REPORT ON THE PERFORMANCE OF XADO LUBRICANTS, 2008

Defective bearing 60314: XADO grease smoothed raceways and cut vibration

UK EPK JSC, technical service bureau of the EPK Trading House · approved by Executive Director S. A. Orlenko; performed by A. V. Ivanochkin, B. L. Kanevsky, S. B. Strakhov

Russia · 2008 · SP-150 rig · 55 cycles · 80 h of running time

PRODUCT

XADO 20K grease

"Restorative", XADO Concern

TEST OBJECT

Ball bearing 60314

removed from an electric motor with damaged working surfaces

DOCUMENT TYPE

Technical service report, UK EPK JSC, signed and stamped

OBJECT AND DUTY	CONDITION AT THE START OF TESTING	WHAT WAS MEASURED
Bearing 60314 removed from an electric motor	Working-surface damage acquired in service; washed and inspected before the tests	Vibration velocity, vibration acceleration, signal power, envelope spectrum modulation at 1800 rpm
Run-in with XADO 20K "Restorative" grease	55 cycles of 1–2 h at 900 rpm, load 600 N axial and 500 N radial, 80 h in total	Ra roughness and Wz waviness of the ring raceways after the bearing was disassembled

The inner-ring raceway defect was confirmed instrumentally before the run-in: envelope spectrum modulation at the 1st harmonic averaged about 18 %.

Key results

↓ 7.04×

Wz waviness of the outer ring raceway, 8.45 → 1.2 µm

↓ 1.8-2.2×

Ra roughness of the ring raceways, 0.1343-0.1474 → 0.0673-0.0745 µm

↓ 44 %

peak vibration acceleration of the bearing, 103 → 58 m/s²

Working-surface quality of the ring raceways after 80 h of run-in

RACEWAY PARAMETER	OUTSIDE ROLLING TRACK	ALONG ROLLING TRACK	REDUCTION
Ra roughness, inner ring	**0.1343 µm**	**0.0745 µm**	**1.80×**
Ra roughness, outer ring	**0.1474 µm**	**0.0673 µm**	**2.19×**
Wz waviness, inner ring	**1.40 µm**	**0.95 µm**	**1.47×**
Wz waviness, outer ring	**8.45 µm**	**1.2 µm**	**7.04×**

The baseline for comparison is the raceway surface outside the rolling track, taken by the report as the initial one. Instruments: Form Talysurf Intra (Ra) and Talyrond (Wz).

Vibration parameters over 80 h of run-in

PARAMETER	CONDITION	RESULT OVER 80 H
RMS vibration velocity, band 1800–10000 Hz	cold	reduced **2.25×** (by **7.0 dB**)
RMS vibration velocity, band 1800–10000 Hz	warmed up	reduced **1.44×** (by **3.2 dB**)
RMS vibration velocity, band 50–300 Hz	warmed up	reduced **1.75×** (by **4.9 dB**)
RMS vibration acceleration, 50–10000 Hz	cold	**25 → 15 m/s²**, **1.68×**
RMS vibration acceleration, 50–10000 Hz	warmed up	reduced **1.29×** (by **2.2 dB**)
Peak vibration acceleration, 50–10000 Hz	cold	**103 → 58 m/s²**, **1.83×**
Peak vibration acceleration, 50–10000 Hz	warmed up	reduced **1.35×** (by **2.6 dB**)
Signal power, 1/3-octave 10 kHz	cold	**77.9 → 73.4 dB**
Signal power, 1/3-octave 10 kHz	warmed up	**80 → 77.6 dB**
Envelope spectrum modulation, 1st harmonic — level of the inner-ring raceway defect	whole run-in	**18 % → 11-13 %**

Measured with an AGAT-M instrument on the SP-150 rig at 1800 rpm to GOST R 52545.1 and GOST 520; the change was determined from trend lines over 80 h of running time.

Report conclusion

The report of UK EPK JSC states: the results of the studies of vibration parameters and of the working-surface quality of the parts of a ball bearing that had been damaged in service “confirm the effectiveness of using XADO 20K “Restorative” grease to improve the operating characteristics of rolling bearings”. The inner-ring raceway defect had been confirmed instrumentally before the run-in — envelope spectrum modulation of about **18 %**; over **80 h** of operation it fell to **11-13 %**, which, in the wording of the report, “may indicate a reduction in the size of the defect on the inner ring”. The crest factor meanwhile held a stable value — the condition of the bearing was not deteriorating. Along the rolling track the ring raceways proved smoother than the untreated areas of the same parts, and vibration decreased throughout the test.

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The results refer to ball bearing 60314 with in-service damage, run in on the SP-150 rig at 900 rpm under a load of 600 N axial and 500 N radial; with other sizes, loads and duties the figures may differ. The original report of UK EPK JSC with signatures and stamp is published in full and available for download.