



Standard Reference Radiographs for High-Strength Copper-Base and Nickel-Copper Alloy Castings¹

This standard is issued under the fixed designation E 272; 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.

1. Scope

1.1 These reference radiographs illustrate various types and degrees of discontinuities occurring in high-strength copper-base, nickel-copper, and related types of alloys.

1.2 These reference radiographs are reproductions of original radiographs that contain indications of discontinuities in sand-cast manganese-nickel-aluminum bronze-alloy plates. These discontinuities are representative of those found in narrow freezing range (formerly “high shrinkage”), high-strength copper and nickel-copper alloys.

1.3 The values stated in inch-pound units are to be regarded as the standard.

1.4 *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 148 Specification for Aluminum-Bronze Sand Castings²
 - B 369 Specification for Copper-Nickel Alloy Castings²
 - B 584 Specification for Copper Alloy Sand Castings for General Applications²
 - E 94 Guide for Radiographic Testing³
 - E 186 Reference Radiographs for Heavy-Walled (2 to 4½-in. (51 to 114-mm)) Steel Castings³
 - E 192 Reference Radiographs of Investment Steel Castings for Aerospace Applications³
 - E 446 Reference Radiographs for Steel Castings Up to 2 in. (51 mm) in Thickness³
 - E 1316 Terminology for Nondestructive Examinations³
- ### 2.2 Military Specification:
- MIL-B-21230A Bronze, Nickel Aluminum and Manganese-

Nickel Aluminum, Casting, Ship Propeller Application⁴

2.3 ASTM Adjuncts:

Reference Radiographs for High-Strength Copper-Base and Nickel-Copper Alloy Castings⁵

3. Terminology

3.1 **Definitions**—For definitions of terms used in this document, see Terminology E 1316.

4. Significance and Use

4.1 Reference radiographs for high-strength copper-base and nickel-copper alloy castings are intended to be used as a guide to the recognition of common discontinuities and their differentiation both as to type and severity level. A standard description of casting defects and corresponding radiographic indication types is available for reference in acceptance standards, specifications, and drawings. Purchasers and suppliers may, by mutual agreement, select particular radiographs to serve as standards representing minimum acceptability. The standards so established are identified by an alphabetic defect type and severity level (or class) designation.

4.2 The following ASTM specifications illustrate alloys that may be used with these standards. It is intended that these reference radiographs also apply to related government and commercial material specifications.

Alloys	ASTM Specifications ⁴
Aluminum Bronze	B 148
Nickel-Aluminum Bronze	B 148
Copper-Nickel	B 369
Manganese Bronze	B 584
Alloys	Government Specification ⁴
Manganese-Nickel-Aluminum Bronze	MIL-B-21230A—Alloy No. 2.
Nickel-Copper	MIL-B-21230A—Alloy No. 2.

⁴ See Section 2 for the complete title(s) of these specification(s).

NOTE 1—The reference radiographs consist of forty-five 5 by 7-in. (127 by 178-mm) radiograph reproductions (twenty made from 1-in. (25.4-mm) plate castings with low-voltage X rays and twenty-five made from 3-in.

¹ These reference radiographs are under the jurisdiction of ASTM Committee E-7 on Nondestructive Testing and are the direct responsibility of Subcommittee E07.02 on Reference Radiographs.

Current edition approved Dec. 10, 1999. Published February 2000. Originally published as E 272 – 65 T. Last previous edition E 272 – 97.

² Annual Book of ASTM Standards, Vol 02.01.

³ Annual Book of ASTM Standards, Vol 03.03.

⁴ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094. Attn: NPODS.

⁵ Available from ASTM Headquarters. Order RRE0272.