SKF Grease Test Rig R2F

Test rig to assess the mechanical stability of lubricating greases especially for bearings in railway applications

LFA 60D

General description

The SKF Grease Test Rig R2F can be simply described as a shaft, driven by an electric motor, and equipped with two test bearings in their respective housings. To simulate actual operating conditions, the bearings are run under load, the speed may be varied and heat can be applied. The test bearings are spherical roller bearings (SKF No. 22312 EWMA/C3P VQ420). They are manufactured with extra precision to ensure good repeatability. Standard running test procedures have been established but the user may adapt test conditions to suit his own particular requirements.

Test bearing put grease through its paces

In a spherical roller bearing there is both, sliding contact and rolling contact. If a grease is able to provide adequate lubrication for such bearings under the rather severe test conditions, this will be proved during the twenty-day test duration.

Purpose of the test

The purpose of the standard SKF R2F test is to assess the High Temperature Performance/ Lubricating Ability for a lubricating grease, simulating in particular the conditions in larger bearings in housing arrangements. The grease performance is evaluated by measuring the wear of the rollers and the cage. In this test significant wear will only occur as a consequence of the inability of the grease to maintain a lubricant film in the rolling and sliding contact during the full test period.

Machine description

1 Test bearing housings
2 Load application bearing housing
3 Weight
4 Base frame
5 Temperature probes
6 Siemens PLC
7 Electrical cabinet

Test method

The grease is tested in two run-in bearings under constant radial load of 8 340 N at a speed of 1 500 r/min for a period of 480 hours (20 days). During the first 24 hours no external heat is applied, during the remaining 19 days heat is applied to keep the bearing housings at a constant temperature, adjustable between 60 and 160 °C.

For every bearing a grease quantity of 180 g is used (50 g in the test bearings + 100 g in the housing and 30 g to regrease the bearing after the first 24 hours running).

Test procedure

The special SKF 22312 EWMA/C3P VQ420 test bearings can be used for up to four running tests, depending on the condition of the bearings. New test bearings need to be run in first according to a prescribed procedure. Before a test, each test bearing is cleaned and the cage, the set of rollers and the assembled bearing are weighed. Then the two test bearings are mounted on the shafts, greased and put in the housings together with an additional quantity of test grease. After 24 hours of testing under unheated conditions, the bearings are relubricated, the heating boxes are mounted and after setting of the test temperature the test is restarted. The test is then continued for a period 19 days, unless the bearing temperature starts to rise more than 3 °C above the pre-set test temperature, due to increased bearing friction.

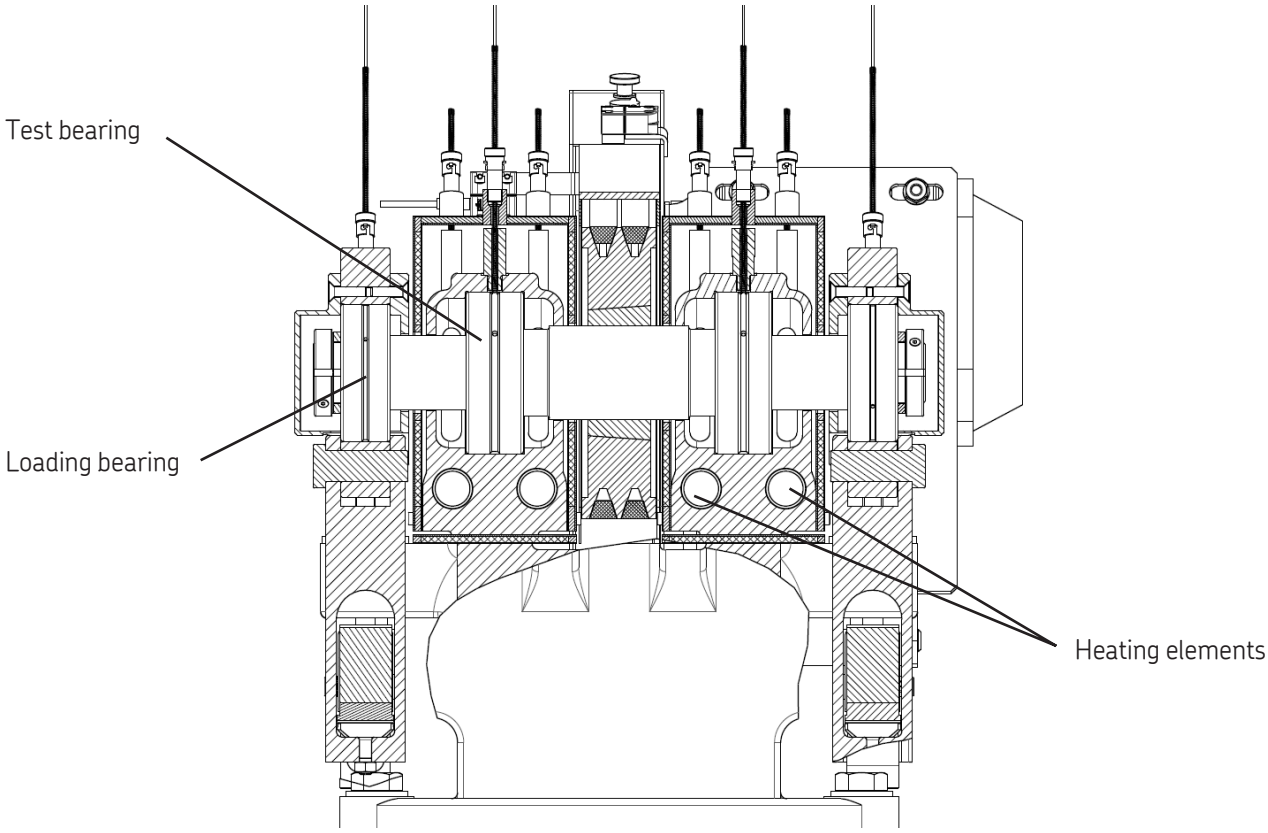
Test results

Following each running test the bearings and the test grease are inspected. The quantity of grease left in the housing is measured and the lubricant film on the rollers and raceways of the test bearings inspected first. The degree of oxidation, consistency and wear particle content of the grease taken from or adjacent to the bearings, can be determined. The bearings are then cleaned and the rollers and cage halves weighed to assess the wear.

A pass rating for the SKF R2F test is obtained, if the wear of both roller sets together is less than or equal to 25 mg and the cage wear is less than or equal to 100 mg.

After several running tests at varying temperatures it will be possible to determine the maximum permissible service temperature at which the grease can safely be used in a rolling bearing under similar conditions. This service temperature will then be defined as the high temperature performance limit of the test grease.

Sectional view



Versatility of the R2F – other test methods

The SKF Grease Test Rig R2F rig provides for great flexibility where choise of test conditions is concerned. For example, grease can be tested under lower temperature, the test speed may be altered and the radial load can be changed. And even other types of bearings can be used as test bearings.

Dry running can be obtained with some greases at lower temperatures. The ability of the grease to bleed sufficient oil to ensure adequate lubrication under lower temperature conditions can also be evaluated using the SKF R2F Grease testing machine. To establish lubrication ability at temperatures, the test can be run without applied heat, and, if wished, at other test speeds.

SKF has experience with unheated testing at 2 500 r/min.

Another standard practice at SKF is using the SKF R2F rig in a cold chamber, to establish the low temperature performance limit of greases. This is the lowest temperature where reliable lubrication still can be provided by the grease.

Accessories

The SKF R2F is supplied with the following equipment as standard: shaft, two test bearings and two V-belt pulleys.

Other equipment - tools for mounting and dismounting the test bearings, hydraulic pumps, workbench stands, etc. - may be ordered from SKF.

SKF also supplies regulating and control devices permitting a number of R2F rigs to be run as a batch and automatic paper recorders as well as equipment for temperature registration.

SKF Test methods are national standards

Only after comparing the results from a large number of tests run under identical conditions according to a specified method, it is possible to safely draw conclusions from such tests.

SKF has the experience and its qualified work in the field has arisen interest in many countries. The SKF R2F rig and the at that time made running tests A and B were standardized in Germany (DIN 51 806).

Technical specifications

- Mechanics
  - Motor: 2,2 kW
  - Heating elements: 4 × 500 W
  - Testing speed: 1 500 r/min, 2 500 r/min
  - Paint: SKF Product blue RAL 5015, SKF Product white RAL 9002, SKF Product grey RAL7024

- Electronics, touch panel
  - Type: Siemens TP1200 comfort
  - Operating system: Windows CE
  - Interface: 2 USB 2.0, 2 MMC slot
  - Network: 2 LAN
  - Monitor: 12,1" TFT display
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- Dimensions and weights
  - Dimensions (H × W × D): 1 065 × 1 460 × 880 mm *(41.9 × 57.5 × 34.7 in.)*
  - Weight: Approx. 580 kg *(1 279 lbs)*

- Requirements
  - Electrical system: See rating plate 3 × 400 V/50 Hz/14A

Technical specifications subject to change without notice.
For more information on your specific application, please contact our engineers at QT.

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PUB GTD/R2F EN · April 2016