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Superseding AMS5547G

Steel, Corrosion and Heat-Resistant, Sheet and Strip

15.5Cr - 4.5Ni - 2.9Mo - 0.10N

Solution Heat Treated

(Composition similar to UNS S35500)

RATIONALE

AMS5547H has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

1.1 Form

This specification covers a corrosion and heat-resistant steel in the form of sheet and strip.

1.2 Application

These products have been used typically for parts requiring oxidation resistance and high strength up to 800 °F (427 °C) and 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), or www.sae.org.

AMS 2242	Tolerances, Corrosion and Heat-Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate
AMS 2248	Chemical Check Analysis Limits, 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
AMS 2807	Identification, Carbon and Low-Alloy Steels, Corrosion and Heat-Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing

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on this Technical Report, please visit
<http://www.sae.org/technical/standards/AMS5547H>**

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, or www.astm.org.

ASTM A 370	Mechanical Testing of Steel Products
ASTM E 18	Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E 290	Bend Testing of Material for Ductility
ASTM E 353	Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron 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 353, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - COMPOSITION

Element	min	max
Carbon	0.10	0.15
Manganese	0.50	1.25
Silicon	--	0.50
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	5.00	16.00
Nickel	4.00	5.00
Molybdenum	2.50	3.25
Nitrogen	0.07	0.13

3.1.1 Check Analysis

Composition variations shall meet the applicable requirements of AMS 2248.

3.2 Melting Practice

Steel shall be multiple melted using consumable electrode practice in the remelt cycle and using only one electrode to produce a single ingot.

3.3 Condition

Cold rolled, annealed, and, unless annealed is performed in an atmosphere yielding a bright finish, descaled having a surface appearance in accordance with ASTM A 480/A 480M and AS4194 and conforming to 3.3.1 or 3.3.2 as applicable.

3.3.1 Sheet

No. 2D finish.

3.3.2 Strip

No. 1 strip finish.

3.4 Solution Heat Treatment

The product shall be solution heat treated by heating to $1900^{\circ}\text{F} \pm 25$ ($1038^{\circ}\text{C} \pm 14$), holding at heat for not less than 45 minutes per inch (1.722 minutes per mm) of nominal thickness, and quenching in water or otherwise cooling as rapidly as possible to room temperature.

3.5 Properties

The product shall conform to the following requirements: tensile, hardness, and bend testing shall be performed in accordance with ASTM A 370:

3.5.1 As Solution Heat Treated

3.5.1.1 Hardness

Shall be not higher than 35 HRC, or equivalent (See 8.3).

3.5.1.2 Bending

The product shall be tested in accordance with ASTM E 290 using a sample prepared nominally 0.75 inch (19.0 mm) in width with its axis of bending parallel to the direction of rolling and shall withstand, without cracking, bending at room temperature through an angle of 180 degrees around a diameter equal to three times the nominal thickness of the product. In case of dispute, the results of tests using the guided bend test of ASTM E 290 shall govern.

3.5.2 As Heat Treated, Sub-Zero Cooled, Austenite Conditioned, Sub-Zero Cooled, and Tempered

The product shall have the following properties after being heat treated as follows: Heat treat by heating to 1900 °F ± 25 (1038 °C ± 14), holding at heat for not less than 45 minutes per inch (25 mm) of nominal thickness, and quenching in water; cool to -100 °F (-73 °C) or colder, hold at this temperature for not less than three hours, and warm in air to room temperature; austenite condition by heating to 1750 °F ± 10 (954 °C ± 6), holding at heat for 10 to 60 minutes, and quenching in water, cool to -100 °F (-73 °C) or colder, hold at this temperature for not less than three hours, and warm in air to room temperature; temper by heating to 1000 °F ± 25 (538 °C ± 14), holding at heat for not less than three hours, and cooling in air:

3.5.2.1 Tensile Properties

Shall be as specified in Table 2.

TABLE 2A - MINIMUM TENSILE PROPERTIES, INCH/POUND UNITS

Nominal Thickness Inch	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
Up to 0.010, incl	165.0	140.0	As agreed upon
Over 0.010 to 0.1875, excl	165.0	140.0	10

TABLE 2B - MINIMUM TENSILE PROPERTIES, SI UNITS

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Up to 0.25, incl	1138	965	As agreed upon
Over 0.25 to 4.762, excl	1138	965	10

3.5.2.2 Hardness

Shall be 37 to 44 HRC, or equivalent (See 8.3) determined in accordance with ASTM E 18, but the product shall not be rejected on the basis of hardness if the tensile properties determined on specimens taken from the same sample as that with nonconforming hardness or another sample with similar nonconforming hardness are acceptable.

3.6 Quality

The product, as received by purchaser, shall be uniform in quality and condition, free of grain boundary carbides, sound, and free from foreign materials and from imperfections detrimental to usage of the product.

3.7 Tolerances

Shall conform to all applicable requirements of AMS 2242.

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

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 AMS 2371.

4.4 Reports

The vendor of the product shall furnish with each shipment a report showing the results of tests for composition of each heat and for hardness and bending as solution heat treated, and tensile properties and hardness as fully heat treated 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, AMS 5547H, size, and quantity.

4.5 Resampling and Retesting

Shall be in accordance with AMS 2371.

5. PREPARATION FOR DELIVERY

5.1 Identification

Shall be in accordance with AMS 2807.

5.2 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.

6. ACKNOWLEDGMENT

A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS

Product not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.

8. NOTES

8.1 A change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this specification. An (R) symbol to the left of the document title indicates a complete revision of the specification, including technical revisions. Change bars and (R) are not used in original publications, nor in specifications that contain editorial changes only.