

# AEROSPACE

# AMS 5541A

## MATERIAL SPECIFICATIONS

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

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ALLOY SHEET, CORROSION AND HEAT RESISTANT  
Nickel Base - 15.5Cr - 2.5Ti - 0.7Al - 7Fe

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. 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	0.7 max
Sulfur	0.01 max
Chromium	14.0 - 17.0
Nickel + Cobalt	70.0 min
Cobalt, if determined	1.0 max
Titanium	2.0 - 2.75
Aluminum	0.40 - 1.0
Iron	5.0 - 9.0
Copper	0.50 max

- 3.1 **Check Analysis:** Composition variations shall meet the requirements of the latest issue of AMS 2269.

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

5. **TECHNICAL REQUIREMENTS:**

- 5.1 **Tensile Properties:**

Ø	Nominal Thickness Inch	Tensile	Elongation
		Strength psi, max	% in 2 in. min
	0.010 to 0.024, incl	130,000	30
	Over 0.024 to 0.250, incl	125,000	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 deg around a diameter equal to the nominal thickness of the material, with axis of bend parallel to the direction of rolling.

Section 8.3 of the SAE Technical Board rules provides that: "All technical rules including standards approved and practices recommended, are advisory only. The use by anyone engaged in industry or trade is entirely voluntary. There is no obligation to conform to or be guided by any technical report. In formulating and applying technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against infringement of patents."

5.3 Grain Size: Grain size shall average not over 0.0060 in. in diameter (Grain Size No. 25) when determined in accordance with ASTM E112-60T.

5.4 Properties After Precipitation Heat Treatment: Material shall be capable of meeting the following requirements, after being precipitation heat treated by heating to 1300 F + 25, holding at heat for 16 hr, and cooling in air:

5.4.1 Tensile Properties:

φ Yield Strength at 0.2% Offset or at Extension Indicated  
Tensile Strength at (E<sub>T</sub> = 31,000,000) Elongation  
Nominal Thickness Strength Extension Under Load % in 2 in.  
 Inch psi, min psi, min

Nominal Thickness Inch	Strength psi, min	Extension Under Load psi, min	Elongation % in 2 in.
0.010 to 0.024, incl	140,000	90,000	0.0098
Over 0.024 to 0.250, incl	140,000	90,000	0.0098

5.4.1.1 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.

5.4.2 Hardness: Shall be not lower than Rockwell C 23 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.

7. TOLERANCES: Unless otherwise specified, tolerances for widths 1/4 in. and under and thicknesses 0.010 in. and over shall conform to all applicable requirements of the latest issue of AMS 2262.

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 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, 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.