

# AERONAUTICAL MATERIAL SPECIFICATIONS

**AMS 5510F**

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## STEEL SHEET AND STRIP, CORROSION AND HEAT RESISTANT 18Cr - 10Ni - Ti (SAE 30321)

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: Primarily for parts and assemblies requiring both corrosion and heat resistance, especially where such parts and assemblies require welding during fabrication. Parts and assemblies requiring oxidation resistance up to approximately 1500 F but useful at this temperature only when stresses are low.

4. COMPOSITION:

### Check Analysis Under Min or Over Max

|            |       |         |      |       |
|------------|-------|---------|------|-------|
| Carbon     | 0.08  | max     | --   | 0.01  |
| Manganese  | 2.00  | max     | --   | 0.04  |
| Silicon    | 0.40  | - 1.00  | 0.05 | 0.05  |
| Phosphorus | 0.040 | max     | --   | 0.005 |
| Sulfur     | 0.030 | max     | --   | 0.005 |
| Chromium   | 17.00 | - 19.00 | 0.20 | 0.20  |
| Nickel     | 8.00  | - 11.00 | 0.15 | 0.15  |
| Titanium   | 6xC   | - 0.70  | 0.05 | 0.05  |
| Molybdenum | 0.50  | max     | --   | 0.03  |
| Copper     | 0.50  | max     | --   | 0.03  |

5. CONDITION:

- 5.1 Sheet: Cold rolled, solution heat treated, and descaled (No. 2D Finish).
- 5.2 Strip: Cold rolled, solution heat treated, and descaled (No. 1 Strip Finish).
- 5.3 Plate: Hot rolled, solution heat treated, and descaled.

6. TECHNICAL REQUIREMENTS:

- 6.1 Tensile Properties:

|                        |             |
|------------------------|-------------|
| Tensile Strength, psi  | 100,000 max |
| Elongation, % in 2 in. | 40 min      |

- 6.1.1 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.

- 6.2 Bending: Material shall withstand, without cracking, bending at room temperature through the angle indicated below, around a diameter equal to the nominal thickness of the material, with axis of bend parallel to the direction of rolling.

| Nominal Thickness<br>Inch | Type of Bend | Angle<br>deg, min | Bend Factor |
|---------------------------|--------------|-------------------|-------------|
| 0.249 and under           | Free Bend    | 180               | 1           |
| 0.249 and under           | V-Block      | 135               | 1           |
| Over 0.249 to 0.749, incl | Free Bend    | 90                | 1           |
| Over 0.249 to 0.749, incl | V-Block      | 135               | 2           |

- 6.3 Embrittlement: Material shall be capable of meeting the following test:

- 6.3.1 Test specimens, after being heated at 1200 F + 10 for 2 hr and air cooled, shall withstand immersion for 48 hr in a boiling aqueous solution containing 100 g of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  and 100 ml of  $\text{H}_2\text{SO}_4$  (sp gr 1.84) per liter of solution under a reflux condenser, without evidence of intercrystalline surface attack. After such immersion, the specimens shall withstand bending as in 6.2.

7. 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.

8. TOLERANCES: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2242 as applicable and as specified below:

- 8.1 Thickness: Tables I and III.

- 8.2 Flatness: Sheet and strip, Table VI.

## 9. REPORTS:

- 9.1 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 tensile 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.
- 9.2 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.
10. IDENTIFICATION: Unless otherwise specified, each plate, sheet, and strip shall be marked, in the respective location indicated below, with AMS 5510F, manufacturer's identification, heat number, and nominal thickness in inches. The characters shall be not less than 3/8 in. in height, shall be applied using a suitable marking fluid, and shall be capable of being removed in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the material or its performance. The characters shall be sufficiently stable to withstand ordinary handling.