ADOPTION NOTICE

SAE-AMS5635, "STEEL, CORROSION RESISTANT, BARS, WIRE, AND FORGINGS 18CR - 9NI - 0.21PB (303PB) FREE-MACHINING, SOLUTION HEAT TREATED", was adopted on 30-OCT-81 for use by the Department of Defense (DoD). Proposed changes by DoD activities must be submitted to the DoD Adopting Activity: Commander, Defense Supply Center Philadelphia, ATTN: DSCP-ILEA, 700 Robbins Avenue, Philadelphia, PA 19111-5096. Copies of this document may be purchased from the Society of Automotive Engineers 400 Commonwealth Drive Warrendale, Pennsylvania, United States, 15096-0001. http://www.sae.org/

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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5635D

Issued JAN 1964
Revised JUL 1992
Reaffirmed SEP 2000

Superseding AMS 5635C

Steel, Corrosion Resistant, Bars, Wire, and Forgings
18Cr - 9Ni - 0.21Pb (303Pb)
Free-Machining, Solution Heat Treated

UNS S30360

1. SCOPE:

1.1 Form:

This specification covers a corrosion-resistant steel in the form of bars, wire, forgings, and forging stock.

1.2 Application:

These products have been used typically for parts on which the amount of machining warrants the use of a free-machining grade of steel, requiring corrosion resistance similar to 18-8 type steel, and not subjected to temperatures exceeding 700 °F (371 °C) during fabrication or in service, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2241	Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
MAM 2241	Tolerances, Metric, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
AMS 2248	Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
AMS 2371	Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.1 (Continued):

AMS 2374 Quality Assurance Sampling and Testing, Corrosion and Heat Resistant Steel and Alloy Forgings
AMS 2806 Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat Resistant Steels and Alloys
AMS 2808 Identification, Forgings

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM A 370 Mechanical Testing of Steel Products
ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

2.3 U.S. Government Publications:

Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage

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 353, by spectrochemical methods, 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	0.12	0.30
Chromium	17.00	19.00
Nickel	8.00	10.00
Lead	0.12	0.30
Molybdenum	--	0.75
Copper	--	0.75

3.1.1 Check Analysis: Composition variations shall meet the requirements of AMS 2248.

3.2 Condition:

The product shall be supplied in the following condition:

3.2.1 Bars, Wire, and Forgings: Solution heat treated free from continuous carbide network.

3.2.1.1 All hexagons, other bars 2.75 inches (69.85 mm) and under in nominal diameter or distance between parallel sides, and wire shall be cold finished.

3.2.1.2 Bars, other than hexagons, over 2.75 inches (69.85 mm) in nominal diameter or distance between parallel sides shall be hot finished.

3.2.2 Forging Stock: As ordered by the forging manufacturer.

3.3 Properties:

Bars, wire, and forgings shall conform to the following requirements; hardness and tensile testing shall be performed in accordance with ASTM A 370. Properties of forging stock shall be as agreed upon by purchaser and vendor.

3.3.1 Tensile Properties:

3.3.1.1 Hot Finished Bars: Shall be as shown in Table 2.

TABLE 2 - Minimum Tensile Properties

Property	Value
Tensile Strength	75.0 ksi (517 MPa)
Yield Strength at 0.2% Offset	30.0 ksi (207 MPa)
Elongation in 4D	40%
Reduction of Area	50%

3.3.1.2 Cold Finished Bars and Wire: Shall be as shown in Table 3.

TABLE 3A - Minimum Tensile Properties, Inch/Pound Units

Nominal Diameter or Distance Between Parallel Sides Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %	Reduction of Area %
Up to 0.500, incl	90.0	45.0	35	45
Over 0.500	75.0	30.0	40	50

TABLE 3B - Minimum Tensile Properties, SI Units

Nominal Diameter or Distance Between Parallel Sides Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %	Reduction of Area %
Up to 12.70, incl	621	310	35	45
Over 12.70	517	207	40	50

3.3.2 Hardness:

3.3.2.1 Bars: Shall be as shown in Table 4, or equivalent, determined approximately at midradius (See 8.2).

TABLE 4 - Hardness

Nominal Diameter or Distance Between Parallel Sides Inch	Nominal Diameter or Distance Between Parallel Sides Millimeters	Hardness Brinell
Up to 0.75, incl	Up to 19.0, incl	170 - 255
Over 0.75	Over 19.0	140 - 241

3.3.2.2 Forgings: Shall be not higher than 187 HB, or equivalent (See 8.2).

3.4 Quality:

The product, as received by purchaser, shall be uniform in quality and condition, sound, and, consistent with the type of steel involved, 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 re-entrant grain flow.

3.5 Tolerances:

Bars and wire shall conform to all applicable requirements of AMS 2241 or MAM 2241.

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 performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to the requirements of this specification.

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 the following:

4.3.1 Bars, Wire, and Forging Stock: AMS 2371.

4.3.2 Forgings: AMS 2374.

4.4 Reports:

4.4.1 The vendor of bars, wire, and forgings shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and the results of tests on each lot to determine conformance to the hardness and tensile property requirements. This report shall include the purchase order number, heat and lot number, AMS 5635D, size, and quantity. If forgings are supplied, the part number and the size and melt source of stock used to make the forgings shall also be included.

4.4.2 The vendor of forging stock shall furnish with each shipment a report showing the results of tests for chemical composition of each heat. This report shall include the purchase order number, heat number, AMS 5635D, size, and quantity.

4.5 Resampling and Retesting:

Shall be in accordance with the following: