

AEROSPACE MATERIAL SPECIFICATION

Tolerances, Metric Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate

1. SCOPE:

This specification covers established manufacturing tolerances applicable to sheet, strip, and plate of corrosion and heat resistant steels, iron alloys, titanium, and titanium alloys ordered to metric dimensions. These tolerances apply to all conditions, unless otherwise noted. The term "excl" is used to apply only to the higher figure of the specified range.

1.1 These tables are based upon logical metric values and preferred metric sizes.

1.2 Throughout this specification the term "metric" is intended to refer to the SI system.

1.3 AMS 2242 is the inch/pound version of this MAM.

2. THICKNESS:

Thickness for sheet and strip is measured at any place on widths less than 25 mm, at any place 10 mm and over from an edge on widths 25 mm and over, and for plate at least 10 mm but not more than 75 mm from an edge.

2.1 Sheet:

Table 1 includes crown tolerances.

SAE Technical Standards Board 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 reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright 2001 Society of Automotive Engineers, Inc.
All rights reserved.

Printed in U.S.A.

QUESTIONS REGARDING THIS DOCUMENT:
TO PLACE A DOCUMENT ORDER:
SAE WEB ADDRESS:

(724) 772-7161
(724) 776-4970
<http://www.sae.org>

FAX: (724) 776-0243
FAX: (724) 776-0790

TABLE 1

Specified Thickness Millimeters	Thickness Tolerance, Millimeter Plus and Minus For Width Ranges Shown Millimeters	
	600 to 1200, incl	Over 1200
0.12	0.03	--
Over 0.12 to 0.20, incl	0.04	--
Over 0.20 to 0.40, incl	0.05	--
Over 0.40 to 0.60, incl	0.08	0.08
Over 0.60 to 1.00, incl	0.10	0.10
Over 1.00 to 1.60, incl	0.10	0.13
Over 1.60 to 1.80, incl	0.13	0.15
Over 1.80 to 2.00, incl	0.13	0.18
Over 2.00 to 2.50, incl	0.15	0.20
Over 2.50 to 3.00, incl	0.18	0.23
Over 3.00 to 3.50, incl	0.20	0.25
Over 3.50 to 4.00, incl	0.25	0.30
Over 4.00 to 5.00, excl	0.30	0.36

2.2 Strip:

Table 2 includes crown tolerances.

TABLE 2

Specified Thickness Millimeters	Thickness Tolerance	Thickness Tolerance	Thickness Tolerance
	Millimeter	Millimeter	Millimeter
	Plus and Minus	Plus and Minus	Plus and Minus
	For Width Ranges Shown Millimeters	For Width Ranges Shown Millimeters	For Width Ranges Shown Millimeters
	5.00 to 150, incl	Over 150 to 300, incl	Over 300 to 600 excl
0.12 to 0.25, incl	10%	10%	10%
Over 0.25 to 0.30, incl	0.04	0.04	0.04
Over 0.30 to 0.35, incl	0.04	0.04	0.05
Over 0.35 to 0.45, incl	0.04	0.05	0.05
Over 0.45 to 0.50, incl	0.04	0.05	0.065
Over 0.50 to 0.75, incl	0.05	0.065	0.065
Over 0.75 to 0.90, incl	0.05	0.08	0.08
Over 0.90 to 1.25, incl	0.065	0.09	0.09
Over 1.25 to 1.75, incl	0.08	0.09	0.09
Over 1.75 to 2.50, incl	0.08	0.10	0.13
Over 2.50 to 3.20, incl	0.10	0.115	0.13
Over 3.20 to 4.10, incl	0.115	0.115	0.13
Over 4.10 to 5.00, excl	0.13	0.13	0.15

2.3 Plate:

Minus tolerances shall be 0.25 mm for all widths for all thicknesses up to 250 mm, inclusive, in alloys; plus tolerances shall be as in Table 3. For circles, the plus thickness tolerances in Table 3 apply to the diameter of the circle corresponding to the width ranges shown. For plates of irregular shape, the plus thickness tolerances apply to the greatest width corresponding to the width ranges shown.

TABLE 3

Specified Thickness Millimeters	Thickness Tolerances, Millimeters, Plus For Width Ranges Shown Millimeters Over 120 to 2140, incl	Thickness Tolerances, Millimeters, Plus For Width Ranges Shown Millimeters Over 2140 to 3050, incl	Thickness Tolerances, Millimeters, Plus For Width Ranges Shown Millimeters Over 3050 to 3650, incl	Thickness Tolerances, Millimeters, Plus For Width Ranges Shown Millimeters Over 3650
5 to 10, excl	1.15	1.25	1.90	--
10 to 20, excl	1.40	1.50	2.15	2.30
20 to 25, excl	1.50	1.65	2.40	2.55
25 to 50, excl	1.80	1.90	4.45	2.90
50 to 75, excl	3.20	3.80	6.20	5.10
75 to 100, excl	4.45	5.35	8.90	7.10
100 to 150, excl	6.35	7.60	8.90	10.15
150 to 200, excl	8.90	10.15	12.15	14.20
200 to 250, incl	11.45	13.70	16.00	--

3. WIDTH:

3.1 Sheet:

3.1.1 Stretcher Leveled, Resquared:

TABLE 4

Specified Thickness Millimeters	Width Tolerances Millimeters, Plus Only For Width Ranges Shown Millimeters 600 to 1200, excl	Width Tolerances Millimeters, Plus Only For Width Ranges Shown Millimeters 1200 and Over
Up to 3.30, excl	1.6	3.2
3.30 to 3.80, incl	3.2	3.2
Over 3.80 to 4.39, incl	4.8	4.8
Over 4.30 to 5.00, excl	6.4	6.4

3.1.2 Not Resquared, Flat or in Coils:

TABLE 5

Specified Width Millimeters	Width Tolerance, Millimeters Plus Only
600 to 1200, excl	1.6
1200 and over	3.2

3.2 Strip:

3.2.1 Rolled Edge or Approximately Square Edge Produced by Rolling or Filing After Slitting:

TABLE 6

Specified Width Millimeters	Specified Thickness Millimeters	Width Tolerance, Millimeter Plus and Minus
Up to 7.0, incl	Up to 1.6, incl	0.13
Over 7.0 to 20.0, incl	Up to 2.5, incl	0.13
Over 20.0 to 120, incl	Up to 3.5, incl	0.13
Over 120 to 250, incl	0.20 to 3.5, incl	0.25
Over 250 to 500, incl	0.40 to 3.0, incl	0.25
Over 500	0.60 to 2.0, incl	0.40

3.2.2 Slit Edge:

TABLE 7

Specified Width Millimeters	Width Tolerance, Millimeter Plus and Minus For Thickness Ranges Shown Millimeters Up to 1.75, incl	Width Tolerance, Millimeter Plus and Minus For Thickness Ranges Shown Millimeters Over 1.75 to 2.50, incl	Width Tolerance, Millimeter Plus and Minus For Thickness Ranges Shown Millimeters Over 2.50 to 4.00, incl	Width Tolerance, Millimeter Plus and Minus For Thickness Ranges Shown Millimeters Over 4.00 to 5.00, excl
5.0 to 12.5, incl	0.1	0.2	0.3	--
Over 12.5 to 150, incl	0.1	0.2	0.3	0.4
Over 150 to 225, incl	0.1	0.3	0.4	0.5
Over 225 to 300, incl	0.3	0.3	0.4	0.5
Over 300 to 500, incl	0.4	0.4	0.5	0.8
Over 500 to 600, incl	0.5	0.5	0.5	0.8

3.3 Plate:

Minus tolerance shall be 6 mm for all widths and lengths in all thicknesses up to 25 mm, inclusive; plus tolerances shall be as shown in Table 8.

TABLE 8

Specified Width Millimeters		Specified Length Millimeters		Width Tolerance, Millimeters Plus For Thickness Ranges Shown Millimeters 4.8 to 9.5 excl	Width Tolerance, Millimeters Plus For Thickness Ranges Shown Millimeters 9.5 to 12.5, incl	Width Tolerance, Millimeters Plus For Thickness Ranges Shown Millimeters Over 12.5 to 25, incl
Over	250 to 1220, incl	Up to		3	5	8
Over	1220 to 1525, incl	3,650,		5	6	10
Over	1525 to 2140, incl	incl		6	8	11
Over	2140 to 2750, incl			8	10	13
Over	2750			10	11	16
Over	250 to 1220, incl	Over		5	6	8
Over	1220 to 1525, incl	3,650 to		6	8	10
Over	1525 to 2140, incl	6,100		10	11	13
Over	2140 to 2750, incl	incl		11	13	16
Over	2750			13	16	18
Over	250 to 1220, incl	Over		6	8	10
Over	1220 to 1525, incl	6,100 to		8	10	13
Over	1525 to 2140, incl	9,150		11	13	16
Over	2140 to 2750, incl	incl		14	16	19
Over	2750			16	18	22
Over	250 to 1525, incl	Over		11	13	16
Over	1525 to 2140, incl	9,150		13	16	19
Over	2140 to 2750, incl	12,200,		14	19	22
Over	2750	incl		19	22	25
Over	250 to 1525, incl	Over		11	13	16
Over	1525 to 2140, incl	12,200 to		13	16	19
Over	2140 to 2750, incl	15,200,		16	19	22
Over	2750	incl		19	22	25
Over	250 to 1525, incl	Over		13	16	19
Over	1525 to 2750, incl	15,200		16	19	22
Over	2750			22	25	29

4. LENGTH:

4.1 Sheet:

4.1.1 Stretcher Leveled, Resquared:

TABLE 9

Specified Thickness Millimeters	Specified Length Millimeters	Length Tolerance Millimeters Plus Only
Up to 3.0, excl	Up to 3000, excl	1.6
Up to 3.0, excl	3000 and over	3.2
3.0 to 3.5, incl	All	3.2
Over 3.5 to 4.5, incl	All	4.8
Over 4.5 to 5.0, incl	All	6.4

4.1.2 Not Resquared:

TABLE 10

Specified Length Millimeters	Length Tolerances, Millimeters Plus Only
Up to 3000, incl	6.4
Over 3000 to 6000, incl	12.5

4.2 Strip:

TABLE 11

Specified Length Millimeters	Length Tolerances, Millimeters Plus Only
Up to 1500, incl	9.5
Over 1500 to 3000, incl	12.5
Over 3000 to 6100, incl	16.0

4.3 Plate:

Minus tolerances shall be 6 mm for all lengths and widths in all thicknesses up to 25 mm, inclusive; plus tolerances shall be as shown in Table 12.

TABLE 12

					Length Tolerance, Millimeters Plus For Thickness Ranges Shown Millimeters	Length Tolerance, Millimeters Plus For Thickness Ranges Shown Millimeters	Length Tolerance, Millimeters Plus For Thickness Ranges Shown Millimeters
Specified Width Millimeters					4.8 to 9.5 excl	9.5 to 12.5, incl	Over 12.5 to 25, incl
Over	250	to	1220,	incl	Up to	5	6
Over	1220	to	1525,	incl	3,650,	6	8
Over	1525	to	2140,	incl	incl	8	10
Over	2140	to	2750,	incl		10	11
Over	2750					11	13
Over	250	to	1220,	incl	Over	10	13
Over	1220	to	1525,	incl	3,650 to	11	16
Over	1525	to	2140,	incl	6,100	13	18
Over	2140	to	2750,	incl	incl	14	19
Over	2750					16	22
Over	250	to	1220,	incl	Over	13	16
Over	1220	to	1525,	incl	6,100 to	16	19
Over	1525	to	2140,	incl	9,150	18	19
Over	2140	to	2750,	incl	incl	19	22
Over	2750					22	25
Over	250	to	1525,	incl	Over	29	32
Over	1525	to	2750,	incl	9,150	32	35
Over	2750				12,200, incl	35	38
Over	250	to	1525,	incl	Over	32	38
Over	1525	to	2750,	incl	12,200 to	35	38
Over	2750				15,200, incl	38	41
Over	250	to	2750,	incl	Over	44	48
Over	2750				15,200	44	51

5. STRAIGHTNESS:

5.1 Sheet and Strip:

TABLE 13

Specified Width Millimeters	Camber Tolerance, Millimeters, in Any 2500 Millimeters of Length
Up to 40, incl	13.0
Over 40 to 600, excl	6.6
600 to 910, incl	3.3
Over 910	2.5

5.2 Plate:

Shall be of such straightness that the maximum edgewise curvature (depth of arc) shall not exceed 3.1 mm in any 1500 mm of length.

6. FLATNESS:

The following tolerances do not apply to strip, dead soft sheet, or deep drawing sheet for which there are no established tolerances. In all cases, the "Variation from Flat" is the maximum deviation from a horizontal flat surface.

6.1 Sheet, Not Stretcher Levelled:

The following table does not apply to cold worked tempers of austenitic grades.

TABLE 14

Specified Thickness Millimeters	Specified Width Millimeters	Variation from Flat, Millimeters
Up to 1.6, excl	600 to 910, incl	12.5
	Over 910 to 1525, incl	19.0
	Over 1525	25.5
1.6 to 5.0, excl	600 to 1525, incl	12.5
	Over 1525 to 1825, incl	19.0
	Over 1825	25.5

6.2 Cold Worked Austenitic Sheet, 1/4 and 1/2 Hard Tempers: