



Designation: B882 – 05

## Standard Specification for Pre-Patinated Copper for Architectural Applications<sup>1</sup>

This standard is issued under the fixed designation B882; 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.

### 1. Scope\*

1.1 This specification covers the establishment of the requirements for pre-patinated (artificially aged) copper sheet and strip in ounce-weight thicknesses supplied in flat lengths for roofing, flashing, and other architectural applications.

1.2 The pre-patinated surface is the result of chemical reaction with the copper and shall be applied on one side of the product.

1.2.1 The pre-patinated surface formed is comparable in color and ability to be bent or formed to the surface formed in naturally occurring patinated copper.

1.3 The pre-patinated surface is not the result of coating applications such as painting.

1.4 Materials made to this specification are not intended to be used for electrical applications.

1.5 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—A companion specification for copper sheet and strip for building construction is Specification B370.

1.6 The following precautionary statement pertains only to the test method portion, Section 12, of this specification: *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>

<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 Oct. 1, 2005. Published October 2005. Originally approved in 1997. Last previous edition approved in 2000 as B882–00. DOI: 10.1520/B0882-05.

<sup>2</sup> 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* volume information, refer to the standard's Document Summary page on the ASTM website.

B248 Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar

B370 Specification for Copper Sheet and Strip for Building Construction

B571 Practice for Qualitative Adhesion Testing of Metallic Coatings

B601 Classification for Temper Designations for Copper and Copper Alloys—Wrought and Cast

B846 Terminology for Copper and Copper Alloys

E8 Test Methods for Tension Testing of Metallic Materials

E478 Test Methods for Chemical Analysis of Copper Alloys

G23 Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials (Discontinued 2001)<sup>3</sup>

### 3. Terminology

3.1 *Definitions*:

3.1.1 For definitions of terms related to copper and copper alloys, refer to Terminology B846.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *pre-patinated copper*—copper that has been artificially aged under controlled and monitored conditions to produce a protective surface that is within the range of colors from green to turquoise.

### 4. Ordering Information

4.1 Orders for product produced to this specification should include the following information:

4.1.1 ASTM designation and year of issue,

4.1.2 Ounce weight thickness of the base copper sheet (see Table 1),

4.1.3 Temper (see Table 2),

4.1.4 *Dimensions*—Width and length of sheets, and

4.1.5 *Quantity*—Total weight or number of sheets of each size.

4.2 The following requirements are optional and shall be included in the purchase order or contract when required:

4.2.1 Certification,

<sup>3</sup> Withdrawn. The last approved version of this historical standard is referenced on www.astm.org.

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

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

Ounce-Weight/ft <sup>2</sup>	Theoretical Thickness, <sup>A</sup> in. (mm)	Tolerances, Plus and Minus, in. (mm)
6	0.0081 (0.206)	0.001 (0.026)
8	0.0108 (0.274)	0.0011 (0.028)
10	0.0135 (0.343)	0.0011 (0.028)
12	0.0162 (0.411)	0.0012 (0.030)
16	0.0216 (0.549)	0.0012 (0.031)
20	0.0270 (0.686)	0.0012 (0.031)
24	0.0323 (0.820)	0.0015 (0.038)
32	0.0431 (1.09)	0.002 (0.05)
48	0.0646 (1.64)	0.0025 (0.06)

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

4.2.2 Mill test reports, or

4.2.3 Supplementary requirements for agencies of the U.S. government as given in Specification **B248**, or both.

## 5. General Requirements

5.1 The following sections of Specification **B248** constitute a part of this specification:

- 5.1.1 Sampling,
- 5.1.2 Number of tests and retests,
- 5.1.3 Specimen preparation,
- 5.1.4 Test methods,
- 5.1.5 Significance of numerical limits,
- 5.1.6 Inspection,
- 5.1.7 Rejection and reheating,
- 5.1.8 Certification,
- 5.1.9 Test reports,
- 5.1.10 Packaging and package markings, and
- 5.1.11 Supplementary requirements.

5.2 In addition, when a section with a title identical to that referenced in **5.1** appears in this specification, it contains additional requirements that supplement those appearing in Specification **B248**.

## 6. Materials and Manufacture

6.1 *Materials*—The base or starting material shall be copper sheet or strip manufactured by any process that provides a product that conforms to the requirements of Specification **B370**.

### 6.2 *Manufacture:*

6.2.1 The pre-patinated surface shall be the result of chemical treatment that artificially ages the base metal, under controlled conditions, to form the green- to turquoise-colored protective layer.

6.2.2 The untreated side of the copper sheet is permitted to have a dull appearance. Stains or discolorations are permitted as long as they do not interfere with the function of the product.

## 7. Chemical Composition

7.1 The copper sheet shall have a minimum copper content of 99.5 % (including silver) as prescribed in Specification **B370**.

7.1.1 Any copper that complies with **7.1** shall be acceptable.

7.2 When limits for unnamed elements are required, those limits shall be established, and the concentration of such elements determined by agreement between the manufacturer and the purchaser.

7.3 The artificial patina is composed of metallic salts which are also found in naturally occurring patinas.

## 8. Temper

8.1 The nonpatinated base copper sheet, referred to in **6.1** of this specification, is commercially available in the following tempers as defined by Classification **B601**: H00 (eighth hard, cold-rolled), H01 (quarter hard, cold-rolled high yield), and H02 (half hard) temper.

8.1.1 Unless otherwise specified, the product is normally supplied in the H00 (eighth hard, cold-rolled) temper.

## 9. Mechanical Properties

### 9.1 *Tensile Strength:*

9.1.1 The nonpatinated base copper sheet material shall conform to the requirements of **Table 2**, for the temper specified in the purchase order, when tested in accordance with Test Methods **E8**.

9.1.2 The tension test results shall be the basis for purchaser acceptance or rejection based upon mechanical properties.

### 9.2 *Rockwell Hardness:*

9.2.1 Since Rockwell hardness tests offer a quick and convenient method of checking the conformity of the product to the requirements of tensile strength, approximate Rockwell hardness values are given in **Table 2** for general information and assistance in testing.

9.2.1.1 The hardness testing must be performed on a non-patinated surface, and the values obtained shall not be used as a basis for rejection.

## 10. Dimensions, Mass, and Permissible Variations

### 10.1 *Thickness:*

10.1.1 The standard method of measuring the thickness of the nonpatinated base sheet shall be by ounce-weight.

10.1.1.1 The corresponding theoretical thickness in inches for the standard ounce-weights is shown in **Table 1**.

10.1.2 The minimum thickness permitted at any point on the nonpatinated base sheet shall be as specified in **Table 1**.

10.1.2.1 The thickness of the patinated product shall not be less than the thickness of the base copper sheet.

### 10.2 *Weight Tolerances:*

10.2.1 Lot-weight tolerances of the nonpatinated starting material, based on case-weight lots of approximately 1000 lbs (455 kg), shall be as specified in **Table 1**.

10.2.1.1 Other case-weight lot sizes are permitted when agreed upon between the purchaser and supplier.

10.2.1.2 Lot-weight tolerances of the patinated material shall not increase the case weight lots of the nonpatinated metal by more than 2 % or as agreed upon between the purchaser and manufacturer.

### 10.3 *Width:*

10.3.1 The width tolerance for slit metal shall be as shown in **Table 3**.

10.3.2 The width tolerances for square-sheared metal shall be as shown in **Table 4**.

### 10.4 *Length:*

10.4.1 Specific and stock length tolerances shall be as shown in **Table 5**.