Installation, Operating and Maintenance Instruction for

STAINLESS STEEL SANITARY DIAPHRAGM VALVE

Manually Operated Diaphragm Valves
OPERATING PRESSURE AND TEMPERATURE

<table>
<thead>
<tr>
<th>Size</th>
<th>Non-shock pressure at temperature range</th>
<th>Non-shock pressure at max. temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>½” - 2” (DN15-DN50)</td>
<td>230 psig from 0°F to 100°F</td>
<td>120 psig at 300°F</td>
</tr>
<tr>
<td>2 ½” &amp; 3” (DN65 &amp; DN80)</td>
<td>155 psig from 0°F to 100°F</td>
<td>80 psig at 300°F</td>
</tr>
<tr>
<td>4” (DN100)</td>
<td>140 psig from 0°F to 100°F</td>
<td>80 psig at 300°F</td>
</tr>
<tr>
<td>T-block</td>
<td>230 psig from 0°F to 100°F</td>
<td>120 psig at 300°F</td>
</tr>
</tbody>
</table>

Notes: The maximum temperature is dependant upon diaphragm material selection

Notes: Not suitable for fire testing, fire hazard or erosive service.

PRESSURE/TEMPERATURE RATING

Sanitary diaphragm valves must be installed in a piping system where the normal pressure and temperature do not exceed the rating shown above. The maximum allowable pressure is for non-shock conditions. Water hammer and impact for example, should be avoided.

![Maximum Operating Pressure-Temperature Curve](image)
PROPER STORAGE OF VALVES

Valves with PTFE faced diaphragm: Since all PTFE faced diaphragm are mould in the closed position, the valves should be stored in closed position without over tightening on the valve. Valve should not be ‘nipped’. The bonnet bolts should be loosened to prevent premature cold flow that may cause leakage when the valve is put into service for the first time.

Valves with other diaphragm: The valves should be stored in the fully open position

The valves storage environment should be dry at ambient temperature.

Note: It is important to remember to tighten the bolts to the proper torque prior to putting the valves into service – See Table 1

LAYOUT AND SITING

It should be considered at the design stage where the diaphragm valve will be located to give access for cleaning, maintenance and repair.

Adjoining pipe work must be supported to avoid the imposition of pipeline forces on the valve body.

INSTALLATION

Prior to installation, a check of the body marking and diaphragm must be made to ensure that the correct product is being installed.

Sanitary diaphragm valves are carefully manufactured and finished items and should not be subjected to misuse such as careless handling or allowing dirt to enter through the body chamber.

End protectors or special packaging should only be permanently removed immediately before installation.

The interior surfaces of the valve body are super finished and should be protected at all times. On no account should there be any damage to the interior surfaces whatsoever.

Immediately prior to installation, the pipe work to which the valve is to be connected should be checked for cleanliness and freedom from damage and debris.

Butt Weld Valves

- Standard tube OD valves may be orbitally welded without removing the bonnet/diaphragm assembly. Exception is made for the ¼” as the distance of the tube is small and the diaphragm may be affected.

- Manually welded valves, including tube to Schedule 10 and heavier require the bonnet/diaphragm assembly to be removed prior to welding.

Note: Two way valves are bi-directional and may be installed either in vertical or horizontal pipe work. Valves in horizontal piping should be installed so that one of the drain marks on either end of the valve is in the 12 o’clock position to ensure optimum draining – See Table 2. Any valve provided with the optional bonnet weep hole should be installed with the hole facing downward.

Care must be taken when installing multiport, multi-block and divert valves to ensure that the correct orientation is maintained to ensure optimum draining.
Drain angles for diaphragm valves

Table 2

<table>
<thead>
<tr>
<th>VALVE SIZE</th>
<th>DRAIN ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>½&quot;</td>
<td>60°</td>
</tr>
<tr>
<td>¾&quot;</td>
<td>65°</td>
</tr>
<tr>
<td>1&quot;</td>
<td>62°</td>
</tr>
<tr>
<td>1 ½&quot;</td>
<td>70°</td>
</tr>
<tr>
<td>2&quot;</td>
<td>70°</td>
</tr>
<tr>
<td>2 ½&quot;</td>
<td>72°</td>
</tr>
<tr>
<td>3&quot;</td>
<td>70°</td>
</tr>
<tr>
<td>4&quot;</td>
<td>75°</td>
</tr>
</tbody>
</table>

Note: Self drainage will only occur if the process line has a slope of a minimum of 3°.

ASSEMBLY

Diaphragm installation

Bayonet type diaphragms
Insert bayonet on diaphragm into compressor and turn until bolt holes on bonnet and diaphragm align.

Screw type diaphragms
Screw threaded stud on diaphragm into compressor until hand tight and back it off until bolt holes on bonnet and diaphragm align.

Caution: do not over tighten screw type diaphragm or the threaded stud may tear out of the rubber.

Bonnet, diaphragm and body assembly

- Turn the bonnet hand wheel counterclockwise to the fully open position with the diaphragm installed until the diaphragm surface mates with the bottom of the bonnet flange.

- Inspect valve body flange and weir for cleanliness prior to mating the bonnet assembly to the valve body. The mating surfaces must be clean and free of any residue to ensure proper sealing of the diaphragm.

- Place the bonnet / diaphragm assembly onto the body.

Caution: Make sure that the weir inside the body and the bead on the diaphragm are aligned properly. Do not assemble valve with the bonnet / diaphragm assembly in the closed position.

- Hand tighten bolts and nuts and then continue to tighten all bolts in a diagonal pattern in small increments with a torque wrench until the proper torque is achieved per table 1.

Caution: See storage section of this manual.
MAINTENANCE

Precautions

a) The valve must be at zero pressure and ambient temperature prior to any maintenance being undertaken. Any valves which have come in contact with hazardous fluids must be decontaminated prior to beginning any work on the valves.

b) Prior to any inspection or repairs, warning labels must be affixed to any upstream and downstream isolating valves to alert personnel that the lines are not to be activated whilst under repair.

c) Maintenance engineers and operators are reminded to use correctly fitting tools and equipment and to take appropriate personal protective precautions.

In systems where corrosion could be a potential hazard, wall thickness checks on the body should be made.

General

1. External parts should be periodically inspected and all parts that show damage, excessive wear or corrosion should be replaced.

2. Any fluid seepage from under the hand wheel indicates diaphragm failure and requires immediate diaphragm replacement.

3. Any fluid leakage from the body/diaphragm joint indicates that the bonnet bolts need to be re-tightened – see Table 1.

To re-tighten the bonnet bolts
- Depressurize the system
- Open the valve slightly
- Tighten the bolts to the require torque—See table 1
- If leakage continues, diaphragm replacement is required.

Caution: Re-tightening of the valve bolts per the torque requirements is recommended 24 hours after the system reaches operating temperature/pressure.

Note: Be sure to tighten bolts to the proper torque prior to putting into service. (see table 1)
Diaphragms should be inspected periodically for wear and should be replaced at least once per year.

_The service life of any diaphragm is determined by the line fluid, operating temperature, frequency of steam sterilization and frequency of operation._

**Diaphragm Replacement**

1. Isolate and de-pressurize that part of the system where the valve is installed. Rotate the hand wheel counter clockwise until the valve is fully open.

2. Remove the bonnet bolts.

3. Lift off the bonnet/diaphragm assembly and rotate hand wheel clockwise a few turns to un-mate the diaphragm from the bottom of the bonnet flange.

4. Remove elastomer type (EPDM or Viton®) diaphragms by turning counter clockwise. Remove Teflon® faced type diaphragms by turning 90° to unlock bayonet from compressor and pull out.

5. Replacement diaphragms should be the same size and grade as original diaphragm being replaced. Screw elastomer diaphragms clockwise into the compressor until hand tight then back off until bolt holes in bonnet flange align with bolt holes in diaphragm. Insert the bayonet on the Teflon® diaphragm into the compressor. Turn 90° to lock the bayonet into the compressor and align the bolt holes in the bonnet flange and diaphragm.

6. Rotate the hand wheel counter clockwise until the diaphragm mates with the bottom of bonnet flange. Fully open position.

7. Place bonnet/diaphragm assembly onto the valve body, making sure that the body weir is aligned properly with the diaphragm centre bead.

8. Replace bolts and nuts and hand tighten.

9. Tighten bonnet nuts in a diagonal pattern to the proper torque shown in table 1.

10. If the valve leaks at the body/diaphragm joint after reaching operating temperature and pressure, depressurize the line containing the valve and re-tighten bonnet nuts/bolts per Table 1 again.

**Bonnet lubrication**

- Bonnets are lubricated at the factory and do not have grease fittings. When used under normal operation, additional lubrication is not necessary.

- When valves are exposed to weather conditions or corrosive atmospheres, external contacting areas of bonnet assemblies should be lubricated.
Adjustable stop

1-Open valve 3 to 4 turns
2-loosen set screw (1 turn max.)
Caution: Do not remove the set screw entirely

3-Push handwheel on the bonnet until seated against bonnet and close valve completely.

4-Retighten the set screw.
The adjustment is complete

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