ASTM INTERNATIONAL

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Standard Practice for
Digital Imaging and Communication Nondestructive Evaluation (DICONDE) for Computed Radiography (CR) Test Methods[1]

This standard is issued under the fixed designation E2738; 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.

ε[1] NOTE—Table 4 was corrected editorially in January 2014.

1. Scope*

1.1 This practice facilitates the interoperability of computed radiography (CR) imaging and data acquisition equipment by specifying image data transfer and archival storage methods in commonly accepted terms. This practice is intended to be used in conjunction with Practice E2339 on Digital Imaging and Communication in Nondestructive Evaluation (DICONDE). Practice E2339 defines an industrial adaptation of the NEMA Standards Publication titled Digital Imaging and Communications in Medicine (DICOM, see http://medical.nema.org), an international standard for image data acquisition, review, storage and archival storage. The goal of Practice E2339, commonly referred to as DICONDE, is to provide a standard that facilitates the display and analysis of NDE results on any system conforming to the DICONDE standard. Toward that end, Practice E2339 provides a data dictionary and a set of information modules that are applicable to all NDE modalities. This practice supplements Practice E2339 by providing information object definitions, information modules and a data dictionary that are specific to computed radiography test methods.

1.2 This practice has been developed to overcome the issues that arise when analyzing or archiving data from CR test equipment using proprietary data transfer and storage methods. As digital technologies evolve, data must remain decipherable through the use of open, industry-wide methods for data transfer and archival storage. This practice defines a method where all standard CR technique parameters and test results are communicated and stored in a standard manner regardless of changes in digital technology.

1.3 This practice does not specify:

1.3.1 A testing or validation procedure to assess an implementation's conformance to the standard.

1.3.2 The implementation details of any features of the standard on a device claiming conformance.

1.3.3 The overall set of features and functions to be expected from a system implemented by integrating a group of devices each claiming DICONDE conformance.

1.4 Although this practice contains no values that require units, it does describe methods to store and communicate data that do require units to be properly interpreted. The SI units required by this practice are to be regarded as standard. No other units of measurement are included in this practice.

1.5 *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:*[2]

E1316 Terminology for Nondestructive Examinations
E2339 Practice for Digital Imaging and Communication in Nondestructive Evaluation (DICONDE)

2.2 *Other Documentation:*

National Electrical Manufacturers Association Standard for Digital Imaging and Communication in Medicine (DICOM), 2011.

3. Terminology

3.1 *Definitions:*

3.1.1 Nondestructive evaluation terms used in this practice can be found in Terminology E1316.

3.1.2 DICONDE terms used in this practice are defined in Practice E2339.

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*A Summary of Changes section appears at the end of this standard

TABLE 1 NDE CR Image Information Object Definition

DICOM Module	DICONDE Module	Reference	Usage
Patient	Component	E2339, Section 7	M
Clinical Trial Subject	Not Applicable		
General Study	Component Study	E2339, Section 7	M
Patient Study	Not Applicable		
Clinical Trial Study	Not Applicable		
General Series	Component Series	E2339, Section 7	M
CR Series	NDE CR Series	Section 7.1	M
Clinical Trial Series	Not Applicable		U
General Equipment	NDE Equipment	E2339, Section 7	M
Contrast/bolous	Not Applicable		U
CR image	NDE CR image	Section 7.3	M
	NDE Indication	E2339, Section 7	U
	NDE Geometry	E2339, Section 7	U
	NDE Source Radiography	Section 7.2	U

4. Summary of Practice

4.1 A fundamental principle of DICONDE is the use of standard definitions and attribute formats for data communication and storage. This means all systems that are DICONDE compliant use a common data dictionary and common communication protocols. To further standardization, the elements in the data dictionary are organized into common groups referred to as information modules. The data dictionary and information modules common to all NDE modalities are defined in Practice E2339.

4.2 The data dictionary and information modules specified in Practice E2339 do not cover the information storage requirements for each individual modality (CT, DR, CR, UT, etc.). Additions to the data dictionary and information modules are required to support the individual modalities. This practice contains the additions to the DICONDE data dictionary and information modules necessary for CR inspection.

4.3 The highest organizational level in the DICONDE information model is the information object definition (IOD). An information object definition is a collection of the information modules necessary to represent a set of test results from a specific modality. This practice contains information object definitions for CR inspection.

5. Significance and Use

5.1 Personnel that are responsible for the creation, transfer, and storage of computed radiography NDE data will use this practice. This practice will define a set of information modules that along with the Practice E2339 and the DICOM standard will provide a standard means to organize CR inspection data. The CR inspection data may be displayed and analyzed on any device that conforms to the standard. Personnel wishing to view any CR inspection data stored in accordance with Practice E2339 may use this practice to help them decode and display the data contained in the DICONDE compliant inspection record.

6. Information Object Definitions

6.1 *NDE Computed Radiography Image IOD Description:*

6.1.1 The NDE Computed Radiography (CR) Image Information Object Definition specifies an image that has been created by a computed radiography imaging device for NDE purposes. The IOD definition will follow that for CR Images found in Part 3, Section A.2 of the DICOM standard except as noted in Table 1. Table 1 is not stand-alone and must be used in conjunction with Part 3, Section A.2 of the DICOM standard to have a complete definition of the NDE CR information object.

6.1.2 This IOD will use the Service-Object Pair (SOP) class for the CR IOD as defined in Part 4, Section B.5 of the DICOM standard.

7. Information Modules

7.1 *NDE CR Series Module:*

7.1.1 Table 2 specifies the attributes that describe NDE Computed Radiography images.

7.2 *NDE Source Radiography Module:*

7.2.1 Table 3 specifies the attributes that describe NDE Source Radiography Module.

7.3 *NDE CR Image Module:*

7.3.1 Table 4 specifies the attributes that describe NDE CR Image Module.

8. Keywords

8.1 Computed Radiography; CR; database; DICOM; DICONDE; digital data storage; digital data transmission; file format