



AEROSPACE MATERIAL SPECIFICATION

AMS5766

REV. E

Issued 1972-05
Reaffirmed 2007-08
Revised 2014-12

Superseding AMS5766D

Alloy, Corrosion and Heat-Resistant, Bars and Forgings
21Cr - 32.5Ni - 0.38Ti - 0.38Al - 45Fe
Solution Heat Treated
(Composition similar to UNS N08800)

RATIONALE

AMS5766E revises Condition (3.2.1.2), Properties (3.3.1.1) and Reports (4.4), and is a Five Year Review and update of this specification.

1. SCOPE

1.1 Form

This specification covers a corrosion and heat-resistant iron-nickel-chromium alloy in the form of bars and forgings 4.0 inches (102 mm) and under, and forging stock of any size.

1.2 Application

These products have been used typically for low-stressed parts requiring corrosion and oxidation resistance particularly where such parts 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 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

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SAE WEB ADDRESS:

- 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

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 E 8/E 8M Tension Testing of Metallic Materials
- 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	--	0.10
Manganese	--	1.50
Silicon	--	1.00
Phosphorus	--	0.035
Sulfur	--	0.015
Chromium	19.00	23.00
Nickel	30.00	35.00
Titanium	0.15	0.60
Aluminum	0.15	0.60
Copper	--	0.75
Iron	remainder	

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS2269.

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Bars and Forgings

Hot finished and solution heat treated.

3.2.1.1 Surface finish of bars shall be as ordered.

3.2.1.2 Bars shall not be cut from plate (See also 4.4.2).

3.2.2 Forging Stock

As ordered by the forging manufacturer.

3.3 Properties

The product shall conform to the following requirements:

3.3.1 Tensile Properties

Shall be as shown in Table 2 for bars and forgings 4.0 inches (102 mm) and under in nominal diameter or least distance between parallel sides, determined in accordance with ASTM E 8/E 8M.

3.3.1.1 Mechanical property requirements for product outside of the range of 1.1 shall be agreed upon between purchaser and producer.

TABLE 2 - Minimum Tensile Properties

Property	Value
Tensile Strength	65 ksi (448 MPa)
Yield Strength at 0.2% Offset	25.0 ksi (172 MPa)
Elongation in 4D	30%

3.4 Quality

The product, 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 product.

3.4.1 Grain flow of die forgings, except in areas which contain flash-line end grain, shall follow the general contour of the forgings showing no evidence of reentrant grain flow.

3.5 Tolerances

Bars shall conform to all applicable requirements of AMS2261.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The vendor of the product 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 product conforms to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (3.1), tensile properties (3.3.1), and tolerances (3.5) are acceptance tests and shall be performed on each heat or lot as applicable.

4.2.2 Periodic Tests

Grain flow of die forgings (3.4.1) is a periodic test and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing

Shall be as follows:

4.3.1 Bars and Forging Stock

In accordance with AMS 2371.

4.3.2 Forgings

In accordance with AMS 2374.

4.4 Reports

4.4.1 The vendor of the product shall furnish with each shipment a report showing the showing the vendor's name and country where the metal was melted (e.g., final melt in the case of metal processed by multiple melting operations) and the results of tests for composition of each heat and for the tensile properties of each lot, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS5766E, size, and quantity. If forgings are supplied, the size and melt source of stock used to make the forgings shall also be included.

4.4.2 If the ship size / shape is cut from a larger cross section, report the nominal metallurgically worked size (See 3.2.1.2).

4.4.3 When the product size is outside the range covered by 1.1, the report shall contain a statement to that effect.

4.4.4 The vendor of forging stock shall furnish with each shipment a report showing the vendor's name and country where the metal was melted (e.g., final melt in the case of metal processed by multiple melting operations) and the results of tests for composition, macrostructure and response to heat treatment of each heat. This report shall include the purchase order number, AMS5766E, size and quality.

4.5 Resampling and Retesting

Shall be as follows:

4.5.1 Bars and Forging Stock

In accordance with AMS2371.

4.5.2 Forgings

In accordance with AMS2374.

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 as follows:

5.2.1 Bars

In accordance with AMS2806.

5.2.2 Forgings

In accordance with AMS2808.

5.2.3 Forging Stock

As agreed upon by purchaser and vendor.