

AEROSPACE MATERIAL SPECIFICATION

SAE AMS5845H

Issued 1972-11
Revised 2008-09

Superseding AMS5845G

Alloy, Corrosion-Resistant, Round Bars
20Cr - 35Ni - 35Co - 10Mo
Vacuum Induction Plus Consumable Electrode Vacuum Remelted
Solution Heat Treated, Work Strengthened, and Aged

(Composition similar to UNS R30035)

RATIONALE

AMS5845H results from a Five Year Review and update of this specification.

1. SCOPE

1.1 Form

This specification covers a high-strength, corrosion-resistant alloy in the form of bars.

1.2 Application

These bars have been used typically for parts requiring a combination of high strength, good tension-tension fatigue strength, toughness, ductility, and exceptionally good corrosion resistance (See 8.2), 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 724-776-4970 (outside USA), www.sae.org.

AMS2261	Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Bars, Rods, and Wire
AMS2269	Chemical Check Analysis Limits, Nickel, Nickel Alloys, and Cobalt Alloys
AMS2371	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS2750	Pyrometry
AMS2806	Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat-Resistant Steels and Alloys

2.2 ASTM Publications

SAE Technical Standards Board 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 reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2008 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: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
<http://www.sae.org>

SAE WEB ADDRESS:

**SAE values your input. To provide feedback
on this Technical Report, please visit
<http://www.sae.org/technical/standards/AMS5845H>**

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 E 8	Tension Testing of Metallic Materials
ASTM E 18	Rockwell Hardness of Metallic Materials
ASTM E 112	Determining Average Grain Size
ASTM E 354	Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - COMPOSITION

Element	min	max
Carbon	--	0.025
Manganese	--	0.15
Silicon	--	0.15
Phosphorus	--	0.015
Sulfur	--	0.010
Chromium	19.00	21.00
Nickel	33.00	37.00
Molybdenum	9.00	10.50
Titanium	--	1.00
Iron	--	1.00
Cobalt	remainder	

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2269.

3.2 Melting Practice

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

3.3 Condition

Solution heat treated, work strengthened, aged, and centerless ground.

3.4 Heat Treatment

Bars shall be solution heat treated by heating to a temperature within the range 1900 to 1925 °F (1038 to 1052 °C), holding at the selected temperature within ± 25 °F (± 14 °C) for 4 to 8 hours, and cooling in air to room temperature. Pyrometry for solution heat treatment shall be in accordance with AMS2750. After work strengthening, the bars shall be aged by heating to a temperature within the range 1000 to 1200 °F (538 to 649 °C), holding at the selected temperature within ± 25 °F (± 14 °C) for 4 to 4-1/2 hours, and cooling in air to room temperature.

3.5 Properties

Bars shall conform to the following requirements (See 8.2):

3.5.1 Tensile Properties

Shall be as shown in Table 2, determined in accordance with ASTM E 8.

TABLE 2 - MINIMUM TENSILE PROPERTIES

Property	Value
Tensile Strength	260 ksi (1793 MPa)
Yield Strength at 0.2% Offset	230 ksi (1586 MPa)
Elongation in 4D	8%
Reduction of Area	35%

3.5.2 Hardness

Shall be not lower than 44 HRC, or equivalent (See 8.3), determined in accordance with ASTM E 18. Product shall not be rejected on the basis of hardness if the tensile properties of 3.5.1 are acceptable, determined on specimens taken from the same sample as that with nonconforming hardness or from another sample with similar nonconforming hardness.

3.5.3 Average Grain Size

Shall be ASTM No. 4 or finer, determined in accordance with ASTM E 112.

3.6 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.

3.7 Tolerances

Shall conform to all applicable requirements of AMS2261.

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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the bars conform to specified requirements.

4.2 Classification of Tests

All technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing

Shall be in accordance with AMS2371 and the following:

In testing round bars, specimens for tensile testing (3.51) shall be of standard proportions in accordance with ASTM E 8 with either 0.250-inch (6.35-mm) diameter at the reduced parallel gage section or smaller specimens proportional to the standard when required. Specimens shall be machined from the center of bars 0.800 inch (20.32 mm) and under in nominal diameter and from mid-radius of larger size bars.

4.4 Reports

The vendor of the product shall furnish with each shipment a report showing the following results of tests and relevant information:

4.4.1 For each heat

Composition.

4.4.2 For each lot

Tensile properties

Hardness

Average grain size.

4.4.3 A statement that the product conforms to the other technical requirements.

4.4.4 Purchase order number

Heat and lot numbers

AMS5845H

Size

Quantity.

4.5 Resampling and Retesting

Shall be in accordance with AMS2371.

5. PREPARATION FOR DELIVERY

5.1 Sizes

Except when exact lengths or multiples of exact lengths are ordered, straight bars will be acceptable in mill lengths of 6 to 24 feet (1.8 to 7.3 m) but not more than 25% of any shipment shall be supplied in lengths of 6 to 9 feet (1.8 to 2.7 m), except that for bars weighing over 25 pounds per foot (37 kg/m), short lengths down to 2 feet (610 mm) may be supplied.

5.2 Identification

Shall be in accordance with AMS2806.

5.3 Packaging

Bars shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the bars to ensure carrier acceptance and safe delivery.

6. ACKNOWLEDGMENT

A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS

Bars not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.