

AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 5540 B

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ALLOY AND SHEET AND STRIP, CORROSION AND HEAT RESISTANT
Nickel Base - 15Cr - 7Fe

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1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **FORM:** Sheet, strip, and plate.
3. **APPLICATION:** This material is intended for applications requiring resistance to high temperatures during fabrication or in service where oxidation resistance superior to that of the 18-8 type of steel is desired.

4. COMPOSITION:	<u>Type A</u>	<u>Type B</u>
Carbon	0.15 max	0.15 max
Manganese	1.0 max	1.0 max
Silicon	0.50 max	0.50 max
Chromium	13.0 - 16.0	16.0 - 18.0
Nickel*	74.0 min	72.0 min
Iron	9.0 max	9.5 max
Copper	0.50 max	0.50 max

*Cobalt calculated as nickel.

Type A shall be supplied to this specification unless otherwise agreed between purchaser and vendor.

5. **CONDITION:** Unless otherwise specified, cold rolled, annealed, and pickled.
6. **TECHNICAL REQUIREMENTS:** (a) Physical Properties. - Material shall have the following physical properties:

Tensile Strength, psi	80,000 - 100,000
Yield Strength at 0.2% Offset or at 0.0059 inch in 2 in. Extension Under Load, psi	30,000 min
Elongation, % in 2 in.	40 min

Yield strength and elongation requirements do not apply to sheet or strip under 0.020 in. in thickness. For widths 9 inches and over, tensile test specimens shall be taken with the axis perpendicular to the direction of rolling. For widths less than 9 inches, tensile test specimens shall be taken with the axis parallel to the direction of rolling.

(b) Bending. - Material shall withstand, without cracking, bending at room temperature through an angle of 180 degrees around a diameter equal to the thickness of the material, with axes of bends both perpendicular and parallel to the direction of rolling.

(c) Grain Size. - The grain size shall be fine to medium and shall average not over 0.0028 inch in diameter when determined in accordance with ASTM E2-44T.

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- 7. **QUALITY:** The produce shall be uniform in quality and condition, clean, sound, and free from foreign material and from internal and external defects detrimental to fabrication or to the performance of parts. Material in which defects are revealed during fabrication will be subject to rejection.
- 8. **TOLERANCES:** Unless otherwise specified, tolerances for sheet and strip shall conform to the following:

(a) Thickness. -

TABLE I
SHEET

Nominal Thickness Inch	Width Inches	Tolerance, Inch Plus and Minus
0.018 to 0.021, incl	Over 14 to 36, incl	0.002
Over 0.021 to 0.028, incl	Over 14 to 44, incl	0.002
Over 0.028 to 0.031, incl	Over 14 to 54, incl	0.002*
Over 0.031 to 0.034, incl	Over 14 to 56, incl	0.002*
Over 0.034 to 0.037, incl	Over 14 to 58, incl	0.003*
Over 0.037 to 0.062, incl	Over 14 to 60, incl	0.003*
Over 0.062 to 0.125, incl	Over 14 to 60, incl	0.004*
Over 0.125 to 0.187, incl	Over 14 to 60, incl	0.005*
Over 0.187 to 0.218, incl	Over 14 to 56, incl	0.006*
Over 0.218 to 0.234, incl	Over 14 to 56, incl	0.007*
Over 0.234 to 0.250, incl	Over 14 to 56, incl	0.008*

*For sheets over 48 inches in width in thicknesses 0.100 inch and under, an additional tolerance of plus 0, minus 0.002 inch shall be permitted; and sheets over 48 inches in width in thicknesses over 0.100 inch, a tolerance of plus and minus 5% of the ordered thickness shall be permitted.

TABLE II
STRIP

Nominal Thickness Inch	Tolerance, Inch, Plus and Minus	
	Width Range, Inches	
	3 and Under	Over 3 to 14, incl
0.005 and under	0.0003	0.0005
Over 0.005 to 0.009, incl	0.0005	0.0008
Over 0.009 to 0.050, incl	0.001	0.001
Over 0.050 to 0.093, incl	0.0015	0.0015
Over 0.093 to 0.125, incl	0.0025	0.0025
Over 0.125 to 0.156, incl	0.003	0.003
Over 0.156 to 0.250, incl	0.004	0.004

(b) Width. -

- (1) Sheet-widths over 14 inches.- Sheet shall not vary from ordered width by more than plus 1/8 inch, minus 0.
- (2) Strip-widths 14 inches and under.-

TABLE III

Nominal Width Inches	Nominal Thickness Inch	Tolerance, Inch Plus and Minus
0.25 to 6, incl	Under 0.010	0.005
0.25 to 8, incl	0.010 to 0.012, excl	0.007
0.25 to 10, incl	0.012 to 0.015, excl	0.007
0.25 to 12, incl	0.015 to 0.018, excl	0.007
0.25 to 14, incl	0.018 to 0.076, excl	0.007
0.50 to 14, incl	0.076 to 0.101, excl	0.009
0.50 to 14, incl	0.101 to 0.126, excl	0.012

- (c) Length. - Flat sheet and strip shall not vary from ordered length by more than plus 1/8 inch, minus 0.
- (d) Straightness. - Flat sheet and strip shall be of such straightness that the maximum edgewise curvature (depth of arc) shall not exceed 0.40 inch in any 8 feet of length, or 0.05 inch x length in feet for shorter lengths.

9. REPORTS: (a) Unless otherwise specified, the vendor of the product shall furnish three copies of a notarized report of the chemical composition of each heat in each shipment and the results of tests on each thickness from each heat to determine conformance to the physical property and bending requirements of this specification. This report shall include the purchase order number, heat number, material specification number, thickness, size, and quantity from each heat.

(b) Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a notarized 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 certification that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

10. IDENTIFICATION: (a) Unless otherwise specified, each sheet, strip, and plate shall be marked with AMS 5540B, manufacturer's identification, and nominal thickness in inches. The characters shall be not less than 3/8 in. in height, and shall be applied to the material by suitable marking fluid. Marking fluid used shall be capable of being removed in hot alkaline cleaning solution without rubbing. The characters shall be legible upon receipt of material by purchaser, and shall be sufficiently stable to withstand ordinary handling.

(1) Plate, flat sheet, and flat strip over 6 in. in width shall be marked in rows of recurring symbols, with rows parallel to the direction of rolling and spaced approximately 3 in. apart with alternate rows staggered.