VALVE USAGE & MAINTENANCE PAMPHLET

[Revision 0 Issue Date: 12/02/09]

SERIES RDP-03

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1 DESIGN DESCRIPTION

The basic design is of spring-loaded diaphragm valve suitable for refrigerant gases. The valve is a dual phase, single outlet handwheel-operated valve, using a two-piece stem separated by non-perforated Stainless steel diaphragms. The diaphragms prevent leakage along the valve stem. The lower spindle is encased in a spring, which forces spindle away from the seat when the valve is opened. The upper spindle is threaded into the gland nut. When the handwheel is rotated to the closed position, the upper spindle pushes on the diaphragms, which deflect downward, forcing the lower spindle against the valve seat. When the handwheel is rotated toward the open position, the upper spindle is moved away from the diaphragms, allowing the spring to push the lower spindle away from the seat. The replacement of elastomeric seals with metal diaphragms gives this valve superior leak integrity to the atmosphere.

Limitation: The valve is difficult to close than standard wheel operated O-ring seal design valves and may require operator to double-close the valve. The design does not withstand any abusive treatment (like using wrenches to close the valve) to any great extent. The diaphragms may become permanently inverted and the elastomeric lower tip can cold-flow down the throat of the valve.

Due to soft seating on the bottom spindle and spring the valve design would not function well in corrosive service. The valve is prone to open when exposed to vibration and shock unless it is properly closed and secured.

2 SALIENT FEATURES

1. Valve design meets all design and test requirements of EN ISO 10297:2006 and has been certified in BAM Berlin, Germany for Test pressure up to 50 Bar. Design is qualified to be used without valve protection cap for weight of the package mass not exceeding 69.44 kgs.
2. The replacement of elastomeric seals with metal diaphragms gives the valve design superior leak integrity to the atmosphere. The design in general does not require any maintenance.
3. Handwheel rotates about 1-3/4 turns from fully open to close. When opening a diaphragm valve, there will be resistance for approximately one turn, at which point most or all resistance on the handwheel will disappear. At this point the upper spindle has lost contact with the diaphragms. The valve should be opened to this point but not backseated. When the handwheel is free from resistance, the valve will provide maximum flow but will not be mistaken for a closed valve because the handwheel will turn freely.
4. The valves have no threads or lubricants in the gas stream to generate particles or contaminate the gas.
5. While the valves are designed for closing torque of only 4 Nm , at times it may be difficult to close. When the valve is open, full cylinder pressure is exerted on the diaphragms. The pressure on this surface area makes it difficult to push the diaphragms down. When closing the valve against cylinder pressure, about 60% of the closing force goes toward overcoming the gas pressure, while only 40% of the force is transmitted to the seat. Because of this effect, it is advisable to use a “double-close procedure” on these valves. This procedure requires the operator to close the valve tightly by hand to vent the pressure in the valve outlet, and then to retighten the valve immediately. Never use wrenches to operate the valve. Use of these cheaters can permanently damage the valve components.
6. Lense washer between lubricated spindle and tip holder reduces friction between diaphragm and spindle assuring long wear resistance service life**.**

3 VALVE FITMENT AND REMOVAL FROM CYLINDERS

It is recommended to use PTFE thread sealant to tighten valve inlet on the cylinder coupling. The recommended valve tightening torque as per ISO 13341 on valves having inlet 25E to EN629-1 is 200-300 Nm for fitting in Seamless steel cylinders. It is advisable to clean/tap cylinder coupling before valve fitment to avoid damage to the valve inlet and to facilitate sealing between the threads.

Valve fitment and removal can be accomplished with either a manual, electric or hydraulic wrench keeping in mind wrench size of 30mm. Remove valves from cylinders ensuring that the jaws gripping the valve fit properly over the wrenching flats on the valve without contacting the outlet, inlet or relief device on the valve. The valves should be removed slowly to prevent damage to engaged threads. Before removing the valves, it is important that the container is completely empty of gas, preferably vacuumized and secure to prevent toppling during valve removal.

DISCLAIMER : The pamphlet shall be used as reference for the users of Tekno Valves design RDP-03. The procedure is not meant to substitute existing plant usage guidelines. Tekno Valves do not take any responsibility for incorrect reconditioning and repair of valves and any mishap as a result of the same.

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Valve inspection & reconditioning should be carried out by trained personnel familiar with valve design and performance requirements and with proper tools, gauges and gadgets.

4 VALVE DISASSEMBLY, INSPECTION AND RECONDITIONING

- Pull handwheel from top spindle serration.
- Caution : Handwheel once dislocated or removed from top spindle would not by reusable.
- Remove gland nut by using 28 mm A/F wrench and remove the gland nut assembly.
- Where possible, blow out the valve body chamber using clean, dry, Compressed Air or Nitrogen to remove any foreign particles. . Inspect the valve body chamber bore for dirt, debris or damage. Components should meet the dimensional specifications of the drawings except taper inlet thread which are deformed during valve installation, & cannot be regauged.
- Inlet threads on used valves should be inspected visually & soft wire brushed to remove burrs & polish threads.
- The internal bores and threads should be inspected for thread deformation, wear and material loss. Inspection gauges should be used to check M27x1 mm internal valve body and external gland nut thread and M14x1 mm gland nut internal threads and top spindle external threads.
- Check nylon 66 tip and lense. Replace entire bottom spindle and/or nylon 66 lens if worn out It is also advisable to replace SS diaphragm during maintenance.
- Clean/Degrease components by suitable solvent before assembly.

5 REASSEMBLY AND TESTING

1. Use lubricant Krytox GPL 225.
2. Insert friction washer on the ridge of the top spindle. Lubricate the top spindle threads and conical face and screw spindle inside internal threads of the gland nut. Ensure the conical spindle thrust face is approximately 1 mm behind face of the gland nut.
3. Place spring around the valve seat and encase seat holder in the spring with nylon 66 tip facing downwards. Position the diaphragms on the top face of the seat holder. Position the nylon washer (lens) where provided aligning with the conical face of the top spindle. Screw gland nut by hand.
4. Clamp Valve body in bench vice with nylon clamp pads and ensuring no damage to the valve body tighten gland/packing nut at specified torque.
5. Fit hand wheel as provided in the drawing. Repeat the steps for both vapour phase and liquid phase. In general the operating mechanism connected to the vapour phase is generally parallel to the valve inlet. .

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