VALVE USAGE and MAINTAINENCE PAMPHLET FOR SERIES CAV-06.

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DESIGN FEATURES AND LIMITATIONS

The design is that of a "packed" valve that use compressed packing to make a seal around the valve spindle/stem and at the valve body. The basic parts of the packed valve are the valve body, spindle, packing nut and packing that is located between the packing follower/ gland and the packing ring/collar. To ensure a good seal at the spindle, the packing nut is firmly tightened to compress the packing against the spindle. This results in high level of torque to operate the valve and therefore the valve design calls for a spindle key to operate the valve. This design as with most packed valve design, use metal to metal shutoff because of high torque that can be exerted with the wrench/Spindle key. However the length of the wrench used with the valve must be the shortest that will do the job to avoid damage to the spindle or valve body seat. Hence adjustable wrenches or pliers are not recommended. This design is not recommended for high purity applications because of particulate generation from packing wear and wear of the spindle against the valve seat and potential for inboard leakage under vacuum.
Also it is important to tighten gland nut as a torque mentioned the drawing (Between 54-60 Nm) in case of gland leakage. In all circumstances, gland nut should be retightened after every 500 cycles.

In addition and to better understand the contents of this pamphlet refer and/or request detailed drawings and gas service chart for valve usage, and assembly.

SALIENT FEATURES OF "TEKNO" MAKE CAV-06 VALVES

1) Complies with all design and test requirements of EN ISO 10297:2006 at test pressure (Pvt) 50 Bar including compliance to Oxygen pressure surge test at 100 bar for gases having oxidizing potential greater than air.
2) Valve assembly tested for impact test at 400 J.
3) Valve inlet and Outlet size as per national and international standard.
4) Valves may be provided with PRD as per international standards.
5) Material of Construction –
    a) Corrosion resistant Alsi Bronze alloy, C-64210 to ASTM B 124 for valve body, packing collar and packing/gland nut
    b) Naval Brass, C-46400 to ASTM B 21 for fuse plugs (Optional)
    c) Virgin PTFE for Packing
    d) Free cutting brass to IS:319, Grade I for Outlet nut, and Packing Gland.
    e) Corrosion resistant Monel metal to C-4400 to ASTM B164 for spindle.
6) Valve body and spindle machined on CNC machines to ensure interchangeability of parts and maximum service life.
7) Cylinder valves are 100% tested for internal leakage at a torque of 4 Nm.
8) Valves are assembled using Krytox GPL 225 lubricant on stem threads and packing area to ensure good service life and ease of operation.
9) Spindle hardness at the shank is maintained around 90 points on Rockwell B scale to offer resistance against twisting/bending of the stem square upto a torque of 80-85 ft-pound. (Against Chlorine Institute maximum allowable torque of 40 ft-pound and 50 ft-pound in case of emergency).
10) In addition to the valve body, the spindle, gland nut, outlet cap and the fuse plugs (If provided) are each marked with an identifying lot number to trace the component to the supplier raw material certificate used to manufacture the component.
10) Optional provision for dip tube – Maximum size -3/8" NGT.

REMOVAL OF VALVES FROM CYLINDERS

Valve removal can be accomplished with either a manual, electric or hydraulic wrench. 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.

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

VALVE DISASSEMBLY

- Use recommended wrench with one end having 1¼" Open end Spanner to remove Outlet Cap & Packing Nut. Fit opposite end of the same spanner with size 3/8" square open to remove spindle along with other internal fitments of Packing Gland, Packing & Packing Collar.
- Do not remove Fusible Plug from body unless it is defective.
- Inspect individual components for structural cracks, gross corrosion & other significant damage.
- Inspect packing rings for wear and discard one or both rings if found in unusable condition.

CLEANING

- We strongly recommend to clean valve bodies and components which are observed "green", likely Copper Chloride due moisture (especially in Chlorine service) either in the Chlorine or which has entered the system during connections and disconnections.
- The greenish layer of Copper Chloride or any other salt formation on threads of valve body and stem depending upon gas service can result in valve body becoming "Jammed" resulting in high torque required to open/close the valve and/or improper fitting of the outlet cap.
- Use suitable cleaning procedures without damaging the valve components and threads. Suitable and recommended cleaning procedures may be more or more of the following.
    a) Steam cleaning (Should not be used for valves with fuse plugs)
    b) Detergent cleaning (Preferably in conjunction with steaming). – Also do not use ammonia solutions because they cause stress corrosion cracking in valve alloys.
    c) Mechanical – Powder driven brush, buffer wheel or bead blaster.
    d) Acid Bath – Use solvents in strict compliance with the manufacturers safety recommendations.

- Regardless of the method used, care should be taken that these components remain within the dimensional specifications of this pamphlet after cleaning.

INSPECTION AND RECONDITIONING

- After cleaning, valve body & its components should be inspected again for cracks & wear. All components should meet the dimensional specifications of the drawings except those areas, which are allowed to be reconditioned & inlet thread which are deformed during valve installation, & cannot be regauged.
- The external threads on valve body (inlet, outlet, and packing nut end) should be examined for corrosive damage, heavy wear, and material loss. Rethreading dies can be used for outlet and packing nut threads to remove material buildup and re-died threads should be subsequently checked by Thread ring "Go" and gauges "Go" and "No Go"
- The valve outlet sealing face should be checked for nicks and crack and refaced if required. Repeated resurfacing will reduce the number of effective threads and may weaken the body.
- Inlet threads on used valves should be inspected visually & soft wire brushed to remove burrs & polish threads.
- The valve body internals should be inspected closely under a bright light, preferably with some magnification.
- The internal bores and threads should be inspected for gross corrosion and material loss. Inspection gauges should be used to check internal ACME thread. The gauges will indicate if the threads present are within specification. A visual inspection of the ACME thread is also required. The threads closest to the valve seat are the most susceptible to corrosion. Loss of these threads could lead to a loss of engagement when the valve is closed, resulting in a "spinner" (a valve with a stem unable to seal at the valve seat due to thread loss or deterioration). If a spinner condition is present, the valve body must be scrapped.
- The sharp edge of seat will become beveled with repeated closing requiring more and more torque to close the valve to make leak proof. It is advisable to recondition the seat area to restore sharp edge by refacing using reconditioning seat cutter. Care should be taken not to reseat valve body to a depth greater than 48 mm.

REASSEMBLY & REINSTALLATION

- Clean parts after reconditioning & assemble using Krytox GPL 225 or any other suitable compatible lubricant on the stem threads and stem shank using recommended spanners & torque wrenches as per GA drawing. Tighten the packing nut between 54-60 Nm and fuse plugs at 15 foot pounds (If present and required).

TESTING (After reconditioning and/or before filling)

- Connect the valve inlet to a source of oil-free dry air or nitrogen regulated to 50 Barg. Close to valve to check internal tightness at 12 Nm check for leakage from valve outlet for one minute by using Teepol HB7 or equivalent soap solution. This torque value may be higher for valves in Chlorine and other corrosive service but should not exceed 40 Nm under any circumstances. Repair the valves if necessary and retest and reject if leakage persists. Check external leakage by installing an outlet cap, open the valve, and test body integrity and possible gland leakage at 50 Barg pressure. In case of leakage, tighten gland nut between 54-60 Nm and recheck for external tightness. Dry valve before filling.

VALVE TIGHTENING TORQUE

We recommend use of 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 should be between 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.

REFERENCE AND DISCLAIMER:

- The pamphlet is to be used as reference for the users of Tekno Valves design CAV-06. 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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