

Company Name

Street

City

Postcode

Country

Dear [Recipient name]

Re: JPS Reliability: Bearing Inspection Report

As requested, I have pleasure in presenting for your attention a Bearing Inspection report on the motor that was removed from service due to an audible noise.

Please contact JPS Reliability Limited for any machinery reliability issues or required health verification, we offer full technical/diagnostic back up which includes:

- Conventional vibration analysis
- Phase analysis
- Resonance testing
- Bearing / gear analysis
- Oil analysis
- On Site dynamic fan balancing
- Laser alignment
- Thermal imaging
- Ultrasonic air leak energy saving surveys
- Shaft Voltage Bearing discharge surveys

Executive Summary:

Failure of the non-drive end bearing NSK 6322

From inspection the failure mode as per ISO 15243:2004 is 5.4.3 Current Leakage Erosion. This type of bearing current problems are caused by the High Frequency components in the Variable Speed Drive PWM voltage.

This is the start of the failure mode and if left to run the grease would be further carbonised and lose its ability to form a lubricant film. This eventually leads to surface-initiated fatigue, spalling and even sudden seizure.

This type of defect can be diagnosed with vibration analysis in a very early stage of deterioration and monitored/managed to prolong the asset life. For a quantifiable level the shaft current voltage can be measured to determine the severity of the electrical discharge.

Background:

JPS Reliability LTD was commissioned by [NAME] of [COMPANY NAME] to conduct bearing inspection on the fan motor removed for audible noise.

Failure Mode:

From inspection the failure mode as per ISO 15243:2004 is 5.4.3 Current Leakage Erosion.

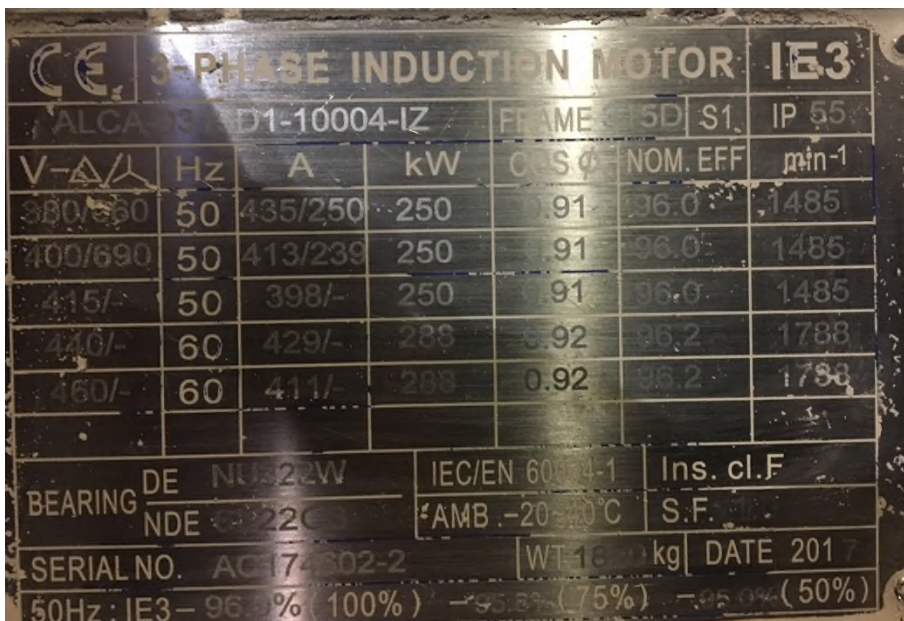
This type of bearing current problems are caused by the High Frequency components in the VSD PWM voltage. The ideal solution to affect the high frequency bearing currents are a proper cabling and earthing system breaking the bearing current loops and damping the high frequency common mode current.

Corrective actions for this can range from:

- Fitment of an insulated bearing at the NDE.
- Use of symmetrical multicore VFD motor cables. The earth connector arrangement in the motor cable must be symmetrical to avoid bearing currents at fundamental frequency. An earthing conductor surrounding all the phase leads or a cable that contains a symmetrical arrangement of three phase leads and three earth conductors achieves this.
- Ensuring a short impedance path. The best and easiest way to do this is to use shielded motor cables; the shield must be continuous and of good conducting material and the connections at both ends needs to be made with 360° termination.
- Adding high frequency bonding connections between the installation and known earthing reference points to equalise the potential of affected items, use braided flat straps of copper 50-100 mm wide.

Asset Identification:

Name Plate from the motor.



Serial No. AC174602-2.

Bearing Inspection Prior To Sectioning:

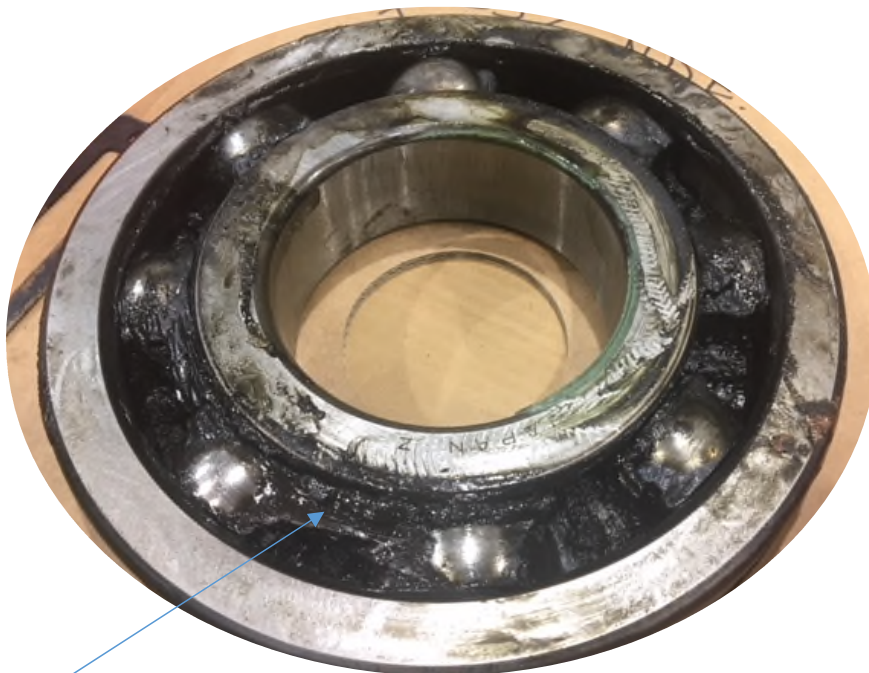
Motor Drive End Bearing

NSK NU322 uncleaned prior to sectioning.



Motor Non-Drive End Bearing

NSK 6322 uncleaned prior to sectioning.



Note: The grease visually looks burnt and black. Current leakage can be the cause of the burnt grease.

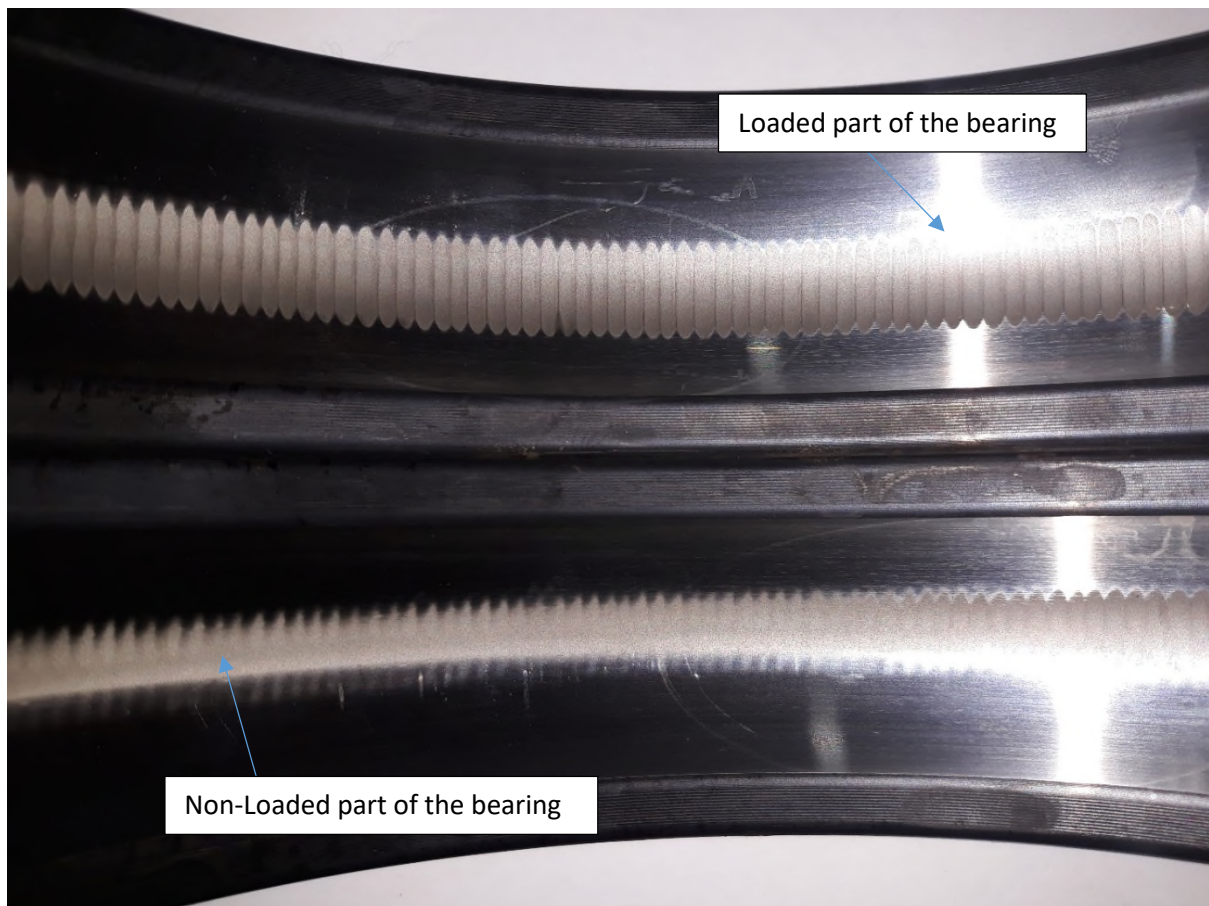
Bearing Inspection: After sectioning and cleaning

Motor Non- Drive End Bearing

NSK 6322 bearing sectioned showing ISO 15243:2004-5.4.3 Current Leakage Erosion.

Image 1 is the non-drive end sectioned and cleaned.

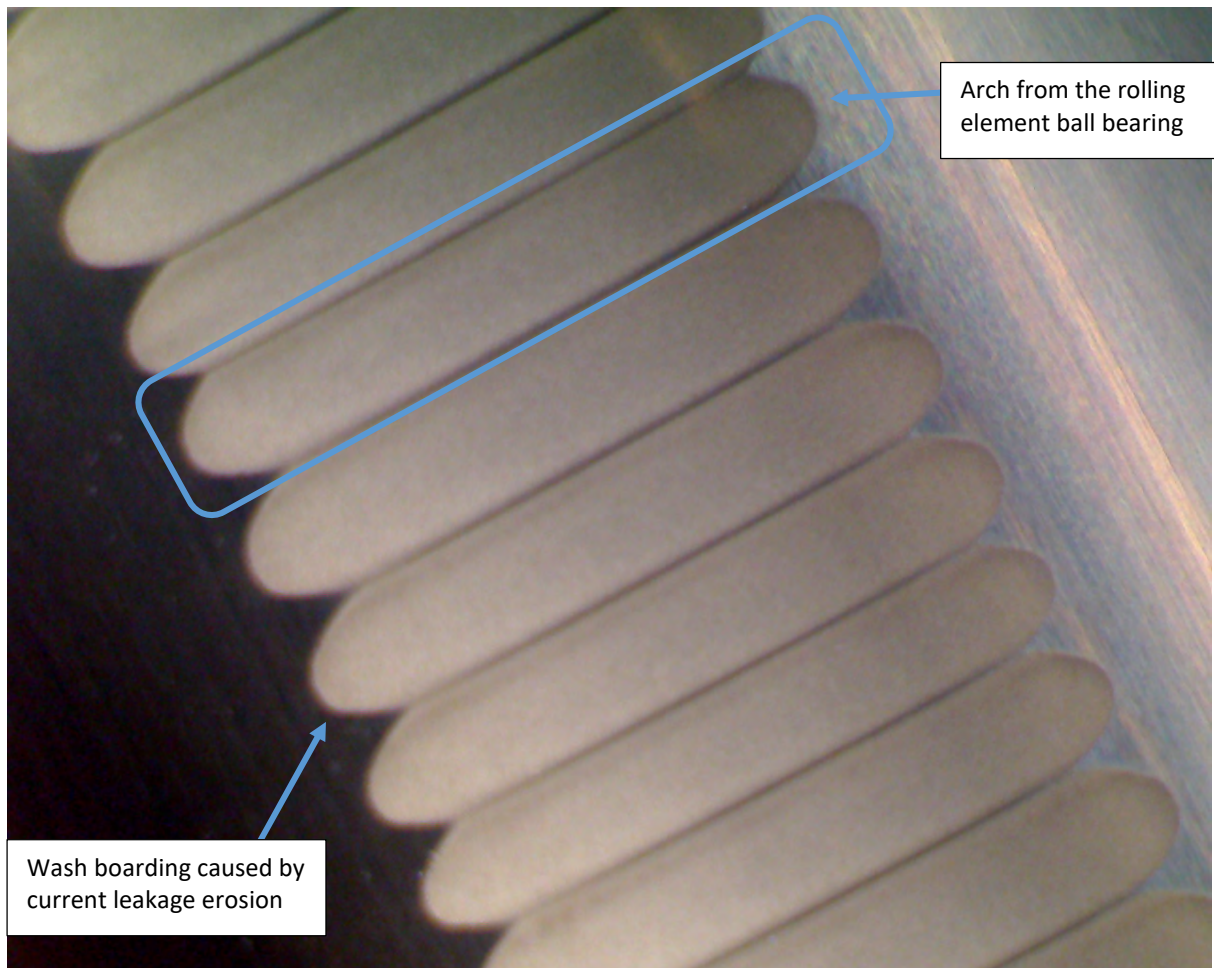
Image 1:



- The above image displays development of flutes on raceways parallel to rolling axis with dull, light to dark grey discolouration.
- This defect would have been the source of the reported audible noise.

Image 2 is the loaded section of the non-drive end bearing.

Image 2:



Additional:

In the interests of reliability and case history, we would appreciate feedback on work undertaken and the details of components used.

We trust that this will be acceptable to your requirements, however, should you require any additional information please contact the undersigned.

Kind Regards

Technician

Technician

Reliability Services



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