

INSTALLATION & MAINTENANCE OF MECHANICAL SEALS.



EQUIPMENT INSPECTION.

With the help of dial indicator check following.

- a) The radial runout of shaft in seal area should not exceed 0.003 inch or 0.08mm.
- b) Axial end play of the shaft no exceed 0.005inch or 0.125mm.
- c) The stuffing box face should be square (at right angle) with the shaft within 0.002 inc or 0.05mm.
- d) Stuffing box bore should be concentric with the shaft within 0.002 inch or 0.05mm.

The above check points usually decide the seal life & hence they should be observed strictly. In actual practice there can be deviations due to any one of the following reasons.

A BENT SHAFT.

Mount the shaft between centres on a lathe machine & check with dial indicator.
If found bent, replace it.

WORN OUT BEARINGS:

It is usual practice to replace the bearing before installing a mechanical seal. The shaft may run out giving excessive vibrations resulting into face separation & subsequent leakage if the bearings are worn out.

IMPROPER FITMENT OF BEARINGS:

If the shaft is not properly locked in both axial as well as radial directions, it may excessive procedures of bearing to avoid excessive radial or end play.

Apart from above following checks should be made regarding general condition of the equipment.

- i Stuffing box must be clean of foreign matter that might harm the seal.
- ii The stuffing box face must be free of sharp edges & the surface capable of being sealed by a gasket or O ring.
- iii Shaft / Sleeve must be free of sharp edges or burrs. If there are any, polish then with emery cloth until smooth.
- iv Deep scratches on shaft or sleeve should not be in the area over which the secondary seal will travel during installation.
- v A gradual chamfer should be provided at the corners so that the elastomer is not damaged while it is pushed on to the shaft or sleeve pusher.
- vi The shaft / sleeve must have a proper finish for the type of mechanical seal.
If the mechanical seal is set screw driven. The surface finish should be 32RMS or better.
However, if the seal is friction driven by secondary elastomer (as in case of rubber bellow seal) the surface finish of the shaft should not be better than 32RMS.
- vii When a sleeve is used, there should not be any radial play between the shaft & the sleeve bore. Excessive clearance between the two will give rise to radial runout of the sleeve.

INSTALLATION



Following are the general guideline for proper installation of mechanical seal.

- a) Installation drawing of the seal is most important. Always insist on a proper assembly drawing as a quick reference guide before starting the installation of any mechanical seal.
- b) Study the drawing carefully, understand the basic design & material of the seal look out for special instruction regarding installation, lubrication, auxiliary arrangement like flushing, quenching, cooling carryout the installation in all respects with a special attention on sequence of assembly & provision of auxiliary systems.
- c) Check the mechanical seal & make sure it is as per the drawing supplied by the manufacturer.

Now, the stage is set for final fitment of the mechanical seal on the equipment. Following are the generalized steps for fitment of seal

- a) Assembly the pump with shaft, sleeve, stuffing box, impeller in position & mark the reference point on the **shaft /sleeve** as shown in the reference drawing.
- b) Disassemble the pump.
- c) Measure back from the reference mark the required length of the seal assembly as per the assembly drawing & mark there.
- d) Place stationary face into the gland. If it is press in type. Apply lubrication to the elastomer & press the seat into the gland.
- e) Lubricate the shaft & secondary seal.
- f) Slide the rotary unit on shaft until back of the seal is in line with the second marking line on the shaft /sleeve.
- g) Reassemble the pump.
- h) Bring stationary seal & gland into position & bolt into the stuffing box.
- i) When seal assembly is complete, connect all the piping & check if necessary arrangements have been made environmental control.

EQUIPMENT START-UP

- a) Observe safety precautions.
- b) After installation, check the shaft for free movement. Manually rotate shaft several turns.
- c) Before start-up all auxiliary systems for seal protection & environmental control should be connected. These auxiliary systems can be flush, quench, barrier fluid system, convection tanks, abrasive separators heat exchange, cooling, heating etc. During start-up, first activate these systems then start the shaft drive.
- d) For liquids that solidify when exposed to atmosphere start heating / cooling prior to start-up.
- e) There should be no noise coming from the stuffing box.
- f) Excessive heat should not be generated. This can happen due to metallic contact. Stop the pump immediately & reassemble the pump.
- g) Observe & correct vibration & any other equipment abnormality.
- h) If anything appears abnormal, stop equipment & take corrective action.