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TITLE OF DOCUMENT: Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate

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AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 2242E

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TOLERANCES

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 inch 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.
2. **THICKNESS:** Thickness for sheet and strip is measured at any place on widths less than 1 in. and at any place 0.375 in. and over from an edge on widths 1 in. and over, and for plate at least 0.375 in. but not over 3 in. from an edge.
- 2.1 **Sheet:** Table I includes crown tolerances.

TABLE I

Specified Thickness Inch	Thickness Tolerance, Inch Plus and Minus For Width Ranges Shown, Inches	
	24 to 48, incl	Over 48
0.005	0.001	--
Over 0.005 to 0.007, incl	0.0015	--
Over 0.007 to 0.016, incl	0.002	--
Over 0.016 to 0.026, incl	0.003	0.003
Over 0.026 to 0.040, incl	0.004	0.004
Over 0.040 to 0.058, incl	0.004	0.005
Over 0.058 to 0.072, incl	0.005	0.006
Over 0.072 to 0.083, incl	0.005	0.007
Over 0.083 to 0.098, incl	0.006	0.008
Over 0.098 to 0.114, incl	0.007	0.009
Over 0.114 to 0.130, incl	0.008	0.010
Over 0.130 to 0.145, incl	0.010	0.012
Over 0.145 to 0.1875, excl	0.012	0.014

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2.2 Strip: Table II includes crown tolerances.

TABLE II

Specified Thickness Inch	Thickness Tolerance, Inch Plus and Minus For Width Ranges Shown, Inches		
	3/16 to 6, incl	Over 6 to 12, incl	Over 12 to 24, excl
0.005 to 0.010, incl	0.10T	0.10T	0.10T
Over 0.010 to 0.011, incl	0.0015	0.0015	0.0015
Over 0.011 to 0.013, incl	0.0015	0.0015	0.002
Over 0.013 to 0.017, incl	0.0015	0.002	0.002
Over 0.017 to 0.020, incl	0.0015	0.002	0.0025
Over 0.020 to 0.029, incl	0.002	0.0025	0.0025
Over 0.029 to 0.035, incl	0.002	0.003	0.003
Over 0.035 to 0.050, incl	0.0025	0.0035	0.0035
Over 0.050 to 0.069, incl	0.003	0.0035	0.0035
Over 0.069 to 0.100, incl	0.003	0.004	0.005
Over 0.100 to 0.125, incl	0.004	0.0045	0.005
Over 0.125 to 0.161, incl	0.0045	0.0045	0.005
Over 0.161 to 0.1875, excl	0.005	0.005	0.006

- 2.3 Plate: Minus tolerances shall be 0.010 in. for all widths for all thicknesses up to 10.000 in., incl, in all alloys; plus tolerances shall be as in Table III. For circles, the plus thickness tolerances in Table III 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 III

Specified Thickness Inches	Thickness Tolerance, Inch, Plus For Width Ranges Shown, Inches			
	Over 10 to 84, incl	Over 84 to 120, incl	Over 120 to 144, incl	Over 144
0.1875 to 0.375, excl	0.045	0.050	--	--
0.375 to 0.750, excl	0.055	0.060	0.075	0.090
0.750 to 1.000, excl	0.060	0.065	0.085	0.100
1.000 to 2.000, excl	0.070	0.075	0.095	0.115
2.000 to 3.000, excl	0.125	0.150	0.175	0.200
3.000 to 4.000, excl	0.175	0.210	0.245	0.280
4.000 to 6.000, excl	0.250	0.300	0.350	0.400
6.000 to 8.000, excl	0.350	0.420	0.490	0.560
8.000 to 10.000, incl	0.450	0.540	0.630	--

3. WIDTH:3.1 Sheet:3.1.1 Stretcher Levelled, Resquared:

TABLE IV

Specified Thickness Inch	Width Tolerance, Inch, Plus Only For Width Ranges Shown, Inches	
	24 to 48, excl	48 and Over
Up to 0.131, excl	1/16	1/8
0.131 to 0.150, incl	1/8	1/8
Over 0.150 to 0.170, incl	3/16	3/16
Over 0.170 to 0.1875, excl	1/4	1/4

3.1.2 Not Resquared, Flat or in Coils:

TABLE V

Specified Width Inches	Width Tolerance, Inch Plus Only
24 to 48, excl	1/16
48 and over	1/8

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

TABLE VI

Specified Width Inches	Specified Thickness Inches	Width Tolerance, Inch Plus and Minus
Up to 0.28125, incl	Up to 0.0625, incl	0.005
Over 0.28125 to 0.750, incl	Up to 0.09375, incl	0.005
Over 0.750 to 5.000, incl	Up to 0.125, incl	0.005
Over 5.000 to 9.000, incl	0.008 to 0.125, incl	0.010
Over 9.000 to 20.000, incl	0.015 to 0.105, incl	0.010
Over 20.000	0.023 to 0.080, incl	0.015

3.2.2 Slit Edge:

TABLE VII

Specified Width Inches		Width Tolerance, Inch, Plus and Minus For Thickness Ranges Shown, Inch			
		Up to 0.068, incl	Over 0.068 to 0.099, incl	Over 0.099 to 0.160, incl	Over 0.160 to 0.1875, excl
0.1875 to 0.500, incl		0.005	0.008	0.010	--
Over 0.500 to 6.000, incl		0.005	0.008	0.010	0.016
Over 6.000 to 9.000, incl		0.005	0.010	0.016	0.020
Over 9.000 to 12.000, incl		0.010	0.010	0.016	0.020
Over 12.000 to 20.000, incl		0.016	0.016	0.020	0.031
Over 20.000 to 24.000, excl		0.020	0.020	0.020	0.031

3.3 Plate: Minus tolerance shall be 1/4 in. for all widths and lengths in all thicknesses up to 1.000 in., incl; plus tolerances shall be as shown in Table VIII. Width tolerances for plates over 1.000 in. thick shall be as agreed upon by purchaser and vendor.

TABLE VIII

Specified Width Inches		Specified Length Inches	Width Tolerance, Inches, Plus For Thickness Ranges Shown, Inch		
			3/16 to 3/8, excl	3/8 to 1/2, incl	Over 1/2 to 1, incl
Over 10 to 48, incl		Up to	1/8	3/16	5/16
Over 48 to 60, incl		144,	3/16	1/4	3/8
Over 60 to 84, incl		incl	1/4	5/16	7/16
Over 84 to 108, incl			5/16	3/8	1/2
Over 108			3/8	7/16	5/8
Over 10 to 48, incl		Over	3/16	1/4	5/16
Over 48 to 60, incl		144 to	1/4	5/16	3/8
Over 60 to 84, incl		240,	3/8	7/16	1/2
Over 84 to 108, incl		incl	7/16	1/2	5/8
Over 108			1/2	5/8	11/16
Over 10 to 48, incl		Over	1/4	5/16	3/8
Over 48 to 60, incl		240 to	5/16	3/8	1/2
Over 60 to 84, incl		360,	7/16	1/2	5/8
Over 84 to 108, incl		incl	9/16	5/8	3/4
Over 108			5/8	11/16	7/8
Over 10 to 60, incl		Over	7/16	1/2	5/8
Over 60 to 84, incl		360 to	1/2	5/8	3/4
Over 84 to 108, incl		480,	9/16	3/4	7/8
Over 108		incl	3/4	7/8	1

TABLE VIII (Cont'd.)

Specified Width Inches	Specified Length Inches	Width Tolerance, Inches, Plus For Thickness Ranges Shown, Inch		
		3/16 to 3/8, excl	3/8 to 1/2, incl	Over 1/2 to 1, incl
Over 10 to 60, incl	Over	7/16	1/2	5/8
Over 60 to 84, incl	480 to	1/2	5/8	3/4
Over 84 to 108, incl	600,	5/8	3/4	7/8
Over 108	incl	3/4	7/8	1
Over 10 to 60, incl	Over	1/2	5/8	3/4
Over 60 to 108, incl	600	5/8	3/4	7/8
Over 108		7/8	1	1-1/8

4. LENGTH:4.1 Sheet:4.1.1 Stretcher Leveled, Resquared:

TABLE IX

Specified Thickness Inch	Specified Length Inches	Length Tolerance, Inch Plus Only
Up to 0.131, incl	Up to 120, excl	1/16
Up to 0.131, excl	120 and over	1/8
0.131 to 0.150, incl	All	1/8
Over 0.150 to 0.170, incl	All	3/16
Over 0.170 to 0.1875, excl	All	1/4

4.1.2 Not Resquared:

TABLE X

Specified Length Inches	Length Tolerance, Inch Plus Only
Up to 120, incl	1/4
Over 120 to 240, incl	1/2

4.2 Strip:

TABLE XI

Specified Length Inches	Length Tolerance, Inch Plus Only
Up to 60, incl	3/8
Over 60 to 120, incl	1/2
Over 120 to 240, incl	5/8

- 4.3 Plate: Minus tolerances shall be 1/4 in. for all lengths and widths in all thicknesses up to 1 in., incl; plus tolerances shall be as shown in Table XII. Length tolerances for plate over 1.000 in. thick shall be as agreed upon by purchaser and vendor.

TABLE XII

Specified Width Inches	Specified Length Inches	Length Tolerance, Inches, Plus For Thickness Ranges Shown, Inch		
		3/16 to 3/8, excl	3/8 to 1/2, incl	Over 1/2 to 1, incl
Over 10 to 48, incl	Up to	3/16	1/4	3/8
Over 48 to 60, incl	144,	1/4	5/16	7/16
Over 60 to 84, incl	incl	5/16	3/8	1/2
Over 84 to 108, incl		3/8	7/16	9/16
Over 108		7/16	1/2	11/16
Over 10 to 48, incl	Over	3/8	1/2	5/8
Over 48 to 60, incl	144 to	7/16	5/8	3/4
Over 60 to 84, incl	240,	1/2	11/16	3/4
Over 84 to 108, incl	incl	9/16	3/4	7/8
Over 108		5/8	7/8	1
Over 10 to 48, incl	Over	1/2	5/8	3/4
Over 48 to 60, incl	240 to	5/8	3/4	3/4
Over 60 to 84, incl	360,	11/16	3/4	7/8
Over 84 to 108, incl	incl	3/4	7/8	1
Over 108		7/8	1	1
Over 10 to 60, incl	Over	1-1/8	1-1/4	1-3/8
Over 60 to 180, incl	360 to	1-1/4	1-3/8	1-1/2
Over 180	480, incl	1-3/8	1-1/2	1-5/8
Over 10 to 60, incl	Over	1-1/4	1-1/2	1-5/8
Over 60 to 108, incl	480 to	1-3/8	1-1/2	1-5/8
Over 108	600, incl	1-1/2	1-5/8	1-3/4
Over 10 to 108, incl	Over	1-3/4	1-7/8	1-7/8
Over 108	600	1-3/4	2	2-1/4

5. STRAIGHTNESS:

5.1 Sheet and Strip:

TABLE XIII

Specified Width Inches	Camber Tolerance, Inch, in Any 8 ft of Length
Up to 1.500, incl	1/2
Over 1.500 to 24.000, excl	1/4
24.000 to 36.000, incl	1/8
Over 36.000	3/32

5.2 Plate: Shall be of such straightness that the maximum edgewise curvature (depth of arc) shall not exceed 1/8 in. in any 5 ft 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 Leveled: The following table does not apply to cold worked tempers of austenitic grades.

TABLE XIV

Specified Thickness Inch	Specified Width Inches	Variation from Flat, Inch
Up to 0.062, excl	24 to 36, incl	1/2
	Over 36 to 60, incl	3/4
	Over 60	1
0.062 to 0.1875, excl	24 to 60, incl	1/2
	Over 60 to 72, incl	3/4
	Over 72	1

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

TABLE XV

Specified Thickness Inch	Specified Width Inches	Variation from Flat, Inches	
		1/4 Hard	1/2 Hard
Up to 0.016, incl	24 to 36,	1/2	3/4
Over 0.016 to 0.030, incl	excl	5/8	7/8
Over 0.030 to 0.1875, excl		3/4	7/8
Up to 0.016, incl	36 to 48,	5/8	1
Over 0.016 to 0.030, incl	incl	3/4	1-1/8
Over 0.030 to 0.1875, excl		1	1-1/8