



AEROSPACE MATERIAL SPECIFICATION

AMS5655™

REV. G

Issued 1959-01
Reaffirmed 2010-10
Revised 2022-09

Superseding AMS5655F

Steel, Corrosion- and Heat-Resistant, Bars, Wire, Forgings, and Forging Stock
12.5Cr - 0.75Ni - 1.0Mo - 1.0W - 0.24V (0.20-0.25C)
Hardened and Tempered
(Composition similar to UNS S42200)

RATIONALE

AMS5655G is the result of a Five-Year Review and update of the specification. The revision updates the title to match the scope, updates composition and reporting (3.1, 3.1.1), prohibits bars being cut from plate (3.2.1.1, 4.4.3), adds tensile strain rate for bar and forgings (3.4.2.1.1), updates decarburization requirement (3.4.2.4.4), removes hardness and impact requirements from wire as not applicable (3.4.2.2, 3.4.2.3, 4.2.1.3), adds AS1182 (3.5.1, 8.4), prohibits unauthorized exceptions (3.7, 4.4.4, 5.2.1.1, 8.6), allows prior revision (8.5), and adds forging stock properties (8.7).

1. SCOPE

1.1 Form

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

1.2 Application

These products have been used typically for parts requiring strength and oxidation resistance up to 1000 °F (538 °C), 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

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2022 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: <http://www.sae.org>

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS5655G/>

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
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
AS1182	Standard Stock Removal Allowance, Aircraft-Quality and Premium Aircraft-Quality Steel Bars and Mechanical Tubing
AS7766	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	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
ASTM E381	Macroetch Testing, Steel Bars, Billets, Blooms, and Forgings
ASTM E1077	Estimating the Depth of Decarburization of Steel Specimens

2.3 Definitions

Terms used in AMS are defined in AS7766.

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	0.20	0.25
Manganese	--	1.00
Silicon	0.20	0.60
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	11.00	13.50
Nickel	0.50	1.00
Molybdenum	0.75	1.25
Tungsten	0.75	1.25
Vanadium	0.17	0.30
Copper	--	0.50

3.1.1 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.

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Bars and Wire

Hardened and tempered. Bars 2.750 inches (69.85 mm) and under in nominal diameter or least distance between parallel sides and wire shall be cold finished. Larger bars shall be hot finished.

3.2.1.1 Bars shall not be cut from plate (see 4.4.3).

3.2.2 Forgings

Hardened, tempered, and descaled.

3.2.3 Forging Stock

As ordered by the forging manufacturer.

3.3 Heat Treatment

Bars, wire, and forgings shall be hardened by heating to 1925 °F ± 25 °F (1052 °C ± 14 °C), holding at heat for not less than 1 hour, and suitably quenching, and tempered by heating to a temperature not lower than a furnace setpoint of 1100 °F (593 °C), holding at heat for not less than 4 hours, cooling in air, reheating to a temperature not lower than a furnace setpoint of 1000 °F (538 °C), holding at heat for not less than 4 hours, and cooling in air. Pyrometry shall be in accordance with AMS2750.

3.4 Properties

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

3.4.1 Macrostructure

Visual examination of transverse full cross-sections from bars, billets, and forging stock, etched in accordance with ASTM E381, shall show no pipe or cracks. When specified, porosity, segregation, inclusions, and other imperfections shall be no worse than the macrographs of ASTM E381 agreed upon by purchaser and producer.

3.4.2 Bars, Wire, and Forgings

3.4.2.1 Tensile Properties

Shall be as shown in Table 2.