SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS5624	REV. E

Issued 1948-11
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Noncurrent 2000-02
Reaf Nonc 2012-04

Superseding AMS5624D

Steel Bars, High Expansion
4.5Mn - 4.0Cr - 12.5Ni (0.50 - 0.60C)
Cold Finished

UNS K91505

RATIONALE

AMS5624E has been reaffirmed to comply with the SAE five-year review policy.

NONCURRENT NOTICE

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of February 2000. It is recommended, therefore, that this specification not be specified for new designs.

"NONCURRENT" refers to those materials which have previously been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs. Each of these "NONCURRENT" specifications is available from SAE upon request.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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http://www.sae.org/technical/standards/AMS5624E

1. SCOPE:

1.1 Form:

This specification covers an alloy steel in the form of bars 1 inch (25.4 mm) and under in nominal diameter or distance between parallel sides.

1.2 Application:

Primarily for bolts and screws requiring a coefficient of thermal expansion approaching that of aluminum alloys. This steel is hardenable only by cold working.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications 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.

AMS 2241	Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
MAM 2241	Tolerances, Metric, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
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
AMS 2371	Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, Wrought Products Except Forgings and Forging Stock
AMS 2806	Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat Resistant Steels and Alloys

2.1.2 Aerospace Standards:

AS1182	Standard Machining Allowance, Aircraft Quality and Premium Quality Steel Products

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103.

ASTM E10	Brinell Hardness of Metallic Materials
ASTM E228	Linear Thermal Expansion of Solid Materials with a Vitreous Silica Dilatometer
ASTM E353	Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

2.3 U.S. Government Publications:

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

2.3.1 Military Standards:

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E353, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

	min	max
Carbon	0.50	0.60
Manganese	3.50	5.50
Silicon	--	0.50
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	3.00	5.00
Nickel	11.00	14.00
Molybdenum	--	0.50
Copper	--	0.50

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

3.2 Condition:

Cold finished.

3.3 Properties:

Bars shall conform to the following requirements:

3.3.1 Hardness: Shall be 269 - 352 HB, or equivalent, determined in accordance with ASTM E10.

3.3.2 Coefficient of Thermal Expansion: Shall be not lower than 11.0 x 10^{-6} inch/inch per degree F (20.0 x 10^{-6} mm/mm per degree C) over the range 72° - 600°F (22° - 316°C), determined in accordance with ASTM E228.

3.4 Quality:

Bars, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the bars.

3.4.1 Bars shall, after removal of the standard machining allowance, be free from seams, laps, tears, cracks, and other defects exposed to the machined surfaces. Standard machining allowance shall be in accordance with AS1182.

3.5 Sizes:

Except when exact lengths or multiples of exact lengths are ordered, straight bars will be acceptable in mill lengths of 6 - 20 feet (1.8 - 6.1 m) but not more than 10% of any shipment shall be supplied in lengths shorter than 10 feet (3 m).

3.6 Tolerances:

Shall conform to all applicable requirements of AMS 2241 or MAM 2241.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of bars 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 bars conform to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for composition (3.1), hardness (3.3.1), and tolerances (3.6) are classified as acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for coefficient of thermal expansion (3.3.2) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling:

Shall be in accordance with AMS 2371.