

AEROSPACE MATERIAL SPECIFICATION

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TOLERANCES, METRIC Low-Alloy Steel Sheet, Strip, and Plate

1. SCOPE:

This specification covers established metric manufacturing tolerances applicable to low-alloy steel sheet, strip, and plate 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.

2. APPLICABLE DOCUMENTS:

There are no referenced publications specified herein.

3. THICKNESS:

3.1 Hot Rolled Sheets; Coils and Cut Lengths:

Shall be as shown in Table 1. Thickness applies at any point on the sheet not less than 10 mm from a cut edge or 19 mm from a mill edge.

TABLE 1 - Thickness Tolerance, Millimeter, Plus and Minus; for Millimeter Width Ranges Shown

Specified Thickness Millimeters	Over 610 to 813, incl	Over 813 to 1016, incl	Over 1016 to 1219, incl	Over 1219 to 1524, incl	Over 1524 to 1778, incl	Over 1778 to 2032, incl	Over 2032 to 2286, incl
1.3 to 1.8, incl	0.15	0.15	0.15	0.18	0.18	--	--
Over 1.8 to 2.1, incl	0.18	0.18	0.18	0.18	0.20	0.20	--
Over 2.1 to 2.5, incl	0.18	0.20	0.20	0.20	0.23	0.23	0.25
Over 2.5 to 4.6, incl	0.20	0.23	0.25	0.25	0.28	0.30	0.30
Over 4.6 to 5.8, incl	0.23	0.23	0.25	--	--	--	--

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3.2 Cold Rolled Sheets; Coils and Cut Lengths:

Shall be as shown in Table 2. Thickness applies at any point on the sheet not less than 10 mm from a cut edge or 19 mm from a mill edge.

TABLE 2 - Tolerance, Millimeter, Plus and Minus; for Millimeter Width Ranges Shown

Specified Thickness Millimeters	Over 610 to 813, incl	Over 813 to 1016, incl	Over 1016 to 1219, incl	Over 1219 to 1524, incl	Over 1524 to 1778, incl	Over 1778 to 2032, incl	Over 2032 to 2286, incl
1.3 to 1.8, incl	0.15	0.15	0.15	0.15	0.18	--	--
Over 1.8 to 2.1, incl	0.18	0.18	0.18	0.18	0.20	0.20	--
Over 2.1 to 2.5, incl	0.18	0.20	0.20	0.20	0.23	0.23	0.25
Over 2.5 to 4.6, incl	0.20	0.23	0.25	0.25	0.28	0.30	0.30
Over 4.6 to 5.8, incl	0.23	0.23	0.25	--	--	--	--

3.3 Hot Rolled Strip; Coils and Cut Lengths, Excluding Crown:

Shall be as shown in Table 3. Thickness applies 10 mm from the edge of strip 25 mm or wider and at any point on strip less than 25 mm wide.

TABLE 3 - Tolerance, Millimeter, Plus and Minus; for Millimeter Width Ranges Shown

Specified Thickness Millimeters	Up to 152, incl	Over 152 to 305, incl	Over 305 to 381, incl	Over 381 to 508, incl	Over 508 to 610, incl
1.3 to 1.8, incl	0.13	0.13	0.15	0.15	0.15
Over 1.8 to 2.1, incl	0.13	0.13	0.15	0.18	0.18
Over 2.1 to 2.8, incl	0.13	0.13	0.18	0.20	0.20
Over 2.8 to 3.6, incl	0.13	0.15	0.18	0.20	0.20
Over 3.6 to 4.4, incl	0.13	0.15	0.18	0.20	0.23
Over 4.4 to 4.8, incl	0.15	0.15	0.18	0.23	0.23
Over 4.8 to 5.2, incl	0.15	0.15	0.20	0.23	0.23
Over 5.2 to 5.8, incl	--	0.18	0.20	0.23	0.23

3.3.1 Crown Tolerances for Hot Rolled Strip, Coils and Cut Lengths: Shall be as shown in Table 4.

TABLE 4 - Crown Tolerance, Millimeter

Specified Width Millimeter	Maximum Additional Thickness at Center
Over 25 to 89, incl	0.05
Over 89 to 152, incl	0.08
Over 152 to 305, incl	0.10
Over 305 to 381, incl	0.13
Over 381 to 608, incl	0.15

3.4 Cold Rolled Strip; Coils and Cut Lengths:

Shall be as shown in Table 5. Thickness applies 10 mm from the edge of strip 25 mm or wider and at any point on strip less than 25 mm wide.

TABLE 5 - Tolerance, Millimeter, Plus and Minus; for Millimeter Width Ranges Shown

Specified Thickness Millimeters	Up to 25 mm, excl	25 to 76 mm, excl	76 to 152 mm, incl	Over 152 to 229 mm, incl	Over 229 to 305 mm, incl	Over 305 to 406 mm, incl	Over 406 to 508 mm, incl	Over 508 to 608 mm, incl
0.25	0.03	0.03	0.03	0.03	0.03	0.03	0.038	0.038
0.28	0.03	0.03	0.03	0.03	0.03	0.038	0.038	0.038
0.30	0.03	0.03	0.03	0.03	0.038	0.038	0.038	0.038
Over 0.30 to 0.40, incl	0.03	0.03	0.03	0.038	0.038	0.038	0.05	0.05
Over 0.40 to 0.50, incl	0.03	0.03	0.03	0.038	0.038	0.05	0.05	0.05
Over 0.50 to 0.65, incl	0.03	0.03	0.038	0.05	0.05	0.05	0.064	0.064
Over 0.65 to 0.70, incl	0.03	0.038	0.038	0.05	0.05	0.05	0.064	0.08
Over 0.70 to 0.85, incl	0.038	0.038	0.05	0.064	0.064	0.064	0.08	0.08
Over 0.85 to 1.00, incl	0.05	0.05	0.064	0.08	0.08	0.08	0.08	0.08
Over 1.00 to 1.25, incl	0.05	0.05	0.064	0.08	0.08	0.08	0.10	0.10
Over 1.25 to 1.75, incl	0.05	0.05	0.08	0.08	0.08	0.08	0.10	0.10
Over 1.75 to 2.50, incl	0.05	0.05	0.08	0.08	0.08	0.10	0.10	0.10
Over 2.50 to 4.00, incl	0.05	0.08	0.08	0.10	0.10	0.10	0.13	0.13
Over 4.00 to 4.75, incl	0.05	0.09	0.10	0.10	0.10	0.13	0.15	0.15

3.5 Rectangular Sheared Plates:

Shall be as shown in Table 6.

TABLE 6 - Tolerance, Millimeter, Plus; for Millimeter Width Ranges Shown

Specified Thickness Millimeter	203 to 1219, incl	Over 1219 to 1524, excl	1524 to 1829, excl	1829 to 2134, excl	2134 to 2438, excl	2438 to 2743, excl	2743 to 3048, excl
4.5 to 11.1, excl	0.76	0.76	0.76	0.76	0.76	0.76	0.76
11.1 to 15.9, excl	0.76	0.76	0.76	0.76	0.76	0.76	1.02
15.9 to 19.1, excl	0.76	0.76	0.76	0.76	0.76	1.02	1.02
19.1 to 25.4, excl	0.76	0.76	0.76	0.76	1.02	1.02	1.27
25.4 to 51.8, excl	1.52	1.52	1.52	1.52	1.52	1.78	1.78
51.8 to 76.2, excl	2.29	2.29	2.29	2.54	2.78	2.78	3.05
76.2 to 101.6, excl	2.78	2.78	2.78	2.78	2.78	3.30	3.56
101.6 to 152.4, excl	3.81	3.81	3.81	3.81	3.81	3.81	3.81

3.5.1 Minus tolerance for all sizes shall be 0.25 mm, plus tolerance shall be as specified in Table 6.

3.5.2 Tolerances apply to measurements made at any point on widths less than 25 mm, at any point not less than 10 mm from a cut edge or not less than 19 mm from a mill edge on widths 25 mm and over, and at a point 10 to 19 mm from the longitudinal edge of rectangular sheared plates. For thicknesses measured at any other location, the thickness tolerance may vary by +75% to -0% from the values shown. Regardless of whether thickness tolerances for sheet and strip are specified equally or unequally, plus and minus, the total tolerance shall be equal to the arithmetic sum of the tabular plus and minus tolerances (twice the tabular tolerances when specified equally plus and minus).

4. WIDTH:

4.1 Hot Rolled or Cold Rolled Sheets; Cut Edge, Coils and Cut Lengths:

Shall be as shown in Table 7.

TABLE 7 - Width Tolerance, Millimeter

Specified Width Millimeters	Tolerance, Plus Only
610 to 762, incl	3.18
Over 762 to 1270, incl	4.76
Over 1270 to 2032, incl	7.94
Over 2032	9.52

4.2 Hot Rolled Strip; Coils and Cut Lengths, Except as Noted:

- 4.2.1 Mill Edge: Shall be as shown in Table 8. Width measurements on mill edge strip include the mill edge.

TABLE 8 - Width Tolerance, Millimeter

Specified Width Millimeters	Tolerance, Plus and Minus
Up to 51, incl	0.79
Over 51 to 127, incl	1.59
Over 127 to 229, incl	2.38
Over 229 to 305, incl	3.18
Over 305 to 508, incl	6.35
Over 508 to 608, incl	9.53

- 4.2.2 Slit Edge: Shall be as shown in Table 9.

TABLE 9 - Width Tolerance, Millimeter, Plus and Minus;
for Millimeter Thickness Ranges Shown

Specified Width Millimeters	Up to 2.77, incl	Over 2.77
Up to 51, incl	0.25	0.41
Over 51 to 127, incl	0.25	0.51
Over 127 to 229, incl	0.41	0.61
Over 229 to 305, incl	0.41	0.79
Over 305 to 508, incl	0.51	0.79
Over 508 to 608, incl	0.79	0.79

4.2.3 Sheared Edge, Cut Lengths Only: Tolerance shall be +3.2 mm, -0 for all sizes.

4.3 Cold Rolled Strip; Coils and Cut Lengths, No. 3 Slit Edge:

Shall be as shown in Table 10.

TABLE 10 - Tolerance, Millimeter, Plus and Minus;
for Millimeter Thickness Ranges Shown

Specified Width Millimeters	Over 0.250 to 1.73, incl	Over 1.73 to 2.51, incl	Over 2.51 to 4.06, incl	Over 4.06 to 4.75, incl	Over 4.75 to 6.35, incl
4.8 to 12.7, incl	0.13	0.20	0.25	--	--
Over 12.7 to 152, incl	0.13	0.20	0.25	0.41	--
Over 152 to 229, incl	0.13	0.25	0.41	0.51	--
Over 229 to 305, incl	0.25	0.25	0.41	0.51	--
Over 305 to 508, incl	0.41	0.41	0.51	0.79	--
Over 508 to 608, incl	0.51	0.51	0.51	0.79	--

4.4 Hot Rolled or Thermally Treated Plate, Sheared:

Minus tolerance shall be 6.4 mm for all sizes; plus tolerance shall be as specified in Table 11.

TABLE 11 - Width Tolerance, Millimeters, Plus; for Millimeter Thickness Ranges Shown

Specified Width Millimeters	Specified Length Millimeters	Up to 9.50, excl	9.50 to 15.88, excl	15.88 to 25.40, excl	25.40 to 50.80, incl
Up to 1524, excl	Up to 3048, excl	9.50	11.11	12.70	15.88
1524 to 2134, excl	Up to 3048, excl	11.11	12.70	15.88	19.05
2134 to 2743, excl	Up to 3048, excl	12.70	15.88	19.05	25.40
2743 and over	Up to 3048, excl	15.88	19.05	22.23	28.58
Up to 1524, excl	3048 to 6096, excl	9.50	12.70	15.88	19.05
1524 to 2134, excl	3048 to 6096, excl	12.70	15.88	19.05	22.23
2134 to 2743, excl	3048 to 6096, excl	14.29	17.46	20.64	25.40
2743 and over	3048 to 6096, excl	15.88	19.05	22.23	28.58

4.5 Hot Rolled or Thermally Treated Plate, Gas Cut:

Shall be as shown in Table 12. These tolerances may be all under, or may be divided over and under if so specified. Tolerances are applicable to all widths and lengths.

TABLE 12 - Width Tolerances, Millimeters

Specified Thickness, Millimeters	Tolerance
Up to 51, excl	19.05
51 to 102, excl	25.40
102 to 152, excl	28.58
152 to 203, excl	33.34
203 to 381, excl	38.10

5. LENGTH:

5.1 Hot Rolled or Cold Rolled Sheet:

Shall be as shown in Table 13.

TABLE 13 - Length Tolerance, Millimeters

Specified Length Millimeters	Tolerance, Plus Only Hot Rolled
610 to 762, incl	6.40
Over 762 to 1524, incl	12.70
Over 1524 to 3048, incl	19.05
Over 3048 to 3962, incl	25.40
Over 3962 to 4877, incl	31.75
Over 4877 to 6096, incl	38.10
Over 6096	44.45

5.2 Hot Rolled Strip:

Shall be as shown in Table 14.

TABLE 14 - Length Tolerance, Millimeters, Plus Only;
for Millimeter Width Ranges Shown

Specified Length Millimeters	Up to 76, incl	Over 76 to 152, incl	Over 152 to 608, incl
Up to 1524, incl	6.40	9.53	12.70
Over 1524 to 3048, incl	9.53	12.70	19.05
Over 3048 to 6096, incl	12.70	15.88	25.40
Over 6096 to 9144, incl	19.05	19.05	31.75
Over 9144 to 12192, incl	25.40	25.40	38.10
Over 12192	38.10	38.10	44.45

5.3 Cold Rolled Strip:

Shall be as shown in Table 15.

TABLE 15 - Length Tolerance, Millimeters, Plus Only
for Millimeter Width Ranges Shown

Specified Length Millimeters	Up to 305, incl	Over 305 to 600, incl
610 to 1524, incl	6.40	12.70
Over 1524 to 3048, incl	12.70	19.05
Over 3048 to 6096, incl	19.05	25.40

5.4 Hot Rolled or Thermally-Treated Plate, Sheared:

Minus tolerance shall be 6.40 mm for all sizes; plus tolerance shall be as shown in Table 16.