AEROSPACE MATERIAL SPECIFICATION

AMS5637™	REV. K

Issued 1949-03
Reaffirmed 2006-04
Revised 2023-10

Superseding AMS5637J

Steel, Corrosion-Resistant, Bars and Wire
18Cr - 9.0Ni (302)
Solution Heat Treated, Cold Drawn and Stress Relieved
125 ksi (862 MPa) Tensile Strength
(Composition similar to S30200)

RATIONALE

AMS5637K is the result of a Five-Year Review and update to the specification. The revision updates composition testing and reporting (see 3.1 and 3.1.1), revises the tensile test specification and adds strain rate control during testing (see 3.3.1 and 3.3.1.2), updates quality provisions and considerations for bar (see 3.4.1 and 8.4), and updates the prohibition of exceptions information (8.5).

1. SCOPE

1.1 Form

This specification covers a corrosion-resistant steel in the form of bars and wire 0.75 inch (19 mm) and under in nominal diameter or distance between parallel sides (thickness).

1.2 Application

These products have been used typically for small parts, such as bolts, screws, and clevis pins requiring corrosion resistance up to 700 °F (371 °C) and which may be fabricated by heading or by machining from bars or wire and roll threading, 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.

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/AMS5637K

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

AMS2371 Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock

AMS2806 Identification Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels, and Corrosion and Heat-Resistant Steels and Alloys

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 A751 Chemical Analysis of Steel Products

ASTM A370 Mechanical Testing of Steel Products

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	--	0.15
Manganese	--	2.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	17.00	19.00
Nickel	8.00	10.00
Molybdenum	--	0.75
Copper	--	0.75

3.1.1 The 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

Solution heat treated, cold drawn, and stress relieved at 700 °F ± 25 °F (371 °C ± 14 °C), and descaled.

3.2.1 Bars shall not be cut from plate (see 4.4.2).

3.3 Properties

Product 0.75 inch (19 mm) and under in nominal diameter or least distance between parallel sides (thickness) shall conform to the following requirements:

3.3.1 Tensile Properties

Shall be as shown in Table 2, determined in accordance with ASTM A370. Determination of yield strength is not required for wire under 0.125 inch (3.18 mm) diameter.

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

Table 2 - Minimum tensile strength

Property	Value
Tensile Strength	125 ksi (862 MPa)
Yield Strength at 0.2% Offset	100 ksi (689 MPa)
Elongation in 4D or 2 inches (50 mm)	17%
Reduction of Area	45%

3.3.1.2 Unless otherwise specified, the strain rate shall be set at 0.005 in/in/min (0.005 mm/mm/min) and maintained within a tolerance of ±0.002 in/in/min (±0.002 mm/mm/min) through 0.2% offset yield strain. After the yield strain, the speed of the testing machine shall be set between 0.05 in/in and 0.5 in/in (0.05 mm/mm and 0.5 mm/mm) of the length of the reduced parallel section (or distance between the grips for specimens not having a reduced section) per minute. Alternatively, an extensometer and strain rate indicator may be used to set the strain rate between 0.05 in/in/min and 0.5 in/in/min (0.05 mm/mm/min and 0.5 mm/mm/min). The requirement for compliance becomes effective for material produced 1 year after the publication date of this document.

3.4 Quality

The product, as received by the 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 Bars shall be free from seams, laps, tears, and cracks after removal of the standard stock removal allowance in accordance with AS1182.

3.5 Tolerances

Shall conform to all applicable requirements of AMS2241.

3.6 Any exceptions shall be authorized by the purchaser and reported as in 4.4.3.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for the producer's tests and shall be responsible for the performance of all required tests. The 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

Tests for 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.

4.4 Reports

4.4.1 The producer of the product shall furnish with each shipment a report showing the producer's name and the country where the metal was melted (e.g., final melt in the case of metal processed by multiple melting operations), the results of tests for composition of each heat and for 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, AMS5637K, size, and quantity.

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).

4.4.3 When material produced to this specification is beyond the sizes allowed in the scope or tables, or exceptions authorized by the purchaser are taken to the technical requirements listed in Section 3 (see 5.2.1), the report shall contain a statement "This material is certified as AMS5637K(EXC) because of the following exceptions:" and the specific exceptions shall be listed.

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 and wire will be acceptable in mill lengths of 6 to 20 feet (1.8 to 6.1 m), but not more than 10% of any shipment shall be supplied in lengths shorter than 10 feet (3.0 m).

5.2 Identification

Shall be in accordance with AMS2806.

5.2.1 When technical exceptions are taken (see 4.4.3), the material shall be marked with AMS5637K(EXC).

5.3 Packaging

The product 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 product to ensure carrier acceptance and safe delivery.