

AERONAUTICAL MATERIAL SPECIFICATIONS

AMS 7850

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Issued 6-30-60
Revised

COLUMBIUM SHEET AND STRIP

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. FORM: Sheet, strip, plate, and foil.
3. APPLICATION: Primarily for parts and assemblies requiring exposure at ultra high temperatures. Applications in oxidizing atmospheres necessitate a protective coating.
4. COMPOSITION:

Tantalum	0.15	max
Carbon	0.05	max
Zirconium	0.04	max
Silicon	0.02	max
Iron	0.02	max
Titanium	0.01	max
Oxygen	0.08	(800 ppm) max
Nitrogen	0.04	(400 ppm) max
Hydrogen	0.005	(50 ppm) max
Columbium		remainder

5. CONDITION: Unless otherwise specified, material shall be supplied in the following conditions:

- 5.1 Sheet, Strip, and Foil: Cold rolled.
- 5.2 Plate: Cold rolled or hot-cold rolled, and descaled.

6. TECHNICAL REQUIREMENTS:

- 6.1 As Received: Tensile properties and hardness shall be as agreed upon by purchaser and vendor.
- 6.2 Properties after Heat Treatment: Material annealed under vacuum (less than 0.1 micron mercury) or inert atmosphere or with suitable protective coating shall conform to the following requirements.
 - 6.2.1 Tensile Properties: These properties apply to tensile test specimens taken from sheet, strip, and plate with the axis parallel to direction of rolling. Rate of strain shall be maintained at 0.003 - 0.007 in. per in. per min. through the yield strength and at a rate of 0.05 in. per in. per min. above the yield strength.

Tensile Strength, psi	30,000 min
Elongation, % in 2 in.	18 min

Note. These properties apply only to material 0.010 in. or more in thickness.

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 intent 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 approving 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 infringement of patents."

- 6.2.2 Hardness: Shall be not higher than Vickers 160 or equivalent.
- 6.2.3 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 Inch	Angle deg, min
0.249 and under	180
Over 0.249 to 0.749	90

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. TOLERANCE: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2242 as applicable.
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 (or batch if made by powder compacting) in the shipment and the results of tests on each thickness from each heat or batch to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, heat or batch number, material specification number, thickness, size, and quantity from each heat or batch.
- 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 copies of laboratory reports showing the results of tests to determine conformance.
10. IDENTIFICATION: Unless otherwise specified, each plate, sheet, strip, and foil shall be marked, in the respective location indicated below, with AMS 7850, heat or batch number, 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 solvent 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.
- 10.1 Plate, Flat Sheet, and Flat Strip Over 6 in. in Width: Shall be marked in lengthwise rows of characters recurring at intervals not greater than 3 in., the rows being spaced not more than 1-1/2 in. apart and alternately staggered. Heat or batch number shall occur at least 3 times across the width of the product and at intervals not greater than 2 ft along the length.