SLOVENSKI STANDARD
SIST EN 2130:2004

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Aerospace series - Bearings, precision ball in corrosion resisting steel for instruments and equipment - Technical specification

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Luft- und Raumfahrt - Präzisionskugellager aus korrosionsbeständigem Stahl für Instrumente und Geräte - Technische Lieferbedingungen

Série aérospatiale - Roulements à billes de précision en acier résistant a la corrosion pour instruments et équipements - Spécification technique

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This European Standard was approved by CEN on 15 January 2001.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After inquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of AECMA, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2002, and conflicting national standards shall be withdrawn at the latest by April 2002.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This standard specifies the required characteristics, inspection and test methods, qualification and acceptance conditions for precision ball bearings, in corrosion resisting steel, with a nominal bore diameter ≤ 8 mm, used for aerospace instruments and equipment.

It is applicable whenever referenced.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies (including amendments).

ISO 1132-1	Rolling bearings – Tolerances – Part 1: Terms and definitions
ISO 2859-1	Sampling procedures for inspection by attributes – Part 1 : Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection
ISO 3290	Rolling bearings – Balls – Dimensions and tolerances
EN 2079	Aerospace series – Bearings, precision ball, with flange in corrosion resisting steel, for instruments and equipment – Dimensions and loads
EN 3042	Aerospace series – Quality assurance – EN aerospace products – Qualification procedure
EN 3446	Aerospace series – Bearings, precision ball without flange in corrosion resisting steel, for instruments and equipment – Dimensions and loads
EN 10204	Metallic products – Types of inspection documents

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1 Precision ball bearing

3.1.1 Shielded rolling bearing

A bearing whose rolling elements and raceways are protected with shields attached to one of the rings and separated from the other by a small space.

3.1.2 Sealed rolling bearing

A bearing whose rolling elements and raceways are completely enclosed by seals attached to the outer ring and rubbing on the other.

3.2 Torques

3.2.1 Starting torque

Maximum torque required to start the rotation of one ring, with the other ring held stationary.

3.2.2 Average torque

Arithmetical average of torque values recorded during the test cycle.

3.2.3 Test load

During the test, it is the specified axial load applied in the bearing rotational axis.

3.3 Load ratings

3.3.1 Basic dynamic radial load rating

That constant stationary radial load which a rolling bearing can theoretically endure for a basic rating life of 1 000 000 revolutions.

3.3.2 Basic static radial load rating

That static radial load which corresponds by calculation to a stress of 4 200 MPa at the most heavily stressed rolling element/raceway contact centre.

3.4 Delivery batch

This consists of bearings with the same identity block, which may come from different production batches.

3.5 Dimensional and geometrical parameters

According to ISO 1132-1

4 Required characteristics, inspection and test methods

See table 1

Table 1

Clause	Characteristics	Requirements	Inspection and test methods	Q [a]	A [b]
4.1	Materials	In accordance with the product standards or design documentation	Chemical analysis or certificate 3.1 according to EN 10204, issued by semi-finished product manufacturer.	X	X
4.2	Dimensions	In accordance with the product standards or design documentation	The measurements shall be carried out at a temperature between 20 °C and 25 °C, with a relative humidity less than 55 %. Bearings shall be placed in this atmosphere at least 1 h before the beginning of measurements. On bearings with shields or seals, the measurement of the external diameter shall be done after shields or seals have been fitted.	X	X
4.3	Masses	In accordance with the product standards or design documentation	Suitable methods	X	
4.4	Marking	In accordance with the product standards or design documentation It shall be legible and shall not adversely affect the material or the functioning of the bearing. Bearings may have no marking. In this event all the marking information shall be marked on the packaging.	Visual examination	X	X
4.5	Hardness	In accordance with the product standards or design documentation	Suitable processes and measuring instruments	X	X
4.6	Surface roughness	In accordance with the product standards or design documentation	Suitable measuring instruments or visual-tactile samples [c]	X	X
4.7	Balls	In accordance with the grade 5 requirements of ISO 3290	According to ISO 3290	X	

(continued)

Table 1 (continued)

Clause	Characteristics	Requirements	Inspection and test methods	Q [a]	A [b]
4.8	Lubrication	Lubricant shall conform with annex A.	Certificate of compliance issued by lubricant manufacturer	X	
4.9	Seals (for sealed bearings) and shields (for shielded bearings).				
4.9.1	Retention	Shields may or may not be removable. Their installation on the outer ring shall not affect its limiting dimensions. When shields and seals are submitted to normal loading and functioning conditions: – They shall not protrude beyond lateral faces of the rings; – They shall not be in contact with the cage or the balls; – They shall remain fastened at the outer ring.	Visual examination	X	X
4.9.2	Sealing	Seals shall: – rub on the inner ring and retain the lubricant; – prevent the intro-duction of foreign par-ticles.	Visual examination	X	X

(continued)

Table 1 (continued)

Clause	Characteristics	Requirements	Inspection and test methods	Q [a]	A [b]
4.10	Magnetism	After demagnetization, residual magnetism shall not exceed 200 μT, whatever the angular position of the outer ring in relation to the inner ring. Due to the influence of handling, transport and storage this value is only guaranteed at the time of shipment by the manufacturer.	Suitable control method in the manufacturer's factory	X	
4.11	Running accuracy: – radial: K_{ia}, K_{ea} – axial : S_{ia}, S_{ea}	In accordance with the product standards or design documentation	Suitable control method	X	X
4.12	Radial internal clearance	In accordance with the product standards or design documentation The recorded value shall be in relation to the value given by a bearing with known radial play which is defined by the measurement of its separated components.	Applied gauge pressure shall be the minimum required to ensure a metal-to-metal contact, but shall not produce a significant elastical deformation of the bearing. Radial internal clearance shall be measured in three different angular positions around the bearing. It shall be done in the radial plane of outer ring with the inner ring held stationary. The highest value of the three measurements shall be recorded.	X	X
4.13	Starting torque	According to table 2. These values are achievable only under the lubrication conditions described in the column "inspection and test methods" and do not apply to sealed bearings.	**Preliminary test conditions:** Bearings shall be cleaned, then lubricated with a synthetic lubricant conforming to annex A. Lubricant quantity shall be as specified in table 3. If applicable, shields shall be mounted on the bearings. Rotate the bearings slowly before the test to distribute the lubricant.	X	X

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