



AEROSPACE MATERIAL SPECIFICATION

AMS4975™**REV. R**Issued 1968-05
Revised 2025-09

Superseding AMS4975P

Titanium Alloy, Bars, Wire, and Rings,
6.0Al - 2.0Sn - 4.0Zr - 2.0Mo - 0.08Si,
Solution and Precipitation Heat Treated
(Composition similar to UNS R54620)

RATIONALE

AMS4975R results from a Five-Year Review and update of this specification with changes to relocate Definitions (see 2.3), add standard note regarding alpha case (see 8.3), and update Applicable Documents (see Section 2), Sampling and Testing (see 4.3), and Ordering Information (see 8.6).

1. SCOPE

1.1 Form

This specification covers a titanium alloy in the form of bars, wire, flash-welded rings 3.00 inches (76.2 mm) and under in nominal diameter or least distance between parallel sides and 16 square inches (103 cm²) and under in cross-sectional area, and stock of any size for flash-welded rings (see 8.6).

1.2 Application

These products have been used typically for parts requiring 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 (U.S. and Canada only) or +1 724-776-4970 (outside U.S. and Canada), www.sae.org.

AMS2241 Tolerances, Corrosion- and Heat-Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire

AMS2249 Chemical Check Analysis Limits, Titanium and Titanium Alloys

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2025 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, or used for text and data mining, AI training, or similar technologies, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
<http://www.sae.org>

SAE WEB ADDRESS:

Full document details: [SAE AMS4975R](http://www.sae.org/standards/content/AMS4975R/)

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS4975R/>

Documents

Standard, visit Sharing Hub

AMS2750	Pyrometry
AMS2809	Identification, Titanium and Titanium Alloy Wrought Products
AMS7498	Rings, Flash Welded, Titanium and Titanium Alloys
ARP982	Minimizing Stress-Corrosion Cracking in Wrought Titanium Alloy Products
AS1814	Terminology for Titanium Microstructures
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 E8/E8M	Tension Testing of Metallic Materials
ASTM E21	Elevated Temperature Tension Tests of Metallic Materials
ASTM E139	Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic 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 Plasma 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.

2.3.1 Terminology relating to titanium microstructures is presented in AS1814.

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
Oxygen	--	0.15
Iron	--	0.10
Carbon	--	0.05
Nitrogen	--	0.05 (500 ppm)
Hydrogen (see 3.1.1)	--	0.0125 (125 ppm)
Yttrium (see 3.1.2)	--	0.005 (50 ppm)
Other Elements, each (see 3.1.2)	--	0.10
Other Elements, total (see 3.1.2)	--	0.30
Titanium	remainder	

3.1.1 Hydrogen content of rings may be as high as 0.0150 (150 ppm).

3.1.2 Determination not required for routine acceptance.

3.1.3 Check Analysis

Composition variations shall meet the applicable requirements of AMS2249.

3.2 Melting Practice

Alloy shall be multiple melted. The first melt shall be made by vacuum consumable electrode, nonconsumable electrode, electron beam cold hearth, or plasma arc cold hearth melting practice. The subsequent melt or melts shall be made using vacuum arc remelting (VAR) practice. Alloy additions are not permitted in the final VAR melt.

3.2.1 The atmosphere for nonconsumable electrode melting shall be vacuum or shall be argon and/or helium at an absolute 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:

3.3.1 Bars

Hot finished with or without subsequent cold reduction, solution and precipitation heat treated, and descaled. The product shall be processed to the final thickness/diameter by metallurgical working operations prior to any straightening, dimensional sizing, or surface finishing operations. Bar shall not be cut from plate.

3.3.2 Wire

Cold drawn, solution and precipitation heat treated, and descaled.

3.3.3 Flash-Welded Rings

Solution and precipitation heat treated and, when so specified, descaled.

3.3.3.1 Flash-welded rings, when supplied, shall be manufactured in accordance with AMS7498.