Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS2374A
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QUALITY ASSURANCE SAMPLING OF CORROSION AND HEAT RESISTANT STEELS AND ALLOYS
Forgings and Forging Stock

1. SCOPE: This specification covers quality assurance procedures which may be used to determine conformance of corrosion and heat resistant steel and alloy forgings and forging stock to applicable material specification requirements.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM E8 - Tension Testing of Metallic Materials

3. TECHNICAL REQUIREMENTS:

3.1 General Requirements:

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 which conform in all aspects to the applicable specification.

3.1.2 In the event of conflict between the requirements specified herein and the requirements of a particular material specification, the following rules shall apply:

3.1.2.1 When the requirements of the material specification are more stringent, they shall take precedence.

3.1.2.2 When the requirements of this AMS are more stringent, they shall take precedence.

3.1.3 When instructions are issued by the purchaser regarding quality assurance sampling procedures, such instructions shall take precedence over the requirements of this specification or the particular specification in which this specification is invoked.

3.2 Responsibility for Tests: The vendor of the product shall supply all samples and shall be responsible for performing 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 Forging Stock: The product of each heat shall be subjected to such tests and inspections as necessary to ensure conformance to applicable requirements. When the material is melted by a consumable-electrode remelt method, a heat shall be all consumable-electrode remelted ingots produced from steel or alloy originally melted in a single furnace charge.

3.3.1.1 For consumable-electrode remelted material, the chemical composition shall be that of the parent heat, except that those elements subject to change during remelting shall be determined on the consumable remelted product.

3.3.1.2 If the applicable specification does not establish the stage of manufacture for testing or the method of preparing test material, tests to ensure that forging stock conforms to specified properties may be made on the stock size supplied, forged-down test bars, or upset pancakes, or as otherwise agreed upon by forging producer and forging stock vendor, for all material that requires hardening and tempering, solution heat treatment, or solution and precipitation heat treatment to develop final properties.

3.3.1.3 Tests for conformance to characteristics other than mechanical properties shall be performed on the forging stock in the size and condition offered for shipment, except as otherwise permitted.

3.3.2 Forgings: For the purpose of clarifying test requirements, forgings shall be given a class number and an inspection lot designation, as follows:

3.3.2.1 Class Number:

Class		Description
I	-	Forgings furnished in the final heat treated condition and requiring destructive testing for verification of specified mechanical properties.
II	-	Forgings, furnished in any heat treated condition other than the final heat treated condition, that require testing to ensure conformance to specified mechanical properties after subsequent heat treatment.
III	-	Forgings furnished in the final heat treated condition to only a specified hardness.
IV	-	Forgings furnished in a preliminary heat treated condition for machinability, welding, etc and not subject to testing for specified mechanical properties after final heat treatment.

3.3.2.2 Inspection Lot Designation:

Inspection Lot		Description
A	-	Shall consist of all forgings of a similar configuration identifiable to a single heat. Opposite hand shall be considered as a single configuration, unless otherwise specified.
B	-	Shall consist of all the restrictions listed for Inspection Lot A. In addition, the lot shall be further restricted to those forgings heat treated as a batch or sequentially heat treated in a continuous furnace.
C	-	Shall consist of all the restrictions listed for Inspection Lot A. In addition, the lot shall be further restricted to those forgings produced by the same technique and processed through the final forging operation on the same setup.
D	-	Shall consist of all the restrictions listed for Inspection Lots A, B, and C.

3.3.2.2.1 Inspection Lot A shall be used, unless otherwise specified.

3.3.3 Test Methods: Shall be in accordance with the requirements of the applicable material specification. If a test method is not specified, the method of test shall be as agreed upon by purchaser and vendor.

3.3.4 Sampling of Forgings:

3.3.4.1 Class I forgings shall be sectioned and tested for conformance on the basis of one forging per inspection lot for mechanical properties other than hardness; in addition, production forgings shall be sampled in accordance with Table I if hardness is specified.

3.3.4.2 A Class II forging shall be taken from each inspection lot, heat treated as specified, sectioned, and tested to demonstrate conformance; in addition, production forgings shall be sampled for hardness in accordance with Table II if hardness is specified.

3.3.4.3 Class III forgings shall be sampled for hardness in accordance with Table I.

3.3.4.4 Class IV forgings shall be sampled in accordance with Table II if hardness is specified.

3.3.4.5 Sampling for hardness shall be as shown in Table I or Table II.

TABLE I

Class I or Class III Forgings

Lot Quantity	Sample Size
1 - 44	100%
45 - 65	44
66 - 110	60
111 - 180	67
180 - 300	73
301 - 500	78
501 - 800	80
Over 800	10% (85 pcs minimum)

TABLE II

Class II or Class IV Forgings

Lot Quantity	Sample Size
1 - 20	100%
21 - 100	25% (20 pcs minimum)
Over 100	10% (25 pcs minimum)

3.3.4.5.1 Each furnace load and/or container of forgings shall be included in the selection of samples.

3.3.4.5.2 All samples shall conform to the specified hardness or 100% inspection shall be applied. If pieces are checked 100%, the vendor may either reheat treat nonconforming pieces, submit nonconforming pieces to the purchaser for consideration, or scrap the pieces.

3.3.5 Testing of Forgings:

3.3.5.1 General: Tests for properties which are characteristic of the heat, such as composition, hardenability, cleanliness, etc, need not be repeated on forgings from a heat provided that these tests have been performed on the stock from that heat and that heat identity of the forgings is maintained.

3.3.5.2 Grain Flow: When grain flow is specified, a preproduction forging shall be sectioned and macroetched to reveal the grain flow pattern. The pattern shall be in essential agreement with flow lines sketched on the drawing or as agreed upon by purchaser and vendor. This procedure shall be repeated following any major change in forging technique or die design.

3.3.5.3 Decarburization, Intergranular Attack, and Other Microstructural Requirements: When microstructural requirements other than cleanliness are specified, the location of specimens and method of testing shall be as agreed upon by purchaser and vendor.

3.3.5.4 Nondestructive Testing: Shall be performed to ensure freedom from harmful imperfections. The methods, standards, and frequency shall be as agreed upon by purchaser and vendor.

3.3.5.5 Dimensions: Forgings shall be inspected as required to ensure conformance to dimensions shown on the applicable drawing.