AEROSPACE MATERIAL SPECIFICATION

AMS2259™ REV. G

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Superseding AMS2259F

Chemical Check Analysis Limits Wrought Low-Alloy and Carbon Steels

RATIONALE

AMS2259G is the result of a Five-Year Review and update of the specification. The revision updates Tables 1 through 5 to clarify requirements, updates definitions (2.3), and clarifies percentage requirements (8.2).

1. SCOPE

1.1 Purpose

This specification defines limits of variation for determining acceptability of the composition of wrought low-alloy and carbon steel 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 producer.

1.2 Application

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 test or verification test operation. Use of check analysis limits is not permitted for ladle or ingot analyses, or for other acceptance testing by the producer.

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.

AS7766 Terms Used in Aerospace Metals Specifications

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https://www.sae.org/standards/content/AMS2259G/

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 A941 Standard Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys

ASTM E1806 Sampling Steel and Iron for Determination of Chemical Composition

2.3 Definitions

Terms used in AMS are defined in AS7766 and the following:

CHECK (PRODUCT OR VERIFICATION) ANALYSIS: Analysis made by purchaser of parts or materials to verify the composition of a heat or lot or to determine variations in the composition within a heat or lot. Acceptance or rejection of a heat or lot of material or batch of parts may be made by applying variation limits. In the analysis of finished parts, limits do not apply to elements whose percentage can be varied by fabricating techniques employed (for example carbon in steel) unless the sample is taken in such a manner as to exclude such variations.

RIMMED OR CAPPED STEEL: Refer to ASTM A941

VARIATION LIMIT, UNDER MINIMUM OR OVER MAXIMUM: The amount an individual determination for a specified element may vary under or over the specified composition limit. In no case shall the reported determinations of any element in a heat, using the same analytical procedure, vary both above and below the specified range.

3. TECHNICAL REQUIREMENTS

3.1 Analytical Procedures

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

3.2 Check Analysis Variation Limits

3.2.1 Carbon Steels

Variations for carbon, phosphorus, and sulfur do not apply to rimmed or capped steels (see 2.3). Variations for phosphorous and sulfur do not apply to rephosphorized or resulfurized steels. Boron is not subject to check analysis variation limits.

3.2.1.1 Bars, Forgings, Wire, Seamless Tubing, and Stock for Forging or Heading

For product up to 100 square inches (645 cm^2), inclusive in cross-sectional area, check analysis variation limits shall be as shown in Table 1.

Table 1 - Check analysis variation limits for carbon steel bars, forgings, wire, seamless tubing, and stock up to 100 square inches cross-sectional area

Element	Limit or Maximum of Specified Range, %	Variation Limit, % Under Min or Over Max
Carbon	Up to 0.25, incl	0.02
	Over 0.25 to 0.55, incl	0.03
	Over 0.55	0.04
Manganese	Up to 0.90, incl	0.03
	Over 0.90 to 1.65, incl	0.06
Silicon	Up to 0.35, incl	0.02
	Over 0.35 to 0.60, incl	0.05
Phosphorus[1]	Up to 0.040, incl	0.008
Sulfur[1]	Up to 0.050, incl	0.008
Copper[2]	All	0.02
Lead	0.15 to 0.35, incl	0.03

[1] Variation applicable only to over maximum.
[2] Variation applicable to under minimum for copper bearing steels.

3.2.1.2 Forging Stock Over 100 Square Inches (645 cm^2) in Cross-Sectional Area

Check analysis variation limits shall be as shown in Table 2.

Table 2 - Check analysis variation limits for carbon steel forging stock over 100 square inches cross-sectional area

Element	Limit or Maximum of Specified Range, %	Variation, % Area Over 100 to 200 Square Inches (Over 645 to 1290 cm^2) Incl	Variation, % Area Over 200 to 400 Square Inches (Over 1290 to 2581 cm^2) Incl	Variation, % Area Over 400 to 800 Square Inches (Over 2581 to 5161 cm^2) Incl
Carbon	Up to 0.25, incl	0.03	0.04	0.05
	Over 0.25 to 0.55, incl	0.04	0.05	0.06
	Over 0.55	0.05	0.06	0.07
Manganese	Up to 0.90, incl	0.04	0.06	0.07
	Over 0.90 to 1.65, incl	0.06	0.07	0.08
Silicon[3]	Up to 0.35, incl	0.02	0.03	0.04
	Over 0.35 to 0.60, incl	--	--	--
Phosphorus[1]	Up to 0.040, incl	0.008	0.010	0.015
Sulfur[1]	Up to 0.050, incl	0.010	0.010	0.015
Copper[2,3]	All	0.03	--	--
Lead[3]	0.15 to 0.35, incl	0.03	--	--

[1] Variation applicable only to over maximum.
[2] Variation applicable to under minimum for copper bearing steels.
[3] Where no variation limit is shown, limits have not been established, and shall be subject to agreement between purchaser and producer.

3.2.1.3 Sheet, Strip, Plate, and Welded Tubing

Check analysis variation limits shall be as shown in Table 3.