

# AERONAUTICAL MATERIAL SPECIFICATION

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## AMS 2232A

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### TOLERANCES Carbon Steel Sheet and Strip

1. PURPOSE: To publish established manufacturing tolerances.
  2. APPLICATION: Tolerances shown herein apply, unless otherwise agreed upon by purchaser and vendor. These tolerances apply to all conditions and are based on individual measurements, unless otherwise noted.
  3. THICKNESS: Thickness is measured at any place on widths less than 1 inch; at any place 0.375 inch and over from an edge on widths 1 inch and over.
- 3.1 Cold Rolled Sheet:

TABLE I

Nominal Thickness Inch	Tolerance, Inch, Plus and Minus Width Ranges, Inches							
	15 and under	Over 15 to 24 incl	Over 24 to 32 incl	Over 32 to 40 incl	Over 40 to 48 incl	Over 48 to 60 incl	Over 60 to 70 incl	Over 70 to 80 incl
.0112 and under	--	--	--	.0015	--	--	--	--
.0113 to .0141, incl	--	--	--	.002	.002	--	--	--
.0142 to .0194, incl	.002	.002	.002	.002	.002	.002	--	--
.0195 to .0254, incl	.003	.003	.003	.003	.003	.003	--	--
.0255 to .0313, incl	.003	.003	.003	.003	.003	.0035	.004	.004
.0314 to .0388, incl	.003	.003	.003	.0035	.0035	.0035	.004	.004
.0389 to .0508, incl	.004	.004	.004	.004	.004	.004	.005	.005
.0509 to .0567, incl	.005	.005	.005	.005	.005	.005	.006	.006
.0568 to .0709, incl	.005	.005	.005	.005	.005	.005	.006	.006
.0710 to .0821, incl	.005	.005	.006	.006	.006	.007	.007	.007
.0822 to .0971, incl	.006	.006	.006	.007	.007	.008	.009	.009
.0972 to .1419, incl	.006	.007	.008	.009	.009	.010	.010	.011
.1420 to .1874, incl	.006	.007	.008	.009	.010	.010	.011	.012
.1875 and over	.007	.007	.008	.009	.010	.011	.012	.013

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3.2 Cold Rolled Strip: This table includes crown tolerances.

TABLE IA

Nominal Thickness Inch	Tolerance, Inch Width Range, Inches									
	0.50 to 1 excl	1 to 3 excl	3 to 5 incl	5 to 6 incl	6 to 9 incl	9 to 12 incl	12 to 16 incl	16 to 20 incl	20 to 24 excl	Over 20 to 24 excl
.005 and Under	+ .0005	+ .00125	+ .00125	+ .0015	-----	-----	-----	-----	-----	-----
Over .005 to .009, incl	- .0005	- .0005	- .0005	- .0005	+ .002	+ .002	+ .0025	+ .0025	+ .0025	+ .0025
Over .009 to .010, incl	+ .001	+ .00175	+ .00175	+ .002	+ .002	+ .002	+ .0025	+ .0025	+ .0025	+ .0025
Over .010 to .011, incl	- .001	- .001	- .001	- .001	- .001	- .001	- .001	- .001	- .001	- .001
Over .011 to .012, incl	+ .001	+ .002	+ .002	+ .002	+ .0025	+ .0025	+ .003	+ .003	+ .003	+ .003
Over .012 to .019, incl	- .001	- .001	- .001	- .001	- .0015	- .0015	- .0015	- .0015	- .0015	- .0015
Over .019 to .025, incl	+ .001	+ .002	+ .002	+ .003	+ .003	+ .003	+ .004	+ .004	+ .004	+ .004
Over .025 to .028, incl	- .001	- .0015	- .0015	- .0015	- .002	- .002	- .002	- .002	- .002	- .002
Over .028 to .031, incl	+ .0015	+ .003	+ .003	+ .0035	+ .004	+ .004	+ .0045	+ .0045	+ .0045	+ .0045
Over .031 to .034, incl	- .0015	- .0015	- .0015	- .0015	- .002	- .002	- .002	- .002	- .002	- .002
Over .034 to .039, incl	+ .002	+ .0035	+ .0035	+ .004	+ .004	+ .004	+ .0045	+ .0045	+ .0045	+ .0045
Over .039 to .049, incl	- .002	- .002	- .002	- .002	- .0025	- .0025	- .0025	- .0025	- .0025	- .0025
Over .049 to .065, incl	+ .002	+ .0035	+ .004	+ .0045	+ .0045	+ .0045	+ .0055	+ .0055	+ .0055	+ .0055
Over .065 to .068, incl	- .002	- .002	- .0025	- .0025	- .0025	- .0025	- .003	- .003	- .003	- .003
Over .068 to .099, incl	+ .002	+ .004	+ .0045	+ .005	+ .0055	+ .0055	+ .0065	+ .0065	+ .0065	+ .0065
Over .099 to .160, incl	- .002	- .002	- .0025	- .0025	- .003	- .003	- .0035	- .0035	- .0035	- .0035
Over .160 to .250, excl	+ .002	+ .005	+ .0055	+ .006	+ .006	+ .006	+ .0075	+ .0075	+ .0075	+ .0075

Note: The term "excl" is used to apply only to the higher figure of the specified range.

3.3 Hot Rolled Sheet:

TABLE II

Tolerance, Inch, Plus and Minus  
Width, Ranges, Inches

Nominal Thickness Inch	Over		Over		Over		Over		Over		Over	
	3.5 and under	3.5 to 6 incl	6 to 12 incl	12 to 15 incl	15 to 20 incl	20 to 32 incl	32 to 40 incl	40 to 48 incl	48 to 60 incl	60 to 70 incl	70 to incl	Over
0.0141 and under	0.002	0.002	0.002	--	--	0.002	0.002	0.002	0.002	0.002	0.002	0.002
0.142 to 0.0194, incl	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
0.0195 to 0.0254, incl	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
0.0255 to 0.0313, incl	--	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
0.0314 to 0.0343, incl	--	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
0.0344 to 0.0388, incl	--	--	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
0.0389 to 0.0508, incl	--	--	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
0.0509 to 0.0567, incl	--	--	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
0.0568 to 0.0709, incl	--	--	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
0.0710 to 0.0821, incl	--	--	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
0.0822 to 0.0971, incl	--	--	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
0.0972 to 0.1419, incl	--	--	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
0.1420 to 0.1799, incl	--	--	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
0.1800 to 0.1874, incl	--	--	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
0.1875 to 0.2299, incl	--	--	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008

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4. WIDTH:4.1 Cold and Hot Rolled Sheet:TABLE III

Nominal Width Inches	Tolerance, Inch Plus Only
20 and under	1/8
Over 20 to 30, incl	3/16
Over 30 to 48, incl	1/4
Over 48 to 80, incl	5/16
Over 80	3/8

4.2 Cold Rolled Strip:TABLE IV

Nominal Width Inches	Tolerance, Inch Plus and Minus
Over 1/2 to 2, incl	1/32
Over 2 to 5, incl	3/64
Over 5 to 10, incl	5/64
Over 10 to 15, incl	3/32
Over 15 to 20, incl	1/8
Over 20 to 23 15/16, incl	5/32

5. LENGTH:TABLE V

Nominal Length Inches	Tolerance, Inch Plus Only
60 and under	1/2
Over 60 to 96, incl	3/4
Over 96 to 120, incl	1
Over 120 to 156, incl	1-1/4
Over 156 to 192, incl	1-1/2
Over 192 to 240, incl	1-3/4

6. STRAIGHTNESS:

- 6.1 Widths Over 1.5 Inches: Shall be of such straightness that the maximum edgewise curvature (depth of arc) shall not exceed 0.250 inch in any 8 feet of length or 0.03125 inch x length in feet for shorter lengths.
- 6.2 Widths 1.5 Inches and Under: Shall be of such straightness that the maximum edgewise curvature (depth of arc) shall not exceed 0.50 inch in any 8 feet of length or 0.0625 inch x length in feet for shorter lengths.