

SCMS™

with Bearing SWB, DWB, DDB, DWBG, DDBG, DG,
DGO, DGG, DGOG

.....

Installation & Operating Manual



ENVIRONMENTAL TECHNOLOGY

Ex II 2 G D

Ex h Gb/Db





Mechanical Seals are Machinery Elements for ATEX 2014/34/EU & IECEx equipment. Documentation available on request.

Pre-Installation Checks

- (i) Check that shaft outside diameter is within tolerance of $\pm 0.002''$ ($\pm 0.05\text{mm}$) of seal size, particularly in the areas of the seal drive clamp and the sealing 'O' ring(s).
- ii) Check that the gearbox bearings (and motor if applicable) conform to the manufacturers recommended values for axial and radial clearance. Investigate and remedy any discrepancies before fitting the seal. There must be a minimum clearance of 0.5mm between stationary and rotating parts after allowing for any bearing clearance.
Maximum axial movement must not exceed $\pm 1\text{mm}$ (i.e. 1 mm either way from the installed position), for example if thrust reversal can cause the shaft to move upwards from the at-rest position.
- iii) Clean and dimensionally check the mating faces of the mounting flange. Using a dial gauge mounted on the shaft, check that the seal mounting surface is at right angles to the shaft axis to within the values shown in table 1, and that the shaft is central to the mounting flange to within 0.5mm. Where compressible or adjustable gaskets are used, the final seal alignment must be checked against the table. Where the seal has an integral bearing used as the lower shaft bearing, these checks can be performed by assembling the equipment without the seal, then allowing the shaft to 'hang' from the upper bearing.
- (iv) The seal shall be assembled to the shaft and vessel flange in accordance with the manufacturers specific instructions. The following points are of general importance.
- Check that there are no sharp edges over which the seal 'O' rings must pass.
 - Lubricate the shaft with the grease provided, except under the drive clamp.
 - Ensure no excessive forces are exerted whilst positioning the seal.
 - Assemble all equipment parts in final running position, prior to securing the mechanical seal.
 - Fix the seal into position applying uniform load to diametrically opposite bolts / studs - (see fig. 3).
 - Uniformly tighten the screws associated with the seal drive clamp (see fig. 3).
- Standard taper lock clamping arrangement**
Tightened to 17.7 Nm (13.1 Lbf.Ft) as per fig.3.
- For non standard shrink disc arrangement**
1. The contact surfaces between the shaft and the seal sleeve, in the area under the disc, must be grease free, dry and clean
 2. Contact area between shrink disc bore and sleeve Outside Diameter To be slightly greased or oiled.
 3. Hand tighten the screws of the shrink disc until the shrink disc sits free of clearance on the seal sleeve. Pay attention to the parallelism of the pressure rings
 4. During clamping check the distance at several points around the circumference to ensure pressure plates are moving uniformly
 5. For tightening torques see stamping on the shrink disc. Tighten bolts in order using following tightening cycles 25%, 50%, 75% & 100% of final torque. Once achieved perform a further 2-3 rounds with the same torque.
 6. Upon completion of the installation ensure the front 2 faces of the shrink disc are flush
- Disengage the setting clips - (see figs. 1 & 2).
 - If possible, rotate the shaft by hand by one complete revolution to check for any resistance to motion.
 - Connect the quench and drain to ports A & B. *
 - Ensure barrier fluid is present before start up, and the seal is primed, (free from trapped air).*
 - The incidental leakage port "C" should be connected with suitable pipe work, to safely collect and dispose of any barrier/buffer fluid leakage. (NOTE: For SWB version incidental leakage = process liquid / vapour)
- v) Pressurise seal support system, start pump (if fitted), and observe for leaks and correct operation. Refer to system specific installation instructions.

Squareness of equipment flange to shaft

For seals to DIN 28138 see DIN 28161 (Measurement C)

For seals not to DIN 28138

Seal nominal size (mm)	TIR Per 25mm (mm)	(1.000") of r (inches)
40	0.065	0.00250
50	0.048	0.00200
60	0.039	0.00150
80	0.049	0.00200
100	0.030	0.00120
125	0.028	0.00100
140	0.024	0.00095
160	0.022	0.00087
180	0.018	0.00071
200	0.017	0.00067
220	0.015	0.00059

Table 1

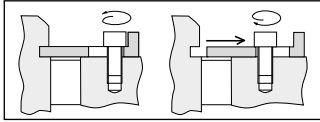
r = Distance to dial gauge measurement from centre line of shaft.

NOTE:

- 1) Ensure that the seal is firmly bolted to the vessel flange, with the shaft already in position before removing the setting clips.
- 2) Prior to full commissioning, run the equipment, with the seal full of sealant for a period of approximately one hour and check for excessive temperature, noise and vibration at the seal position. It is advised that the vessel has a sufficient level of liquid during running (check the manufactures recommended instructions).

Disengaging Setting Clips

Fig. 1



- Ensure the Setting Clips are disengaged prior to equipment start-up.
- Ensure the Setting Clips are engaged before removing the seal and transporting.

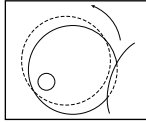


Fig. 2

Disassembly

- Stop operation.
- Release the pressure in the vessel.
- Release the sealant system pressure.
- Drain the sealant.
- Stop the cooling water circulation (where applicable).
- Disconnect the sealant pipes and where applicable, the cooling water pipes from the seal unit.
- Engage the clips.
- Disconnect the clamp device.
- The further disassembly of the vessel and drive has to be carried out in accordance with the instructions of the drive manufacturer.

Seal Maintenance

- Monitor the sealant pressure.
- Monitor the coolant water circulation (where applicable).

Seal Lubrication

- Self-aligning roller bearings are grease filled. Bearings must be lubricated through grease nipple 'G'. Bearings are factory greased, for re-greasing see table below.

Flange & Clamp Screw Tightening

Tighten the screws in the following sequence:

a,e → c,g → b,f → d,h

Repeat the sequence until secure.

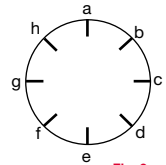


Fig. 3

Grease Data

SKF Length (mm)	SKF ID (mm)	SKF OD (mm)	From SKF Mass of Bearing (Kg)	Seal Type	SKF Bearing Reference	Grease Type		Re-greasing Schedule / 6 months (ml)
						Speed 1 – 99 (rpm)	Speed 100–500 (rpm)	
25	55	100	0.84	40mm SCMS	22211E	FM462 of SHC POLYREX 462	FM222	10
31	65	120	1.55	50mm SCMS	22213E	FM462 of SHC POLYREX 462	FM222	10
31	75	130	1.7	60mm SCMS	22215E	FM462 of SHC POLYREX 462	FM222	20
43	95	170	4.15	80mm SCMS	22219E	FM462 of SHC POLYREX 462	FM222	20
46	120	180	4.2	100mm SCMS	23024CC/W33	FM462 of SHC POLYREX 462	FM222	30
56	150	225	7.95	125mm SCMS	23030CC/W33	FM462 of SHC POLYREX 462	FM222	30
60	160	240	9.7	140mm SCMS	23032CC/W33	FM462 of SHC POLYREX 462	FM222	40
52	180	250	7.9	160mm SCMS	23936CC/W33	FM462 of SHC POLYREX 462	FM222	50
60	200	280	11.5	180mm SCMS	23940CC/W33	FM462 of SHC POLYREX 462	FM222	60
60	220	300	12	200mm SCMS	23944CC/W33	FM462 of SHC POLYREX 462	FM222	70
60	240	320	13	220mm SCMS	23948CC/W33	FM462 of SHC POLYREX 462	FM222	80

Initial grease volume = 50% of free volume in bearing. FM222, FM462 and SHC POLYREX 462 are FDA approved greases

The above should only be used as a guide, refer to bearing manufacturers recommendation for further information.

Thermosyphon Systems

These are widely used on applications with low heat removal requirements, and are extremely reliable if correctly installed. The following guidelines should be observed:

- The pot should be sited at a MIN 1 meter MAX 2 meter above the seal. No more than 1 meter from the side of the seal. See Fig. 4
- Seal return pipe must slope gradually from the seal to the pot. NO SAGS!
- Minimise number of fittings. No right-angled fittings.
- Minimum bend radius 100mm. NO KINKS!

For forced circulation systems refer to system IOM.

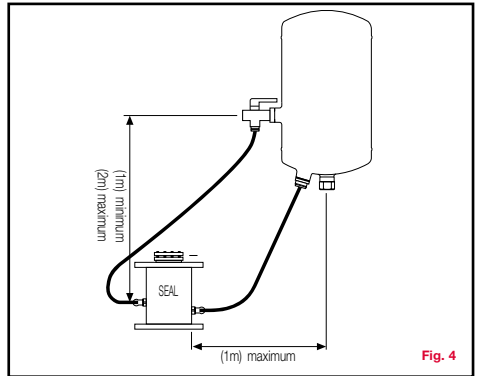


Fig. 4

NOTE:

Some loss of barrier fluid in normal operation is to be expected, typically up to 1 litre per week. The rate of loss is affected by service conditions, particularly radial shaft motion. A sudden loss of fluid, or an increasing rate of loss, indicates a problem with the process conditions, the equipment, the seal or its support system.

Dry-running seals

Check barrier gas pressure and flow daily.

NOTE: Some fluctuation in flow rates is normal; Nitrogen usage is affected by service conditions.

A sudden increase in flow rate, or a gradually increasing flow rate, indicates a problem with the process conditions, the equipment, the seal or its support system.

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