AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
29 West 39th Street
New York City

AMS 5542 D

Issued 9-1-47
Revised 12-1-53

ALLOY SHEET, CORROSION AND HEAT RESISTANT
Nickel Base - 15.5Cr - 7Fe - 2.5Ti - 1(Cb+Ta) - 0.7Al

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

2. APPLICATION: Primarily for parts such as turbine nozzle diaphragms, combustion chamber liners, and afterburner shells requiring high strength up to 1500 F and oxidation resistance up to 1800 F, and for bellows and flat springs requiring optimum resistance to relaxation up to 1000 F with moderate or relatively low stresses. Parts may be formed and then heat treated to improve strength at elevated temperatures. Fabrication, welding, and intended end use and temperature will dictate the heat treatments to be used.

3. COMPOSITION:

Carbon	0.08 max
Manganese	1.0 max
Silicon	0.5 max
Sulfur	0.01 max
Chromium	14.0 - 17.0
Nickel + Cobalt	70.0 min
Cobalt, if determined	1.0 max
Columbium + Tantalum	0.7 - 1.2
Titanium	2.25 - 2.75
Aluminum	0.40 - 1.0
Iron	5.0 - 9.0
Copper	0.5 max

4. CONDITION: Cold rolled, annealed, descaled and leveled.

5. TECHNICAL REQUIREMENTS:

5.1 Tensile Properties:

Nominal Thickness Inch	Tensile Strength psi, max	Yield Strength at 0.2% Offset or at Extension Indicated (E = 31,000,000) psi, max	Extension Under Load in. in 2 in.	Elongation % in 2 in., min
0.125 and under	130,000	60,000	0.0079	40
Over 0.125	130,000	65,000	0.0082	40

5.1.1 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.

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

5.3 Properties After Aging: Material shall, after aging at 1300 F ± 25 for 20 hr and air cooling, be capable of meeting the following requirements:

5.3.1 Tensile Properties:

Tensile Strength, psi	155,000 min
Yield Strength at 0.2% Offset or at 0.0105 in. in 2 in. Extension Under Load (E = 31,000,000), psi	100,000 min
Elongation, % in 2 in.	20 min

5.3.1.1 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.

5.3.2 Hardness: Material shall have hardness of Rockwell C 30-37 or equivalent.

5.4 Grain Size: The grain size shall average not over 0.0060 in. in diameter when determined in accordance with ASTM E91.

6. QUALITY: Material shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts.

7. TOLERANCES: Unless otherwise specified, tolerances for widths 4 in. and under and thicknesses 0.025 in. and over shall conform to the latest issue of AMS 2262 as applicable. Thickness tolerances shall conform to Table I and width tolerances shall conform to 4.1.

8. REPORTS:

8.1 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 of tests on each thickness from each heat to determine conformance to the requirements of Section 5. This report shall include the purchase order number, heat number, material specification number, thickness, size, and quantity from each heat.

8.2 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.