TECHNICAL REPORT

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Photography — Archiving systems —

Part 1: Best practices for digital image capture of cultural heritage material

Photographie — Systèmes d'archivage —

Partie 1: Meilleures pratiques pour la capture d'images numériques du matériel de patrimoine culturel

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 documents 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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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 42, *Photography*.

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Introduction

Today digitization programs need to satisfy the demands of an interconnected dynamic user community. A digitized image can be repurposed across any number of systems and therefore needs to be well defined, technically robust and media agnostic. The digital image of an original is intended to satisfy multiple uses including access, archiving, research, conservation, education, marketing, social media, reproduction and distribution both in print and online.

Intended for organizations, such as cultural heritage institutions, ISO 19264-1 specifies a method for analysing imaging systems where it is important to control the degree of accuracy and to ensure that imaging quality is maintained over time. There are three common applications of ISO 19264-1:

a) imaging system performance evaluation (benchmarking) – used for system development and system selection

b) imaging system performance optimization – used for tailoring the system to a particular job (use case)

c) imaging system performance monitoring – used for controlling that the quality of the system remains consistent and within specifications over time

The purpose of this document is to provide practical guidance on how to apply ISO 19264-1 for cultural heritage imaging of two-dimensional originals. This includes how the image quality analysis is performed, the function of technical target features, and how to adjust/optimize the performance of imaging systems. Additionally this document illustrates how ISO 19264-1 can be used for selection of appropriate imaging systems and how to establish and maintain image quality in digitization workflows.

Annex B provides information related to developing a digitization strategy including assessment of collections, developing a hardware strategy and system selection.

ISO 19262 provides definitions for imaging terminology used in this document and ISO 19264-1.

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1 Scope

This document specifies how to perform quality analysis of imaging systems (e.g. flatbed scanners, planetary scanners, or digital still cameras) used for digitization of reflective two-dimensional originals.

Original materials include but are not limited to books, textual documents, drawings, prints, photographs, and paintings. Certain types of two-dimensional materials with complex surface geometry and or highly reflective surface elements require special illumination techniques that can fall outside the scope of this document.

NOTE ISO/TS 19264-2 will address transmissive materials.

2 Analysis of image quality

2.1 General

In order to analyse imaging system quality ISO 19264-1 specifies a technical target (ISO 19264-1 target) designed to incorporate multiple technical features for the measurement of key imaging characteristics from a single image. Calculations are performed via software dedicated to ISO 19264-1 target analysis.

2.2 Image quality characteristics

Image technical analysis involves a number of interrelated measurement steps, typically the analysis process begins with validating white balance and tone reproduction followed by additional calculation steps as listed below. When all measurements are within a set of defined tolerances, an imaging system meets a defined quality level. Resolution and geometry are analysed after first analysing core image quality elements.

— **White Balance**: adjustment of electronic still picture colour channel gains or image processing so that radiation with relative spectral power distribution equal to that of the scene illumination source is rendered as a visual neutral.

— **Tone Reproduction Curve (TRC)**: curve graphically describing the relationship between the input tones and the output tones in an imaging process.

— **Gain Modulation** (highlights/other patches): variation of the gain over the signal level.

— **Noise**: unwanted variations in the response of an imaging system.

— **Dynamic Range**: the difference, over a given period of time, between maximum and minimum signal levels, expressed in decibels, contrast ratios or f-stops.

— **Banding**: unwanted stripes or bands that occur in a digital image.

— **Defect Pixels**: pixel or subpixel that operates in a way other than the one in which it is driven.

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