

# AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.  
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## AMS5532A

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ALLOY SHEET, CORROSION AND HEAT RESISTANT  
Iron Base - 20Cr - 20Ni - 20Co - 3Mo - 2W - 1Cb

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **APPLICATION:** Parts, such as welded nozzle diaphragm assemblies, burner liner parts, tail pipes, exhaust cone assemblies, and other parts requiring high strength up to approximately 1500 F, and oxidation resistance up to 1800 F.
3. **COMPOSITION:**

|            |               |  | Check Analysis |             |
|------------|---------------|--|----------------|-------------|
|            |               |  | Under Min      | or Over Max |
| Carbon     | 0.20 max      |  | —              | 0.01        |
| Manganese  | 1.00 - 2.00   |  | 0.04           | 0.04        |
| Silicon    | 1.00 max      |  | —              | 0.05        |
| Phosphorus | 0.040 max     |  | —              | 0.005       |
| Sulfur     | 0.030 max     |  | —              | 0.005       |
| Chromium   | 20.00 - 22.50 |  | 0.25           | 0.25        |
| Nickel     | 19.00 - 21.00 |  | 0.20           | 0.20        |
| Cobalt     | 18.50 - 21.00 |  | 0.20           | 0.20        |
| Molybdenum | 2.50 - 3.50   |  | 0.10           | 0.10        |
| Tungsten   | 2.00 - 3.00   |  | 0.10           | 0.10        |
| Columbium  | 0.75 - 1.25   |  | 0.05           | 0.05        |
| Nitrogen   | 0.10 - 0.20   |  | 0.01           | 0.01        |
| Iron       | Remainder     |  |                |             |

4. **CONDITION:** Unless otherwise specified, material shall be hot rolled, annealed, and pickled, having a surface appearance as close as possible to a commercial corrosion resistant steel No. 2D finish; standards for acceptance and rejection shall be as agreed upon by purchaser and vendor.

### 5. TECHNICAL REQUIREMENTS:

#### 5.1 Physical Properties:

|                        |                   |
|------------------------|-------------------|
| Tensile Strength, psi  | 100,000 - 140,000 |
| Elongation, % in 2 in. | 40 min            |

Note: 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.

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- 5.2 Bending: Material shall withstand, without cracking, bending at room temperature through the angle indicated below around a diameter equal to the bend factor times the nominal thickness of the material, with axes of bends both perpendicular and parallel to the direction of rolling.

| Nominal Thickness<br>Inch | Angle, Degrees<br>Min | Bend Factor |
|---------------------------|-----------------------|-------------|
| Under 0.050               | 180                   | 1           |
| 0.050 and over            | 180                   | 2           |

- 5.3 Stress-Rupture Test at 1500 F: Sheet shall be capable of meeting the following requirements:

- 5.3.1 A tensile test specimen, maintained at  $1500\text{ F} \pm 5$  while an axial load of 18,000 psi is applied continuously, shall not rupture in less than 24 hours. The test shall be continued, after the 24 hours, until the specimen ruptures, either maintaining the same load or increasing the load to not over 25,000 psi as necessary to produce rupture. In either case, the elongation after rupture, measured at room temperature, shall be not less than 10% in 2 in.

6. QUALITY: Material shall be uniform in quality and condition, clean, sound, smooth, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts.

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

- 7.1 Thickness: Table I.

- 7.2 Flatness: Table VIII.

8. REPORTS:

- 8.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a notarized report of the results of tests for chemical composition of each heat in each shipment and the results of tests on each thickness from each lot to determine conformance to the physical property and bending requirements of this specification. This report shall include the purchase order number, lot number, material specification number, thickness, size and quantity from each lot. A lot shall be considered to be any number of individual furnace heats of approximately the same composition which are processed as a unit.

- 8.2 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.