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Graphic technology — Multispectral imaging measurement and colorimetric computation for graphic arts and industrial application —

Part 2: Requirements for decorative surfaces

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Foreword

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This document was prepared by Technical Committee ISO/TC 130, *Graphic technology*.

A list of all parts in the ISO 24585 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

In the wood products industry, wood-based panels, for use as furniture or flooring components, are prepared by impregnating a printed base paper with an artificial resin, and then laminating it to a chipboard or fibreboard base by curing the resin using high temperature and pressure. In the decorative printing industry, the base papers are often printed with a simulation like a woodgrain or other natural material.

The assessment of the appearance of such prints during the make-ready and for re-prints have long been done using trial and error. It is common to take a master pattern provided by a customer and to reproduce it. The visual agreement between the master and the reproduction is normally carried out by experienced personnel who visually compare the target and the production, under controlled illumination conditions, using either D65- or D50-like illumination. The necessary changes to improve the visual match were manual recipe updates in the ink kitchen in case of rotogravure printing[1] or manual adjustment of image artwork on calibrated monitors in case of digital printing.

Conventional point measurement devices are occasionally used to objectify the assessment, but their field of view was too large to resolve fine detail and repositioning was also challenging. Such manual and subjective methods gave satisfactory results for the production, but it has the following problems:

— it requires specially trained personnel requiring a long training phase;

— the results of the judgments change over time due to observer fatigue;

— the master aim changes its colours over time for many reasons; and

— the subjective assessment gives rise for debates in cases of dispute.

Multispectral imaging devices were introduced to wood lamination production around the year 2010[2] to improve both process control and quality assurance[3],[4]. First, the spatial resolved inline capturing allowed for a pixel-by-pixel comparison between the master and the pertinent reproduction. Given an appropriate image registration and spectral accuracy multispectral imaging systems allowed for an objective evaluation of the image differences including aspects such as local contrast. Such a comparison typically leads to two different outcomes. On the one hand, a single number index is condensed to uniquely define the visual closeness, which eases communication with customer and the agreement of tolerance schemas. On the other hand, the comparison of tristimulus images leads to a plethora of individual colour difference vectors that can be adapted to the individual press technology to provide guidance for process control and the ink formulation. In both cases, it reduces scads of measurement data (spectra of each pixel in a revolution as measured over a full press run) down to a digestible amount of human and process control information. A single point measurement system is not able to provide this information[5]. This objective assessment can be used for both conventional and digital production of the final panels.

For digital printing presses, which are increasingly used in that industry, the spatial colour difference can be used to alter the image data in the RIP while printing. This improves the visual closeness noticeably and is sometimes called colour looping.

This document defines the requirements for multispectral imaging systems which are needed for the use case of decorative lamination and includes the introduction of an image similarity index, termed SIM_PDE.

Since the sample preparation has an impact on the final product, this document provides guidance with respect to the laboratory preparation of samples, to allow interoperability in the development of process automation in the assessment of the appearance of the print.

Graphic technology — Multispectral imaging measurement and colorimetric computation for graphic arts and industrial application —

Part 2: Requirements for decorative surfaces

1 Scope

This document specifies requirements for multispectral imaging devices to measure and compare the decorative surfaces. Based on spatially resolved spectral measurement of reflecting surfaces, tristimulus images are computed. A metric is provided that reflects the visual closeness between a reference surface and a comparison surface using a single index called SIM_PDE. Recommendations are provided with regard to laboratory sample preparation.

This document is not applicable to functional surfaces.

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 13655, *Graphic technology — Spectral measurement and colorimetric computation for graphic arts images*

ISO 24585-1, *Graphic technology — Multispectral measurement and colorimetric computation for graphic arts and industrial applications — Part 1 Parameters and measurement methods*

ISO 28178, *Graphic technology — Exchange format for colour and process control data using XML or ASCII text*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 24585-1 and the following 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
decorative surfaces
base papers, printed with a simulation like a woodgrain or other design

Note 1 to entry: Decorative surfaces are usually created in the decorative printing industry. They show either a uniform colour or a texture of some kind. Decorative surfaces are typically not showing a high level of fluorescence.