

## **Gulf WAFER CHECK™ Check Valve**

### **ASSEMBLY AND DISASSEMBLY INSTRUCTIONS**

#### **ASSEMBLY**

Assembly of the WAFER CHECK™ valve is relatively easy using only an open end wrench, Teflon tape and the following instructions.

**NOTE: EYE PROTECTION IS RECOMMENDED WHEN ASSEMBLING AND DISASSEMBLING OF WAFER CHECK™ VALVES.**

1. Lay the body down with the "downstream" side facing upward.
2. Lay the discs inside the body, sealing surface down, with the disc hinge lugs together.
3. Insert the thrust bushings between the body and the outer disc lug.
4. With the spring legs pointing downward rotate the forward spring leg in a clockwise direction.
5. Place wound spring between the discs on the center post.
6. While maintaining pressure on spring with hand, insert hinge shaft through the body, thrust bushing, discs' hinge lugs and spring. The spring may now be released.
7. Wrap retainer(s) and body pipe plugs with 1-1/2 rounds of Teflon tape.
8. Screw the retainer(s) into body and tighten.
9. Move the hinge shaft to insure that it is free from binding on retainers.

#### **DISASSEMBLY**

The disassembly of the WAFER CHECK™ valve is accomplished by reversing the assembly instructions.

Please use caution when removing the stop or hinge shaft. Preset spring(s) may cause serious injury when tension is released.

**PLEASE USE EYE PROTECTION!**

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### **HANDLING AND LIFTING INSTRUCTIONS**

WARNING! DO NOT LIFT THE VALVE BY THE DISC STOP, HINGE SHAFT, DISC, OR BY ANY OTHER MEANS NOT UTILIZING THE LIFTING EYE BOLT. This can damage the valve and become very dangerous, when handling.

Care should be taken so as not to drop the valve or cause damage to the valve flange or any exterior special coating. Large and heavy valves are furnished with lifting eye bolts for easy handling and lifting. For safe handling and lifting it is suggested that the item be lifted only by the eye bolt, when either being installed or removed.

### **RECEIVING INSTRUCTIONS**

Unloading should be carried out in a careful manner.

Upon receipt the interior of the WAFER CHECK™ should be inspected prior to installation. Paper tags are sometimes wired to the disc stop. These should be removed. Valve flange faces should be inspected for possible damage during shipment and any special coatings should be checked for nicks, scrapes, scratches or other types of damage they may have occurred during shipment.

WAFER CHECK™ is furnished with nameplates which identify general information about the particular valve. Nameplate information can be documented at time of receipt at the discretion of the customer.

Additional testing or marking of the WAFER CHECK™ are not required.

### **STORAGE INSTRUCTIONS**

To minimize damage or deterioration of the WAFER CHECK™ supplied, it is suggested that the WAFER CHECK™ be stored indoors. If the WAFER CHECK™ is stored in a dry indoor location it will not be necessary to cover the valve. A thin coat of easily removable rust preventative should be applied to all machined areas, including metal seating surfaces of the valve body and disc.

Should outside storage be required, it is suggested that the WAFER CHECK™ be packaged (similar to packaging for export shipment) so as to prevent environmental damage to the valve. Note that valve body and disc seating surfaces should receive the most attention.

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### **INSTALLATION INSTRUCTIONS**

#### **Horizontal Installation**

Prior to installing the wafer body style Model "MB" WAFER CHECK™ between two flanges the bottom stud bolts should be loosely in place between the two flanges providing a foundation to set the WAFER CHECK™ on. The WAFER CHECK™ must be installed with the hinge shafts in a vertical alignment in order for the discs to swing properly.

After the appropriate gasket has been placed between the WAFER CHECK™ body and the companion flanges nuts on the studs should be torqued alternately across the valve body in accordance with the recommendation of good standard piping practices.

#### **Vertical Installation**

After the appropriate gasket has been placed between the WAFER CHECK™ body and the companion flanges nuts on the studs should be torqued alternately across the valve body in accordance with the recommendation of good standard piping practices.

The WAFER CHECK™ when installed downstream of an elbow should have the pin perpendicular to the piping elbow, dividing the flow velocity across the WAFER CHECK™ discs.

### **MAINTENANCE INSTRUCTIONS**

The WAFER CHECK™ is maintenance free, meaning it needs no periodic lubrication, packing adjustment or seat adjustment. The valve should be inspected every 2 (two) years in order to check for wear of the discs, spring, shafts and thrust bushings.

The torque on the flange studs nuts should be checked periodically to insure no loosening has occurred due to pipe vibration, thermal cycling and stretching of the stud.

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### APPLICATION AND OPERATIONS

The WAFER CHECK™ valve is a self operating check valve designed to prevent the backflow of gas or liquid media. Initial opening of the WAFER CHECK™ discs begins when the upstream pressure exceeds the downstream pressure and the effective torque of the spring. This pressure is called the "cracking" pressure. Once the WAFER CHECK™ discs open, flow velocity determines the position and stability of the discs.

If the flow velocity upstream of the WAFER CHECK™ decreases and/or stops, the springs force the discs to a closed position. Ideally, the discs will be fully closed just prior to flow reversal, thus alleviating the potential for water hammer.

### LIMITATIONS AND PRECAUTIONS

WAFER CHECK™ valves are not recommended for the following service conditions.

- Pulsating Flows
- Service condition requiring a "Full Port" opening
- Installation directly to a Butterfly valve or other piping accessory that may interfere with the opening or closing of WAFER CHECK™ discs.
- Vertical Flow DOWN without prior Factory Approval

The following precautions should be taken to insure long service life of WAFER CHECK™ valves.

- Accurate sizing of WAFER CHECK™ is crucial to ensure an acceptable pressure drop and long service life.
- Flow velocities should be in the following ranges:

Media	Flow Rate
Liquid	3 to 11 feet/second
	.91 to 3.35 m/second
Gas	20 to 250 feet/second
	6.1 to 76.2 m/second

- A minimum of 5 (five) pipe diameters should maintained between the WAFER CHECK™ and likely causes of turbulence. (i.e. pump discharge, reducers, elbows and tees, etc.)

## Gulf WAFER CHECK™ Check Valves

### FAILURE TO CLOSE

Gulf's WAFER CHECK™ check valve is a general purpose spring loaded dual disc swing check valve designed to prevent back flow. This design has been installed and operates successfully in both liquid and gas applications.

It is important to understand that the WAFER CHECK™ is a swing check valve that has a modified and improved design. In general, should a WAFER CHECK™ valve fail to close, a conventional single disc swing check valve would have also failed. The cause of swing check valve failure, excluding warranted defects in material and workmanship, is usually, too low or high liquid velocities and turbulence or corrosion.

The discs position and movement is determined by the flow. Therefore, it is very important to size the valve correctly. Should the flow velocity be too low, less than 3 ft/sec liquid (dual disc WAFER CHECK™) / 6 ft/sec (single disc swing check) the discs will not be in a stable position and will "flutter". Disc flutter causes the discs to wear in the lug area and also causes the spring in a WAFER CHECK™ to cycle excessively and fail prematurely. Excessive velocities (11 t/sec, liquid; f 250 ft/sec gas) will also cause the discs to flutter and wear out the spring.

Turbulent flows caused by pump discharges, elbows and swedges upstream of a check valve will also cause the discs to flutter excessively. It is recommended that all check valves be installed a minimum 5 pipe diameters downstream from sources of turbulence.

Specifically addressing the WAFER CHECK™ valve; the failure of the spring will not prevent the valve from closing. The stop pin prevents the discs from traveling past 85 degrees. Thus, should the spring break, there is disc surface for the flow to push against and cause the discs to close. The spring is NOT necessary for the WAFER CHECK™ to close.

Should a WAFER CHECK™ fail to close, a missing spring would be the most obvious, however further inspection should be focused on the following areas:

1. Washout of the body around the hinge pin may have occurred allowing the hinge pin to be cocked, thus preventing the discs from seating properly. The plates could be missing due to the washout of the hinge pin.
2. The lugs of one or both plates may be worn out of round allowing the edge of the disc to contact the rib area in such a way as to jam the disc open. One or both discs could also be missing.
3. The stop pin may be missing due to body washout, breakage, or corrosion, allowing the discs to swing past the center line of the valve when in the open position. This would prevent the back flow from catching the discs properly to close them.
4. The hinge pin was not vertical when the valve was installed in a horizontal flow position.