International Standard

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Second edition
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Non-destructive testing — Qualification of radiographic film digitisation systems —

Part 1: Definitions, quantitative measurements of image quality parameters, standard reference film and qualitative control

Essais non destructifs — Qualification des systèmes de numérisation des films radiographiques —

Partie 1: Définitions, mesures quantitatives des paramètres de qualité de l'image, film de référence normalisé et contrôle qualitatif

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 5, *Radiographic testing*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 138, *Non-destructive testing*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 14096-1:2005), which has been technically revised.

The main changes are as follows:

— definitions of terms 3.2, 3.6, 3.7, 3.13, 3.16 and 3.17 updated;

— Clause 4 symbols and abbreviations added;

— in 5.1.3, details added on digitisers capable to capture densities D > 4,5;

— in 5.1.5, details on the calculation of the standard deviation σ_D of the calibrated density $D(gl)$ and Note 2 added;

— determination of the basic spatial resolution of the digitiser (SR_b^D) added in the new subclause 5.2.5;

— clause 6 "Presentation of results" with a new Figure 2 added;

— Table 2 with quality numbers for representation of results in Figure 2 added;

— new Figure 1 presents examples of line pair test pattern for direct evaluation of SR_b^D;

— "MTF calculation" moved to Annex A and "standard reference film" description moved to Annex B;

— editorial revision.

A list of all parts in the ISO 14096 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Radiographic film systems are used for industrial inspection by X- and gamma rays. For computer-supported analysis, transmission and storage, the information stored in the radiographic film is converted into digital data (digitisation). This document provides quantitative evaluation procedures which form the basis for minimum requirements specified in ISO 14096-2.

Non-destructive testing — Qualification of radiographic film digitisation systems —

Part 1:
Definitions, quantitative measurements of image quality parameters, standard reference film and qualitative control

1 Scope

This document specifies procedures for the evaluation of basic performance parameters of the radiographic film digitisation process, such as spatial resolution and spatial linearity, density range, density contrast sensitivity and characteristic transfer curve, which are applied in ISO 14096-2. These procedures can be integrated into the system software, and together with a standard reference film (see Annex B), used for quality control of the digitisation process. This reference film provides a series of test targets for performance evaluation. The test targets are suitable for evaluating a digitisation system with a basic spatial resolution down to 10 µm, a density contrast sensitivity down to 0,02 optical density, a density range of 0,5 to 4,5 and a film size capacity of (350 × 430) mm^2.

This document does not address signal processing and display of the digitised data.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11699-1, *Non-destructive testing — Industrial radiographic film — Part 1: Classification of film systems for industrial radiography*

ISO 14096-2, *Non-destructive testing — Qualification of radiographic film digitisation systems — Part 2: Minimum requirements*

ISO 19232-5, *Non-destructive testing — Image quality of radiographs — Part 5: Determination of the image unsharpness and basic spatial resolution value using duplex wire-type image quality indicators*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
radiographic film digitisation system
digitiser
sequential application of the two functions below: