



Designation: ~~B370-98~~ Designation: **B 370 – 03**

## Standard Specification for Copper Sheet and Strip for Building Construction<sup>1</sup>

This standard is issued under the fixed designation B 370; 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 ( $\epsilon$ ) 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 specification establishes the requirements for rolled copper sheet and strip in flat lengths or coils in ounce-weight thicknesses for roofing, flashing, gutters, downspouts, and general sheet metal work in building construction.

1.1.1 Products produced to this specification are not intended for electrical applications.

~~1.2 Values given in inch-pound units are to be regarded as the standard. Values given in parentheses are provided for information only.~~

1.2 Units—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.

~~NOTE 1—Specification B 101 is a companion specification for lead-coated copper sheets. is an associated specification for lead-coated copper sheets and strip for building construction.~~

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 establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

2.1 *ASTM Standards:*

B 101 [Specification for Lead-Coated Copper Sheets](#) ~~Sheet and Strip for Building Construction~~

B 248 [Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar](#)

B 601 [Practice Classification for Temper Designations for Copper and Copper Alloys—Wrought and Cast](#)

B 846 [Terminology for Copper and Copper Alloys](#)

E 3 [Methods of Preparation of Metallographic Specimens](#) ~~Practice for Preparation of Metallographic Specimens~~

E 8 [Test Methods for Tension Testing of Metallic Materials](#)

E 53 [Methods for Chemical Analysis of Copper](#) ~~Test Methods for Determination of Copper in Unalloyed Copper by Gravimetry~~

E 112 [Test Methods for Determining Average Grain Size](#)

E 255 [Practice for Sampling Copper and Copper Alloys for Determination of Chemical Composition](#)

E 478 [Chemical Analysis of Copper Alloys](#)

### 3. ~~Test Methods for Chemical Analysis of Copper Alloys~~

#### 3. General Requirements

3.1 The following sections of Specification B 248 constitute a part of this specification:

3.1.1 Terminology,

3.1.2 Materials and Manufacture,

3.1.3 Workmanship, Finish, and Appearance,

3.1.4 Specimen Preparation,

3.1.5 Test Methods,

3.1.6 Significance of Numerical Limits,

3.1.7 Inspection,

3.1.8 Certification,

3.1.9 Mill Test Report,

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee ~~B-5-B05~~ on Copper and Copper Alloys and is the direct responsibility of Subcommittee ~~B05.01 on Plate, Sheet, Strip, and Rolled Bar~~.

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

- 3.1.10 Packaging and Package Marking, and
- 3.1.11 Supplementary Requirements.

3.2 In addition, when a section with a title identical to that referenced in 3.1, above, appears in this specification, it contains additional requirements, which supplement those appearing in Specification B 248.

#### 4. Terminology

4.1 *Definitions*—For definitions of terms related to copper and copper alloys, refer to Terminology B 846.

4.1.1 *coil, n*—a length of the product wound into a series of connected turns.

4.1.1.1 *Discussion*—The unqualified term “coil” as applied to “flat product” usually refers to a coil in which the product is spirally wound, with the successive layers on top of one another (sometimes called a “roll”).

4.1.2 *lengths, mill, n*—straight lengths, including ends, that ~~can~~ be manufactured conveniently in the mills.

4.1.2.1 *Discussion*—Full length pieces usually are 8 or 10 ft (2.4 or 3.0 m) and subject to established length tolerances.

4.1.3 *lengths, specific, n*—straight lengths that are uniform in length, as specified, and subject to established length tolerances.

4.1.4 *length, stock, n*—straight lengths that are mill cut and stored in advance of orders.

4.1.3.1 *Discussion*—They usually are 8 or 10 ft (2.4 or 3.0 m) and subject to established length tolerances.

4.1.5.1.4 *sheet, for building construction, n*— a rolled flat product over 24 in. (610 mm) in width and of ounce-weight thickness from 8 to 48 oz (225 to 1360 g)-oz.

4.1.6.1.5 *strip, for building construction, n*— a rolled flat product up to 24 in. (610 mm), inclusive, in width and of ounce-weight thickness from 8 to 48 oz (225 to 1360 g)-oz.

4.1.7.1.6 *ounce-weight, n*—~~the weight of copper sheet or strip expressed in ounces per square foot.~~ the weight of copper sheet or strip expressed in ounces per square foot.

NOTE 2—In 4.1.4 and 4.1.5, the 8 to 48 oz refers to the names commonly used in the building industry for the sizes used. The respective sizes that correspond to these names are listed in Table 1.

#### 5. Ordering Information

5.1 Contracts or purchase orders for products supplied under this specification should include the following information:

5.1.1 ASTM designation and year of issue (for example, B 370–XX),

5.1.2 Temper (Section 8),

5.1.3 Dimensions: tolerances (Section 12),

5.1.4 How furnished: flat lengths or coils (4.1.1-4.1.4.1.1-4.1.3),

5.1.5 Quantity: total weight or number of pieces of each form and size, and

5.1.6 When product is purchased for agencies of the U.S. Government (Section 11).

5.2 The following are options available under this specification and should be specified in the contract or purchase order when required:

5.2.1 Heat identification or traceability details,

5.2.2 Certification, and

5.2.3 Mill test report.

#### 6. Materials and Manufacture

6.1 *Materials*—

6.1.1 ~~The~~ The material shall be any copper conforming with the chemical composition requirements (Section 7).

6.2 *Manufacture*:

6.2.1 *Sheet*—The product shall be manufactured in flat sheets.

**TABLE 2 1 Thickness and Weight Tolerances of Sheet and Strip**

Ounce-Weight/ft <sup>2</sup>	Theoretical Thickness, <sup>A</sup> in. (mm)	Minimum Thickness at Any Point, in. (mm)	Lot-Weight Tolerances, Plus and Minus % <sup>B</sup>
6	0.0081 (0.206)	0.0071 (0.180)	10
8	0.0108 (0.274)	0.0097 (0.246)	8
10	0.0135 (0.343)	0.0124 (0.315)	6
12	0.0162 (0.411)	0.0150 (0.381)	5
16	0.0216 (0.549)	0.0204 (0.518)	4
20	0.0270 (0.686)	0.0258 (0.655)	3.5
24	0.0323 (0.820)	0.0308 (0.782)	3.5
32	0.0431 (1.09)	0.0411 (1.04)	3
48	0.0646 (1.64)	0.0621 (1.58)	2

<sup>A</sup>Based on a density of 0.322 lb/in.<sup>3</sup> (8.91 g/cm<sup>3</sup>).

<sup>B</sup>Lot-weight tolerances are the permissible deviation from the theoretical weight of the number of sheets comprising a case or crate (normally approximately 1000 lb or 450 kg).

6.2.2 *Strip*—The product ~~may~~shall be manufactured in flat lengths or in coils (rolls) of one single continuous length not less than 25 ft (7.5 m) wound into a cylindrical spiral.

**7. Chemical Composition**

7.1 The material ~~may~~shall be any copper with a minimum copper content, including silver, of 99.5 %.

7.1.1 Limits ~~may~~shall be established and analysis required for unnamed elements by agreement between the manufacturer and the purchaser.

**8. Temper**

8.1 Copper sheet and strip produced to this specification is available in the following tempers as defined in Specification Classification B 601: O60 (soft annealed), (soft), H00 (¼ hard), (cold-rolled), H01 (¼ hard), (cold-rolled, high yield), H02 (½ half hard), H03 (¾ three-quarter hard), and H04 (hard).

~~NOTE 2—The purchaser should confer with the manufacturer or supplier concerning the availability of a specific temper and form.~~ 3—The purchaser should confer with the manufacturer or supplier concerning the availability of a specific temper and form.

NOTE 4—H00 temper is commonly known in the building industry as cold-rolled temper.

NOTE 5—H01 temper is commonly known in the building industry as cold-rolled, high yield temper.

**9. Physical Properties**

9.1 *Grain Size*—Although no grain size has been established for temper O60, the product shall be recrystallized fully as determined by Test Method E 112.

**10. Mechanical Properties Requirements—Mechanical Property Requirements**

10.1 *Tensile and Yield Strength Requirements:*

10.1.1 The product shall conform to the requirements specified in ~~Table 1~~Table 2 for the specific temper when subjected to test in accordance with Test Methods E 8.

10.1.2 Acceptance or rejection for mechanical properties shall be based upon the results of the tensile and yield strength tests.

10.2 *Rockwell Hardness:*

~~10.2.1 The~~—The approximate Rockwell values are given in ~~Table 1~~Table 2 for general information and assistance in testing and shall not be a basis for rejection.

10.2.1

~~NOTE 3—The 6—The~~ Rockwell hardness test offers a quick and convenient method of checking for general conformity to the specification requirements for temper and tensile strength.

**11. Purchases for U.S. Government Agencies**

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11.1 When identified in the contract or purchase order, product purchased for agencies of the U.S. Government shall conform to the special government requirements stipulated in the Supplemental Requirements.

**12. Dimensions, Mass, and Permissible Variations**

12.1 The product shall conform to the following requirements:

12.1.1 *Thickness:*

12.1.1.1 *Tolerances of Sheet and Strip* —The standard method for specifying thickness shall be by ounce-weight. The theoretical thickness for standard ounce-weights and the minimum thickness, measured at any point, shall be as specified in ~~Table 2~~Table 1.

**TABLE 1 2 Mechanical Properties**

Temper Designation		Tensile Strength, ksi <sup>A</sup> (MPa)		Yield Strength, at 0.5 % Extension Under Load, min ksi <sup>A</sup> (MPa)	Approximate Rockwell Hardness <sup>B</sup> (For Information Only)	
Standard	Former	Min	Max	F Scale	Yield Strength, at 0.5 % Extension Under Load, min ksi <sup>A</sup> (MPa)	Approximate Rockwell Hardness <sup>B</sup> (For Information Only)
Standard	Former	Min	Max	F	Superficial 30 T	Scale
O60	soft	30 (205)	38 (260)	...	up to 65	up to 31
H00	cold-rolled	32 (220)	40 (275)	20 (135)	54–82	15–49
H01	cold-rolled, high yield	34 (235)	42 (290)	28 (190)	60–84	18–51
H02	half hard	37 (255)	46 (315)	30 (205)	77–89	43–57
H03	three-quarter hard	41 (285)	50 (345)	32 (220)	82–91	47–59
H04	hard	43 (295)	52 (360)	35 (240)	86–93	54–62

<sup>A</sup>ksi = 1000 psi.

<sup>B</sup> Rockwell hardness values apply as follows: The F scale applies to metal 0.020 in. (0.508 mm) and over in thickness; the superficial 30T scale applies to metal 0.012 in. (0.305 mm) to 0.020 in. (0.508 mm) in thickness.