



Standard Practice for Radiographic Examination of Advanced Aero and Turbine Materials and Components¹

This standard is issued under the fixed designation E 2104; 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 This practice establishes the minimum requirements for radiographic examination of metallic and nonmetallic materials and components used in designated applications such as gas turbine engines and flight structures.

1.2 The requirements in this practice are intended to control the radiographic process to ensure the quality of radiographic images produced for use in designated applications such as gas turbine engines and flight structures; this practice is not intended to establish acceptance criteria for material or components. When examination is performed in accordance with this practice, engineering drawings, specifications or other applicable documents shall indicate the acceptance criteria.

1.3 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.

1.4 *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 747 Practice for Design, Manufacture and Material Grouping Classification of Wire Image Quality Indicators (IQI) Used for Radiology²
- E 999 Guide for Controlling the Quality of Industrial Radiographic Film Processing²
- E 1025 Practice for Design, Manufacture, and Material Grouping Classification of Hole-Type Image Quality Indicators (IQI) Used for Radiology²
- E 1030 Test Method for Radiographic Examination of Metallic Castings²
- E 1032 Test Method for Radiographic Examination of Weldments²

¹ This practice is under the jurisdiction of ASTM Committee E07 on Nondestructive Testing and is the direct responsibility of Subcommittee E07.01 on Radiology (X and Gamma) Method, Task Group E07.01.05 on Radiology Applications.

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² Annual Book of ASTM Standards, Vol 03.03.

E 1079 Practice for Calibration of Transmission Densitometers²

E 1165 Test Method for Measurement of Focal Spots of Industrial X-ray Tubes by Pinhole Imaging²

E 1254 Guide for Storage of Radiographs and Unexposed Industrial Radiographic Films²

E 1316 Terminology for Nondestructive Examinations²

E 1815 Test Method for Classification of Film Systems for Industrial Radiography²

E 1817 Standard Practice for Controlling Quality of Radiological Examination by Using Representative Quality Indicators (RQIs)²

2.2 AWS Documents:³

ANSI/AWS A2.4 Symbols for Welding and Nondestructive Testing

2.3 AIA Documents:⁴

NAS-410 Certification and Qualification of Nondestructive Test Personnel

2.4 NCRP Documents:⁵

NCRP 51 Radiation Protection Design Guidelines for 0.1-100 MeV Particle Accelerator Facilities

NCRP 91 Recommendations on Limits for Exposures to Ionizing Radiation

2.5 Other Government Documents:

NIST Handbook 114 General Safety Standard for Installations Using Non-Medical X-ray and Sealed Gamma-ray Sources, Energies up to 10 MeV⁶

NOTE 1—*DoD Contracts*: Unless otherwise specified, the issues of the documents that are DoD adopted are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) cited in the solicitation.

NOTE 2—*Order of Precedence*: Contractual requirements and specific direction from the cognizant engineering organization shall take precedence over the requirements in this practice. In the event of conflict between the text of this practice and the references cited herein, the text

³ Available from American Welding Society (AWS), P.O. Box 351040, Miami, FL 33135.

⁴ Available from Aerospace Industries Association (AIA), 1050 Eye St. N.W., Washington, DC 20005.

⁵ Available from National Council on Radiation Protection and Measurements (NCRP), NCRP Publications, 7910 Woodmount Ave., Suite 800, Bethesda, MD 20814.

⁶ Available from National Institute of Standards and Technology (NIST), Gaithersburg, MD 20899.