

# AEROSPACE MATERIAL SPECIFICATIONS

## AMS 5549A

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

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### STEEL PLATE, CORROSION AND MODERATE HEAT RESISTANT 15.5Cr - 4.5Ni - 2.9Mo - 0.10N Solution Heat Treated

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 and assemblies requiring high strength and oxidation resistance up to 800 F (425 C) and where parts require welding during fabrication. This material has better formability but lower machinability than AMS 5594.
3. **COMPOSITION:**

	min	max
Carbon	0.10	0.15
Manganese	0.50	1.25
Silicon	--	0.50
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	15.00	16.00
Nickel	4.00	5.00
Molybdenum	2.50	3.25
Nitrogen	0.07	0.13

- 3.1 **Check Analysis:** Composition variations shall meet the requirements of the latest issue of AMS 2248.
4. **CONDITION:** Hot rolled, solution heat treated, and descaled.
5. **TECHNICAL REQUIREMENTS:**
  - 5.1 **Heat Treatment:** Unless otherwise specified, material shall be solution heat treated by  $\emptyset$  heating to  $1900\text{ F} \pm 25$  ( $1037.8\text{ C} \pm 14$ ), holding at heat for 1 - 3 hr, and quenching in water.
  - 5.2 **Bending:** Material shall withstand, without cracking, bending at room temperature through the angle indicated below around a diameter equal to 3 times the nominal thickness, with axis of bend parallel to direction of rolling.

Nominal Thickness Inches	Angle deg, min
Over 0.187 to 0.249, incl	130
Over 0.249 to 0.750, incl	90

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

5.4 Properties After Heat Treatment: Material shall conform to the following requirements when heat treated as follows: Solution heat treat by heating to  $1900\text{ F} \pm 25$  ( $1037.8\text{ C} \pm 14$ ), holding at heat for 1 - 3 hr, and quenching in water; cool to not higher than  $-100\text{ F}$  ( $-74\text{ C}$ ), hold at this temperature for not less than 3 hr, and warm in air to room temperature; austenite condition by heating to  $1750\text{ F} \pm 10$  ( $954.4\text{ C} \pm 5.6$ ), holding at heat for not less than 10 min, but not more than 1 hr, and quenching in water or otherwise cooling as rapidly as possible to room temperature; cool to not higher than  $-100\text{ F}$  ( $-74\text{ C}$ ), hold at the temperature for not less than 3 hr, and warm in air to room temperature; temper by heating to  $1000\text{ F} \pm 25$  ( $537.8\text{ C} \pm 14$ ), holding at heat for not less than 3 hr, and cooling in air.

5.4.1 Tensile Properties:

Tensile Strength, psi	165,000 min
Yield Strength at 0.2% Offset or at 0.0137 in. in 2 in. Extension Under Load (E = 29,000,000), psi	140,000 min
Elongation, % in 2 in. or 4D	12 min

5.4.2 Hardness: Rockwell C37 - 44 or equivalent.

6. QUALITY: Material shall be multiple melted using consumable electrode practice in the remelt cycle, unless otherwise permitted. The product shall be uniform in quality and condition, essentially free of grain boundary carbides, 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 shall conform to all applicable requirements of the latest issue of AMS 2242.

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.