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

AMS 5542F

Issued 9-1-49
Revised 1-15-59

ALLOY SHEET AND STRIP, 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 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.

3. COMPOSITION:

Carbon	0.08 max
Manganese	1.0 max
Silicon	0.50 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	0.50 max

4. CONDITION:

4.1 Sheet: Cold rolled, annealed, descaled, and leveled as flat as possible.

4.2 Strip: Cold rolled and annealed. Strip need not be bright and may have an Ø oxidized surface.

5. TECHNICAL REQUIREMENTS:

5.1 Tensile Properties:

5.1.1 Strip:

Ø Nominal Thickness Inch	Tensile Strength psi, max	Elongation % in 2 in., min
Under 0.010	140,000	--
0.010 to 0.025, excl	130,000	20
0.025 and over	As agreed upon by purchaser and vendor	

5.1.2 Sheet:

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
0.025 to 0.125, incl	130,000	60,000	0.0079	40
Over 0.125 to 0.250, incl	130,000	65,000	0.0082	40

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

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

5.3 Grain Size: Grain size of material 0.010 in. and over in thickness shall average not over 0.0060 in. in diameter (Grain Size No. 2.5) when determined in accordance with ASTM E112-55T.

5.4 Properties After Precipitation Heat Treatment: Material shall conform to the following requirements after being precipitation heat treated by heating to 1300 F ± 25, holding at heat for 20 hr, and cooling in air:

5.4.1 Tensile Properties:

5.4.1.1 Strip:

Nominal Thickness Inch	Tensile Strength psi, min	Elongation % in 2 in., min
Under 0.010	150,000	--
0.010 to 0.025, excl	155,000	15
0.025 and over	As agreed upon by purchaser and vendor	

5.4.1.2 Sheet:

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

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

5.4.2 Hardness: Material 0.005 in. and over in thickness shall have hardness not lower than Rockwell C 30 or equivalent.

6. QUALITY: Material 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.