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Technologies de l'information — Équipement de bureau — Diagrammes et méthodes pour mesurer la résolution des imprimantes monochromes

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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 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/IEC JTC1, *Information technology*, Subcommittee SC 28, *Office equipment*.

This first edition cancels and replaces ISO/IEC TS 29112:2012.

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

The purpose of this document is to provide a process for the objective measurement of print quality characteristics that contribute to perceived resolution in pages printed on paper or similar opaque materials using monochrome electro-photographic printing processes.

This document prescribes the following:

— Definitions of print quality characteristics that contribute to perceived resolution.

— Definitions of conformance methods to qualify a reflection scanner for use as a measuring device.

— A testing procedure based upon:

  a) a well-documented printer and printing environment setup,

  b) well-controlled printing of specified test pages, and

  c) subsequent measurement of print quality characteristics using reflection scans of test pattern elements on the printed test pages.

— Definitions of methods for measuring the contributing print quality characteristics using printed test pattern elements of the specified test pages and analysing the resulting data to derive an assessment of printer resolution.

— Requirements for the report of a printer resolution assessment that define the context of the assessment and describe the results of the assessment.

Printer resolution, a quantification of the ability of a digital printing system to depict fine spatial detail, is a perceptually complex entity with no single, simple, objective measure. Five print quality characteristics that meaningfully contribute to resolution are described in this document. These print quality characteristics are: native addressability, effective addressability, edge blurriness, edge raggedness and the printing system spatial frequency response characteristic (SFR).

— Native or physical addressability refers to the imaging framework in a digital printing process, usually a rectangular grid of printable spots, which enables depiction of fine spatial detail. Native addressability specifies only one facet of the perceived resolution of a printing system. The common unit for native addressability is DPI (dots per inch).

— Effective addressability is a measure of the minimum pitch by which the centre of a printed object (e.g. line segment) can be displaced and evaluates the effects of imaged spot position modulation, size modulation or exposure modulation.

— Edge blurriness provides an optical measure of the geometric transition width of an edge between an unprinted substrate region and a printed solid area region.

— Edge raggedness provides an optical measure of the geometric deviations of a printed edge from a requested straight line.

— The spatial frequency response characteristic (SFR) describes the ability of a linear imaging system to depict fine spatial detail. This is the spatial analogue of frequency response used to characterize sound reproduction. A common synonym of the SFR characteristic is the modulation transfer function (MTF). The ability to depict fine spatial detail is affected by edge blurriness and edge raggedness as well as the spot size and shape of the printer's marking technology and any adjacency effects that can occur in the reproduction of fine detail. Two measurement methods are described that provide estimates of the printing system's spatial frequency response including contributions from edge blurriness, edge raggedness, spot-size, spot shape and adjacency effects.

An essential part of the development of this document was verification that the specified measurement methods correlate well with perceived printer resolution (the ability of a digital printing system to depict fine spatial detail) and that the measurements are reproducible across laboratories and instruments.

The steps in and results of this process to verify the utility of the measurement methods specified in this document are presented in more detail in Annex F. The applicability of the measurement methods specified in this document could be expanded by undertaking similar verification processes with other printing technologies.