



## Standard Practice for Liquid Penetrant Testing<sup>1</sup>

This standard is issued under the fixed designation E1417/E1417M; the number immediately following the designation indicates the year of original adoption or, in the case of revisions, the year of last revision. A number in parentheses indicates the year of last approval. A superscript symbol (n) indicates an editorial change since the last revision or approval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

### 1. Scope<sup>2</sup>

1.1 This practice establishes the minimum requirements for conducting liquid penetrant examination of nonporous metal and nonmetal components.

Note 1—This practice replaces MIL-STD-1616.

1.2 The penetrant examination processes described in this practice are applicable to in-process, final, and maintenance (in-service) examinations. These processes are applicable for the detection of discontinuities, such as lack of fusion, corrosion, cracks, laps, cold shuts, and porosity, that are open or connected to the surface of the component under examination.

1.3 Caution must be exercised in the usage of elevated temperature with components manufactured from thermoplastic materials. Also, some cleaners, penetrants, and developers can have a deleterious effect on nonmetallic materials such as plastics. Prior to examination, tests should be conducted to ensure that none of the cleaning or examination materials are harmful to the components to be examined.

1.4 Units—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.5 All areas of this practice may be open to agreement between the cognizant engineering organization and the supplier, or specific direction from the cognizant engineering organization.

1.6 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 appro-

priate safety and health practices and determine the applicability of regulatory limitations prior to use.

### 2. Referenced Documents

2.1 The following documents form a part of this practice to the extent specified herein:

#### 2.2 ASTM Standards<sup>3</sup>

D95 Test Method for Water in Petroleum Products and Bituminous Materials by Distillation

D2512 Test Method for Compatibility of Materials with Liquid Oxygen (Impact Sensitivity Threshold and Pass-Fail Techniques)

D6304 Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration

E165 Practice for Liquid Penetrant Examination for General Industry

E543 Specification for Agencies Performing Nondestructive Testing

E1135 Test Method for Comparing the Brightness of Fluorescent Penetrants

E1316 Terminology for Nondestructive Examinations

E2297 Guide for Use of UV-A and Visible Light Sources and Meters used in the Liquid Penetrant and Magnetic Particle Methods

E3022 Practice for Measurement of Emission Characteristics and Requirements for LED UV-A Lamps Used in Fluorescent Penetrant and Magnetic Particle Testing

#### 2.3 ASNT Standards<sup>4</sup>

ANSI/ASNT-CP-189 Standard for Qualification and Certification of Nondestructive Testing Personnel

SNETC-1A Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing

<sup>1</sup>This practice is under the jurisdiction of ASTM Committee E37 on Nondestructive Testing and is the direct responsibility of Subcommittee E37.01 on Liquid Penetrant and Magnetic Particle Methods.

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<sup>2</sup>The referenced ASTM standards, and the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For a final book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup>Available from American Society for Nondestructive Testing (ASNT), P.O. Box 28568, 1715 Jefferson La., Columbus, OH 43228-0518, <http://www.asnt.org>.

<sup>4</sup>A Summary of Changes section appears at the end of this standard.

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**Lauren Gardner**



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