

AERONAUTICAL MATERIAL SPECIFICATIONS

AMS 5551

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

Issued 6-30-60
Revised

ALLOY SHEET AND STRIP, CORROSION AND HEAT RESISTANT
Nickel Base - 19Cr - 10Co - 10Mo - 1Al - 2.5Ti
Vacuum Melted - Solution Heat Treated

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. FORM: Sheet and strip.
3. APPLICATIONS: Primarily for parts requiring high strength up to 1500 F and oxidation resistance up to 1800 F and which may be welded during fabrication.
4. COMPOSITION:

Carbon	0.10	max
Manganese	0.75	max
Silicon	0.75	max
Phosphorus	0.015	max
Sulfur	0.015	max
Chromium	18.0	- 20.0
Cobalt	9.00	- 11.00
Molybdenum	9.00	- 11.00
Titanium	2.25	- 3.00
Aluminum	0.75	- 1.30
Boron	0.003	- 0.010
Iron	5.00	max
Nickel		remainder

- 4.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2269.
5. CONDITION: Unless otherwise specified, material shall be hot or cold rolled, solution heat treated, and descaled, having a surface appearance as close as possible to a commercial corrosion resistant steel No. 2D finish; actual acceptance and rejection standards shall be as agreed upon by purchaser and vendor.
6. TECHNICAL REQUIREMENTS:
 - 6.1 Heat Treatment: Material shall be solution treated by heating to 1975 F \pm 25, holding at heat for 30 min., and cooling in air.
 - 6.2 Tensile Properties:

Tensile Strength, psi	120,000 min
Yield Strength at 0.2% Offset or at 0.0097 in.	
in 2 in. Extension Under Load (E = 31,500,000), psi	90,000 max
Elongation, % in 2 in.	25 min

- 6.2.1 For widths 9 in. and over, tensile test specimens shall be taken with the axis perpendicular to the direction of rolling. For widths less than 9 in., tensile test specimens shall be taken with the axis parallel to the direction of rolling.

6.3 Bending: Material shall withstand, without cracking, bending at room temperature, through an angle of 180 deg around a diameter equal to 1.5 times the nominal thickness of the material, with axis of bend parallel to the direction of rolling.

6.4 Properties After Precipitation Heat Treatment: Material shall be capable of meeting the following requirements after heating to 1650 F \pm 25, holding at heat for 4 hr, and cooling in air.

6.4.1 Tensile Properties at Room Temperature:

Tensile Strength, psi	160,000 min
Yield Strength at 0.2% Offset or at 0.0103 in. in 2 in. Extension Under Load (E = 31,500,000), psi	100,000 min
Elongation, % in 2 in.	10 min

6.4.1.1 Tensile Properties at 1500 F: Tensile specimens shall be heated to 1500 F \pm 10, held at 1500 F \pm 10 for 30 min. before testing, and tested at 1500 F \pm 10 at a rate of approximately 0.005 in. per in. per min. to the 0.2% yield point and shall conform to the following requirements.

Tensile Strength, psi	85,000 min
Yield Strength at 0.2% Offset or at 0.0103 in. in 2 in. Extension Under Load (E = 31,500,000), psi	70,000 min
Elongation, % in 2 in.	8 min

6.4.1.2 For widths 9 in. and over, tensile test specimens shall be taken with the axis perpendicular to the direction of rolling. For widths less than 9 in., tensile test specimens shall be taken with the axis parallel to the direction of rolling.

6.4.2 Grain Size: Shall be predominantly 3 or finer with occasional grains as large as 1 permissible, as determined by comparison of a polished and etched specimen with the chart in ASTM E-112-58T.

7. QUALITY: Material shall be produced by vacuum induction melting or by double vacuum melting. It shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.

8. TOLERANCES: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2262 as applicable.

9. REPORTS:

9.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report of the results of tests for chemical composition of each heat in the shipment and the results of tests on each thickness from each heat to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, heat number, material specification number, size, and quantity from each heat.