



**Aluminum Technical Data
Sheet and Plate
Flatness Tolerances**

Flatness Tolerances - Flat Sheet (1)

Alloy (includes Alclads)	Specified Thickness in.	Longitudinal or Transverse Distance (ft) Center to Center Buckles or Edge Waves (2)				
		Up Thru 2	Over 2 Thru 3	Over 3 Thru 4	Over 4 Thru 6	Over 6
		Tolerances, in. (3) (4) (5)				
1060, 1100, 1350, 3003, 3005, 3105, 5005, 5050, 5X57	0.020 thru 0.064 0.065 thru 0.249	1/8 1/8	3/16 3/16	3/16 5/16	5/16 3/8	3/8 1/2
3004, 5052, 5083, 5086, 5252, 5X54, 5456, 5652, brazing sheet, and all heat treatable alloys	0.020 thru 0.064 0.065 thru 0.249	3/16 3/16	3/16 5/16	5/16 3/8	3/8 1/2	1/2 9/16

(1) Not applicable to cut-to-length sheet, panel flat sheet, coiled sheet, or sheet over 60 in. wide

(3) Allowable deviation from flat with the sheet positioned on flat horizontal surface to minimize deviation

(2) Also applicable to overall length of width of sheet if only one longitudinal and/or transverse buckle or edge wave is present.

(4) Not applicable to O, F and FX8 and harder tempers.

(5) Not applicable to end or corner turn-up.

Flatness Tolerances - Sawed or Sheared Plate

Longitudinal Flatness

Specified Thickness, in.	Tolerance (1) in. - Allowable Deviation from Flat	
	TX51 Tempers (2)	Other than TX51 tempers (2)(7)
0.250 - 3.000	3/16 in any 6 ft (3)	1/4 in any 6 ft or less
3.001 - 8.000	1/8 in any 6 ft or less	1/4 in any 6 ft or less

Transverse Flatness

Specified Thickness, in.	Tolerance (1) in. - Allowable Deviation from Flat				
	Widths over 4 ft thru 6 ft (4)		Widths over 2 ft thru 4 ft		Widths 2 ft and less
	TX51 tempers (2)	Other than, TX51 tempers (2)(7)	TX51 tempers (2)	Other than, TX51 tempers (2)(7)	All tempers (7)
0.250 - 0.624	3/8	1/2	5/16	3/8	Only short-span flatness tolerance applies
0.625 - 1.500	5/16	3/8	3/16	1/4	
1.501 - 3.000	3/16	1/4	3/16	3/16	
3.001 - 8.000	1/8	1/4	1/8	3/16	

Short-Span Flatness (5)

Specified Thickness, in.	Tolerance (6) in. - Allowable Deviation from Flat	
	TX51 Tempers (2)	Other than TX51 tempers (2)(7)
0.250 - 0.624	0.1	0.125
0.625 - 8.000	0.075	0.09

(1) As measured with plate resting on a flat surface concave side upward, using a straightedge and a feeler gauge, dial gauge or scale.

(5) Short-span flatness is the deviation from flat over full span for spans 2 ft and less

(2) TX51 is a general designation for the following stress-relieved tempers: T351, T451, T651, T851, T7351, and T7651.

(6) As measured with the plate resting on a flat surface

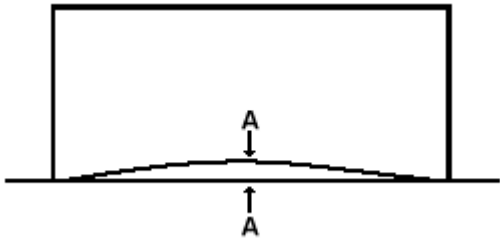
(7) Not applicable to O, F, and HX8 and harder tempers.

(3) For pieces ordered to less than 6 ft length, the tolerance is 1/8 in. for the total length



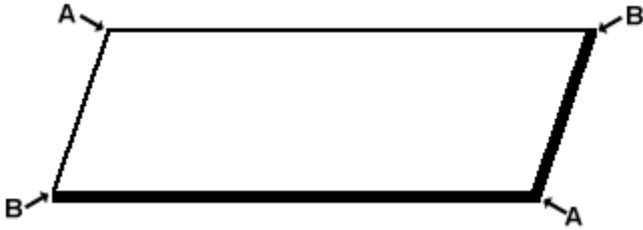
Aluminum Technical Data Sheet and Plate Lateral Bow and Squareness Tolerances

Lateral Bow Tolerances - Flat Sheet and Plate

Specified Thickness in.	Specified Width in.	Allowable Deviation of a side edge from a straight line						
								
		Maximum allowable value of AA						
		Specified Length - in.						
		Up thru 60	Over 60 thru 90	Over 90 thru 120	Over 120 thru 150	Over 150 thru 180	Over 180 thru 210	Over 210 thru 240+
		Tolerance - in.						
0.006-0.125	Up thru 4	0.250	0.563	1.000	1.563	2.250	3.000	4.000(1)
	Over 4 thru 10	0.094	0.219	0.375	0.563	0.875	1.156	1.500(1)
	Over 10 thru 35	0.063	0.125	0.188	0.250	0.375	0.500	0.750(1)
	Over 35	0.032	0.063	0.125	0.188	0.250	0.375	0.500(1)
0.126-0.249	Over 4 thru 15	0.063	0.125	0.250	0.375	0.563	0.750	1.000(1)
	Over 15	0.032	0.063	0.125	0.188	0.250	0.375	0.500(1)
0.250-8.000	Up thru 10	0.250	0.563	1.000	1.563	2.250	3.000	4.000(1)
	Over 10 thru 18	0.063	0.125	0.250	0.406	0.594	0.781	1.000(1)
	Over 18	0.032	0.094	0.125	0.219	0.312	0.438	0.562(1)

(1) Also applicable to any 240-inch increment of longer sheet or plate

Squareness Tolerances - Flat Sheet and Plate

Specified Length ft.	Specified Width - ft.	
	Up thru 3	Over 3
	Allowable difference in length of diagonals - inches 	
	Maximum difference between AA and BB	
Up thru 12	3/32 x width, ft (2)	5/64 x width, ft (2)
Over 12	9/64 x width, ft (2)	7/64 x width, ft (2)



**Aluminum Technical Data
Sheet and Plate
Thickness Tolerances**

Non Aerospace Applications

Specified Thickness in.		Specified Width - in.							
		Up Thru 39.37	Over 39.37 Thru 59.06	Over 59.06 Thru 78.74	Over 78.74 Thru 98.43	Over 98.43 Thru 118.11	Over 118.11 Thru 137.80	Over 137.80 Thru 157.48	Over 157.48 Thru 177.17
Over	Thru	Tolerances - in. plus and minus							
0.0059	0.01	0.001	0.0015	...	...	...	...	...	...
0.01	0.016	0.001	0.0015	...	...	...	...	...	...
0.016	0.025	0.0015	0.002	0.003	0.0035	...	...	...	...
0.025	0.032	0.002	0.0025	0.0035	0.004	...	...	...	...
0.032	0.039	0.002	0.003	0.0035	0.0045	0.006	...	...	...
0.0039	0.047	0.0025	0.0035	0.0045	0.006	0.007	0.008	...	...
0.0047	0.063	0.003	0.0035	0.005	0.006	0.007	0.009	...	...
0.063	0.079	0.0035	0.004	0.006	0.007	0.008	0.01	...	...
0.079	0.098	0.0035	0.0045	0.006	0.007	0.009	0.011	...	...
0.098	0.126	0.0045	0.006	0.007	0.009	0.011	0.013	...	...
0.126	0.158	0.006	0.007	0.009	0.011	0.013	0.015	...	...
0.158	0.197	0.007	0.009	0.011	0.013	0.015	0.018	...	...
0.197	0.248	0.009	0.011	0.013	0.015	0.018	0.022	0.027	...
0.248	0.315	0.012	0.014	0.015	0.018	0.022	0.027	0.035	0.043
0.315	0.394	0.015	0.017	0.02	0.023	0.027	0.033	0.041	0.051
0.394	0.63	0.023	0.023	0.027	0.032	0.035	0.043	0.053	0.065
0.63	0.984	0.031	0.031	0.037	0.043	0.047	0.058	0.07	0.085
0.984	1.575	0.039	0.039	0.047	0.055	0.065	0.075	0.09	0.105
1.575	2.362	0.055	0.055	0.06	0.07	0.085	0.1	0.115	...
2.362	3.15	0.075	0.075	0.085	0.1	0.105	0.125	...	...
3.15	3.937	0.1	0.1	0.115	0.125	0.13	0.16	...	...
3.937	6.299	0.13	0.13	0.145	0.165	...	...	...	...
6.3	8	0.16	0.16	0.16	0.165	...	...	...	...

Aerospace Applications

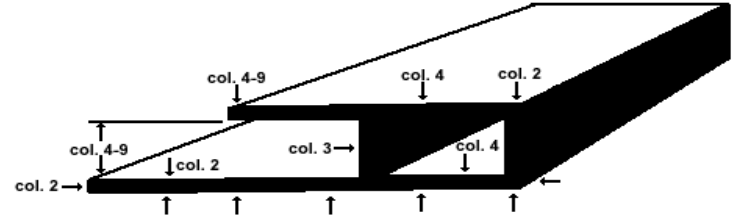
Includes Aerospace Alloys - 2014, 2024, 2124, 2219, 2324, 2419, 7050, 7150, 7178 and 7475

Specified Thickness		Specified Width - in.											
		Up thru 39.37	Over 39.37 thru 47.24	Over 47.24 thru 55.12	Over 55.12 thru 59.06	Over 59.06 thru 70.87	Over 70.87 thru 78.74	Over 78.74 thru 86.61	Over 86.61 thru 98.43	Over 98.43 thru 118.11	Over 118.11 thru 137.80	Over 137.80 thru 157.48	Over 157.48 thru 177.17
Over	Thru	Tolerance - in. plus and minus											
0.0059	0.01	0.001	0.002	0.002	...	...	...	...	...	...	...	...	...
0.01	0.016	0.0015	0.0025	0.0025	...	...	...	...	...	...	...	...	...
0.016	0.025	0.0015	0.0025	0.0025	...	...	...	...	...	...	...	...	...
0.025	0.032	0.0015	0.0015	0.002	0.003	0.003	...	...	...	...	...	...	...
0.032	0.039	0.0015	0.0015	0.002	0.003	0.003	0.0035	0.0035	0.007	...	...	...	...
0.039	0.047	0.002	0.002	0.002	0.003	0.003	0.0035	0.0035	0.008	0.01	0.011	...	...
0.047	0.063	0.002	0.002	0.003	0.003	0.003	0.0035	0.0035	0.009	0.011	0.013	...	...
0.063	0.079	0.002	0.002	0.003	0.0035	0.0035	0.0035	0.0035	0.01	0.013	0.015	...	...
0.079	0.098	0.0025	0.0025	0.0035	0.004	0.004	0.0045	0.0045	0.011	0.015	0.018	...	...
0.098	0.126	0.0035	0.0035	0.0035	0.0045	0.0045	0.0045	0.0045	0.013	0.016	0.02	...	...
0.126	0.158	0.004	0.004	0.0045	0.007	0.007	0.009	0.009	0.015	0.018	0.022	...	...
0.158	0.197	0.006	0.007	0.007	0.009	0.009	0.011	0.011	0.018	0.022	0.026	...	...
0.197	0.248	0.009	0.012	0.012	0.012	0.017	0.017	0.021	0.021	0.025	0.029	...	...
0.248	0.315	0.012	0.015	0.015	0.015	0.019	0.019	0.024	0.024	0.029	0.033	0.041	0.051
0.315	0.394	0.017	0.018	0.018	0.018	0.022	0.022	0.028	0.028	0.033	0.039	0.047	0.059
0.394	0.63	0.023	0.023	0.023	0.023	0.028	0.028	0.033	0.033	0.039	0.047	0.059	0.07
0.63	0.984	0.031	0.031	0.031	0.031	0.037	0.037	0.043	0.043	0.051	0.06	0.07	0.085
0.984	1.575	0.039	0.039	0.039	0.039	0.047	0.047	0.055	0.055	0.065	0.075	0.09	0.105
1.575	2.362	0.055	0.055	0.055	0.055	0.06	0.06	0.07	0.07	0.09	0.1	0.115	...
2.362	3.15	0.075	0.075	0.075	0.075	0.085	0.085	0.1	0.1	0.11	0.125	...	...
3.15	3.937	0.1	0.1	0.1	0.1	0.115	0.115	0.13	0.13	0.15	0.16	...	...
3.937	6.299	0.13	0.13	0.13	0.13	0.145	0.145	0.165	0.165	...	...	...	...
6.3	8	0.16	0.16	0.16	0.16	0.16	0.16	0.165	0.165	...	...	...	...



Aluminum Technical Data
Wire, Rod and Bar
Extruded

Cross Sectional Dimension Tolerances - Profiles
 Except for T3510, T4510, T6510, T73510, T76510 and T8510 Tempers

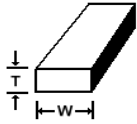


Tolerance - in plus and minus																
Specified Dimension in.	Metal Dimensions				Space Dimensions											
	Allowable Deviation From Specified Dimension Where 75 Percent or more of the Dimension is Metal				Allowable Deviation From Specified Dimension Where more than 25 Percent of the Dimension is Space											
	All Except Those Covered by Column 3		Wall Thickness Completely Enclosing Space 0.11 sq. in. and Over (Eccentricity)		At Dimensioned Points 0.250-0.624 inches from Base of Leg	At Dimensioned Points 0.625-1.249 inches from Base of Leg	At Dimensioned Points 1.250-2.499 inches from Base of Leg	At Dimensioned Points 2.500-3.999 inches from Base of Leg	At Dimensioned Points 4.000-5.999 inches from Base of Leg	At Dimensioned Points 6.000-8000 inches from Base of Leg						
	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9								
Col. 1	Alloys 5083 5086 5454	Other Alloys 5086 5454	Alloys 5083 5086 5454	Other Alloys 5086 5454	Alloys 5083 5086 5454	Other Alloys 5086 5454	Alloys 5083 5086 5454	Other Alloys 5086 5454	Alloys 5083 5086 5454	Other Alloys 5086 5454	Alloys 5083 5086 5454	Other Alloys 5086 5454	Alloys 5083 5086 5454			
Circumscribing Circle Sizes Less Than 10 Inches in Diameter																
Up thru 0.124	0.009	0.006	±15% of specified dimension; ±.090 max. ±.015 min.	±10% of specified dimension; ±.060 max. ±.010 min.	0.013	0.01	0.015	0.012	...	...	...	...	...	...
0.125-0.249	0.011	0.007			0.016	0.012	0.018	0.014	0.02	0.016	...	...	...	...	...	...
0.250-0.499	0.012	0.008			0.018	0.014	0.02	0.016	0.022	0.018	0.024	0.02	...	...	...	...
0.500-0.749	0.014	0.009			0.021	0.016	0.023	0.018	0.025	0.02	0.027	0.022	...	...	...	...
0.750-0.999	0.015	0.01			0.023	0.018	0.025	0.02	0.027	0.022	0.03	0.025	0.035	0.03	...	...
1.000-1.499	0.018	0.012			0.027	0.021	0.029	0.023	0.032	0.026	0.036	0.03	0.041	0.035	...	...
1.500-1.999	0.021	0.014			0.031	0.024	0.033	0.026	0.038	0.031	0.043	0.036	0.049	0.042	0.057	0.05
2.000-3.999	0.036	0.024			0.046	0.034	0.05	0.038	0.06	0.048	0.069	0.057	0.08	0.068	0.092	0.08
4.000-5.999	0.051	0.034			0.061	0.044	0.067	0.05	0.081	0.064	0.095	0.078	0.111	0.094	0.127	0.11
6.000-7.999	0.066	0.044			0.076	0.054	0.084	0.062	0.104	0.082	0.121	0.099	0.142	0.12	0.162	0.14
8.000-9.999	0.081	0.054	0.091	0.064	0.101	0.074	0.127	0.1	0.147	0.12	0.182	0.145	0.197	0.17		
Circumscribing Circle Sizes 10 Inches in Diameter and Over																
Up thru 0.124	0.021	0.014	±15% of specified dimension; ±.090 max. ±.025 min.	±15% of specified dimension; ±.090 max. ±.015 min.	0.025	0.018	0.027	0.02	...	...	...	...	...	...
0.125-0.249	0.022	0.015			0.026	0.019	0.029	0.022	0.035	0.028	...	...	...	...	...	...
0.250-0.499	0.024	0.016			0.028	0.02	0.032	0.024	0.038	0.03	0.058	0.05	...	...	...	...
0.500-0.749	0.025	0.017			0.03	0.022	0.035	0.027	0.049	0.04	0.068	0.06	...	...	...	...
0.750-0.999	0.027	0.018			0.031	0.023	0.039	0.03	0.057	0.05	0.079	0.07	0.099	0.09	...	...
1.000-1.499	0.028	0.019			0.033	0.024	0.043	0.034	0.069	0.06	0.089	0.08	0.109	0.1	...	...
1.500-1.999	0.036	0.024			0.046	0.034	0.056	0.044	0.082	0.07	0.102	0.09	0.122	0.11	0.182	0.17
2.000-3.999	0.051	0.034			0.061	0.044	0.071	0.054	0.097	0.08	0.117	0.1	0.137	0.12	0.197	0.18
4.000-5.999	0.066	0.044			0.076	0.054	0.086	0.064	0.112	0.09	0.132	0.11	0.152	0.13	0.212	0.19
6.000-7.999	0.081	0.054			0.091	0.064	0.101	0.074	0.127	0.1	0.147	0.12	0.167	0.14	0.227	0.2
8.000-9.999	0.096	0.064			0.106	0.074	0.116	0.084	0.142	0.11	0.162	0.13	0.182	0.15	0.242	0.21
10.000-11.999	0.111	0.074			0.121	0.084	0.131	0.094	0.157	0.12	0.177	0.14	0.197	0.16	0.257	0.22
12.000-13.999	0.126	0.084			0.136	0.094	0.146	0.104	0.172	0.13	0.192	0.15	0.212	0.17	0.272	0.23
14.000-15.999	0.141	0.094			0.151	0.104	0.161	0.114	0.187	0.14	0.207	0.16	0.227	0.18	0.287	0.24
16.000-17.999	0.156	0.104			0.166	0.114	0.176	0.124	0.202	0.15	0.222	0.17	0.242	0.19	0.302	0.25
18.000-19.999	0.171	0.114			0.181	0.124	0.191	0.134	0.217	0.16	0.237	0.18	0.257	0.2	0.317	0.26
20.000-21.999	0.186	0.124	0.196	0.134	0.206	0.144	0.232	0.17	0.252	0.19	0.272	0.21	0.332	0.27		
22.000-24.000	0.201	0.134	0.211	0.144	0.221	0.154	0.247	0.18	0.267	0.2	0.287	0.22	0.347	0.28		

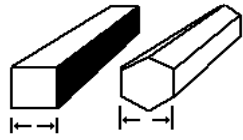
Diameter - Round Wire and Rod

Specified Diameter in.	Tolerance - in. plus and minus			
	Allowable Deviation From			
	Drawn Wire	Cold Finished Rod	Rolled Rod	
Plus			Minus	
Up thru 0.035	0.0005	...	...	...
0.036 - 0.064	0.001	...	...	...
0.065 - 0.374	0.0015	...	...	...
0.375 - 0.500	...	0.0015	...	...
0.501 - 1.000	...	0.002	...	...
1.001 - 1.500	...	0.0025	...	...
1.501 - 2.000	...	0.004	0.006	0.006
2.001 - 3.000	...	0.006	0.008	0.008
3.001 - 3.499	...	0.008	0.012	0.012
3.500 - 5.000	...	0.012	0.031	0.016
5.001 - 8.000	...	...	0.062	0.031

Thickness and Width - Rectangular Wire and Bar

Specified Thickness or Width in.		Tolerance in. plus and minus			
		Allowable Deviation from Specified Thickness and Width			
		Drawn Wire		Rolled Bar	
		Thickness	Width	Thickness	Width
Up thru 0.035	0.001	...	...	...
0.036 - 0.064	0.0015	...	...	...
0.065 - 0.500	0.002	0.002	0.006	...	
0.501 - 0.750	0.0025	0.0025	0.008	0.016	
0.751 - 1.000	0.0025	0.0025	0.012	0.016	
1.001 - 1.500	0.003	0.003	0.016	0.016	
1.501 - 2.000	0.005	0.005	0.016	0.031	
2.001 - 3.000	0.008	0.008	0.02	0.031	
3.001 - 4.000	...	0.01	0.02	0.031	
4.001 - 6.000	...	...	...	0.047
6.001 - 10.000	...	...	...	0.062

Distance across Flats - Square, Hexagonal and Octagonal Wire and Bar

Specified Distance Across Flats in.		Tolerance		
		Allowable Deviation From Specified Distance Across Flats		
		Drawn Wire	Cold Finished Bar	Rolled Bar
Up thru 0.035	0.001	...	...
0.036 - 0.064	0.0015	...	...
0.065 - 0.374	0.002	...	...
0.375 - 0.500	...	0.002	...	
0.501 - 1.000	...	0.0025	...	
1.001 - 1.500	...	0.003	...	
1.501 - 2.000	...	0.005	0.016	
2.001 - 3.000	...	0.008	0.02	
3.001 - 4.000	...	...	0.02