Designation: E 505 – 96

An American National Standard

Standard Reference Radiographs for Inspection of Aluminum and Magnesium Die Castings[1]

This standard is issued under the fixed designation E 505; 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 the categories and severity levels of discontinuities that may occur in aluminum-alloy and magnesium-alloy die castings. They are intended to provide:

1.1.1 A guide enabling recognition of discontinuities and their differentiation both as to type and severity level through radiographic examination.

1.1.2 Example radiographic illustrations of discontinuities and a nomenclature for reference in acceptance standards, specifications, and drawings.

1.1.3 The values stated in inch-pounds are to be regarded as standard.

NOTE 1—The set of reference radiographs consists of five 8½ by 11-in. cardboard frames containing radiographs covering discontinuities in aluminum and magnesium alloy die castings. The first four frames each contain two sets of four graded levels of increasing severity, while the last frame contains two ungraded radiographs. The 5 frames are contained in a 10½ by 11½-in. ring binder.

NOTE 2—Reference radiographs applicable to aluminum and magnesium castings up to 2 in. (50 mm) in thickness are contained in ASTM Reference Radiographs E 155, for Inspection of Aluminum and Magnesium Castings, Volumes I and II.

1.2 Two kinds of illustration categories are covered as follows:

1.2.1 *Graded*—Three discontinuity categories for aluminum die castings and three discontinuity categories for magnesium die castings, each illustrated in four levels of progressively increasing severity. Category A discontinuities are illustrated for aluminum and magnesium die castings having thicknesses of ⅛ in. (3.2 mm) and ⅝ in. (15.9 mm); Category B discontinuities are illustrated for ⅛-in. thick aluminum and magnesium die castings; and Category C discontinuities are illustrated for ⅝-in. thick aluminum and magnesium die castings.

1.2.2 *Ungraded*—One illustration of one discontinuity for 0.20-in. (5.1-mm) thickness aluminum die casting; and one illustration of one discontinuity for ⅛-in. (3.2-mm) thickness magnesium die casting.

1.3 This document may be used for other materials, thicknesses, or with other energy levels for which it has been found to be applicable and agreement has been reached between the purchaser and manufacturer.

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:*

E 94 Guide for Radiographic Testing[2]

E 142 Test Method for Controlling Quality of Radiographic Testing[2]

E 1316 Terminology for Nondestructive Examinations[2]

2.2 ASTM Adjuncts:

Reference Radiographs for Inspection of Aluminum and Magnesium Die Castings[3]

3. Terminology

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

4. Appearance of Radiographic Indications

4.1 The following descriptions are for use in discontinuity identification and classification. These descriptions apply to these reference radiographs only.

4.1.1 *Category A (Porosity)*—Round or elongated, smooth-edged dark spots occurring individually distributed or in clusters.

4.1.2 *Category B (Cold Fill)*—A distinct darkened line or band of variable length and definite smooth outline, usually continuous or interconnected.

4.1.3 *Category C (Shrinkage)*—Filamentary or jagged darkened areas, usually continuous or interconnected.

4.1.4 *Category D (Foreign Material)*—Isolated irregular variation in film density, either lighter or darker than surrounding areas. They may indicate the inclusion of oxide or dross or metallic compounds of different density. Illustration shows a more dense material.

5. Significance and Use

5.1 These radiographs are so designed that acceptance

[1] These reference radiographs are under the jurisdiction of ASTM Committee E-7 on Nondestructive Testing.

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[2] *Annual Book of ASTM Standards*, Vol 03.03.

[3] Available from ASTM Headquarters. Order PCN 17-505050-22.