



<b>AEROSPACE MATERIAL SPECIFICATION</b>	<b>AMS5623™</b>	<b>REV. D</b>
	Issued 1959-06 Revised 1990-01 Noncurrent 2001-10 Reaf. Nonc. 2013-04 Stabilized 2017-04  Superseding AMS5623C	
Steel Bars and Forgings, High Expansion 9.5No - 5.5Mn (0.55 - 0.65C) Annealed (Composition similar to UNS K91456)		

RATIONALE

AMS5623D stabilizes this document because it contains mature technology that is not expected to change and thus no further revisions are anticipated.

STABILIZED NOTICE

AMS5623D has been declared "STABILIZED" by the SAE AMS F Corrosion Heat Resistant Alloys Committee. This document was stabilized because this document contains mature technology that is not expected to change and thus no further revisions are anticipated. Previously this document was non-current. The last technical update of this document occurred in January, 1990. Users of this document should refer to the cognizant engineering organization for disposition of any issues with reports/certifications to this specification; including exceptions listed on the certification.

NOTE: In many cases, the purchaser may represent a sub tier supplier and not the cognizant engineering organization.

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## 1. SCOPE:

### 1.1 Form:

This specification covers a high-expansion steel in the form of bars, forgings, and forging stock.

### 1.2 Application:

Primarily for parts, such as bushings and spacers, 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 publications shall be the issue in effect on the date of the purchase order.

### 2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

#### 2.1.1 Aerospace Material Specifications:

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 2371	Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, Wrought Products Except Forgings and Forging Stock
AMS 2374	Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, 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
AMS 2808	Identification, Forgings

#### 2.1.2 Aerospace Standards:

AS1182	Standard Machining Allowance, Aircraft Quality and Premium Aircraft Quality Steel Products
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## 2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM E 10 Brinell Hardness of Metallic Materials  
ASTM E 228 Linear Thermal Expansion of Solid Materials with a Vitreous Silica Dilatometer  
ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

## 2.3 U.S. Government Publications:

Available from Naval Publications and Forms Center, Attn: NPODS, 5801 Tabor Avenue, Philadelphia, PA 19120-5099.

### 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 E 353, by spectrochemical methods, or by other analytical methods acceptable to purchaser:

	min	max
Carbon	0.55	0.65
Manganese	5.00	6.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Nickel	8.50	10.50

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

### 3.2 Condition:

#### 3.2.1 Bars: Annealed.

3.2.1.1 Bars 2.75 Inches (69.8 mm) and Under in Nominal Diameter or Distance Between Parallel Sides and Hexagons: Annealed and cold finished.

3.2.1.2 Bars, Other Than Hexagons, Over 2.75 Inches (69.8 mm) in Nominal Diameter or Distance Between Parallel Sides: Hot finished and annealed.

3.2.2 Forgings: Annealed.

3.2.3 Forging Stock: As ordered by the forging manufacturer.

3.3 Properties:

The product shall conform to the following requirements:

3.3.1 Hardness: Shall be 149 - 179 HB, or equivalent, determined in accordance with ASTM E 10.

3.3.2 Coefficient of Thermal Expansion: Shall be not lower than  $11.5 \times 10^{-6}$  inch/inch per F degree ( $20.7 \times 10^{-6}$  mm/mm per C degree) over the temperature range 72° - 600 °F (22° - 316 °C), determined in accordance with ASTM E 228.

3.4 Quality:

The product, 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 product.

3.4.1 Bars ordered hot rolled, cold drawn, ground, turned, or polished shall, after removal of the standard machining allowances in accordance with AS1182, be free from seams, laps, tears, and cracks open to the thereby created ground, turned, or polished surfaces.

3.4.2 Grain flow of die forgings, except in areas which contain flash-line end grain, shall follow the general contour of the forgings showing no evidence of re-entrant grain flow.

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 the product 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 product conforms to the requirements of this specification.