



Designation: B882 – 24

Standard Specification for Pre-Patinated Copper for Architectural Applications¹

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1. Scope*

1.1 This specification establishes the requirements for mill-produced pre-patinated (artificially aged) copper sheet and strip in ounce-weight or other standard mill-defined 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 industrially applied artificial coatings, similar to paint or any other finishes that prevent interaction between the copper and the climate.

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

1.5 *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, which 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 safety hazard caveat 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ 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.

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2. Referenced Documents

2.1 ASTM Standards:²

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/E8M Test Methods for Tension Testing of Metallic Materials

E478 Test Methods for Chemical Analysis of Copper Alloys

G152 Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

G153 Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

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, n*—copper that has been artificially aged at a mill, that is climate controlled and monitored to produce a protective surface that is within the typical range of colors spanning from brown, through green and blue tones.

4. General Requirements

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

4.1.1 Sampling,

4.1.2 Number of Tests and Retests,

4.1.3 Specimen Preparation,

4.1.4 Test Methods,

4.1.5 Significance of Numerical Limits,

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. 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

- 4.1.6 Inspection,
- 4.1.7 Rejection and Rehearing,
- 4.1.8 Certification,
- 4.1.9 Test Reports,
- 4.1.10 Packaging and Package Markings, and
- 4.1.11 Supplementary Requirements.

4.2 In addition, when a section with a title identical to that referenced in 4.1 appears in this specification, it contains additional requirements that supplement those appearing in Specification B248.

5. Ordering Information

5.1 Include the following specified choices when placing orders for product under this specification, as applicable:

- 5.1.1 ASTM designation and year of issue,
- 5.1.2 Ounce weight thickness of the base copper sheet (see Table 1), or other standard mill-defined thicknesses.
- 5.1.3 Temper (see Table 2),
- 5.1.4 *Dimensions*—Width and length of sheets, and
- 5.1.5 *Quantity*—Total weight or number of sheets of each size.

5.2 The following options are available and, when required, shall be specified at the time of placing the order:

- 5.2.1 Certification,
- 5.2.2 Test Report,
- 5.2.3 If product is purchased for agencies of the U.S. Government (see the Supplementary Requirements section of Specification B248) for additional requirements, if specified.

6. Materials and Manufacture

6.1 Materials:

6.1.1 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 brown, green- or blue-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.

TABLE 1 Thickness and Weight Tolerances of Sheet and Strip

Ounce-Weight/ft ²	Theoretical Thickness, ^A 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)

^A Based on a density of 0.322 lb/in.³ (8.91 g/cm³).

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 H01 (quarter hard, cold-rolled high yield) 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/E8M.

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 The approximate Rockwell hardness values given in Table 2 are for general information and assistance in testing, and shall not be used as a basis for product rejection.

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.

NOTE 2—The Rockwell hardness test offers a quick and convenient method of checking for general conformity to the specification requirements for temper, tensile strength.

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, mill-defined standard base metal thicknesses.

10.1.1.1 The corresponding theoretical thickness in inches for the standard ounce-weights is shown in Table 1. Other mill-defined standard base metal thicknesses should be discussed with the manufacturer.

10.1.2 The minimum and maximum thickness permitted at any point on the nonpatinated base sheet shall be as specified in Table 1, or mill-defined standard base metal thicknesses.

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

10.2 Width: