

AEROSPACE MATERIAL SPECIFICATION

SAE

MAM 2242B

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MAM 2242A

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.

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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 Millimeter Plus and Minus For Width Ranges Shown Millimeters | Thickness Tolerance Millimeter Plus and Minus For Width Ranges Shown Millimeters | Thickness Tolerance Millimeter Plus and Minus 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 | Millimeters Over 2140 to 3050, incl | Millimeters Over 3050 to 3650, incl | 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 Levelled, Resquared:

TABLE 4

| Specified Thickness Millimeters | Width Tolerances Millimeters, Plus Only For Width Ranges Shown | Width Tolerances Millimeters, Plus Only For Width Ranges Shown |
|------------------------------------|--|--|
| | Millimeters 600 to 1200, excl | 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 | Width Tolerance, Millimeter Plus and Minus For Thickness Ranges Shown Millimeters | Width Tolerance, Millimeter Plus and Minus For Thickness Ranges Shown Millimeters | Width Tolerance, Millimeter Plus and Minus For Thickness Ranges Shown Millimeters |
|--------------------------------|--|--|--|--|
| | Up to 1.75, incl | Over 1.75 to 2.50, incl | Over 2.50 to 4.00, incl | 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 | | Width Tolerance, Millimeters Plus For Thickness Ranges Shown Millimeters | | Width Tolerance, Millimeters Plus For Thickness Ranges Shown Millimeters | |
|--------------------------------|------------------------------------|---|-------------------------|---|-----------------------------|---|-----------------------------|
| | | 4.8 to 9.5 excl | 9.5 to 12.5, incl | 9.5 to 12.5, incl | Over 12.5 to 25, incl | Over 12.5 to 25, incl | Over 12.5 to 25, incl |
| Over 250 to 1220, incl | Up to | 3 | 5 | 5 | 8 | 8 | |
| Over 1220 to 1525, incl | 3,650, | 5 | 6 | 6 | 10 | 10 | |
| Over 1525 to 2140, incl | incl | 6 | 8 | 8 | 11 | 11 | |
| Over 2140 to 2750, incl | | 8 | 10 | 10 | 13 | 13 | |
| Over 2750 | | 10 | 11 | 11 | 16 | 16 | |
| Over 250 to 1220, incl | Over | 5 | 6 | 6 | 8 | 8 | |
| Over 1220 to 1525, incl | 3,650 to | 6 | 8 | 8 | 10 | 10 | |
| Over 1525 to 2140, incl | 6,100 | 10 | 11 | 11 | 13 | 13 | |
| Over 2140 to 2750, incl | incl | 11 | 13 | 13 | 16 | 16 | |
| Over 2750 | | 13 | 16 | 16 | 18 | 18 | |
| Over 250 to 1220, incl | Over | 6 | 8 | 8 | 10 | 10 | |
| Over 1220 to 1525, incl | 6,100 to | 8 | 10 | 10 | 13 | 13 | |
| Over 1525 to 2140, incl | 9,150 | 11 | 13 | 13 | 16 | 16 | |
| Over 2140 to 2750, incl | incl | 14 | 16 | 16 | 19 | 19 | |
| Over 2750 | | 16 | 18 | 18 | 22 | 22 | |
| Over 250 to 1525, incl | Over | 11 | 13 | 13 | 16 | 16 | |
| Over 1525 to 2140, incl | 9,150 | 13 | 16 | 16 | 19 | 19 | |
| Over 2140 to 2750, incl | 12,200, | 14 | 19 | 19 | 22 | 22 | |
| Over 2750 | incl | 19 | 22 | 22 | 25 | 25 | |
| Over 250 to 1525, incl | Over | 11 | 13 | 13 | 16 | 16 | |
| Over 1525 to 2140, incl | 12,200 to | 13 | 16 | 16 | 19 | 19 | |
| Over 2140 to 2750, incl | 15,200, | 16 | 19 | 19 | 22 | 22 | |
| Over 2750 | incl | 19 | 22 | 22 | 25 | 25 | |
| Over 250 to 1525, incl | Over | 13 | 16 | 16 | 19 | 19 | |
| Over 1525 to 2750, incl | 15,200 | 16 | 19 | 19 | 22 | 22 | |
| Over 2750 | | 22 | 25 | 25 | 29 | 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

| Specified Width Millimeters | Specified Length Millimeters | 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 | |
|--------------------------------|---------------------------------|--|-------------------------|--|------------------------|--|-----------------------------|
| | | 4.8 to 9.5 excl | 9.5 to 12.5, incl | 9.5 to 12.5, incl | 12.5 to 25, incl | 12.5 to 25, incl | Over 12.5 to 25, incl |
| Over 250 to 1220, incl | Up to | 5 | 6 | | | | 10 |
| Over 1220 to 1525, incl | 3,650, incl | 6 | 8 | | | | 11 |
| Over 1525 to 2140, incl | | 8 | 10 | | | | 13 |
| Over 2140 to 2750, incl | | 10 | 11 | | | | 14 |
| Over 2750 | | 11 | 13 | | | | 18 |
| Over 250 to 1220, incl | Over 3,650 to 6,100, incl | 10 | 13 | | | | 16 |
| Over 1220 to 1525, incl | | 11 | 16 | | | | 19 |
| Over 1525 to 2140, incl | | 13 | 18 | | | | 19 |
| Over 2140 to 2750, incl | | 14 | 19 | | | | 22 |
| Over 2750 | | 16 | 22 | | | | 25 |
| Over 250 to 1220, incl | Over 6,100 to 9,150, incl | 13 | 16 | | | | 19 |
| Over 1220 to 1525, incl | | 16 | 19 | | | | 19 |
| Over 1525 to 2140, incl | | 18 | 19 | | | | 22 |
| Over 2140 to 2750, incl | | 19 | 22 | | | | 25 |
| Over 2750 | | 22 | 25 | | | | 25 |
| Over 250 to 1525, incl | Over 9,150 to 12,200, incl | 29 | 32 | | | | 35 |
| Over 1525 to 2750, incl | | 32 | 35 | | | | 38 |
| Over 2750 | | 35 | 38 | | | | 41 |
| Over 250 to 1525, incl | Over 12,200 to 15,200, incl | 32 | 38 | | | | 41 |
| Over 1525 to 2750, incl | | 35 | 38 | | | | 41 |
| Over 2750 | | 38 | 41 | | | | 44 |
| Over 250 to 2750, incl | Over 15,200 | 44 | 48 | | | | 48 |
| Over 2750 | | 44 | 51 | | | | 57 |

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: