

**AEROSPACE
MATERIAL
SPECIFICATION**



MAM 2222C

Issued JUL 1982
Reaffirmed NOV 1999
Noncurrent MAR 2003

Superseding MAM 2222B

Tolerances, Metric
Copper and Copper Alloy Sheet, Strip, and Plate

NONCURRENCY NOTICE

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of March, 2003. It is recommended, therefore, that this specification not be specified for new designs.

AMS 2222 covers the same requirements.

"NONCURRENT" refers to those materials which have been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs.

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1. SCOPE:

This specification covers established metric manufacturing tolerances applicable to copper and copper alloy sheet, strip, and plate ordered to metric dimensions. These tolerances apply to all conditions, unless otherwise noted.

1.1 AMS 2222 is the inch/pound version of this MAM.

2. THICKNESS:

2.1 Non-Refractory:

See Table 1.

TABLE 1A - Strip Thickness Tolerances, Non-Refractory

Strip Thickness, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm
	Strip Up to 200 mm, Incl, in Width	Strip Over 200 mm to 300 mm, Incl, in Width	Strip Over 300 mm to 600 mm, Incl, in Width
Up to 0.10, incl	0.007	0.015	---
Over 0.10 to 0.20, incl	0.01	0.02	0.03
Over 0.20 to 0.30, incl	0.015	0.025	0.035
Over 0.30 to 0.40, incl	0.02	0.03	0.045
Over 0.40 to 0.50, incl	0.025	0.035	0.05
Over 0.50 to 0.60, incl	0.03	0.04	0.05
Over 0.60 to 0.70, incl	0.035	0.05	0.06
Over 0.70 to 1.0, incl	0.045	0.05	0.06
Over 1.0 to 1.3, incl	0.05	0.06	0.07
Over 1.3 to 2.0, incl	0.06	0.07	0.08
Over 2.0 to 3.5, incl	0.07	0.08	0.10
Over 3.5 to 5.0, incl	0.08	0.10	0.11

TABLE 1B - Sheet Thickness Tolerances, Non-Refractory

Strip Thickness, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm
	Sheet Over 600 mm to 700 mm, Incl, in Width	Sheet Over 700 mm to 900 mm, Incl, in Width	Sheet Over 900 mm to 1200 mm, Incl, in Width	Sheet Over 1200 mm to 1600 mm, Incl, in Width
Up to 0.010, incl	---	---	---	---
Over 0.010 to 0.020, incl	---	---	---	---
Over 0.020 to 0.030, incl	---	---	---	---
Over 0.030 to 0.040, incl	0.06	0.08	0.09	0.10
Over 0.040 to 0.050, incl	0.06	0.08	0.09	0.11
Over 0.050 to 0.060, incl	0.08	0.09	0.10	0.12
Over 0.060 to 0.070, incl	0.08	0.09	0.10	0.12
Over 0.070 to 1.0, incl	0.09	0.10	0.12	0.15
Over 1.0 to 1.3, incl	0.10	0.12	0.15	0.17
Over 1.3 to 2.0, incl	0.12	0.15	0.17	0.20
Over 2.0 to 3.5, incl	0.15	0.17	0.20	0.25
Over 3.5 to 5.0, incl	.17	0.20	0.25	0.30

TABLE 1C - Rolled Bar Thickness Tolerances, Non-Refractory

Rolled Bar Thickness, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm
	Rolled Bar Up to 200 mm, Incl, in Width	Rolled Bar Over 200 mm to 300 mm, Incl, in Width	Rolled Bar Over 300 mm to 600 mm, Incl, in Width
Over 5.0 to 8.0, incl	0.10	0.11	0.12
Over 8.0 to 13.0, incl	0.11	0.12	0.15
Over 13.0 to 20.0, incl	0.13	0.17	0.22
Over 20.0 to 30.0, incl	0.17	0.22	0.27
Over 30.0 to 40.0, incl	0.55	0.55	0.55
Over 40.0 to 60.0, incl	0.65	0.65	0.65

TABLE 1D - Plate Thickness Tolerances, Non-Refractory

Plate Thickness, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm
	Plate Over 600 mm to 700 mm, Incl in Width	Plate Over 700 mm to 900 mm, Incl in Width	Plate Over 900 mm to 1200 mm, Incl in Width	Plate Over 1200 mm to 1600 mm, Incl in Width
Over 5.0 to 8.0, incl	0.22	0.25	0.30	0.35
Over 8.0 to 13.0, incl	0.30	0.35	0.40	0.45
Over 13.0 to 20.0, incl	0.40	0.45	0.50	0.60
Over 20.0 to 30.0, incl	0.45	0.55	0.60	0.75
Over 30.0 to 40.0, incl	0.55	0.65	0.75	0.90
Over 40.0 to 60.0, incl	0.65	0.75	0.90	1.1

2.2 Refractory:

See Table 2.

TABLE 2A - Strip Thickness Tolerances, Refractory

Strip Thickness, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm
	Strip Up to 200 mm, Incl, in Width	Strip Over 200 mm to 300 mm, Incl, in Width	Strip Over 300 mm to 600 mm, Incl, in Width
Up to 0.010, incl	0.01	0.02	---
Over 0.10 to 0.20, incl	0.015	0.025	0.035
Over 0.20 to 0.30, incl	0.02	0.03	0.05
Over 0.30 to 0.40, incl	0.025	0.035	0.06
Over 0.40 to 0.50, incl	0.03	0.05	0.06
Over 0.50 to 0.60, incl	0.035	0.06	0.07
Over 0.60 to 0.70, incl	0.05	0.06	0.07
Over 0.70 to 1.0, incl	0.06	0.07	0.08
Over 1.0 to 1.3, incl	0.07	0.08	0.10
Over 1.3 to 2.0, incl	0.08	0.10	0.11
Over 2.0 to 3.5, incl	0.10	0.11	0.12
Over 3.5 to 5.0, incl	0.11	0.13	0.15

TABLE 2B - Sheet Thickness Tolerances, Refractory

Sheet Thickness, mm	Thickness Tolerances, Plus and Minus, mm Sheet Over 600 mm to 700 mm, Incl, in Width	Thickness Tolerances, Plus and Minus, mm Sheet Over 700 mm to 900 mm, Incl, in Width	Thickness Tolerances, Plus and Minus, mm Sheet Over 900 mm to 1200 mm, Incl, in Width	Thickness Tolerances, Plus and Minus, mm Sheet Over 1200 mm to 1600 mm, Incl, in Width
	Up to 0.010, incl	---	---	---
Over 0.010 to 0.020, incl	---	---	---	---
Over 0.020 to 0.030, incl	---	---	---	---
Over 0.030 to 0.040, incl	---	---	---	---
Over 0.040 to 0.050, incl	---	---	---	---
Over 0.050 to 0.060, incl	---	---	---	---
Over 0.060 to 0.070, incl	0.10	0.13	0.15	0.18
Over 0.070 to 1.0, incl	0.13	0.15	0.18	0.20
Over 1.0 to 1.3, incl	0.15	0.18	0.20	0.25
Over 1.3 to 2.0, incl	0.18	0.20	0.25	0.30
Over 2.0 to 3.5, incl	0.20	0.25	0.30	0.35
Over 3.5 to 5.0, incl	0.25	0.30	0.35	0.40

TABLE 2C - Rolled Bar Thickness Tolerances, Refractory

Rolled Bar Thickness, mm	Thickness Tolerances, Plus and Minus, mm Rolled Bar Up to 200 mm, Incl, in Width	Thickness Tolerances, Plus and Minus, mm Rolled Bar Up to 200 mm to 300 mm, Incl, in Width	Thickness Tolerances, Plus and Minus, mm Rolled Bar Up to 300 mm to 600 mm, Incl, in Width
	Over 5.0 to 8.0, incl	0.13	0.15
Over 8.0 to 13.0, incl	0.15	0.18	0.20
Over 13.0 to 20.0, incl	0.20	0.25	0.30
Over 20.0 to 30.0, incl	0.30	0.40	0.50
Over 30.0 to 40.0, incl	0.70	0.70	0.70
Over 40.0 to 60.0, incl	0.85	0.85	0.85

TABLE 2D - Plate Thickness Tolerances, Refractory

Plate Thickness, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm	Thickness Tolerances, Plus and Minus, mm
	Plate Over 600 mm to 700 mm, Incl, in Width	Plate Over 700 mm to 900 mm, Incl, in Width	Plate Over 900 mm to 1200 mm, Incl, in Width	Plate Over 1200 mm to 1600 mm, Incl, in Width
Over 5.0 to 8.0, incl	0.30	0.35	0.40	0.45
Over 8.0 to 13.0, incl	0.40	0.45	0.50	0.60
Over 13.0 to 20.0, incl	0.50	0.55	0.60	0.75
Over 20.0 to 30.0, incl	0.60	0.65	0.75	0.95
Over 30.0 to 40.0, incl	0.70	0.80	0.95	1.2
Over 40.0 to 60.0, incl	0.85	0.96	1.1	1.4

3. WIDTH:

3.1 General Purpose (Including Square Sheared Metal):

Applicable to all lengths up to 3000 mm, inclusive. See Table 3.

TABLE 3 - Width Tolerances, General Purpose

Specified Width, mm	Width Tolerance, mm Plus and Minus	Width Tolerance, mm Plus and Minus	Width Tolerance, mm Plus and Minus
	Thickness Ranges, mm Up to 1.5, Incl	Thickness Ranges, mm Over 1.5 to 3.5, Incl	Thickness Ranges, mm Over 3.5
Up to 500, incl	0.79	1.2	1.6
Over 500 to 900, incl	1.2	1.2	1.6
Over 900 to 3000, incl	1.6	1.6	1.6

3.2 Slit Metal and Slit Metal With Rolled Edges:

See Table 4.

TABLE 4 - Width Tolerances, Slit Metal

Specified Width	Width Tolerance, mm Plus and Minus Thickness Ranges, mm			
	0.10 to 0.80, Incl	Over 0.80 to 3.2, Incl	Over 3.2 to 5.0, Incl	Over 5.0 to 12.0, Incl
Up to 50, incl	0.13	0.25	0.30	0.38
Over 50 to 200, incl	0.20	0.33	0.38	0.38
Over 200 to 600, incl	0.40	0.40	0.40	0.80
Over 600 to 1000, incl	0.79	0.79	0.79	1.19

3.3 Rolled (Not Previously Slit) or Drawn Edge Metal:

See Table 5.

TABLE 5 - Tolerances, Rolled or Drawn

Width, mm	Tolerances Plus and Minus mm
Up to 1.2, incl	0.040
Over 1.2 to 2.3, incl	0.050
Over 2.3 to 3.3, incl	0.075
Over 3.3 to 4.8, incl	0.10
Over 4.8 to 12, incl	0.13
Over 12 to 32, incl	0.18

3.4 Sawed Metal:

See Table 6.

TABLE 6 - Width Tolerances, Sawed Metal

Width, mm	Width Tolerances Plus and Minus, mm For Lengths Up to 3000 mm, Incl For Thicknesses Up to 38 mm, Incl	Width Tolerances Plus and Minus, mm For Lengths Up to 3000 mm, Incl For Thicknesses Over 38 mm	Width Tolerances Plus and Minus, mm For Lengths Over 3000 mm All Thicknesses
	Up to 300, incl	0.79	1.6
Over 300 to 3000, incl	1.6	1.6	1.6

4. LENGTH:

4.1 Square Sheared Metal:

See Table 7.

TABLE 7 - Length Tolerance, Square Sheared Metal

Specified Length mm	Length Tolerance, mm Plus and Minus	Length Tolerance, mm Plus and Minus	Length Tolerance, mm Plus and Minus
	Thickness Ranges, mm Up to 1.6, Incl	Thickness Ranges, mm Over 1.6 to 3.2, Incl	Thickness Ranges, mm Over 3.2
Up to 500, incl	0.8	1.2	1.6
Over 500 to 900, incl	1.2	1.2	1.6
Over 900 to 3000, incl	1.6	1.6	1.6

4.2 Full length pieces specific and stock lengths with or without ends.

See Table 8.

TABLE 8 - Length Tolerance, Full and Stock Lengths

Length, mm	Length Tolerances mm Plus Only
Specific lengths, mill lengths, multiple lengths, and specific lengths with ends	6.5
3000 and under	13
Over 3000 to 6000, incl	25 ¹
Stock lengths and stock lengths with ends	

¹As stock lengths are cut and placed in stock in advance of orders, departure from this tolerance is not practicable.

4.3 Slit Metal and Slit Metal with Rolled Edges:

When specific lengths are ordered, length shall not vary from the length ordered by more than -0, +6.25 mm for lengths up to 3000 mm, incl, and by not more than -0, +12.5 mm for lengths over 3000 to 6000 mm, inclusive. Stock lengths shall not vary by more than -0, +25.0 mm from the length ordered.