



AEROSPACE MATERIAL SPECIFICATION	AMS2249™	REV. J
	Issued 1961-01 Reaffirmed 2013-10 Revised 2019-04 Superseding AMS2249H	
Chemical Check Analysis Limits Titanium and Titanium Alloys		

RATIONALE

AMS2249J returns the header for “iron” in Table 1. AMS2249J is a Five-Year Review and update of this specification that added ASTM E2994.

1. SCOPE

1.1 Form

This specification defines limits of variation for determining acceptability of the composition of cast or wrought titanium and titanium alloy parts and material acquired from a producer.

1.2 Application

- 1.2.1 When specifically referenced in the material specification, the purchaser may apply check analysis limits to determine the acceptability of parts and materials at purchaser final acceptance or verification testing operation.
- 1.2.2 Check analysis limits are not for producers use at producer’s acceptance testing. Composition of parts and materials must conform to the limits of the material specification. Check limits are not permitted for ladle or ingot analysis.

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.

ARP1917 Clarification of Terms Used in Aerospace Metals Specifications

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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 E539 Analysis of Titanium Alloys by 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 Titanium and Titanium Alloys by the Inert Gas Fusion Thermal Conductivity/Infrared Detection Method
- 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
- ASTM E2994 Analysis of Titanium and Titanium Alloys by Spark Atomic Emission Spectrometry and Glow Discharge Atomic Emission Spectrometry

3. TECHNICAL REQUIREMENTS

3.1 Analytical Procedures

Referee methods of analysis shall be ASTM E1409 for oxygen and nitrogen, ASTM E1447 for hydrogen, and ASTM E1941 for carbon. Other elements shall be determined by ASTM E2371, ASTM E539, or ASTM E2994.

3.2 Check (Product) Analysis Limits

Shall be shown in Table 1. Check analysis limits for elements or for ranges of elements not listed herein shall be as specified in the applicable material specification or as agreed upon by purchaser and vendor.

Table 1 - Check analysis limits

Element	Limits or Maximum of Specified Range, %		Variation Under Min or Over Max
Carbon	Up to	0.20, incl	0.02
	Over	0.20 to 0.50, incl	0.04
	Over	0.50	0.06
Manganese	Up to	0.30, incl	0.10
	Over	0.30 to 6.00, incl	0.20
	Over	6.00 to 9.00, incl	0.25
Chromium	Up to	1.00, incl	0.05
	Over	1.00 to 4.00, incl	0.20
	Over	4.00	0.25
Molybdenum	Up to	0.50, incl	0.04
	Over	0.50 to 1.00, incl	0.10
	Over	1.00 to 10.00, incl	0.20
	Over	10.00 to 30.00, incl	0.25
Aluminum	Up to	1.00, incl	0.12
	Over	1.00 to 10.00, incl	0.40
	Over	10.00 to 30.00, incl	0.50
Hydrogen	Up to	0.020 (200 ppm), incl	0.0020 (20 ppm)
	Over	0.020 to 0.050 (200 to 500 ppm), incl	0.005 (50 ppm)
	Over	0.050 (500 ppm),	0.010 (100 ppm)
Nitrogen	Up to	0.10 (1000 ppm), incl	0.02 (200 ppm)
Oxygen	Up to	0.20 (2000 ppm), incl	0.02 (200 ppm)
	Over	0.20 (2000 ppm)	0.03 (300 ppm)