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GB/T 4661-2015

Replacing GB/T 4661-2002

Rolling Bearings – Cylindrical Rollers

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard replaced GB/T 4661-2002 Rolling Bearings – Cylindrical Rollers; Compared with GB/T 4661-2002, this Standard has the major technical changes as follows:

--- Added and modified part of terms and definitions (see Chapter 3 of this Edition; Chapter 2 of 2002 Edition);

--- Took “symbol” as an independent chapter, and added relevant symbols (see Chapter 4 of this Edition; Chapter 3 of 2002 Edition);

--- Increased and modified the dimension specifications of rollers (see Chapter 5 of this Edition; Chapter 4 of 2002 Edition);

--- Modified the roller grade and diameter tolerance (see Chapter 6 of this Edition; Chapter 5 of 2002 Edition);

--- Modified the roller technical requirements (see Chapter 6 and 7 of this Edition; Chapter 5 of 2002 Edition);

--- Modified roller marks etc. (See Chapter 8 of this Edition; Chapter 9 of 2002 Edition);

--- Added roller diameter gauge value and classification rules (see Appendix A);

--- Added roller length gauge value and classification rules (see Appendix B).

This Standard was proposed by China Machinery Industry Federation.

This Standard shall be under the jurisdiction of National Technical Committee for Standardization of Rolling Bearings (SAC/TC 98).

Drafting organizations of this Standard: Luoyang Bearing Research Institute Co., Ltd., Suzhou Bearing Factory Co., Ltd., Changzhou Guangyang Bearing Co., Ltd., Jiangsu Lixing General Steel Ball Co., Ltd., and Shandong KMR Science & Technology Co., Ltd.

Chief drafting staffs of this Standard: Guo Baoxia, Zhang Xiaoling, Lian Weifeng, Sha Xiaojian, Yan Jingxiang, Sun Dianxun, and Feng Bing.

The historical editions replaced by this Standard are as follows:

--- GB 4661-1984, GB/T 4661-1989, GB/T 4661-2002.

Rolling Bearings – Cylindrical Rollers

1 Scope

This Standard specifies the dimensions, technical requirements, inspection and measurement methods, inspection rules, marks, package and storage for finished product of steel cylindrical rollers used by rolling bearings.

This Standard is applicable to the steel cylindrical rollers (hereinafter referred to as roller) for the supporting and commercializing usage of the rolling bearings.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 4199-2003 Rolling Bearings - Tolerances - Definitions

GB/T 6930-2002 Rolling Bearings - Vocabulary

GB/T 7235 Geometrical Product Specifications(GPS) - Methods for the Assessment of Departure from Roundness - Measurement of Variations in Radius

GB/T 7811 Rolling Bearings – Symbols for Quantities

GB/T 8597 Rolling Bearings – Rust Roof Packaging

GB/T 18254 High-Carbon Chromium Bearing Steel

GB/T 18579 High-Carbon Chromium Bearing Steel Wires

GB/T 24608 Inspection Rules for Rolling Bearings and Commercial Parts

GB/T 24632.1 Geometrical Product Specifications (GPS) – Roundness - Part 1: Vocabulary and Parameters

JB/T 1255 Rolling Bearings - Parts Made from High-Carbon Chromium Bearing Steels - Specifications for Heat Treatment

JB/T 6641 Rolling Bearings – Residual Magnetism and its Assessment Method

JB/T 7051 Rolling Bearing Parts – Methods for the Measurement and Assessment

3.7 Chamfer dimension (r)

The chamfer dimension value as the benchmark.

3.8 Single chamfer dimension (r_s)

In the single radial plane, the <radial> distance between imaginary sharp corner of the roller and the intersecting point of chamfer surface and roller end face.

In the single radial plane, the <axial> distance between imaginary sharp corner of the roller and the intersecting point of chamfer surface and roller outer surface.

NOTE: according to GB/T 4199-2003, define 5.4.2, and modify.

3.9 Smallest single chamfer dimension ($r_{s\ min}$)

The allowable smallest radial and axial single chamfer dimension of roller.

NOTE: according to GB/T 4199-2003, define 5.4.3, and modify.

3.10 Largest single chamfer dimension ($r_{s\ max}$)

The allowable largest radial and axial largest chamfer dimension of roller.

NOTE: according to GB/T 4199-2003, define 5.4.4, and modify.

3.11 Axial runout of roller end face with respect to the roller axis (S_{Dw})

In certain radial distance away from the roller axis, the difference between the maximum and minimum axial distance of the roller end face.

3.12 Deviation from circular form of roller outside diameter surface (Δ_{Rw})

The radial distance between the minimum circumscribed circle and maximum inscribed circle, generally, the center of the circle is one of least square circle.

3.13 Surface roughness

The surface roughness with relatively smaller interval, which generally includes the roughness influencing by the applied processing method and (or) other factors.

NOTE: these roughness is generally considered within the scope of the conventional definition, such as the sampling length range.

3.14 Roller diameter gauge

the dispersion between the average diameter of roller diameter gauge lot and nominal diameter of roller; such dispersion is a quantity within a set of series.

In the same roller length gauge lot, the difference between the maximum and minimum average length of rollers.

3.24 Roller grade (*G*)

Roller groups divided by size, shape, surface roughness and classification tolerance.

[GB/T 6930-2002, define 05.05.10]

3.25 Hardness

The specific test method is used to determine the magnanimity to resist the pressure, such as Rockwell Hardness Method.

3.26 Roller outside diameter surface

When rotating around the roller axis, the surface formed by the effective roller length.

NOTE: effective roller length L_a=L_w-2r.

4 Symbols

The following symbols and the ones stipulated in GB/T 7811 are applicable to this document.

Unless otherwise is specified, the symbols shown in Figure 1 (except for the tolerance symbol) and the values shown in Table 1 are the nominal dimensions.

D_w: roller diameter;

D_{wmL}: mean diameter of roller diameter gauge lot;

G: roller grade;

I_{GDw}: interval of roller diameter gauge;

I_{GLw}: interval of roller length gauge;

L_a: roller effective length, L_a=L_w-2r;

L_w: roller length;

L_{wmL}: mean length of roller length gauge lot;

r: chamfer dimension;

r_s: single chamfer dimension;

The plain lines on the roller surface shall conduct crown modification; its convexity and crown values shall be determined by the product drawing.

6.5 Residual magnetism

The residual magnetism limit of roller shall conform to the provisions of JB/T 6641.

6.6 Appearance quality

The roller surface shall be free from cracks and rust. The working surface shall be free from the following visible defects, such as casting skin, pocking mark, scratches etc.; after acid cleaning, there shall be no burns or soft spots.

6.7 Roller gauge and classification rules

The roller diameter gauge and classification rules can refer to Appendix A; while the roller length gauge and classification rules can refer to Appendix B.

6.8 Others

For the rollers with special requirements, they shall be determined by the negotiation between the user and manufacturer.

7 Inspection and Measurement Methods

7.1 The roller diameter and diameter variation shall be measured in the middle of the roller by two-point method.

7.2 The measurement of deviation from circular form of roller can refer to the provisions of Appendix C.

7.3 The measurement of roller length and length variation shall be performed by placing the measured roller between instrument probe and the plane perpendicular to the measured axis or by the two-point method.

7.4 The measurement of axial runout of roller end face with respect to the roller axis: place the roller onto the V-block as shown in Figure 2a); rotate the roller for one turn, the maximum difference shown by the tester. For the roller with section having recess or large diameter, the method shown in Figure 2b) can be taken, rotate the roller for one turn, then take half of the maximum difference shown by the tester.

Both end surfaces of the roller shall be measured.

b) Roller nominal dimension: diameter × length, unit is mm not marking.

c) Roller tolerance grade: marked by G1, G1A, G2, G2A, G3, G5; thereof G5 is not marked.

d) Roller diameter gauge, roller length gauge, unit is μm not marking.

e) Roller conforming standard number, and supplemented technical condition codes.

Example 1: cylindrical roller 5×8 G2 -2/-6 GB/T 4661-2015

It indicates the cylindrical roller conforming to GB/T 4661-2015; its nominal diameter 5mm, nominal length 8mm, tolerance grade G2, roller diameter gauge -2μm, roller length gauge -6μm, roller actual average diameter is in the range of 4.997mm~4.999mm, roller actual length is in the range of 7.989mm~7.999mm.

Example 2: cylindrical roller 20×30 G3 +3/-10 GB/T 4661-2015

It indicates cylindrical roller conforming to GB/T 4661-2015; its nominal diameter 20mm, nominal length 30mm, tolerance grade G3, roller diameter gauge +3μm, roller length gauge -10μm, roller actual average diameter is in the range of 20.0015mm~20.0045mm, roller actual length is in the range of 29.9825mm~29.9975mm.

9.2 Marking method

Mark the roller order, certificate, packaging material, and other places need marks according to the contents and sequence of 9.1; one white space shall be retained among the items.

10 Package and Storage

10.1 Roller shall be performed rust resistance and package according to the provisions of GB/T 8597. When packaging, the rollers with different dimensions, different tolerance grades, and different gauges shall be packaged into different containers (boxes), not mixed.

10.2 The roller mark, material, quantity (or mass), manufacturer name or trademark, batch number, and packaging date shall be indicated outside the packaging container (box) of the roller.

10.3 After the rust-proof package, and in the condition of conforming to the transportation and warehouse custody stipulated in GB/T 8597, the rollers shall be ensured without rust within 12 months since the date of leaving the factory.

Appendix C

(Informative)

Evaluation Method on Deviation from

Circular Form of Roller Outside Diameter Surface

C.1 The measurement of deviation from circular form of roller outside diameter surface shall be finished through measuring deviation from circular form on several radial planes.

C.2 Use the calculation result obtained from the centre of least square circle conforming to the provisions of GB/T 24632.1 to estimate the deviation from circular form in the single radial plane. Assuming the deviation from circular form of roller outside diameter surface is the maximum deviation from circular form in any radial plane.

C.3 The detailed instructions of evaluation method on deviation from circular form can refer to GB/T 7235. If different evaluation method is used, it shall be determined through the negotiation between the user and manufacturer.

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