

TOLERANCES, METRIC
Nickel, Nickel Alloy, and Cobalt Alloy Sheet, Strip, and Plate

1. **SCOPE:** This specification covers established metric manufacturing tolerances applicable to sheet, strip, and plate of nickel, nickel alloys, and cobalt 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 a specified range.
 - 1.1 AMS 2262, specified in inch/pound units, is the equivalent of this MAM.
 - 1.2 Throughout this specification the term "metric" is intended to refer to the SI system. These tables are based upon logical metric values and preferred metric sizes.
 - 1.3 Where the terms "nickel", "nickel-copper", "nickel-chromium", "nickel-molybdenum", "nickel-molybdenum-chromium", and "cobalt" are used without qualification, they refer to both non-heat-treatable and heat-treatable alloys as applicable, unless otherwise noted.
2. **THICKNESS:** Thickness for sheet and strip is measured at any place on widths under 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.

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2.1 Sheet:

- 2.1.1 Nickel, Nickel-Chromium, and Nickel-Copper Alloys: For thicknesses 0.45 mm and under, tolerances apply only to widths of 900 mm and under in lengths 2400 mm and under. Cold rolled tolerances do not apply to precipitation-hardenable nickel-chromium alloys over 1100 mm in width.

TABLE I

Specified Thickness Millimetres	Thickness Tolerance, Millimetre, Plus and Minus			
	Cold Rolled		Hot Rolled	
	Width Ranges Millimetres		Width Ranges Millimetres	
	Up to 1200, incl	Over 1200 to 1500, incl	Up to 1200, incl	Over 1200 to 1500, incl
0.25 to 0.45, incl	0.05	--	--	--
Over 0.45 to 0.65, incl	0.05	0.08	0.08	0.10
Over 0.65 to 0.85, incl	0.08	0.10	0.10	0.13
Over 0.85 to 1.40, incl	0.10	0.13	0.13	0.15
Over 1.40 to 1.80, incl	0.13	0.15	0.15	0.18
Over 1.80 to 2.00, incl	0.15	0.18	0.18	0.20
Over 2.00 to 2.35, incl	0.18	0.20	0.20	0.23
Over 2.35 to 2.75, incl	0.18	0.23	0.23	0.25
Over 2.75 to 3.20, incl	0.20	0.25	0.25	0.30
Over 3.20 to 3.55, incl	0.20	0.25	0.30	0.35
Over 3.55 to 4.35, incl	0.23	0.30	0.35	0.40
Over 4.35 to 4.75, incl	0.25	0.33	0.38	0.43

- 2.1.2 Nickel-Molybdenum, Nickel-Molybdenum-Chromium, and Cobalt Alloys (Widths 1200 mm and Under): For specified thicknesses over 4.75 mm, plate tolerances of Table V apply.

TABLE II

Specified Thickness Millimetres	Thickness Tolerance Millimetre	
	Plus	Minus
0.25 to 0.45, incl	0.05	0.05
Over 0.45 to 0.65, incl	0.08	0.08
Over 0.65 to 0.85, incl	0.10	0.10
Over 0.85 to 1.40, incl	0.13	0.13
Over 1.40 to 1.80, incl	0.15	0.15
Over 1.80 to 2.00, incl	0.18	0.18
Over 2.00 to 2.35, incl	0.20	0.20
Over 2.35 to 2.75, incl	0.23	0.23
Over 2.75 to 3.20, incl	0.25	0.25
Over 3.20 to 3.55, incl	0.33	0.25
Over 3.55 to 4.35, incl	0.40	0.25
Over 4.35 to 4.75, incl	0.45	0.25

2.2 Cold-Rolled Strip:

- 2.2.1 All Alloys: Table III does not apply to precipitation-hardenable nickel-chromium and nickel-molybdenum-chromium alloys for specified thicknesses over 0.65 mm or to any alloy in widths over 300 millimetres.

TABLE III

Specified Thickness (T) Millimetres	Thickness Tolerance Millimetre
	All Widths Plus and Minus
Up to 0.15, excl	0.10T
0.15 to 0.40, incl	0.02
Over 0.40 to 1.25, incl	0.04
Over 1.25 to 2.35, incl	0.06
Over 2.35 to 3.20, incl	0.10

- 2.3 Hot-Rolled Plate: Minus tolerance shall be 0.25 mm for all widths and all thicknesses in all alloys; plus tolerance shall be as shown in 2.3.1 and 2.3.2.

- 2.3.1 Nickel, Nickel-Chromium, and Nickel-Copper Alloys: Tolerances shown in Table IV are only approximate for precipitation-hardenable nickel-chromium alloys; failure to meet these tolerances shall not be cause for rejection of such alloy product.

TABLE IV

Specified Thickness (T) Millimetres	Thickness Tolerance, Millimetres, Plus Only For Width Ranges Shown, Millimetres				
	Up to 1200, excl	1200 to 1500, excl	1500 to 1800, excl	1800 to 2100, excl	2100 to 2400 excl
4.75 to 7.95, excl	0.113T	0.132T	0.150T	0.169T	0.184T
7.95 to 9.50, excl	0.094T	0.113T	0.132T	0.150T	0.169T
9.50 to 11.00, excl	0.088T	0.094T	0.113T	0.132T	0.150T
11.00 to 12.50, excl	0.075T	0.088T	0.094T	0.113T	0.132T
12.50 to 16.00, excl	0.063T	0.075T	0.088T	0.094T	0.113T
16.00 to 19.00, excl	0.057T	0.069T	0.075T	0.088T	0.094T
19.00 to 25.00, excl	0.050T	0.057T	0.069T	0.075T	0.088T
25.00 and Over	0.050T	0.050T	0.057T	0.069T	0.075T

- 2.3.2 Nickel-Molybdenum, Nickel-Molybdenum-Chromium, and Cobalt Alloys (Widths 1200 mm and Under: Tolerances shown in Table V are only approximate for precipitation-hardenable alloys. Failure to meet these tolerances shall not be cause for rejection of such alloy product.

TABLE V

Specified Thickness (T) Millimetres	Thickness Tolerance, Millimetres, Plus Only For Width Ranges Shown, Millimetres				
	Up to 1200, excl	1200 to 1500, excl	1500 to 1800, excl	1800 to 2100, excl	2100 to 2400, excl
4.75 to 7.95, excl	0.132T	0.150T	0.169T	0.184T	0.199T
7.95 to 9.50, excl	0.113T	0.132T	0.150T	0.169T	0.184T
9.50 to 11.00, excl	0.094T	0.113T	0.132T	0.150T	0.169T
11.00 to 12.50, excl	0.088T	0.094T	0.113T	0.132T	0.150T
12.50 to 16.00, excl	0.075T	0.088T	0.094T	0.113T	0.132T
16.00 to 19.00, excl	0.069T	0.075T	0.088T	0.094T	0.113T
19.00 to 25.00, excl	0.057T	0.069T	0.075T	0.088T	0.094T
25.00 and Over	0.050T	0.057T	0.069T	0.075T	0.088T

3. WIDTH:

- 3.1 Sheet (All Alloys, Widths 1500 mm and Under): Shall not vary in width more than +3 mm, -0.

3.2 Cold-Rolled Strip:

- 3.2.1 All Alloys:

TABLE VI

Specified Thickness Millimetres	Specified Width Millimetres	Width Tolerance Millimetre Plus and Minus
Up to 0.23, incl	300 and Under	0.13
Over 0.23 to 0.60, incl	300 and Under	0.18
Over 0.60 to 1.90, incl	350 and Under	0.18
Over 1.90 to 2.50, incl	350 and Under	0.23
Over 2.50 to 3.20, incl	350 and Under	0.30

3.3 Hot-Rolled Plate:

- 3.3.1 Nickel, Nickel-Chromium, Nickel-Copper, Nickel-Molybdenum, Nickel-Molybdenum-Chromium, and Cobalt Alloys:

- 3.3.1.1 Sheared Plate 6000 mm and Under in Length: Minus tolerance shall be 3.0 mm for all widths and all thicknesses; plus tolerances shall be as shown in Table VII. The minimum available width of sheared plate is 600 millimetres.

TABLE VII

Specified Thickness Millimetres	Width Tolerance, Millimetres, Plus Only for Width Ranges, Millimetres		
	Up to 750, incl	Over 750 to 1800, incl	Over 1800 to 2400, incl
4.75 to 8.00, excl	4.75	6.25	9.50
8.00 to 12.50, excl	6.25	9.50	9.50
12.50 to 19.00, excl	9.50	9.50	12.50
19.00 to 25.00, excl	12.50	12.50	15.50
25.00 to 31.50, incl	15.50	15.50	19.00

- 3.3.1.2 Sheared Plate Over 6000 mm in Length: Minus tolerance shall be 4.75 mm for all widths and all thicknesses; plus tolerance shall be 1.60 mm greater than those of Table VII.

- 3.3.1.3 Abrasive-Cut Plate: Standard width tolerances for abrasive-cut plate shall be ± 3.0 mm for specified thicknesses 31.50 mm and under and +4.75 mm, -3.0 mm for specified thicknesses over 31.50 to 70.00 mm, inclusive.

- 3.3.1.3.1 Minimum available width of abrasive-cut plate is 50 mm and increases to 100 mm for thick plate.

- 3.3.2 Tolerances for width of powder or inert-arc cut plate and for diameter of machined, powder, or inert-arc cut circular plate shall be as agreed upon by purchaser and vendor.

4. LENGTH:

- 4.1 Sheet and Strip: Definite lengths shall not vary more than +3 mm, -0 from the length ordered.

4.2 Hot-Rolled Plate:

- 4.2.1 Nickel, Nickel-Chromium, Nickel-Copper, Nickel-Molybdenum, Nickel-Molybdenum-Chromium, and Cobalt Alloys:

- 4.2.1.1 Sheared Plate: Minus tolerance shall be 3.0 mm for all lengths and all thicknesses; plus tolerances shall be as shown in Table VIII.