

AEROSPACE MATERIAL SPECIFICATION



AMS 7897C

Issued	SEP 1966
Noncurrent	MAR 1994
Cancelled	JUL 2002

Superseding AMS 7897B

Tungsten Forgings
Pressed, Sintered, and Forged

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1. SCOPE:

1.1 Form:

This specification covers tungsten in the form of forgings produced from billets processed by isostatically cold pressing, utilizing hydrogen reduced tungsten powder, and high-temperature sintering.

1.2 Application:

Primarily for rocket nozzle inserts and other parts exposed to ultra high temperatures.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2375 Control of Forgings Requiring First Article Approval
AMS 2350 Standards and Test Methods
AMS 2630 Ultrasonic Inspection, Product Over 0.5 in. (12.5 mm) Thick
AMS 2645 Fluorescent Penetrant Inspection

2.2 ASTM Publications:

Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM B311 Density of Cemented Carbides
ASTM E18 Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E21 Elevated Temperature Tension Tests of Metallic Materials

2.3 U.S. Government Publications:

Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-163 - Steel Mill Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the following percentages by weight; carbon shall be determined conductometrically, nitrogen and oxygen by the vacuum fusion or conductometric method, hydrogen by the vacuum extraction method, and metallic elements by spectrographic or other analytical methods approved by purchaser:

	min	max
Molybdenum	--	0.010
Carbon	--	0.006
Iron	--	0.003
Aluminum	--	0.003
Nickel	--	0.002
Silicon	--	0.002
Oxygen	--	0.005 (50 ppm)
Nitrogen	--	0.002 (20 ppm)
Hydrogen	--	0.001 (10 ppm)
Other Elements, each	--	0.001
Tungsten	remainder	

3.2 Condition:

Stress relieved and descaled, Forgings shall be stress relieved at such temperatures and for such times and cooling rates as may be necessary to meet the requirements of 3.3 and 3.4.

3.3 Properties:

The forgings shall conform to the following requirements:

3.3.1 Hardness: Shall be 36 - 45 HRC, or equivalent, determined in accordance with ASTM E18 on forgings or representative coupons removed from forgings.

3.3.2 Tensile Properties at 400°F (205°C): Shall be as shown in Table I, determined in accordance with ASTM E21 on specimens tested at 400°F ± 10 (205°C ± 5).

TABLE I

	Longitudinal	Transverse
Tensile Strength, min	105,000 psi (725 MPa)	100,000 psi (690 MPa)
Elongation in 4D, min	10%	4%