

SKF Grease Test Rig V2F

Test rig to assess mechanical stability of greases

LFG 220A



General description

Lubricating greases have to be mechanically stable. This means that when a bearing arrangement that contains grease is subject to vibrations, the grease must not soften to such an extent that the grease leaks out from the housing.

A good-quality grease will be resistant to mechanical forces such as this. In order to be able to recommend mechanically stable greases to its bearing customers, SKF has developed the SKF Grease Test Rig V2F.

Purpose of the test

Initially development of the SKF Grease Test Rig V2F was carried out to check greases for railway companies. This was to ensure that there was no leakage from the axle box when train wagons were subjected to regular shocks upon passing rail track joints. Leakage could occur because the grease in the vicinity of the bearing could fall into the bearing due to the regular vibrations. It would then work its way through the

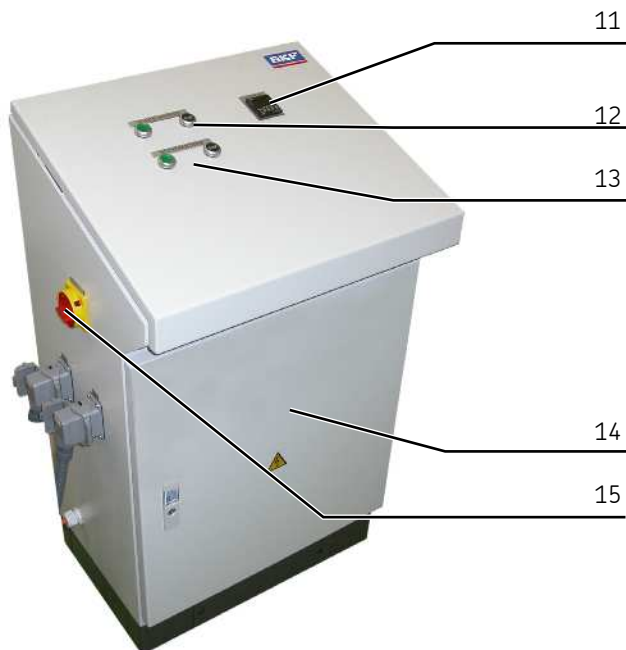
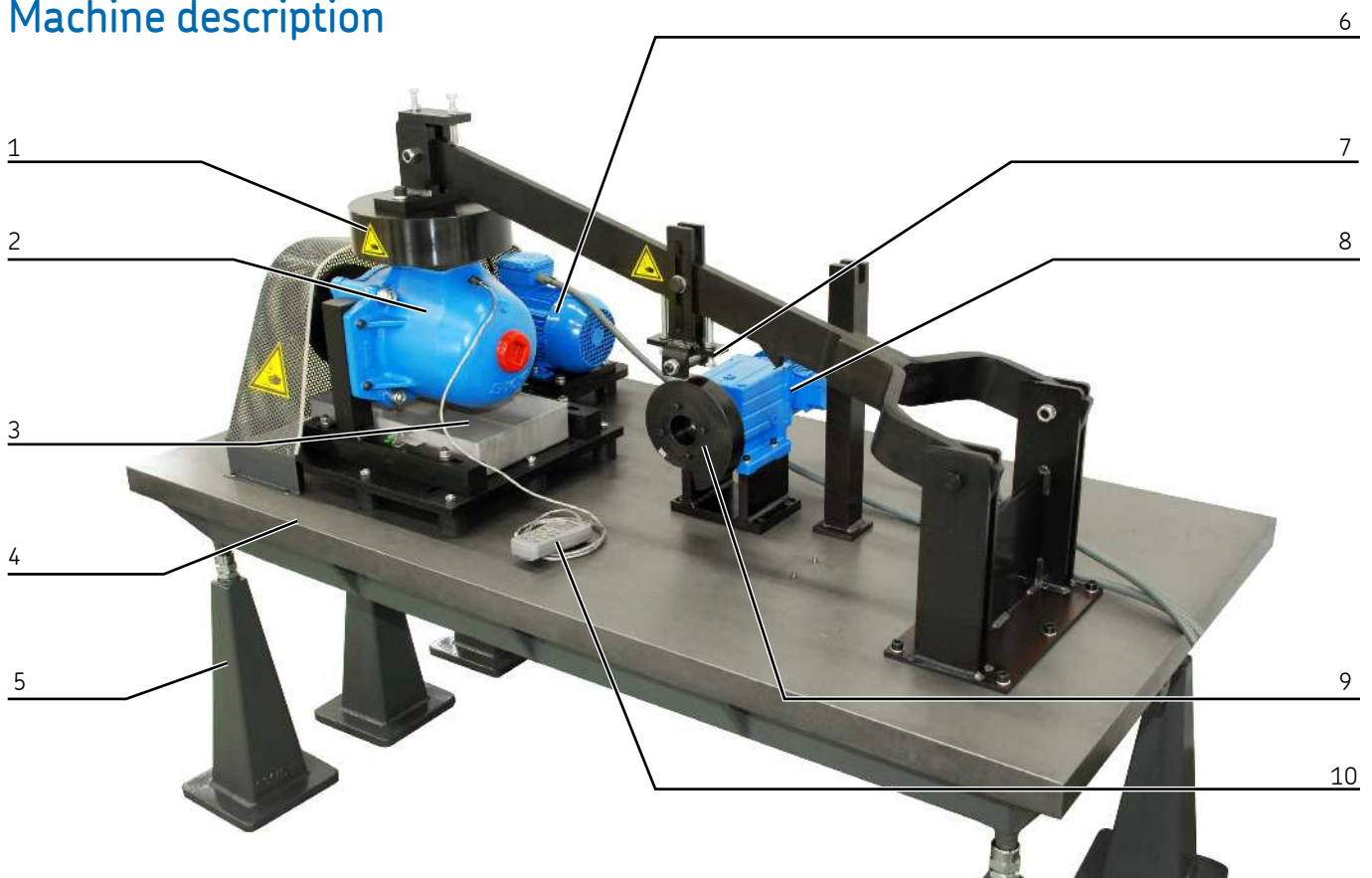
bearings and, in the case of non-mechanically stable greases, the thickener structure would break and consequently the grease would become liquid and run out from the housing.

This phenomenon is not only relevant for railway bearing greases, but for any machine or vehicle subject to vibrations, such as trucks, cars, vibrating sieves, crushers, etc.

The mechanical stability of grease can be measured by various means. It has been found that the severity of testing can be ranked in the following order: 100 000 stroke-worked penetration (ASTM D217), roll stability (ASTM D1831), and finally SKF V2F. Greases which pass the very stringent testing limits of the roll stability test have been found to fail the SKF V2F procedure, and these greases have recently be found to fail in service.



Machine description



- 1 50 kg hammer
- 2 SKF W4A railway axlebox with two spherical roller bearings 229750/C3
- 3 Tray to collect lubricating grease leakage
- 4 Cast iron foundation
- 5 Adjustable supporting legs
- 6 Electrical driving motor
- 7 Hammer height adjusting bolt
- 8 Electrical motor with gear for driving cam
- 9 Eccentric cam to lift the hammer
- 10 Digital thermometer
- 11 Timer for test time setting
- 12 Start stop button for spindle drive
- 13 Start stop button for cam drive
- 14 Electrical cabinet
- 15 Main switch

The SKF Grease Test Rig V2F consists of an SKF W4A railway axle box (2) with labyrinth seal a so-called UIC axle box, of which far more than 500 000 units are in service (UIC = Union International des Chemins de Fer). The box is fitted with two spherical roller bearings 229750/C3. The box is suspended in a frame and mounted via rubber shock

absorbers on a 1 000 kg cast-iron foundation (4), supported by five heavy, adjustable cast-iron legs (5). A 50 kg hammer (1) is mounted over the box and lifted by an eccentric cam (9). The bearings and hammer are each driven by an electric motor (6, 8).

Test method

The test grease is applied to the two bearings. The bearings are mounted on the shaft and the whole is put into the axle box, after which the complete machine is assembled. The test is started and for 72 hours the 50 kg hammer hits the axle box every second. The test rig is calibrated using normal accelerometer technology. During the first testing period of 72 hours the bearings run at 500 r/min (corresponding to a speed of 100 km/h). Depending on the results immediately after the first test a second test is run at 1 000 r/min.

Test procedure

After the rig has been disassembled, the bearings are cleaned and dried. The bearings are greased with a standard quantity of the test grease and mounted, after which the rest of the test grease is applied.

The test rig is assembled and runs for the first period and, if no more than 50 g leakage is found, is run for an additional second period. The temperature of the bearings should be recorded during the whole test run.

Test result

In order to receive a pass, the quantity of grease which leaks after the first test must be less than 50 g. The total after both tests must be less than 150 g.

After the test machine is disassembled, the grease from between the labyrinth is taken and analysed in terms of e.g. the change in consistency compared with the original sample.

Applicability to service conditions

The SKF Grease Test Rig V2F has a very close link to practice. The machine was developed after extensive measurements on railway axle boxes in use and constructed in such a way that the vibrations obtained in the machine are identical to the vibration found in the axle boxes mounted on railway wagons. This has allowed a large amount of practical testing to be avoided and many unnecessary, dangerous and expensive lubrication failures to be prevented.

The test results obtained from the SKF Grease Test Rig V2F have proven to be identical with the outcome of practical experience with greases used in vibrating screens, crushers, off-road vehicles, road construction equipment, rams, etc.

Test cost

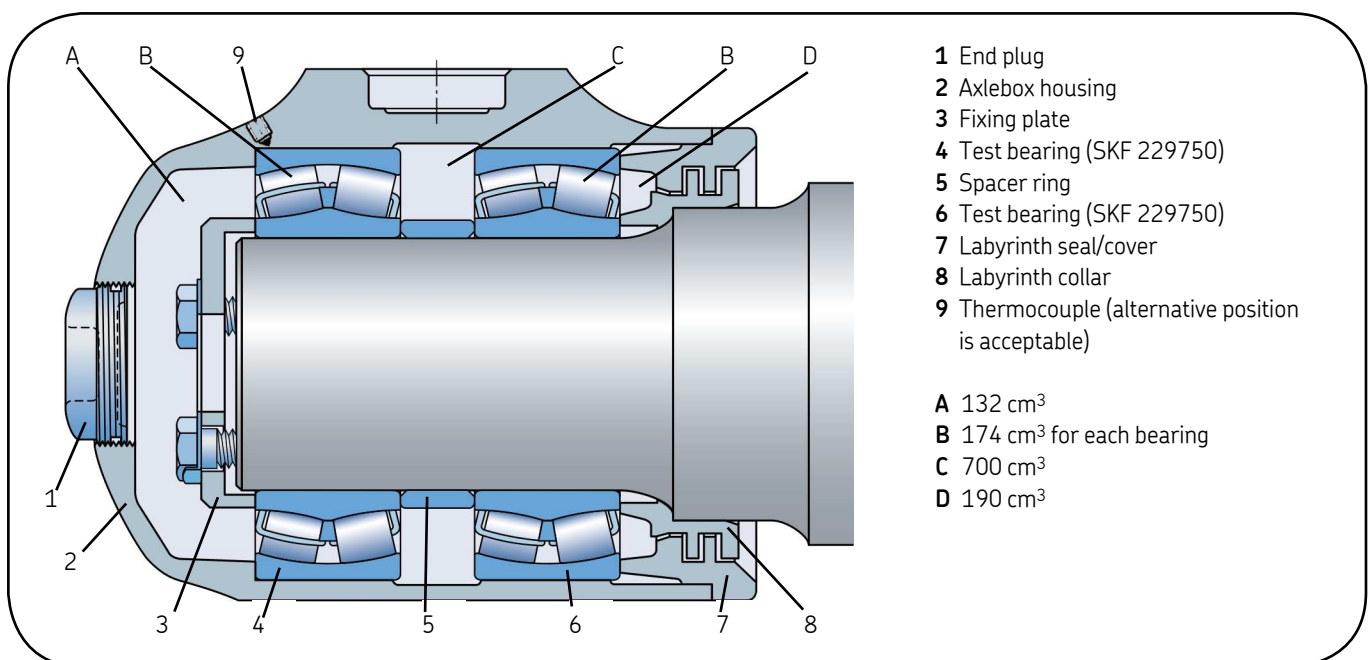
The two bearings 229750/C3 can be used many times and normally very seldom need replacement.

The assembling and disassembling of the machine can be done quickly and adequately provided the right tooling is used, which means that the labour cost is minimal.

Standardisation

The test is standardized in SS 3653, CEN/TC 256/SC2/WG12 (part of EN 12081) and EN 14865-2.

SKF W4A railway axlebox and grease filling volumes



Technical specifications

- Test bearing
Special spherical roller bearing (229750)
- Speed
500 r/min, 1 000 r/min
- Dimensions and weights
 - Dimensions (H W × D): 1 779 × 2 610 × 1 030 mm
(70.0 × 102.8 × 40.6 in.)
 - Weight: 1 550 kg (3 417 lbs)
- Requirements
 - Electrical system: See rating plate
3 × 400 V/50 Hz/2 kVA
3 × 480 V/60 Hz/2 kVA
- Noise level
 - Speed 1 000 r/min: Noise level 88 dBA

Technical specifications subject to change without notice.

For more information on your specific application, please contact our engineers at QT.

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