Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 4816A
Superseding AMS 4816

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BEARINGS, SILVER CLAD STEEL STRIP

1. SCOPE:

1.1 Form: This specification covers a low-alloy steel strip clad on one or both faces with silver in the form bearing stock or finished bearings.

1.2 Application: Primarily for shims, thrust washers, bushings, and bearings.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2259 - Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels
AMS 2350 - Standards and Test Methods
AMS 2370 - Quality Assurance Sampling of Carbon and Low-Alloy Steels, Wrought Products Except Forgings and Forging Stock
AMS 2800 - Identification, Finished Parts

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM A370 - Mechanical Testing of Steel Products
ASTM E350 - Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron
ASTM E378 - Spectrographic Analysis of Silver by the Powder Technique

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

3.1.1 Basis Steel: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E350, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Carbon	0.11	0.17
Manganese	0.75	1.00
Silicon	0.15	0.35
Phosphorus	--	0.040
Sulfur	--	0.040
Chromium	0.40	0.60
Nickel	0.40	0.70
Molybdenum	0.15	0.25

3.1.1.1 Check Analysis: Composition variations shall meet the applicable requirements of AMS 2259.

3.1.2 Cladding: Shall be oxygen-free silver having a minumum fineness of 99.95%, determined by spectrographic methods in accordance with ASTM E378 or by other methods agreed upon by purchaser and vendor.

3.2 Condition: Shall be a composite material produced by bonding silver sheet to one or both faces of steel strip by a controlled combination of temperature and pressure and subsequently cold rolled to the specified thickness.

3.3 Properties: Bearings shall conform to the following requirements, determined in accordance with ASTM A370:

3.3.1 Hardness: The basis steel shall have hardness of 26 - 38 HRC, or equivalent, unless otherwise specified.

3.3.2 Bending: Bearings, after being annealed in a suitable protective atmosphere, shall withstand, without cracking, free bending through an angle of 180 deg around a diameter equal to the nominal thickness of the bearing with axis of bend parallel to the direction of rolling and with the clad surface on the outside of bend.

3.4 Quality: Bearings, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections detrimental to usage of the bearings.

3.4.1 Cladding shall be firmly and continuously bonded to the steel backing, determined by a procedure agreed upon by purchaser and vendor.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of bearings shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the bearings conform to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each lot.

4.3 Sampling: Shall be in accordance with the following; a lot shall be all parts of one size and configuration made from a single heat of basis steel and a single heat of cladding processed in one continuous run and submitted for vendor's inspection at one time:

4.3.1 Basis Steel: AMS 2370.

4.3.2 Cladding: Two samples from each heat of material melted at the same time.

4.3.3 Bearings or Bearing Stock: Three samples from each lot.

4.4 Reports:

4.4.1 The vendor of bearing stock shall furnish with each shipment three copies of a report showing the results of tests for chemical composition, hardness, and bending of each lot. This report shall include the purchase order number, lot number, material specification number and its revision letter, part number, and quantity from each heat.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: If any part or specimen used in the above tests fails to meet the specified requirements, disposition of the parts may be based on the results of testing three additional parts or specimens for each original nonconforming specimen. Failure of any retest part or specimen to meet the specified requirements shall be cause for rejection of the parts represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 Bearing stock shall be identified as agreed upon by purchaser and vendor.

5.1.2 Bearings shall be identified in accordance with AMS 2800.

5.1.3 Bearings and bearing stock shall be protected, during shipment and storage, by coating with a suitable corrosion-preventive compound which is readily removable by hydrocarbon solvents.

5.1.4 Bearings having different part numbers shall be packed in separate containers.

5.1.5 Each container of bearings shall be marked to show not less than the following information:

BEARINGS, SILVER CLAD STEEL
AMS 4816A
PART NUMBER _____
PURCHASE ORDER NUMBER _____
QUANTITY _____
MANUFACTURER'S IDENTIFICATION _____

5.1.6 Containers of bearings shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the bearings to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.