

**AEROSPACE
MATERIAL
SPECIFICATION**

AMS5533A

Issued 7-1-48
Revised 10-1-82

UNS R30590

ALLOY SHEET, STRIP, AND PLATE, CORROSION AND HEAT RESISTANT
Iron Base - 20Cr - 20Ni - 20Co - 4Mo - 4W - 4Cb

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of 10-1-82. It is recommended, therefore, that this specification not be specified for new designs.

This cover sheet should be attached to the "A" revision of the subject specification.

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This specification has been declared "CANCELLED" by the Aerospace Materials Division, SAE, as of 1-15-81. By this action, subject specification number and title will be deleted from the active specification index of Aerospace Material Specifications.

This specification is under the jurisdiction of AMS Committee "F".

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AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
29 West 39th Street
New York City

AMS 5533A

Issued 7-1-48

Revised 6-15-50

ALLOY SHEET AND STRIP, CORROSION AND HEAT RESISTANT
Iron Base - 20Cr - 20Ni - 20Co - 4Mo - 4W - 4Cb

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:** Parts and assemblies, such as welded turbine nozzle assemblies, burner liner parts, tail pipes, exhaust cone assemblies, and hollow turbine buckets or blades, requiring high strength up to 1500 F and oxidation resistance up to 1800 F.
4. **COMPOSITION:**

		Check Analysis	
		Under	Min or Over Max
Carbon	0.38 - 0.48	0.00	0.00
Manganese	2.00 max	--	0.04
Silicon	1.00 max	--	0.05
Phosphorus	0.040 max	--	0.005
Sulfur	0.030 max	--	0.005
Chromium	19.00 - 22.00	0.25	0.25
Nickel	18.50 - 21.50	0.20	0.20
Cobalt	18.50 - 21.50	0.10	0.10
Molybdenum	3.50 - 4.50	0.10	0.10
Tungsten	3.50 - 4.50	0.05	0.05
Columbium + Tantalum	3.50 - 4.50	--	0.03
Copper	0.50 max	--	--
Iron	remainder		

5. **CONDITION:** Unless otherwise specified, material shall be hot rolled with or without subsequent cold reduction, solution heat treated, 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.

6. **TECHNICAL REQUIREMENTS:**

- 6.1 **Heat Treatment:** Material shall be heated to 2150 F $\pm$ 20, followed by air cooling.

6.2 **Physical Properties:**

Tensile Strength, psi	130,000 max
Elongation, % in 2 in.	25 min
Hardness, Rockwell B	105 max

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.

- 6.3 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 Inch	Angle, Degrees Min	Bend Factor
Under 0.050	180	1.5
0.050 and over	90	2.0

7. QUALITY: Material shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external defects 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. Thickness and flatness tolerances shall be as specified below:

8.1 Thickness: Tables I and III A.

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 chemical composition of each heat in the 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.
- 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 sheet, strip, and plate shall be marked with AMS 5533A, manufacturer's identification, 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.