
- s. Replace spring or weight.
- t. Pressurize and bleed.

2. Seat Rings/Disc Rings

a. When to polish

Leakage is considered excessive.

b. Replacement parts

See Page 7

c. Supplies

Crocus cloth or very fine (600 grit maximum) wet/dry sand paper or valve lapping compound.

d. Procedure

1. See Page 5 – Steps d.1 through d.6.
2. Inspect seat ring and disc ring (on metal to metal valves). Polish away any scale and check for nicks and scratches.
3. For metal to metal valves – lay a piece of wet/dry paper or a very flat surface and polish the disc ring (with a wiping and rotating motion) until the entire brass disc ring is smooth, flat and free of scratches.
4. Wipe the entire surface of the seat ring. It must be smooth, flat and free from radial scratches.
5. For a better than usual seal, use some valve lapping compound on the seat ring. Rub the disc on the seat ring

with a rotating and wiping motion. Clean the compound from the seat and disc and replace it several times.

6. See Page 5 & 6 – Steps d.13 through d.21.

**V. RECOMMENDED SPARE PARTS FOR C.I. CHECK VALVES (Figure 106, 106A, 126 and 126A)**

A. Necessary

1. Cap gasket
2. Resilient disc (for rubber faced valves only)
3. Packing for lever & spring and lever & weight valves.

B. Useful

1. Hinge pin, hinge, and disc assembly
2. Bolts and nuts
3. Disc bolt o-ring (106A/126A/126 valves)
4. Disc bolt gasket (106 valves)

Valve Size	Bolt Size	Torque (ft-lbs)
2", 2 1/2", 3", 4", 6"	5/8 UNC	100
6" & 8"	3/4 UNC	150
10" & 12"	7/8 UNC	230

Gaskets (Cap):

2" to 12" valves use a cap gasket identical to the end flange gasket.

**VI SIZING OF SWING CHECK VALVES**

To assure reliable, stable, chatter-free operation, it is recommended that swing check valves be sized to assure the disc will open full during normal flow conditions. The head loss during normal flow conditions should exceed (1) one psi for valves 4" and smaller and exceed (1/2) one-half psi for the remaining larger sizes. The data below provides an estimate of what should be the minimum design flow rates:

SIZE	DESIGN MIN. FLOW G.P.M.	REF CV*
2"	150	141
2 1/2"	250	235
3"	350	347

4"	650	643
6"	1100	1532
8"	2100	2836
10"	3300	4573
12"	4800	6756

\*CV values are based partially on extrapolated data and in any case only apply to flows greater than the minimum flows specified.