

**AEROSPACE
MATERIAL
SPECIFICATION**

AMS 7445B
Superseding AMS 7445A

Issued 3-1-51
Revised 10-1-84

BALLS, STEEL, CORROSION RESISTANT
17Cr
Hardened

UNS S44002
UNS S44003
UNS S44004

1. SCOPE:

- 1.1 Form: This specification covers balls made of high-carbon corrosion-resistant steel of three carbon ranges.
- 1.2 Application: Primarily for bearing balls. The particular carbon range to be chosen depends on the size of the ball and the manufacturer's techniques.

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

- 2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2248 - Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
AMS 2350 - Standards and Test Methods

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

ASTM E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E353 - Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

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2.3 U.S. 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: Shall conform to one of the following compositions in percentages by weight, determined by wet chemical methods in accordance with ASTM E353, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	51440A		51440B		51440C	
	min	max	min	max	min	max
Carbon	0.60	0.75	0.75	0.95	0.95	1.20
Manganese	--	1.00	--	1.00	--	1.00
Silicon	--	1.00	--	1.00	--	1.00
Phosphorus	--	0.040	--	0.040	--	0.040
Sulfur	--	0.030	--	0.030	--	0.030
Chromium	16.00	18.00	16.00	18.00	16.00	18.00
Nickel	--	0.75	--	0.75	--	0.75
Molybdenum	--	0.75	--	0.75	--	0.75
Copper	--	0.50	--	0.50	--	0.50

3.1.1 Check Analysis: Composition variations shall meet the requirements of AMS 2248.

3.2 Condition: Hardened by quenching from above the transformation range, tempered, and polished.

3.3 Properties: Balls shall conform to the following requirements:

3.3.1 Hardness: Shall be as specified on the part drawing. When not specified on the part drawing, hardness shall be 55 - 64 HRC or equivalent, determined in accordance with ASTM E18.

3.4 Quality:

3.4.1 Steel for balls shall be aircraft quality for bearing applications.

3.4.2 Balls, as received by purchaser, shall be free from cracks, pits, rust, and foreign materials and from imperfections detrimental to their performance.

3.5 Tolerances: Shall be as specified on the drawing or as agreed upon by purchaser and vendor.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of balls shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the balls 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 heat or lot as applicable.

4.3 Sampling: Shall be in accordance with the following: a lot shall be all balls of the same size or part number from one heat of steel heat treated in one furnace charge and presented for vendor's inspection at one time:

4.3.1 Composition: At least one sample from each heat of steel.

4.3.2 Hardness: At least three samples from each lot.

4.4 Reports: The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 7445B, composition used, contractor or other direct supplier of material, part number, and quantity. When material for making balls 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 either a statement that the material conforms or 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 Balls shall be handled and packaged in such a manner that they will be protected, during shipment and storage, against mechanical injury and exposure to moisture.