SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS2269 | REV. F

Issued 1960-01
Revised 2006-05
Reaffirmed 2012-01

Superseding AMS2269E

Chemical Check Analysis Limits Nickel, Nickel Alloys, and Cobalt Alloys

RATIONALE

AMS2269F has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

1.1 Form

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

1.1.1 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.

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's final acceptance or verification testing operation.

1.2.2 Check analysis limits are not for producer's 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 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 E 55	Sampling Wrought Nonferrous Metals and Alloys for Determination of Chemical Composition
ASTM E 88	Sampling Nonferrous Metals and Alloys in Cast Form for Determination of Chemical Composition

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
SAE WEB ADDRESS: http://www.sae.org

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS2269F

3. 3. TECHNICAL REQUIREMENTS

3.1 Analytical Procedures

Referee analysis shall be by any method acceptable to purchaser and vendor.

3.2 Check Analysis Limits

Shall be as shown in Table 1:

TABLE 1 - Check Analysis Variation

Element	Limit or Maximum of Specified Element, %	Variation Under min or Over max
Carbon	Up to 0.02, incl	0.005
	Over 0.02 to 0.20, incl	0.01
	Over 0.20 to 0.60, incl	0.02
	Over 0.60 to 1.00, incl	0.03
Manganese	Up to 1.00, incl	0.03
	Over 1.00 to 3.00, incl	0.04
	Over 3.00 to 6.00, incl	0.07
	Over 6.00 to 10.00, incl	0.10
Silicon	Up to 0.05, incl	0.01
	Over 0.05 to 0.25, incl	0.02
	Over 0.25 to 0.50, incl	0.03
	Over 0.50 to 1.00, incl	0.05
	Over 1.00 to 4.50, incl	0.10
Phosphorus	All	0.005
Sulfur	Up to 0.02, incl	0.003
	Over 0.02 to 0.06, incl	0.005
Chromium	Up to 5.00, incl	0.10
	Over 5.00 to 15.00, incl	0.15
	Over 15.00 to 25.00, incl	0.25
	Over 25.00 to 35.00, incl	0.30
	Over 35.00 to 45.00, incl	0.40
	Over 45.00 to 50.00, incl	0.50

TABLE 1 - Check Analysis Variation (Continued)

Element	Limit or Maximum of Specified Element, %	Variation Under min or Over max
Nickel	Up to 1.00, incl	0.05
	Over 1.00 to 5.00, incl	0.10
	Over 5.00 to 10.00, incl	0.15
	Over 10.00 to 20.00, incl	0.20
	Over 20.00 to 30.00, incl	0.25
	Over 30.00 to 40.00, incl	0.30
	Over 40.00 to 60.00, incl	0.35
	Over 60.00 to 80.00, incl	0.45
	Over 80.00 to 99.00, incl	0.60
Cobalt	Up to 0.10, incl	0.01
	Over 0.10 to 0.20, incl	0.02
	Over 0.20 to 1.00, incl	0.03
	Over 1.00 to 5.00, incl	0.05
	Over 5.00 to 10.00, incl	0.10
	Over 10.00 to 15.00, incl	0.15
	Over 15.00 to 20.00, incl	0.20
	Over 20.00 to 25.00, incl	0.25
	Over 25.00 to 30.00, incl	0.30
	Over 30.00 to 35.00, incl	0.35
	Over 35.00 to 50.00, incl	0.50
Molybdenum	Up to 1.00, incl	0.03
	Over 1.00 to 3.00, incl	0.05
	Over 3.00 to 5.00, incl	0.10
	Over 5.00 to 20.00, incl	0.15
	Over 20.00 to 30.00, incl	0.25
	Over 30.00 to 35.00, incl	0.35
Tungsten	Up to 1.00, incl	0.04
	Over 1.00 to 3.00, incl	0.10
	Over 3.00 to 5.00, incl	0.15
	Over 5.00 to 10.00, incl	0.20
	Over 10.00 to 20.00, incl	0.25
Columbium (Niobium) and/or Tantalum	Up to 1.50, incl	0.05
	Over 1.50 to 3.00, incl	0.10
	Over 3.00 to 5.00, incl	0.15
	Over 5.00 to 7.00, incl	0.20
	Over 7.00 to 10.00, incl	0.25
	Over 10.00 to 13.00, incl	0.30

TABLE 1 - Check Analysis Variation (Continued)

Element	Limit or Maximum of Specified Element, %	Variation Under min or Over max
Titanium	Up to 0.10, incl	0.02
	Over 0.10 to 0.50, incl	0.03
	Over 0.50 to 1.00, incl	0.04
	Over 1.00 to 2.00, incl	0.05
	Over 2.00 to 3.50, incl	0.07
	Over 3.50 to 5.00, incl	0.10
	Over 5.00 to 10.00, incl	0.20
Aluminum	Up to 0.10, incl	0.02
	Over 0.10 to 0.50, incl	0.05
	Over 0.50 to 2.00, incl	0.10
	Over 2.00 to 5.00, incl	0.20
	Over 5.00 to 10.00, incl	0.25
	Over 10.00 to 15.00, incl	0.30
Boron	Up to 0.01, incl	0.002
	Over 0.01 to 0.05, incl	0.005 (See 3.2.1)
	Over 0.05 to 0.15, incl	0.010
Iron	Up to 0.20, incl	0.02
	Over 0.20 to 0.75, incl	0.03
	Over 0.75 to 2.50, incl	0.05
	Over 2.50 to 5.00, incl	0.07
	Over 5.00 to 10.00, incl	0.10
	Over 10.00 to 15.00, incl	0.15
	Over 15.00 to 30.00, incl	0.30
	Over 30.00 to 50.00, incl	0.45
Copper	Up to 0.20, incl	0.02
	Over 0.20 to 0.50, incl	0.03
	Over 0.50 to 5.00, incl	0.04
	Over 5.00 to 10.00, incl	0.05
	Over 10.00 to 20.00, incl	0.10
	Over 20.00 to 30.00, incl	0.15
	Over 30.00 to 40.00, incl	0.20
	Over 40.00 to 50.00, incl	0.25
	Over 50.00 to 60.00, incl	0.30
	Over 60.00 to 70.00, incl	0.35
	Over 70.00 to 80.00, incl	0.40
Vanadium	Up to 0.50, incl	0.04 (See 3.2.2)
	Over 0.50 to 1.50, incl	0.05