

KS

KOREAN INDUSTRIAL STANDARD

Double-row rod end ball bearing for aircraft

KS W 1925 : 2000

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Double-row rod end ball bearing for aircraft

1. Scope This standard defines double-row rod end ball bearing that used in the control system device of aircraft.

Note 1. This specification covers rod end ball bearings with application in temperature ranges $-54\sim 121^{\circ}\text{C}$ and -54°C to 149°C with 20% reduction of the predicted performance.

2. Unit and dimension in parenthesis in this standard are that use through consultation as things by unit hitherto.

2. Application specification The following specification composes a fraction of regulation of this standard by being quoted in this standard. The latest thing is applied to this quotation standard.

KS B 0806	Rockwell hardness test method
AMS 2417	Plating, Zinc-Nickel Alloy
ANSI B46.1	Surface Texture
ISO 12103-1	Road vehicles-Test dust for filter evaluation-Part 1 : Arizona test dust
MIL-B-6039E	Bearings, ball, rod end, double row, self-aligning
MIL-S-8879	General specification for controlled radius root with increased minor diameter screw threads
MIL-STD-1949	Inspection, magnetic particle

3. Classification Rod end ball bearing is classified according to the shape of shank and the screw sticking availability and shall be in accordance with table 1.

Table 1 Type

Type	Classification	Shape of shank	Remarks
Type 1	Solid shank	Solid shank	Appendage 1
Type 2	Solid shank with external thread	Processing a male screw on solid shank	Appendage 2
Type 3	Hollow shank	Hollow shank	Appendage 3
Type 4	Hollow shank with internal thread	Processing a female screw on hollow shank	Appendage 4

4. Shape or Dimensions The Shape and Dimensions of rod end ball bearing shall be in accordance with Appendages 1~4. The dimensions of Appendage is that after plating.

5. Structure

- The outer ring shall be of single-piece construction with the rod end shank. The inner ring shall be of a single-piece construction.
- Threads shall conform to UNJF-3A and UNJF-3B in accordance with MIL-S-8879 External threads shall be fully formed by a single rolling process after heat treatment. Internal threads may be machined.
- The point representing the center of self-alignment motion shall be coincident with the axis of the rod end

within 0.254mm.

- d) The bearing shall be thoroughly cleaned prior to lubrication. Grease conforming to **MIL-G-81322** or **MIL-G-23827** shall be injected into the bearing, filling the bearing voids 80% minimum full. The bearing bore and the inside diameter of hollow or internally threaded shanks shall also be coated with grease.
- e) The custody term of bearing that is injected grease is 24 months.
- f) The outer raceways shall be case hardened, and the effective case depth shall be from a minimum of 25% to a maximum of 50% of the ring thickness.
- g) The weight of the bearing shall be as specified on Appendage.

6. Material

- a) The inner ring and the ball are manufactured using **ANSI E52100** steel or other things of equal value..
- b) The outer ring and shank are manufactured using **ANSI E4130** steel or **E8620** steel or other thing of equal value.
- c) Seal is made from PTFE (**AMS 3652** or **AMS 3666** or other things of equal value).
- d) Thread retainer is manufactured using **ANSI 301** steel or **430 CRES** or other things of equal value.

7. Outward

- a) There shall not be things that have hindrance in using, sharp corner, small fragments, pieces, dust etc.
- b) There shall not be tool print, imprint, scratch etc. in the orbit surface and the ball.

8. Plating All external surfaces of the rod end, excluding the bore and seal retainer, shall be Zn-Ni plated in accordance with **AMS 2417 Type 2**. The plating thickness follows the **Table 2**.

Table 2 Plating thickness

Position	Plating thickness(mm)
Threaded Surface	0.005~0.012
Unthreaded Surface	0.008~0.015

9 . Performance

9.1 Internal play The radial play and axial play shall be suitable in each following clause when tested in accordance with **10.2**.

- a) The axis play shall be less than 0.010mm.
- b) The radial play shall be less than 0.076mm.

9.2 Radial strength

9.2.1 Radial limit load rating The bearing shall have a radial limit load rating of not less than the values specified on Appendage.

9.2.2 Radial fracture load The minimum static fracture load shall be not less than 1.5 times the radial limit load values specified on Appendage.

9.3 Axial strength

9.3.1 Axial limit load rating The bearing shall have an axial limit load rating of not less than the values specified on Appendage.

9.3.2 Axial fracture load The minimum static fracture load shall be not less than 1.5 times the radial limit load values specified on Appendage.

9.4 Dynamic load rating The bearing shall have a dynamic load rating of not less than the values specified on Appendage.

9.5 Bearing starting torque Starting torque shall be within the maximum allowable values as specified on Appendage.

9.6 Thermal stability The change of dimensions of all parts must be within 0.001mm per 10mm when tested thermal stability test of 10.5.

9.7 Coldproof and Heatproof of the seals The seals shall be capable of withstanding the test requirements as specified in 10.6 without failure. No less than 50% of the bearing's lubricant by weight shall be retained in the bearing at the end of test.

9.8 Internal play of seals It shall be suitable in each next clause when tested in accordance with 10.7.

a) Starting torque increase no more than 100% over the initial measured value.

b) Radial play increase no more than 50% over the initial measured value.

9.9 Hardness The hardness of the rod end ball bearing should be suitable in Table 3 when tested 10.8.

Table 3 Hardness

Position	Hardness
The inner ring and roller	HRC 60~66
The outer ring's raceway	HRC 59~63
Shank	Minimum HRC 92.5 Maximum HRC 34

9.10 Surface roughness The surface roughness of each part shall be in accordance with Table 4 when measured in accordance with ANSI B46.1.

Table 4 Surface roughness

Position	Surface roughness
Raceway	R_a 0.2 μ m(8 μ in)
The sides of the inner ring	R_a 1.6 μ m(63 μ in)

10. Inspection and test

10.1 General particular

10.1.1 Test records The manufacturer shall maintain a record showing quantitative results of all tests performed to the requirements of this specification. This record shall be available to the purchaser.

10.1.2 Test samples The 32 samples that shall be selected in relevant kind of bearings shall be inspected in accordance with the plan of Table 5 sample table.

10.1.3 Examination of product Each bearing in the sample shall be carefully examined for conformance to this specification with respect to materials, construction, dimensions, tolerances, weight, finish, identification, marking.

10.1.4 Magnetic particle inspection

a) This inspection shall be in accordance with MIL-STD-1949.

b) The bearing outer race and shank shall be 100% magnetically inspected by both longitudinal and circular methods prior to assembly.