



Standard Specification for Nickel-Copper Alloy (UNS N04400) Plate, Sheet, and Strip¹

This standard is issued under the fixed designation B 127; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification² covers rolled nickel-copper alloy (UNS N04400)* plate, sheet, and strip.

~~1.2 The values stated in inch-pound units are to be regarded as the standard. The other values given are for information only.~~

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to become familiar with all hazards including those identified in the appropriate Material Safety Data Sheet (MSDS) for this product/material as provided by the manufacturer, to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:³

~~B164 Specification for Nickel-Copper Alloy Rod, Bar, and Wire~~ 906 Specification for General Requirements for Flat-Rolled Nickel and Nickel Alloys Plate, Sheet, and Strip

~~E8 Test Methods for Tension Testing of Metallic Materials~~

~~E10 Test Method for Brinell Hardness of Metallic Materials~~⁴

~~E18 Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials~~⁴

~~E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications~~

~~E76 Test Methods for Chemical Analysis of Nickel-Copper Alloys~~

~~E112 Test Methods for Determining the Average Grain Size~~⁴

~~E140 Hardness Conversion Tables for Metals~~⁴

140 Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, and Scleroscope Hardness (2009)

F 155 Test Method for Temper of Strip and Sheet Metals for Electronic Devices (Spring-Back Method)⁴

2.2 Military Standards: Federal Standards:⁵

Fed. Std. No. 102 Preservation, Packaging, and Packing Levels

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)

Fed. Std. No. 182 Continuous Identification Marking of Nickel and Nickel-Base Alloys

2.3 Military Standards:⁵

MIL-STD-129 Marking for Shipment and Storage

MIL-STD-271 Nondestructive Testing Requirements for Metals

3. Terminology

3.1 *Descriptions of Terms Specific to This Standard*—The terms given in Table 1 shall apply.

¹ This specification is under the jurisdiction of ASTM Committee B-2-B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.07 on Refined Nickel and Cobalt and Their Alloys.

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² For ASME Boiler and Pressure Vessel Code applications, see related Specification SB-127 in Section II of that code.

* New designation established in accordance with ASTM E 527 and SAE J1086, Practice for Numbering Metals and Alloys (UNS).

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards*, Vol 02.04, volume information, refer to the standard's Document Summary page on the ASTM website.

⁴ Withdrawn.

⁵ *Annual Book of ASTM Standards*, Vol 14.02.

⁶ Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, <http://www.dodssp.daps.mil>.

*A Summary of Changes section appears at the end of this standard.



TABLE 1 Product Description

Product	Thickness, in. (mm) Width, in. (mm)	
Hot-rolled plate ^A	3/16 and over (Table 5 and Table 6)	(Table 8) ^B
Hot-rolled sheet ^A	0.018 to 0.250 (0.46 to 6.4), incl (Table 7)	(Table 10)
Gold-rolled sheet ^C	0.018 to 0.250 (0.46 to 6.4), incl (Table 7)	(Table 10)
Cold-rolled sheet ^B	0.018 to 0.250 (0.46 to 6.4), incl (Table 7)	(Table 10)
Gold-rolled strip ^C	0.005 to 0.250 (0.13 to 6.4), incl (Table 7)	(Table 10)
Cold-rolled strip ^B	0.005 to 0.250 (0.13 to 6.4), incl (Table 7)	(Table 10)

^A Material 3/16 to 1/4 in. (4.8 to 6.4 mm), incl, in thickness may be furnished as sheet or plate provided the material meets the specification requirements for the condition ordered.

^B Hot-rolled plate, in widths 10 in. (254 mm) and under, may be furnished as hot-finished rectangles with sheared or cut edges in accordance with Specification B164, provided the mechanical property requirements of this specification are met.

^C Material under 48 in. (1219 mm) in width may be furnished as sheet or strip provided the material meets the specification requirements for the condition ordered.

4. General Requirements

4.1 Material furnished under this specification shall conform to the applicable requirements of Specification B 906 unless otherwise provided herein.

5. Ordering Information

4.1 Orders for material under this specification shall include the following information:

4.1.1

5.1 It is the responsibility of the purchaser to specify all requirements that are necessary for material ordered under this specification. Examples of such requirements include, but are not limited to the following:

5.1.1 Alloy—Name or UNS number (see Table 2).

4.1.2 ASTM designation, including year of issue.

4.1.3.1.3 Condition—See 6.1, 6.2, 7.1, 7.2, and Appendix X1.

4.1.4

5.1.4 Finish—See Appendix X1.

4.1.5

5.1.5 Dimensions—Thickness, width, and length.

4.1.6

5.1.6 Quantity.

4.1.7 [s://standards.iteh.ai/catalog/standards/sist/b0883d93-5719-47e3-9e07-c12a219f648e/astm-b127-052009](http://standards.iteh.ai/catalog/standards/sist/b0883d93-5719-47e3-9e07-c12a219f648e/astm-b127-052009)

5.1.7 Optional Requirements:

4.1.7.1

5.1.7.1 Sheet and Strip—Whether to be furnished in coil, in cut straight lengths, or in random straight lengths.

TABLE 2 Chemical Requirements

Element	Composition, % Product (Check) Anal- ysis Variations, under min or over max, of the Specified Limit of Element	
	Alloy N04400	
Nickel, min ^A	63.00-45	
Nickel, min ^A	63.0	
Copper	28.0 to 34.0	0.15 under min- 0.20 over max
Iron, max	2.50-05	
Iron, max	2.5	
Manganese, max	2.00-04	
Manganese, max	2.0	
Carbon, max	0.30-02	
Carbon, max	0.3	
Silicon, max	0.50-03	
Silicon, max	0.5	
Sulfur, max	0.024	0.005

^A Element shall be determined arithmetically by difference.

4.1.7.2

5.1.7.2 *Strip*—Whether to be furnished with commercial slit edge, square edge, or round edge.

4.1.7.3

5.1.7.3 *Plate*—Whether to be furnished specially flattened (7.7:27.2); also how plate is to be cut (see (7.2:18.2.1 and 7.3:28.3.2)).

4.1.8

5.1.8 *Fabrication Details*—Not mandatory but helpful to the manufacturer.

4.1.8.1

5.1.8.1 *Welding or Brazing*—Process to be employed.

4.1.8.2

5.1.8.2 *Plate*—Whether material is to be hot-formed.

4.1.9

5.1.9 *Certification*—State if certification or a report of test results is required (see Section 15).

4.1.10—State if certification or a report of test results is required (see Specification B 906, section on Material Test Report and Certification).

5.1.10 *Samples for Product (Check) Analysis*—Whether samples for product (check) analysis should be furnished (see 5.2).

4.1.11—Whether samples for product (check) analysis should be furnished (see Specification B 906, section on Sampling).

5.1.11 *Purchaser Inspection*—If the purchaser wishes to witness the tests or inspection of material at the place of manufacture, the purchase order must so state indicating which tests or inspections are to be witnessed (see Section Specification B 906, section on Inspection).

5.6. Chemical Composition

5.1.6.1 The material shall conform to the requirements as to chemical composition prescribed in Table 2.

5.2.6.2 If a product (check) analysis is performed by the purchaser, the material shall conform to the product (check) analysis variations prescribed in Table 2 Specification B 906.

6.

7. Mechanical and Other Requirements

6.1

7.1 *Mechanical Properties*—The material shall conform to the requirements for mechanical properties prescribed in Table 3.

6.2

TABLE 3 Mechanical Properties for Plate, Sheet, and Strip (All Thicknesses and Sizes Unless Otherwise Indicated)

Condition (Temper)	Tensile Strength, min, psi (MPa)	Yield Strength ^A (0.2 % offset), min, psi (MPa)	Elongation in 2 in. or 50 mm, or 4D, min, %	Rockwell Hardness (B Scale) ^{B,C}
Hot-Rolled Plate				
Annealed	70 000 (485)	28 000 (195)	35	...
As-rolled ^{D,E}	75 000 (515)	40 000 (275)	25	...
Hot-Rolled Sheet				
Annealed	70 000 (485)	28 000 (195)	35	...
Cold-Rolled Sheet				
Annealed	70 000 to 85 000 (485 to 585)	28 000 (195)	35	...
Quarter-hard	...	...	...	73 to 83
Half-hard	...	...	...	82 to 90
Hard	100 000 (690)	90 000 (620)	2	...
Cold-Rolled Strip				
Annealed	70 000 to 85 000 (485 to 585) ^F	28 000 (195)	35 ^F	...
Skin hard	...	...	...	68 to 73
Quarter-hard	...	...	...	73 to 83
Half-hard	...	...	...	82 to 90
Three-quarter-hard	...	...	...	89 to 94
Hard	100 000 (690) ^F	90 000 (620)	2 ^F	...
Spring temper	...	...	...	98 min

^A Yield strength requirements do not apply to material under 0.020 in. (0.51 mm) in thickness.

^B For Rockwell or equivalent hardness conversions see Hardness Conversion Tables E 140.

^C Caution should be observed in using the Rockwell test on thin material, as the results may be affected by specimen thickness. For thicknesses under 0.050 in. (1.3 mm), the use of the Rockwell superficial or the Vickers hardness test is suggested.

^D As-rolled plate may be given a stress-relieving heat treatment subsequent to final rolling.

^E As-rolled plate specified "suitable for hot forming" shall be furnished from heats of known good hot-malleability characteristics (see X1.2.2). There are no applicable tensile or hardness requirements for such material.

^F Not applicable for thickness under 0.010 in. (0.25 mm).

7.2 Deep-Drawing and Spinning Quality Sheet and Strip—The material shall conform to the requirements for grain size and hardness properties prescribed in Table 4.

~~6.2.1~~**7.2.1** The mechanical properties of Table 3 do not apply to deep-drawing and spinning quality sheet and strip.

7.

8. Dimensions and Permissible Variations

~~7.1 Thickness and Weight~~

8.1 Weight:

~~7.1.1~~**Plate**—For plate up to 2 in. (50.8 mm), inclusive, in thickness, the permissible variation under the specified thickness and permissible excess in overweight shall not exceed the amounts prescribed in Table 5.

~~7.1.1.1~~For use with Table 5, plate shall be assumed to weigh 0.319 lb/in.

8.1.1 For calculations of mass or weight a density of 0.319 lb/in.³ (8.83 g/cm³):

~~7.1.2~~ shall be used.

8.2 Thickness:

~~8.2.1~~**Plate**—For plate over 2 in. (50.8 mm) in thickness, the permissible variations over the specified thickness shall not exceed the amounts prescribed in Table 6.

~~7.1.3~~—For plate up to 2 in. (50.8 mm) inclusive, in thickness, the permissible variation, under the specified thickness and permissible excess in overweight shall not exceed the amounts prescribed in Specification B 906, see Permissible Variations in Thickness and Overweight of Rectangular Plates Table.

~~8.2.2~~**Plate**—For plate over 2 in. (50.8 mm) in thickness, the permissible variations over the specified thickness shall not exceed the amounts prescribed in Specification B 906, see Permissible Variations in Thickness for Rectangular Plates Over 2 in. (51 mm) in Thickness Table.

~~8.2.3~~**Sheet and Strip**—The permissible variations in thickness of sheet and strip shall be as prescribed in Table 7. The thickness of strip and sheet shall be measured with the micrometer spindle $\frac{3}{8}$ in. (9.5 mm) or more from either edge for material 1 in. (25.4 mm) or over in width and at any place on the strip under 1 in. in width.

~~7.2~~

8.3 Width or Diameter:

~~7.2.1~~

~~8.3.1~~**Plate**—The permissible variations in width of rectangular plates and diameter of circular plates shall be as prescribed in Table 8 and Table 9:

~~7.2.2~~—The permissible variations in width of rectangular plates and diameter of circular plates shall be as prescribed in Specification B 906, see Permissible Variations in Width of Sheared, Plasma Torch-Cut, and Abrasive-Cut Rectangular Plate Table and Permissible Variations in Diameter for Circular Plates Table.

~~8.3.2~~**Sheet and Strip**—The permissible variations in width for sheet and strip shall be as prescribed in Table 10:

~~7.3~~—The permissible variations in width for sheet and strip shall be as prescribed in Specification B 906, see Permissible Variations in Width of Sheet and Strip Table.

8.4 Length:

~~7.3.1~~**Sheet****8.4.1** Sheet and strip of all sizes may be ordered to cut lengths in which case, a variation of $\frac{1}{8}$ in. (3.2 mm) over the specified length shall be permitted.

~~7.3.2~~Permissible variations in length of rectangular plate shall be as prescribed in Table 11.

TABLE 4 Grain Size and Hardness for Cold-Rolled, Deep-Drawing, and Spinning Quality Sheet and Strip

Thickness, in. (mm)	Calculated Diameter of Average Grain Section, max		Corresponding ASTM Micro-Grain Size No.	Rockwell B ^{A,B} Hardness, max
	mm	in.		
Sheet (56 in. (1420 mm) Wide and Under)				
0.050 (1.3) and under	0.075	0.0030	4.5	76
Over 0.050 to 0.250 (1.3 to 6.4), incl	0.110	0.0043	3.5	76
Strip (12 in. (305 mm) Wide and Under) ^C				
0.005 ^D to 0.015 (0.13 to 0.38), incl	0.022	0.0009	8 ^E	76 ^E
Over 0.015 to 0.024 (0.38 to 0.61), incl	0.060	0.0024	5.5	76
Over 0.024 to 0.125 (0.61 to 3.2), incl	0.075	0.0030	4.5	76

^A For Rockwell or equivalent hardness conversions see Hardness Conversion Tables E 140.

^B Caution should be observed in using the Rockwell test on thin material as the results may be affected by specimen thickness. For thicknesses under 0.050 in. (1.3 mm), the use of the Rockwell superficial or the Vickers hardness test is suggested.

^C Sheet requirements in Table 4 apply to strip thicknesses over 0.125 in. (3.2 mm), and for all thicknesses of strip over 12 in. (305 mm) in width.

^D For ductility evaluations for strip under 0.005 in. (0.13 mm) in thickness, the spring-back test such as described in Test Method F 155 is often used and the manufacturer should be consulted.

^E Accurate grain size and hardness determinations are difficult to make on strip under 0.005 in. (0.13 mm) in thickness and are not recommended.

TABLE 5 Permissible Variations in Flat Thickness and Overweight of Rectangular, Circular, and Sketch Plates

NOTE 1—Permissible variations apply to plates sh up to 12 ft (366 cm) in length, ordered to any 12 thick or longer plates.

NOTE 2—If the weight per dimension is under 36 in. (914 mm), the permissible variation is not greater than 0.01 ¼ in. (0.34 mm) under.

NOTE 3—The shorter dimension specified is considered the width, and the permissible variation in each thickness across the width shall not exceed the tabular amount of that dimension.†

NOTE 4—The maximum dim is permitted to remove a flat surface imperfection, such as not to exceed 0.01 in. (0.3 mm) the tabular tolerance for the longer dimension specified thickness.

Specified Thickness, in. (mm)	Under 48 (1220), excl	48 to 60 (1220 to 1520), excl	60 to 72 (1520 to 1830), excl	72 to 84 (1830 to 2130), excl	84 to 96 (2130 to 2440), excl	96 to 108 (2440 to 2740), excl	108 to 120 (2740 to 3050), excl	120 to 132.44 (3050 to 3350), excl	132 to 144 (3350 to 3660), excl	144 to 160 (3660 to 4070), incl and over
	Inches									
9/16 to (4.8 to 7.9) ¼, excl	9.0% ^a	-10.5% ^b	-12.0% ^c	-13.5% ^c	-15.0% ^c	-16.5% ^c	-18.0	...	...	...
3/16 to ¼, excl	¾	1 1/16	1 ¼	1 3/8	1 5/8	1 7/8	18.0	...	...	...
¼ to 3/8 (7.9 to 9.5), excl	7.5-11 1/16	-9.0% ^a	-10.5% ^b	-12.0% ^c	-13.5% ^c	-15.0% ^c	-16.5% ^c	-18.0% ^c	...	...
¼ to 3/8, excl	1 1/16	¾	15/16	1 1/8	1 3/8	1 7/16	1 9/16	1 7/8	...	...
3/8	1 1/2	9/16	1 1/8	1 1/8	1 5/16	1 1/2	1 1/4	1 7/16	1 3/4	1 9/16
3/8 to ½, excl	1 1/2	9/16	1 1/8	1 1/8	1 5/16	1 1/2	1 1/4	1 7/16	1 3/4	1 9/16
½ to ¾, excl	1 1/2	9/16	5/8	5/8	3/4	1 1/8	1 1/8	1 1/8 to 7/16 (9.5 to 11.1), excl	1 1/8	1 1/8
½ to ¾, excl	1 1/2	9/16	5/8	13/16	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8
7.0% ^a	-7.5	-9.0% ^b	-10.5% ^b	-12.0% ^c	-13.5% ^c	-15.0% ^c	-16.5% ^c	-18.0	-19.5% ^c	-19.5% ^c
¾ to 1, excl	1 1/2	9/16	5/8	5/8	¾	1 1/8	1 1/8	1	1 1/8	1 1/8
to 2, excl	1 1/2	6.0% ^b	-7.0% ^b	-7.5% ^b	-9.0% ^b	-10.5% ^b	-12.0% ^b	-13.5% ^b	-15.0	-15.0
1 to 2, excl	1 1/2	9/16	9/16	9/16	1 1/16	1 1/16	1 1/16	¾	1	1
2 to 4, incl	1 1/4	18.0								
5/16	7/16	1/2 to	9/16	9/16 (12.7 to 15.9), excl	5.0% ^a	7/8				
5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8			
Millimetres										
4.8 to 6.0	-7.0	-7.5	-9.0	-10.5	-12.0	-13.5	-15.0	-16.5	...	...
4.8 to 6.4, excl	19.0	27.0	31.7	34.9	41.3	41.3	...	...	...	...
to ¾ (15.9 to 19.0), excl	4.5	-5.5	-6.0	-7.0	-7.5	-9.0	-10.5	-12.0	-13.5	-13.5
6.4 to 9.5, excl	17.5	19.0	23.8	28.6	35.0	36.5	39.7	47.6	...	...
9.5	12.7	14.3	17.5	17.5	19.0	23.8	28.6	31.7	35.0	44.4
9.5 to 12.7, excl	12.7	14.3	17.5	19.0	23.8	28.6	31.7	35.0	44.4	44.4
to 1 (19.0 to 25.4), excl	4.0	-4.5	-5.5	-6.0	-7.0	-7.5	-9.0	-10.5	-12.0	-13.5
12.7 to 19.0, excl	12.7	14.3	15.9	15.9	20.6	28.6	28.6	28.6	28.6	34.9
12.0	12.7	14.3	17.5	15.9	19.0	20.6	23.8	25.4	28.6	28.6
19.0 to 25.4, excl	12.7	14.3	15.9	15.9	19.0	20.6	23.8	25.4	28.6	28.6
1 to 2 (25.4 to 50.8), incl	4.0	-4.0	-4.5	-5.5	-6.0	-7.0	-7.5	-9.0	-10.5	-12.0
25.4 to 50.8, excl	12.7	14.3	14.3	14.3	17.5	17.5	17.5	19.0	25.4	25.4
50.8 to 106.6, incl	-6.4	-7.9	-9.5		12.7	14.3	15.9	19.0	22.2	22.2
50.8 to 101.6, incl	6.4	7.9	9.5	11.1	12.7	14.3	15.9	19.0	22.2	22.2

† Editorially corrected.

^aThe term "lot" applied to this table means all of the plates of each group width and each group thickness.

^bThe permissible overweight for lots of circular and sketch plates shall be 25% greater than the amounts given in this table.

^cThe weight of individual plates shall not exceed the nominal weight by more than 1 ¼ times the amount given in the table and Footnote B.

7.4

8.4.2 Permissible variations in length of rectangular plate shall be as prescribed in Specification B 906, see Permissible Variations in Length of Sheared, Plasma Torch-Cut, and Abrasive-Cut Rectangular Plate Table.

8.5 Straightness:

7.4.1 The 8.5.1 The edgewise curvature (depth of chord) of flat sheet, strip, and plate shall not exceed 0.05 in. multiplied by the length in feet (0.04 mm multiplied by the length in centimetres).

7.4.2 Straightness **8.5.2 Straightness** for coiled material is subject to agreement between the manufacturer and the purchaser.

7.5.8.6 Edges:

7.5.1.1 When **8.6.1** When finished edges of strip are specified in the contract or purchase order, the following descriptions shall apply:

7.5.1.1.1 Square-edge strip shall be supplied with finished edges, with sharp, square corners, and without bevel or rounding.

7.5.1.2 Round-edge **8.6.1.2 Round-edge** strip shall be supplied with finished edges, semicircular in form, and the diameter of the circle forming the edge being equal to the strip thickness.

7.5.1.3 When **8.6.1.3** When no description of any required form of strip edge is given, it shall be understood that edges such as those resulting from slitting or shearing will be acceptable.

7.5.1.4 Sheet **8.6.1.4 Sheet** shall have sheared or slit edges.

7.5.1.5 Plate **8.6.1.5 Plate** shall have sheared or cut (machined, abrasive-cut, powder-cut, or inert-arc-cut) edges, as specified.

7.6.8.7 Squareness (Sheet)—For sheets of all thicknesses, the angle between adjacent sides shall be $90 \pm 0.15^\circ$ ($1/16$ in. in 24 in.) (1.6 mm in 610 mm).

7.7

8.8 Flatness:

7.7.1 There **8.8.1** There shall be no flatness requirements for “deep drawing quality,” “spinning quality,” or “as-rolled,” sheet and strip (see X1.4).

7.7.2 Standard **8.8.2 Standard** flatness tolerances for plate shall conform to the requirements prescribed in Table 425. “Specially flattened” plate when so specified, shall have permissible variations in flatness as agreed upon between the manufacturer and the purchaser.

8.

9. Workmanship, Finish, and Appearance

8.1 The **9.1** The material shall be uniform in quality and temper, smooth, commercially straight or flat, and free of injurious imperfections.

8.2.2 Sheet, Strip, and Plate—Sheet, strip, and plate supplied in the conditions and finishes as listed in the appendix may be ground or machined to remove surface imperfections, provided such removal does not reduce the material below the minimum specified dimensions. Surface eliminated depressions shall be faired smoothly into the surrounding material. The removal of a surface imperfection shall be verified by the method originally used to detect the imperfection.

9. Sampling

9.1 Lot—Definition:

9.1.1 A lot for chemical analysis shall consist of one heat.

9.1.2 A lot for mechanical properties, hardness, and grain size testing shall consist of all material from the same heat, nominal thickness, and condition.

9.1.2.1 Where material cannot be identified by heat, a lot shall consist of not more than 500 lb (227 kg) of material in the same thickness and condition, except for plates weighing over 500 lb, in which case only one specimen shall be taken.

9.2 Test Material Selection:

9.2.1 Chemical Analysis—Representative samples shall be taken during pouring or subsequent processing.

9.2.1.1 Product (Check) Analysis shall be wholly the responsibility of the purchaser.

9.2.2 Mechanical Properties, Hardness, and Grain Size—Samples of the material to provide test specimens for mechanical properties, hardness, and grain size shall be taken from such locations in each lot as to be representative of that lot. (Hardness and grain size required only on the products as specified in Table 3 and Table 4.)

10. Number of Tests

10.1 Chemical Analysis—One test per lot.

10.2 Mechanical Properties—One test per lot.

10.3 Hardness—One test per lot. (Required only as specified in Table 3 and Table 4.)

10.4 Grain Size—One test per lot. (Required only as specified in Table 4.)

11. Specimen Preparation

11.1 Tension test specimens shall be taken from material in the final condition (temper) and tested transverse to the direction of rolling when width will permit.

11.2 Tension test specimens shall be any of the standard or subsize specimens shown in Test Methods E8.

11.3 In the event of disagreement, referee specimens shall be as follows:

11.3.1 Full thickness of the material machined to the form and dimensions shown for the sheet-type specimen in Test Methods E8 for material under $1/2$ in. (12.7 mm) in thickness.

11.3.2 The largest possible round specimen shown in Test Methods E8 for material $1/2$ in. (12.7 mm) and over.