



AEROSPACE MATERIAL SPECIFICATION	AMS2371™	REV. L
	Issued 1969-11 Reaffirmed 2015-12 Revised 2019-12 Superseding AMS2371K	
Quality Assurance Sampling and Testing Corrosion and Heat-Resistant Steels and Alloys Wrought Products and Forging Stock		

RATIONALE

AMS2371L adds Sampling and Testing for Hardness (3.3.2.2) and Microstructure, revises Resampling and retesting (3.3.4.1), test invalidity conditions (3.3.4.3.1), and adds Note 4 of Table 2.

1. SCOPE

This specification covers quality assurance sampling and testing procedures used to determine conformance to applicable material specification requirements of wrought corrosion and heat-resistant steel and alloy products and of forging stock.

1.1 Attributes included in detail herein are: Composition, tensile properties, macrostructure, microstructure, hardness and micro-inclusion rating. Other requirements are included in Table 2.

1.2 Quality assurance sampling and testing procedures for forgings are covered in AMS2374.

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.

AMS2374 Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steel and Alloy Forgings

ARP1917 Clarification of Terms Used in Aerospace Metals Specifications

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 revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2019 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
<http://www.sae.org>

SAE WEB ADDRESS:

**SAE values your input. To provide feedback on this
Technical Report, please visit
<http://standards.sae.org/AMS2371L>**

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 E8/E8M Tension Testing of Metallic Materials

ASTM E10 Brinell Hardness of Metallic Materials

ASTM E292 Conducting Time-for-Rupture Notch Tension Tests of Materials

3. TECHNICAL REQUIREMENTS

3.1 General

3.1.1 Omission from this specification of confirmatory tests of certain material properties or attributes controlled by the applicable material specification does not relieve the vendor of responsibility for furnishing products that conform in all respects to the applicable material specification.

3.1.2 In event of conflict between requirements specified herein and requirements of a particular material specification, requirements of the material specification shall take precedence.

3.2 Responsibility for Tests

The vendor of the product shall supply all samples for vendor's tests and shall be responsible for the performance of all required tests. Results of such tests shall be reported to the purchaser as required by the applicable material specification.

3.3 Detail Requirements

3.3.1 Lot Definition

A lot shall be as defined in 3.3.1.1 or 3.3.1.2, the applicable definition being as specified in Table 2 for the type of test and type of product being tested.

3.3.1.1 A lot shall be restricted to the product of a single heat.

3.3.1.1.1 A heat shall be all steel melted in a single furnace charge. For consumable electrode remelted steel, a heat shall be all consumable electrode remelted ingots processed from steel or alloy originally melted as a single furnace charge.

3.3.1.2 Lot

A lot shall be a mill form of one shape, condition, and nominal cross-sectional dimensions from a single heat, processed in accordance with 3.3.1.2.1 or 3.3.1.2.2.

3.3.1.2.1 Sequentially heat treated during a 24-hour period in a continuous furnace with no interruption in operations and no change in furnace temperature, charge rate, or racking pattern.

3.3.1.2.1.1 Time may be extended to 120 hours for austenitic, non-hardenable grades.

3.3.1.2.1.2 The nominal cross-sectional dimension restriction may be disregarded when multiple sizes are heat treated in a single batch or during an 8-hour period in a continuous furnace operating at a constant speed. In such cases, tensile and macrostructure testing shall be performed on the size having the greatest equivalent round cross-section. The equivalent round cross-section shall be determined by multiplying wall thickness of tubing and thickness or diameter of solids by the shape factors shown in Table 1.

Table 1 - Shape factors

Product	Shape Factor
Tubing	2.0
Rounds	1.0
Hexagons	1.1
Squares	1.25
Flats	1.50

3.3.1.2.2 Sequentially heat treated during a 48-hour period in one or a series of batch-type furnace loads provided the loads are processed in the same furnace or same series of furnaces, and at the same power setting, set temperature, soak time, quench parameters, and racking pattern.

3.3.1.2.2.1 Time may be extended to 120 hours for austenitic, non-hardenable grades.

3.3.2 Sampling and Testing

Shall be in accordance with Table 2 and as follows:

3.3.2.1 Composition

3.3.2.1.1 The reported composition of the steel or alloy subjected to a single melting operation shall be that of a sample taken immediately before or during the pouring of a heat. Analysis results of the sample shall be within the composition limits established by the material specification, excluding any consideration of product check analysis.

3.3.2.1.1.1 If the sample of 3.3.2.1.1 is lost, a new sample shall be taken from the semi-finished or finished product.

3.3.2.1.2 For remelted steels and alloys, analyses shall be obtained from the remelted ingot or product thereof in accordance with a sampling plan that will allow the reported composition of the steel to conform to one of the following options:

The average of all ingots in the remelted heat.

The average of the ingots directly involved with the order.

The average of samples representing the first and last usable metal poured from the heat.

The analysis of each ingot involved with the order.

3.3.2.1.2.1 If an average for an element is reported, each analysis of the element shall fall within the composition limits established by the material specification; each individual analysis may include the applicable product check analysis allowance, but no average shall include analyses that are both above and below the compositional limits.

3.3.2.1.2.2 When the remelting method is vacuum-arc remelting and the applicable material specification establishes minimum values for carbon and/or manganese, these elements shall be determined and reported for each remelted ingot.

3.3.2.1.2.3 The heat analysis may be used for reporting the analyses of those elements governed only by a maximum in the material specification if the analysis is within the composition limits and the element routinely decreases or remains constant during remelting.

3.3.2.1.2.4 Analyses of samples made prior to discard need not be reported.

3.3.2.2 Tensile, Stress-Rupture, Creep, and Hardness Specimen Orientation, Location, and Size

Specimens conforming to either ASTM E8/E8M or ASTM E292, as applicable, shall be cut from the semi-finished or finished product in the direction indicated in the following paragraphs, and shall be cut from the locations and to the sizes specified. The sample shall consist of one or more sections of the product selected to represent a specific location or locations with respect to the order of pouring of the selected ingot or ingots and with respect to the location within the ingot. Specimens conforming to ASTM E10 shall be cut from the same location as that for the tensile specimen.