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GB/T 32333-2015

Rolling bearings - Measuring methods and specifications for vibration (acceleration)

滚动轴承 振动（加速度）测量方法及技术条件

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1 Scope

China's national standard for measuring the vibration acceleration of rolling bearings and for the acceleration specification of deep groove ball bearings. It specifies the measurement method, which applies broadly, and the technical requirements, which apply to deep groove ball bearings. The measurement method covers radial ball bearings with cylindrical bores and cylindrical outside surfaces - single row and double row deep groove ball bearings, self-aligning ball bearings and single row and double row angular contact ball bearings - together with spherical roller bearings and single row and double row tapered roller bearings and cylindrical roller bearings. That breadth is the point of it: one measurement method for the whole family, with the specification limits set for the one type made in the greatest quantity. It is the companion to GB/T 32325, which measures the same phenomenon as velocity, and the difference between the two is a difference of emphasis rather than of subject. A vibration signal from a bearing contains components from a few hundred hertz to tens of kilohertz; expressing it as velocity weights the low frequencies and so responds to raceway waviness and geometric error, while expressing it as acceleration weights the high frequencies and so responds to surface finish, to small local defects and to

contamination. Acceleration is therefore the more sensitive measure of the things that make a bearing fail rather than merely sound rough - a spall starting, a particle rolling in the raceway, a burr from handling - which is why the same measurement principle underlies the condition monitoring of bearings in service. Issued on 31 December 2015 and in force since 1 April 2016.

This standard specifies the vibration (acceleration) measurement method of rolling bearings (hereinafter referred to as bearings) and the vibration (acceleration) technology of deep groove ball bearings. Technical conditions. The measurement methods specified in this standard are applicable to radial ball bearings with cylindrical bores and cylindrical outer surfaces (single row and double row deep groove ball bearings, adjustable Center ball bearings and single row and double row angular contact ball bearings), spherical roller bearings, single row and double row tapered roller bearings and single row and double row round Cylindrical roller bearing vibration (acceleration) measurement. See Appendix A for the technical conditions of vibration (acceleration) of deep groove ball bearings.

2 Centripetal ball with cylindrical hole and cylindrical outer surface Bearing

GB/T 24610.3-2009 Rolling bearing vibration measurement method Part

3.Spherical roller with cylindrical bore and cylindrical outer surface Sub-bearings and tapered roller bearings

GB/T 24610.4-2009 Rolling bearing vibration measurement method Part

4.Cylindrical roller with cylindrical bore and cylindrical outer surface Sub-bearing

JB/T 2974 Supplementary Regulations for Rolling Bearing Code Method SH0004 solvent oil for rubber industry

3 Terms and definitions

The following terms and definitions apply to this document.

4 Requirements for measuring instruments

4.1 Mechanical device The mechanical device includes a driving device that makes the main shaft rotate at a certain speed, a spindle with bearings, and an axial load and radial load loading mechanism And acceleration sensor system, etc.

4.1.1 Drive 10dB. The measurement method is in accordance with Appendix B.

4.1.1.2 According to the different structural types and sizes of the bearing, the set value of the spindle speed is shown in Table 1. After negotiation between the manufacturer and the user, other speeds and deviations can also be used. Refer to GB/T 24610.2-2009, GB/T

24610.3- 2009 and the provisions of

4.1 in GB/T 24610.4-2009.

4.1.2 Mandrel

4.1.2.1 The hardness of the mandrel is not less than 58HRC. Refer to Table 2 for the tolerance of the outer diameter of the mating part of the spindle and the inner hole of the bearing.

4.1.2.2 After the mandrel and the main shaft are combined, the radial and axial circular runout shall not be greater than 5μm. The measurement method is in accordance with Appendix C.

4.1.3 Axial load and radial load loading mechanism

4.1.3.1 In addition to being able to apply a large enough load to the outer ring of the bearing to limit the rotation of the outer ring, the loading mechanism should also make the outer ring in all directions

--- Radial, axial, angular or flexural (depending on the bearing type) vibration is essentially free, that is, the outer ring vibration is not affected by the loading mechanism The disturbance is only caused by the operation of the bearing.

4.1.3.2 The size of the axial load and radial load imposed on the outer ring of the bearing is specified in 6.2.

4.1.3.3 The direction of the bearing axial load should coincide with the axis of rotation of the bearing inner ring, and its deviation should not exceed GB/T 24610.2-2009 and The range specified in Figure 1 and Table 3 in GB/T 24610.3-2009.The measurement method is in accordance with GB/T 24610.2-2009 and The provisions of Appendix A in GB/T 24610.3-2009.

4.1.3.4 The radial load of the bearing should be applied to the middle of the width of the outer ring, and the direction should be coincident with the center line perpendicular to the axis of rotation of the main shaft. It should not exceed the range specified in Figure 1 and Table 3 in GB/T 24610.4-2009.The measurement method is in accordance with GB/T 24610.4-2009 attached Record A's regulations.

4.1.3.5 For single-row and double-row cylindrical roller bearings that can withstand axial loads, the loading position and direction of the axial load should be the same as those in the bearing. The axis of rotation of the ring is consistent, and the deviation should not exceed the range specified in Figure 2 and Table 4 in GB/T 24610.4-2009.

4.1.4 Acceleration sensor system

4.1.4.1 The structure of the acceleration sensor system is shown in Figure

1.The total mass of the vibration transmission rod and the acceleration sensor should be 50g±5g, and the vibration transmission The diameter of the probe at the front end of the rod should be within the range of 3.5mm<=phi<=4.5mm.

4.1.4.2 The maximum allowable axial position deviation and angular deviation of the vibration transmission rod of the acceleration sensor system and the radial axis are in accordance with GB/T 24610.2- 2009, GB/T 24610.3-2009 and GB/T 24610.4-2009 in the range specified in 6.3.4.

4.1.4.3 The contact load between the vibration transmission rod of the acceleration sensor system and the outer cylindrical surface of the bearing. the contact load of the bearing with an outer diameter D<=25mm It is 1.0N~5.0N; the contact load of bearings with outer diameter D >25mm is 5.0N~10.0N.

4.2 Electronic measuring instruments

4.2.1 When using a piezoelectric acceleration sensor, the resonance frequency of the piezoelectric acceleration sensor used should be greater than 20kHz.

4.2.2 Within the measured bearing vibration acceleration level range, the amplitude linear error of the acceleration sensor should be less than 5%.

4.2.3 The installation resonance frequency of the acceleration sensor system should be greater than.2000 Hz.

4.2.4 In the frequency range of 50Hz~10000Hz, the following characteristics of the acceleration sensor system should be good, and the amplitude linearity error should be small Less than 5%.

4.2.5 The dynamic range of electronic measuring instruments should not be less than 60dB.

4.2.6 In the dynamic range of the electronic measuring instrument, the noise floor should not be greater than 5dB.

4.2.7 Within the measurement range of the electronic measuring instrument, the amplitude linearity error of the instrument should be less than 5%.

4.2.8 The passband of the electronic measuring instrument is 50Hz~10000Hz. For different types of bearings, low frequency (L) and intermediate frequency can be used (M) and high frequency (H) three frequency bands are measured, and the frequency range is according to GB/T 24610.2-2009, GB/T 24610.3-2009 and GB/T 24610.4-2009 stipulates 5.2.You can also choose to use spectrum analysis to analyze the vibration signal.

4.2.9 In the frequency range of 50Hz~10000Hz, the linear error of the integrated amplitude of the electronic measuring instrument and the acceleration sensor system should be small Less than 10%.