



AEROSPACE MATERIAL SPECIFICATION

AMS5745™**REV. G**

Issued 1959-01
Reaffirmed 2014-06
Revised 2020-05

Superseding AMS5745F

Steel, Corrosion and Heat-Resistant, Bars and Forgings
16.5Cr - 4.5Ni - 2.9Mo - 0.10N
Consumable Electrode Remelted
Equalized and Over-Tempered
(Composition similar to UNS S35000)

RATIONALE

AMS5745G prohibits unauthorized exceptions (3.8), revises Title, Composition (3.1) to replace obsolete chemical analysis standards, Condition (3.3.1.4), Properties (3.5), Reports (4.4) and Identification (5.2.1.1), and results from a Five-Year Review and update of this specification.

1. SCOPE

1.1 Form

This specification covers a corrosion and heat resistant steel in the form of bars, forgings, and forging stock.

1.2 Application

These products have been used typically for parts requiring oxidation resistance and high strength up to 800 °F (427 °C) and which may require welding during fabrication, but usage is not limited to such applications.

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.

2.1 SAE Publications

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

AMS2241 Tolerances, Corrosion and Heat-Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire

AMS2248 Chemical Check Analysis Limits, Corrosion and Heat-Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys

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Documents
Document Sharing Hub

AMS2371	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS2374	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steel and Alloy Forgings
AMS2806	Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat-Resistant Steels and Alloys
AMS2808	Identification, Forgings
ARP1917	Clarification of Terms Used in Aerospace Metals Specifications

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 A751	Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
ASTM E140	Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness

3. TECHNICAL REQUIREMENTS

3.1 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 purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	0.07	0.11
Manganese	0.50	1.25
Silicon	--	0.50
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	16.00	17.00
Nickel	4.00	5.00
Molybdenum	2.50	3.25
Nitrogen	0.07	0.13

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2248.

3.2 Melting Practice

Steel shall be multiple melted using consumable electrode practice in the remelt cycle.

3.3 Condition

The product shall be supplied in the following condition:

3.3.1 Bars

3.3.1.1 Rounds

Equalized, over-tempered, and ground, turned, or polished.

3.3.1.2 Shapes

Cold finished, equalized, over-tempered, and descaled.

3.3.1.3 Flats

Hot finished, equalized, over-tempered, and descaled.

3.3.1.4 Bars shall not be cut from plate (also see 4.4.2).

3.3.2 Forgings

Equalized and over-tempered.

3.3.3 Forging Stock

As ordered by the forging manufacturer.

3.4 Heat Treatment

Bars and forgings shall be equalized by heating to $1400^{\circ}\text{F} \pm 50^{\circ}\text{F}$ ($760^{\circ}\text{C} \pm 28^{\circ}\text{C}$), holding at heat for not less than 3 hours, and cooling in air to 90°F (32°C) or lower, and over-tempered by heating to $1100^{\circ}\text{F} \pm 25^{\circ}\text{F}$ ($593^{\circ}\text{C} \pm 14^{\circ}\text{C}$), holding at heat for not less than 3 hours, and cooling in air.

3.5 Properties

The product shall conform to the following requirements; hardness and tensile testing shall be performed in accordance with ASTM A370:

3.5.1 Bars and Forgings

3.5.1.1 As Equalized and Over-Tempered

3.5.1.1.1 Hardness

Shall be not higher than 363 HB, or equivalent (see 8.2), except that bars 0.625 inch (15.88 mm) and under in nominal diameter may have hardness as high as 375 HB, or equivalent (see 8.2).

3.5.1.2 Response to Heat Treatment

Bars and forgings shall have the properties shown in Table 2 after being solution heat treated by heating to $1900^{\circ}\text{F} \pm 25^{\circ}\text{F}$ ($1038^{\circ}\text{C} \pm 14^{\circ}\text{C}$), holding at heat for 1 to 3 hours, and quenching in water; cooling to -100°F (-73°C) or colder, holding at this temperature for not less than 3 hours, and warming in air to room temperature; austenite conditioned by heating to $1750^{\circ}\text{F} \pm 25^{\circ}\text{F}$ ($954^{\circ}\text{C} \pm 14^{\circ}\text{C}$), holding at heat for 10 to 60 minutes, and quenching in water; cooling to -100°F (-73°C) or colder, holding at this temperature for not less than 3 hours, and warming in air to room temperature; and tempered by heating to $1000^{\circ}\text{F} \pm 25^{\circ}\text{F}$ ($538^{\circ}\text{C} \pm 14^{\circ}\text{C}$), holding at heat for not less than 3 hours, and cooling in air.

3.5.1.2.1 Tensile Properties

Shall be as shown in Table 2: