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.

Designation: E433 – 71 (Reapproved 2018)

Standard Reference Photographs for Liquid Penetrant Inspection[1]

This standard is issued under the fixed designation E433; 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 photographs are supplied as a means of establishing types and characteristics of surface discontinuities detectable by the penetrant examination methods. They may be used as a reference for acceptance standards, specifications and drawings.

1.2 Actual dimensions including maximum length of indications and number of indications per unit area must be specified by the users of this document. No attempt has been made to establish limits of acceptability or the metallurgical cause of a discontinuity.

NOTE 1—Examples of these reference photographs are shown in Figs. 1-8.

1.3 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E165 Practice for Liquid Penetrant Examination for General Industry

2.2 *ASTM Adjuncts:*

Reference Photographs for Penetrant Inspection[3]

3. Classifications

3.1 *Types*—For the purposes of this standard there are two types of indications, which are defined as follows:

3.1.1 *Type I Indications*—Those in which neither of the measurable dimensions is greater than three times the other.

3.1.2 *Type II Indications*—Those in which one of the measurable dimensions is at least three times greater than the other.

3.2 *Classes*—For purposes of this standard there are four classes of indications which are defined as follows:

A. Single
B. Multiple unaligned
C. Multiple aligned
D. Intersection of surfaces (threads, corners, fillets, etc.)

4. Identification

4.1 The types of discontinuity indications covered by these reference photographs are listed and described in Table 1. Each type of discontinuity indication is designated by a Roman numeral. The class of indication is designated by the letters A through D. Individual photographs within type and class are identified by numbers. Each reference photograph is, therefore, identified with the proper Roman numeral, letter, and number.

5. Method of Preparation

5.1 The reference photographs were reproduced from master photographs which are the property of ASTM. The photographs retain the original photographic contrast.

6. Basis for Use of Reference Photographs

6.1 These reference photographs are intended for use when specified in the inquiry, contract, order material specification, or applicable code, and when the severity is mutually agreed upon between the manufacturer and the purchaser. It is recognized that it is impossible to rigidly interpret indications from a set of photographic references. Consequently, there is a need for close cooperation between manufacturer and purchaser.

6.2 Zones of inspection and severity levels in each zone shall be shown on applicable drawings or otherwise specified. Unless otherwise specified all accessible surfaces shall be examined.

6.3 These reference photographs are intended to depict penetrant indications of surface discontinuities. They are not intended to indicate the depth of such discontinuities.

6.4 Applicable penetrant examination methods and techniques are described in the latest issue of Test Method E165.

[1] These reference photographs are under the jurisdiction of ASTM Committee E07 on Nondestructive Testing and are the direct responsibility of Subcommittee E07.03 on Liquid Penetrant and Magnetic Particle Methods.

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[2] 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.

[3] Available from ASTM Headquarters. Order ADJE0433.

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TABLE 1 Reference Photographs, Indication Types

Type	Class	Description	Fig. No.
I	A	single	I-A1, 2
	B	multiple unaligned	I-B1, 2, 3, 4
	C	multiple aligned	I-C1, 2
	D	intersection of surfaces (threads, corners, fillets, etc.)	I-D1
II	A	single	II-A1, 2, 3, 4
	B	multiple unaligned	II-B1, 2, 3
	C	multiple aligned	II-C1, 2, 3, 4
	D	intersection of surfaces (threads, corners, fillets, etc.)	II-D1, 2, 3, 4, 5

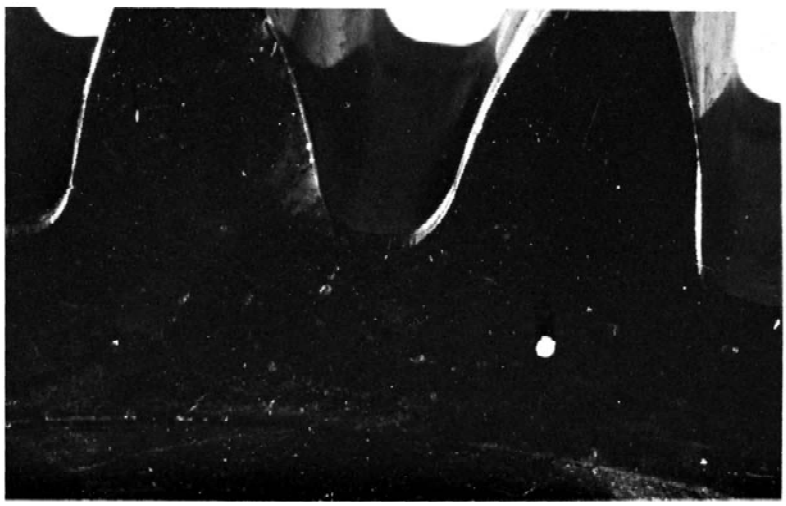

FIG. 1 Example of Type I, Class A, Indication

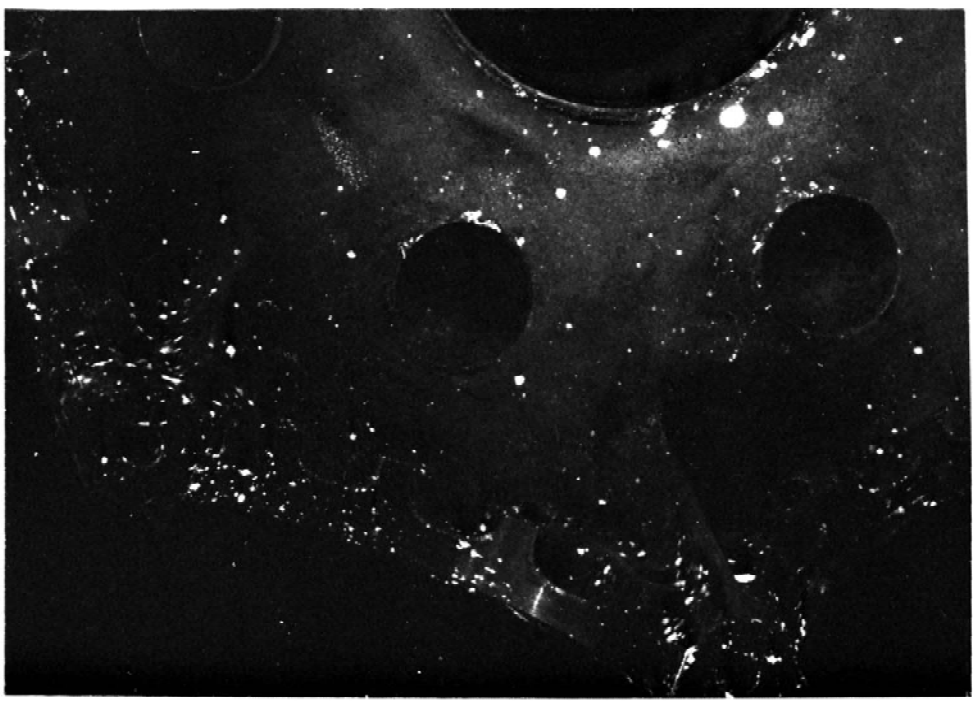

FIG. 2 Example of Type I, Class B, Indication

7. Keywords

7.1 discontinuities; liquid penetrant indications; liquid penetrant inspection; penetrant inspection; penetrant examination; photographs; reference photographs

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