



Designation: ~~B370-03~~ Designation: **B 370 – 09**

## 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 *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 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:<sup>2</sup>

B 101 Specification for Lead-Coated Copper 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 Classification for Temper Designations for Copper and Copper Alloys—Wrought and Cast

B 846 Terminology for Copper and Copper Alloys

E 3 Practice Guide for Preparation of Metallographic Specimens

E 8 Test Methods for Tension Testing of Metallic Materials

~~E 53 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 the Determination of Chemical Composition

E 478 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,

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

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

Current edition approved October 1, 2003; 2009. Published November 2003; May 2009. Originally approved in 1961. Last previous edition approved in 1998 as B370-98—B 370-03.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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

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 are 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 *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.

4.1.4 *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.

4.1.5 *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.

4.1.6 *ounce-weight, n*—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 Include the following information when placing orders for product under this specification, as applicable:

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 (4.1.1-4.1.3),

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

**TABLE 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>
Ounce-Weight/ft <sup>2</sup>	Theoretical Thickness, <sup>A</sup> in. (mm)	Toint, in. (mm)	Lot-Weight Tolerances, Plus and Minus in. (mm)
6	0.0081 (0.206)	—0.0071 (—0.180)	10
8	0.0108 (0.274)	—0.0071 (—0.180)	.001(.026)
10	0.0135 (0.343)	—0.0097 (—0.246)	8
12	0.0162 (0.411)	—0.0097 (—0.246)	.0011(.028)
16	0.0216 (0.549)	—0.0124 (—0.315)	6
20	0.0270 (0.686)	—0.0124 (—0.315)	.0011(.028)
24	0.0323 (0.820)	—0.0150 (—0.381)	5
32	0.0431 (1.09)	—0.0150 (—0.381)	.0012(.030)
48	0.0646 (1.64)	—0.0204 (—0.518)	4
48	0.0646 (1.64)	—0.0204 (—0.518)	.0012(.031)
20	0.0270 (0.686)	—0.0258 (—0.655)	3.5
24	0.0323 (0.820)	—0.0258 (—0.655)	.0012(.031)
24	0.0323 (0.820)	—0.0308 (—0.782)	3.5
24	0.0323 (0.820)	—0.0308 (—0.782)	.0015(.038)
32	0.0431 (1.09)	—0.0411 (—1.04)	3
32	0.0431 (1.09)	—0.0411 (—1.04)	.002(.05)
48	0.0646 (1.64)	—0.0621 (—1.58)	2
48	0.0646 (1.64)	—0.0621 (—1.58)	.0025(.06)

<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 Manufacture:

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

6.2.2 *Strip*—The product 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 shall be any copper with a minimum copper content, including silver, of 99.5 %.

7.1.1 Limits 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 Classification B 601: O60 (soft), H00 (cold-rolled), H01 (cold-rolled, high yield), H02 (half hard), H03 (three-quarter hard), and H04 (hard).

8.1 The standard tempers for products described in this specification are given in Table 2.

8.2 Cold Rolled tempers as defined in Classification B 601: H00 (cold-rolled), H01 (cold-rolled, high yield), H02 (half hard), H03 (three-quarter hard), and H04 (hard).

8.3 Annealed temper as defined in Classification B 601: O60 (soft)

NOTE 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—Physical Property Requirements

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 Property Requirements

10.1 *Tensile and Yield Strength Requirements:*

10.1.1 The product shall conform to the requirements specified in 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 Requirement*—The approximate Rockwell values are given in Table 2 are for general information and assistance in testing and shall not be a basis for rejection.

10.2.1 *product rejection.*

NOTE 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

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 and maximum thickness, measured at any point, shall be as specified in Table 1.

**TABLE 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) Scale	
Standard	Former	Min	Max		F	Superficial 30 T
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.