AEROSPACE MATERIAL SPECIFICATION

AMS2263™	REV. F

Issued 1948-11
Reaffirmed 2017-12
Revised 2022-12

Superseding AMS2263E

Tolerances
Nickel, Nickel Alloy, and Cobalt Alloy Aircraft Tubing

RATIONALE

AMS2263F is the result of a Five-Year Review and update of the specification. The revision updates the title to clarify the applicability of the document.

1. SCOPE

This specification covers established inch-pound manufacturing tolerances applicable to seamless and welded thin-wall aircraft tubing of nickel, nickel alloys, and cobalt alloys ordered to inch-pound dimensions. These tolerances apply to all conditions and are based on individual measurements, unless otherwise noted. The term “exclusive” is used to apply only to the higher figure of a specified range.

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

2.2 Definitions

Terms used in AMS are defined in AS7766.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
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For more information on this standard, visit
https://www.sae.org/standards/content/AMS2263F/

3. DIAMETER

Mean diameter is the average of two measurements taken at right angles to each other at the same section. Ovality is the difference between the maximum and minimum diameters of any one section of a tube.

3.1 Seamless, Cold Finished

3.1.1 Nickel-Copper Alloy, Annealed

Table 1 - Diameter tolerances, annealed nickel-copper alloy

Specified OD Inches	Specified Wall Thickness % of OD	Tolerance Inches OD Plus	Tolerance Inches OD Minus	Tolerance Inches Mean OD Plus	Tolerance Inches Mean OD Minus	Ovality
Up to 0.400, incl	Up to 3.0, incl	--	--	0.004	0	0.004
	Over 3.0	0.004	0	--	--	--
Over 0.400 to 0.625, excl	Up to 3.0, incl	--	--	0.005	0	0.005
	Over 3.0	0.005	0	--	--	--
0.625 to 1.500, incl	Up to 3.0, incl	--	--	0.005	0.005	0.01 x OD
	Over 3.0	0.005	0.005	--	--	--
Over 1.500 to 4.500, incl	Up to 3.0, incl	--	--	0.010	0.010	0.01 x OD
	Over 3.0	0.010	0.010	--	--	--
Over 4.500 to 6.000, incl	Up to 3.0, incl	--	--	0.015	0.015	0.01 x OD
	Over 3.0	0.030	0.030	0.015	0.015	--
Over 6.000 to 7.500, incl	Up to 3.0, incl	--	--	0.020	0.020	0.01 x OD
	Over 3.0	0.040	0.040	0.020	0.020	--
Over 7.500 to 8.625, incl	Up to 3.0, incl	--	--	0.025	0.025	0.01 x OD
	Over 3.0	0.050	0.050	0.025	0.025	--

3.1.2 Nickel-Chromium-Iron Alloy, Annealed

Table 2 - Diameter tolerances, annealed nickel-chromium-iron alloy

Specified OD Inches	Specified Wall Thickness % of OD	Tolerance Inches OD Plus	Tolerance Inches OD Minus	Tolerance Inches Mean OD Plus	Tolerance Inches Mean OD Minus	Ovality
Up to 0.400, incl	Up to 3.0, incl	--	--	0.004	0	0.004
	Over 3.0	0.004	0	--	--	--
Over 0.400 to 0.625, excl	Up to 3.0, incl	--	--	0.005	0.005	0.005
	Over 3.0	0.005	0.005	--	--	--
0.625 to 1.500, incl	Up to 3.0, incl	--	--	0.0075	0.0075	0.01 x OD
	Over 3.0	0.0075	0.0075	--	--	--
Over 1.500 to 3.500, incl	Up to 3.0, incl	--	--	0.010	0.010	0.01 x OD
	Over 3.0	0.010	0.010	--	--	--
Over 3.500 to 4.500, incl	Up to 3.0, incl	--	--	0.015	0.015	0.01 x OD
	Over 3.0	0.015	0.015	--	--	--
Over 4.500 to 6.000, incl	Up to 3.0, incl	--	--	0.020	0.020	0.01 x OD
	Over 3.0	0.040	0.040	0.020	0.020	--
Over 6.000 to 6.625, incl	Up to 3.0, incl	--	--	0.025	0.025	0.01 x OD
	Over 3.0	0.050	0.050	0.025	0.025	--

3.2 Copper Furnace Brazed, Cold Finished

3.2.1 Nickel-Copper Alloy, Annealed

Table 3 - Diameter tolerances, annealed nickel-copper alloy

Specified OD Inches	Specified Wall Thickness Inches	OD Tolerance Inches Plus	OD Tolerance Inches Minus
0.125	0.028	0.001	0.001
0.188	0.028	0.001	0.001
0.250	0.028	0.003	0
0.312	0.028	0.003	0
0.375	0.028	0.003	0
0.500	0.028	0.005	0
0.625	0.028	0.005	0
0.625	0.035	0.005	0

3.3 Welded, All Alloys

OD tolerances apply to mean OD for tubing with specified wall thickness of 3% or less of specified OD. OD and ID tolerances shall not both apply to the same lot of tubing.

Table 4 - Diameter tolerances and ovality, all alloys, welded tubing

Specified OD Inches	Specified Wall Thickness % of OD	Tolerance Inches Plus and Minus OD	Tolerance Inches Plus and Minus ID	Ovality
Up to 0.094, incl	Up to 3.0, incl	0.001	0.001	0.001
	Over 3.0	0.001	0.001	--
Over 0.094 to 0.1875, excl	Up to 3.0, incl	0.0015	0.0015	0.002
	Over 3.0	0.0015	0.0015	--
0.1875 to 0.500, excl	Up to 3.0, incl	0.003	0.005	0.004
	Over 3.0	0.003	0.005	--
0.500 to 1.000, excl	Up to 3.0, incl	0.004	0.006	0.01 x OD
	Over 3.0	0.004	0.006	--
1.000 to 1.500, excl	Up to 3.0, incl	0.005	0.007	0.01 x OD
	Over 3.0	0.005	0.007	--
1.500 to 2.000, excl	Up to 3.0, incl	0.006	0.008	0.01 x OD
	Over 3.0	0.006	0.008	--
2.000 to 2.500, excl	Up to 3.0, incl	0.007	0.010	0.01 x OD
	Over 3.0	0.007	0.010	--
2.500 to 3.500, excl	Up to 3.0, incl	0.010	0.014	0.01 x OD
	Over 3.0	0.010	0.014	--
3.500 to 5.000, excl	Up to 3.0, incl	0.015	0.020	0.01 x OD
	Over 3.0	0.015	0.020	--

4. WALL THICKNESS

4.1 Seamless, Cold Finished

4.1.1 Wall thickness of all tubes except for those alloys and sizes shown in 4.1.2 and 4.1.3 shall not vary more than ±10%.

4.1.2 Nickel-Copper Alloy, Seamless

4.1.2.1 Wall thickness may vary ±12.5% for the following sizes:

4.1.2.1.1 Tubes with specified OD over 0.400 to 0.625 inch, exclusive, with specified wall thickness of 0.040 inch and over.

4.1.2.1.2 Tubes with specified wall thicknesses more than 25% of the specified OD.

4.1.2.1.3 Tubes over 4.500 inches in specified OD.