



AEROSPACE MATERIAL SPECIFICATION

AMS6543™**REV. H**

Issued 1975-09
Reaffirmed 1995-05
Revised 2026-05

Superseding AMS6543G

Steel, Bars and Forgings and Forging Stock,
2.0Cr - 10Ni - 8.0Co - 1.0Mo (0.10 - 0.14C) (HY-180),
Double Vacuum Melted,
Solution Heat Treated, Marage Hardenable
(Composition similar to UNS K91970)

RATIONALE

AMS6543H is the result of a Five-Year Review and update of the specification. The revision updates the Title to match the Scope, clarifies forms and size limits (see 1.1), adds a note on stress corrosion (see 1.2.1), updates composition reporting (see 3.1.1), removes reference to tubing as it is outside of scope (see 3.5.1.1.2 and 3.6.1), updates strain rate requirement for tensile testing (see 3.5.1.2.1.1), removes note for mechanical properties outside of specified limits deferring to EXC requirements (see 3.5.1.2.4, Rev. G), clarifies reporting for bar (see 4.4.2), and adds stock removal note (see 8.6) and reference on trade name (see 8.8).

1. SCOPE

1.1 Form

This specification covers a premium aircraft-quality maraging steel in the form of bars and forgings, 0.50 to 8.00 inches (12.7 to 203.2 mm) in nominal diameter or least distance between parallel sides, and forging stock of any size.

1.2 Application

These products have been used typically for heat-treated parts requiring a combination of high strength, toughness, and weldability, but usage is not limited to such applications.

1.2.1 Certain design and processing procedures may cause these products to become susceptible to stress-corrosion cracking after heat treatment; ARP1110 recommends practices to minimize such conditions.

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.

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2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 1-877-606-7323 (U.S. and Canada only) or 1-724-776-4970 (outside U.S. and Canada), www.sae.org.

AMS2248	Chemical Check Analysis Limits, Corrosion- and Heat-Resistant Steels and Alloys, Maraging and Other Highly Alloyed Steels, and Iron Alloys
AMS2251	Tolerances, Low-Alloy Steel Bars
AMS2370	Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Wrought Products and Forging Stock
AMS2372	Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Forgings
AMS2630	Inspection, Ultrasonic, Product Over 0.5 Inch (12.7 mm) Thick
AMS2750	Pyrometry
AMS2806	Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat-Resistant Steels and Alloys
AMS2808	Identification, Forgings
ARP1110	Minimizing Stress Corrosion Cracking in Wrought Forms of Steels and Corrosion-Resistant Steels and Alloys
AS1182	Standard Stock Removal Allowance, Aircraft-Quality and Premium Aircraft-Quality Steel, Bars and Mechanical Tubing
AS7766	Terms Used in Aerospace Metals Specifications
HS-1086	Metals and Alloys in the Unified Numbering System

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 A370	Mechanical Testing of Steel Products
ASTM A604	Macroetch Testing of Consumable Electrode Remelted Steel Bars and Billets
ASTM A751	Chemical Analysis of Steel Products
ASTM E140	Standard Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness

2.3 Definitions

Terms used in AMS are defined in AS7766 and as follows:

MARAGING: The precipitation-hardening treatment applied to a special group of iron-based alloys to precipitate one or more intermetallic compounds in a matrix of essentially carbon-free martensite.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Composition shall conform to the percentages by weight shown in Table 1, determined in accordance with ASTM A751 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	0.10	0.14
Manganese	0.05	0.25
Silicon	--	0.10
Phosphorus	--	0.010
Sulfur	--	0.006
Chromium	1.80	2.20
Nickel	9.50	10.50
Cobalt	7.50	8.50
Molybdenum	0.90	1.10
Titanium	--	0.015
Aluminum	--	0.025
Oxygen	--	0.0025 (25 ppm)
Nitrogen	--	0.0075 (75 ppm)

3.1.1 The producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection unless limits of acceptability are specified by the purchaser.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248. No variation is permitted for oxygen and nitrogen.

3.2 Melting Practice

Product shall be multiple melted using vacuum induction melting followed by vacuum consumable electrode remelting.

3.3 Condition

The product shall be supplied in the following condition; hardness shall be determined in accordance with ASTM A370:

3.3.1 Bars

3.3.1.1 Bar shall not be cut from plate (see 4.4.2).

3.3.1.2 Bars shall be hot finished, solution heat treated, and descaled, having hardness not lower than 42 HRC, or equivalent (see 8.2).

3.3.2 Forgings

Forgings shall be hot finished, solution heat treated, and descaled, having hardness not lower than 42 HRC, or equivalent (see 8.2).

3.3.3 Forging Stock

Forging stock shall be as ordered by the forging manufacturer.