



AEROSPACE MATERIAL SPECIFICATION

AMS4919™**REV. K**Issued 1978-04
Revised 2024-04

Superseding AMS4919J

Titanium Alloy Sheet, Strip, and Plate
6Al - 2Sn - 4Zr - 2Mo - 0.08Si
Duplex Annealed
(Composition similar to UNS R56420)

RATIONALE

AMS4919K results from a Five-Year Review and update of this specification with changes to update wording to prohibit unauthorized exceptions (see 3.5.1.3 and 8.4), relocate Definitions (see 2.3), and update Applicable Documents (see Section 2), Bending (see 3.5.2), and Ordering Information (see 8.6).

1. SCOPE

1.1 Form

This specification covers a titanium alloy in the form of sheet, strip, and plate 0.025 to 3.000 inches (0.64 to 76.20 mm), inclusive, in nominal thickness (see 8.6).

1.2 Application

These products have been used typically for parts requiring a combination of high strength and toughness and good creep resistance up to 1000 °F (538 °C), but usage is not limited to such applications.

1.2.1 Certain processing procedures and service conditions may cause these products to become subject to stress-corrosion cracking; ARP982 recommends practices to minimize such conditions.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2242 Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium and Titanium Alloy Sheet, Strip, and Plate

AMS2249 Chemical Check Analysis Limits, Titanium and Titanium Alloys

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Full document details: SAE AMS4919K

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS4919K>

Documents

Sharing Hub

AMS2368	Sampling and Testing of Wrought Titanium Raw Material, Except Forgings and Forging Stock
AMS2631	Ultrasonic Inspection, Titanium and Titanium Alloy Bar, Billet, and Plate
AMS2750	Pyrometry
AMS2809	Identification, Titanium and Titanium Alloy Wrought Products
ARP982	Minimizing Stress-Corrosion Cracking in Wrought Titanium Alloy Products
AS1814	Terminology for Titanium Microstructures
AS4194	Sheet and Strip Surface Finish Nomenclature
AS6279	Standard Practice for Production, Distribution, and Procurement of Metal Stock
AS7766	Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM A480/A480M General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip

ASTM E8/E8M	Tension Testing of Metallic Materials
ASTM E21	Elevated Temperature Tension Tests of Metallic Materials
ASTM E290	Bend Testing of Material for Ductility
ASTM E384	Microindentation Hardness of Materials
ASTM E539	Analysis of Titanium Alloys by Wavelength Dispersive X-Ray Fluorescence Spectrometry
ASTM E1409	Determination of Oxygen and Nitrogen in Titanium and Titanium Alloys by Inert Gas Fusion
ASTM E1447	Determination of Hydrogen in Reactive Metals and Reactive Metal Alloys by Inert Gas Fusion with Detection by Thermal Conductivity or Infrared Spectrometry
ASTM E1941	Determination of Carbon in Refractory and Reactive Metals and Their Alloys by Combustion Analysis
ASTM E2371	Analysis of Titanium and Titanium Alloys by Direct Current Plasma and Inductively Coupled Atomic Emission Spectrometry (Performance-Based Test Methodology)
ASTM E2994	Analysis of Titanium and Titanium Alloys by Spark Atomic Emission Spectrometry and Glow Discharge Atomic Emission Spectrometry (Performance-Based Method)

2.3 Definitions

Terms used in AMS are defined in AS7766 and as follows:

2.3.1 Oil-Can

An excess of material in a localized area of a sheet that causes the sheet to buckle in that area. When the sheet is placed on a flat surface and hand pressure is applied to the buckle, the buckle will spring through to the opposite surface or spring up in another area of the sheet.

2.3.2 Terminology for titanium microstructure is presented in AS1814.

2.3.3 Commercial corrosion-resistant steel finishes are defined in ASTM A480/A480M and AS4194.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1; carbon shall be determined in accordance with ASTM E1941, hydrogen in accordance with ASTM E1447, oxygen and nitrogen in accordance with ASTM E1409, and other elements in accordance with ASTM E539, ASTM E2371, or ASTM E2994. Other analytical methods may be used if acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max	
Aluminum	5.50	6.50	
Zirconium	3.60	4.40	
Molybdenum	1.80	2.20	
Tin	1.80	2.20	
Silicon	0.06	0.10	
Iron	--	0.25	
Oxygen	--	0.12	
Carbon	--	0.05	
Nitrogen	--	0.05	(500 ppm)
Hydrogen	--	0.0150	(150 ppm)
Yttrium (see 3.1.1)	--	0.005	(50 ppm)
Residual Elements, each (see 3.1.1)	--	0.10	
Residual Elements, total (see 3.1.1)	--	0.30	
Titanium	remainder		

3.1.1 Determination not required for routine acceptance.

3.1.2 Hydrogen content shall be determined in accordance with ASTM E1447 or other method acceptable to the purchaser, on a sample from each lot after completion of all thermal and chemical processing.

3.1.3 Check Analysis

Composition variations shall meet the applicable requirements of AMS2249.

3.2 Quality

Alloy shall be multiple melted. Melting cycle(s) prior to the final melting cycle shall be by vacuum consumable electrode, nonconsumable electrode, electron beam cold hearth, or plasma arc cold hearth melting practice(s). The final melting cycle shall be made using vacuum arc remelting (VAR) with no alloy additions permitted.

3.2.1 The atmosphere for nonconsumable electrode melting shall be vacuum or shall be inert gas at a pressure not higher than 1000 mm of mercury.

3.2.2 The electrode tip for nonconsumable electrode melting shall be water-cooled copper.

3.3 Condition

The product shall be supplied in the following condition: