

SAE Aerospace <i>An SAE International Group</i>	AEROSPACE STANDARD	SAE AS6038	REV. A
		Issued 1998-08 Revised 2011-03	
		Superseding AS6038	
(R) Bearing, Ball, Bellcrank, Antifriction, Airframe			

RATIONALE

It has been ten years since this document was converted directly from the MIL-STD-6038 (word-for-word) version. There are numerous changes that were needed to bring it up to date.

1. SCOPE

1.1 This specification covers antifriction bellcrank ball bearings intended primarily for airframe use.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS6440	Steel, Bars, Forgings, and Tubing 1.45Cr (0.93-1.05C)(SAE 52100) for Bearing Applications
AMS6444	Steel ,Bars, Forgings, and Tubing, 1.45Cr (0.93-1.05C) (SAE 52100), Premium Aircraft-Quality, Consumable Electrode Vacuum Remelted
AMS-QQ-P-416	Plating, Cadmium (Electrodeposited)
AS20218	Bearings, Ball, Bellcrank, Anti-friction, Airframe

2.2 ASTM Publications:

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM A304	Carbon and Alloy Steel Bars Subject to End-Quench Hardenability Requirements
ASTM A322	Steel Bars, Alloy, Standard Grades, Standard Specification for
ASTM A108	Steel Bars, Carbon, Cold Finished, Standard Quality

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2.3 ANSI Publications:

Available from American National Standard Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ANSI B46.1 Surface Texture (Surface Roughness, Waviness, and Lay)

2.4 U.S. Government Publications:

Available from Standardization Documents Order Desk, Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094. Electronic copies may be obtained from <https://assist.daps.dla.mil/quicksearch>

MIL-DTL-197 Packaging of Antifriction Bearings, Associated Parts and Sub-Assemblies

MIL-PRF-23827 Grease; Aircraft and Instrument, Gear and Actuator Screw

MIL-STD-129 Military Marking for Shipment and Storage

MIL-STD-130 Identification Marking of U.S. Military Property

MIL-STD-810 Environmental Engineering Considerations and Laboratory Tests

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Preproduction:

This specification makes provisions for preproduction testing. (See 6.2)

3.2 Materials

Materials to be as specified in AS20218. Inner ring - AMS6440, Outer ring - AMS6440, AMS6444 or AMS6448, Balls - AMS6440, Seals - Nitrile butadiene or PTFE AMS3652 retained by 300 series stainless steel caps, Seal retainer - carbon Steel or CRES, Cage - carbon Steel or CRES.

3.3 Design and Construction

The bearings shall be designed and constructed to conform to the requirements specified herein and on Standard AS20218.

3.3.1 Dimensions and Tolerances

The dimensions and tolerances shall be as specified on Standard AS20218.

3.3.2 Hardness

The raceways shall be uniformly through-hardened HRC 58-62. The ball hardness shall be HRC 60-67. The hardness of the riveting flanges of the bearings shall be not greater than HRC 25 (see 4.5.2). Inner ring shall be HRC 58-64.

3.3.3 Surface Texture

The raceways shall be ground or lapped to a surface finish of 4 μ m maximum in accordance with Standard ANSI B46.1. The bore and all external surfaces shall have a surface finish of 32 μ m maximum.

3.3.4 Plating

All bearing external surfaces and the bore shall be cadmium plated. The plating shall be in accordance with Type I, Class 2 of Specification AMS-QQ-P-416. The plating thickness shall not exceed 0.0005 inch maximum (see 4.5.4).

3.3.5 Seals

Closures shall be provided to prevent the entrance of contaminants and to retain the lubricant throughout the temperature range specified in 3.3.5.1.

3.3.5.1 Type

The closures shall be of the positive contact type, consisting of external metal shields and positive seal washers that shall operate satisfactorily when tested as specified in 4.5.5. The closures shall be readily removable for inspection and relubrication and shall be of such construction that they may be replaced without undue difficulty. The closures shall withstand temperatures of -67 to +250 °F without warpage or embrittlement that will prevent retention of the lubricant. The closures shall be compatible with the lubricant specified herein.

3.3.6 Retainers

The retainers shall be of a suitable material consistent with the requirements of this specification. They shall be so constructed as to not limit the proper functioning of the bearings for which they are designed.

3.4 Internal Clearance

3.4.1 Radial Play

The radial play, measured before and after the radial static capacity and axial static capacity tests (4.5.8 and 4.5.10, respectively), shall not exceed the values specified on Standard AS20218 (see 4.5.6)

3.4.2 Axial Play

The axial play, measured before and after the radial static capacity and axial static capacity tests (4.5.8 and 4.5.10, respectively), shall not exceed the values specified on Standard AS20218 (see 4.5.7).

3.5 Radial Strength

3.5.1 Radial Static Capacity

The radial static capacity of the bearing shall be not less than the value specified on Standard AS20218.

3.5.2 Radial Fracture Load

The radial fracture load of the bearing shall be not less than one and one-half times the radial static capacity value specified on Standard AS20218.

3.6 Axial Strength

3.6.1 Axial Static Capacity

The axial static capacity of the bearing shall be not less than the value specified on Standard AS20218.

3.6.2 Axial Fracture Load

The axial fracture load of the bearing shall be not less than one and one-half times the axial static capacity value specified on Standard AS20218.

3.7 Wobble

The total wobble, measured before and after the radial static and axial static capacity tests (4.5.8 and 4.5.10, respectively) shall be not greater than the value specified on Standard AS20218.

3.8 Radial Endurance

The load applied to the bearing in the radial endurance test (4.5.13) shall be as specified on Standard AS20218.

3.9 Lubrication

Unless otherwise specified, the bearing shall be filled with grease conforming to Specification MIL-PRF-23827, completely filling the bearing voids. The bearing shall be thoroughly cleaned and dried before being lubricated.

3.10 Stabilization

The bearing components shall not vary more than 0.0001 inch dimensionally for operation from -67 to +250 °F.

3.11 Interchangeability

All parts having the same part number shall be both functionally and dimensionally interchangeable.

3.12 Identification of Product

The bearings shall be permanently and legibly marked for identification in accordance with Standard MIL-STD-130. The identification data applied to the bearings shall be as follows:

- a. Complete part number
- b. Manufacturer's name or trademark

3.13 Workmanship

The bearings shall be free of tool marks, chatter waves, rust, grinding scratches, pits, or any other defects that may adversely affect their serviceability.

4. QUALITY ASSURANCE PROVISIONS

4.1 Inspection Responsibility

The supplier is responsible for the performance of all inspection requirements as specified herein.

4.2 Classification of Tests

The inspection and testing of bearings shall be classified as follows:

- a. Qualification Inspection (4.3)
- b. Conformance Inspection (4.4)

4.3 Qualification Inspection

4.3.1 Sampling

The test samples shall consist of 20 bearings of each part number and shall be representative of the production equipment. The bearings shall be tested at a laboratory designated by the procuring activity or, when so stated in the contract, at the contractor's plant under the supervision of the procuring activity (see 6.2).