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Grafisk teknik – Krav på system för skärmprovtryck (ISO 14861:2015, IDT)

Graphic technology – Requirements for colour soft proofing systems (ISO 14861:2015, IDT)

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Den internationella standarden ISO 14861:2015 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 14861:2015.

The International Standard ISO 14861:2015 has the status of a Swedish Standard. This document contains the official English version of ISO 14861:2015.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Grafisk teknik, SIS/TK 434.

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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 WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 130, *Graphic technology.*

Introduction

The use of images displayed on a colour monitor is increasingly being used in the graphic arts industry for colour evaluation and colour acceptance (commonly referred to as "soft" proofing). This requires that the colour display and its associated viewing environment be able to simulate the appearance of the final printed image viewed under standard graphic arts viewing conditions. The major components required to accomplish this are assembled to create a soft proofing system which is usually comprised of a monitor, colour measurement device, driving software (for calibration, profiling the monitor, and displaying the data), and a viewing cabinet. The overall design and calibration has to control and take into account the influence of ambient lighting.

As the use of soft proofing increases, the need for an objective and vendor neutral assessment of soft proofing systems is steadily increasing. This International Standard specifies requirements for systems that are used to produce, from digital data, images on electronic displays that are intended to simulate a characterized printing condition defined by a set of characterization data and spot colours defined by a physical reference.

This International Standard builds on the monitor requirements defined in ISO 12646, the viewing cabinet defined in ISO 3664, and the requirements for contract hard copy proofing defined in ISO 12647-7.

Three common soft proof scenarios are typically encountered. In the first scenario, a soft proof is displayed on a monitor without an associated viewing cabinet. In the second scenario, a viewing cabinet is associated with the monitor. In the third, the monitor is a part of, and built-into, a viewing cabinet. To test how closely the displayed image simulates the encoded colorimetric data of the original, there is no need to differentiate between these three scenarios. However, to assess the similarity of the soft proof reproduction (as described in this standard) to a reference print, a viewing cabinet or controlled room lighting is required.

The objective assessment of a soft proofing display system is carried out in three steps. First, the monitor and the viewing cabinet are tested to ensure that these components are capable of achieving the results needed to produce a high quality soft proof. Second, the capability of the combination of the monitor and the display driving software is tested. Third, the simulation of an output condition, usually a characterized printing condition, is assessed.

With respect to the data handling and display driving software, a separation is made between the driving of the display and the simulation of a given colorimetric reference, termed simulation. The primary focus of the display driving software lies in the accurate characterization of the display. This is typically accomplished by a contact measurement device.

Once the display device itself is evaluated, the integration of the display and any associated viewing cabinet (or a room lighting setup to function as a viewing cabinet) and the effect of ambient lighting has to be evaluated. The simulation of an intended characterized printing condition represents the colorimetry of the display as seen from the viewer position. For that reason, telespectroradiometric readings are required at this stage of evaluation.

The use of a display and an associated viewing cabinet and/or the display integrated into a hard copy viewing cabinet often occurs in situations where a printed product, like a newspaper or offset print, is being evaluated with respect to the soft copy proof in the absence of a hard copy proof. In this case, there is active research as to how a concrete document can be shown reliably in order to facilitate it as a contract proof or reference in disputes of colour difference.

The use of a standalone display in uncontrolled ambient lighting is not subject of this International Standard because the final visual appearance of a soft proof on a display cannot be judged without taking into account the influence of the ambient light, even when the soft proof is viewed alone, without comparison to a physical object like a proof print, production print, or product sample.

Obtaining a good soft proof simulation of a reference is not simple and to be fully accurate requires careful control of many aspects of the process. The primary purpose of this International Standard is to establish the criteria and tolerances needed to evaluate a complete soft proofing system.

Graphic technology — Requirements for colour soft proofing systems

1 Scope

This International Standard specifies requirements for systems that are used to produce, from digital data, images on electronic displays that are intended to simulate a characterized printing condition defined by a set of characterization data and spot colours defined by a physical reference. Recommendations are provided with regard to equipment selection, setup, operating, and environmental conditions. Appropriate test methods associated with these requirements are specified.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3664, *Graphic technology and photography — Viewing conditions*

ISO 12639, *Graphic technology — Prepress digital data exchange — Tag image file format for image technology (TIFF/IT)*

ISO 12646, *Graphic technology — Displays for colour proofing — Characteristics and viewing conditions*

ISO 12647-7, *Graphic technology — Process control for the production of half-tone colour separations, proof and production prints — Part 7: Proofing processes working directly from digital data*

ISO 15930, *Graphic technology — Prepress digital data exchange using PDF*

3 Terms and definitions

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

3.1
display
electronic device capable of visibly communicating information

3.2
characterized printing condition
printing condition for which process control aims are defined and for which the relationship between input data (printing-tone values, usually CMYK) and the colorimetry of the printed image is documented

[SOURCE: ISO 15930-8:2010, 3.1]

3.3
power off
condition in which the *display* (3.1) is switched off

3.4
soft proof
visualization of colour image data using a *display* (3.1) with the intent of synthesizing the colour appearance under a defined illumination and viewing condition

3.5
soft proofing system
system of hardware and software components used to reproduce the colour appearance for a specific viewing condition

3.6
spectroradiometer
instrument for measuring radiometric quantities in narrow wavelength intervals over a given spectral region

[SOURCE: IEC 60050-845:1987 17.4]

3.7
telespectroradiometer
spectroradiometer (3.6) that uses an optical relay component to allow measurements to be made at a distance from the specimen

[SOURCE: ISO 13655:2009, 3.12]

Note 1 to entry: The measurement of spectral radiance is independent of the distance from the source, but the area that is imaged will not produce constant results unless the source is perfectly uniform. The surface of most *displays* (3.1) are not uniform enough for the radiance from a 25 mm diameter area to produce the same results as the radiance from a 10 mm diameter area. The distance to the display face and the cone half angle needs to be noted in the report.

Note 2 to entry: While some instruments of this type have obvious external input optics such as lenses and apertures (telescopic optics), many simpler, portable instruments used in graphic reproduction have such input optics inside the instrument housing and may have the ability to be used as a non-contact spectroradiometer with full conformance with this definition.

3.8
surround
area adjacent to the border of an image which, upon viewing the image, can affect the local state of adaptation of the eye

3.9
viewing cabinet
area of controlled illumination (usually enclosed on the sides and back) intended to provide a specified intensity and spectral power distribution to allow consistency viewing of a specimen

4   Requirements

4.1   Data delivery

Soft copy proofing systems shall accept digital data delivered as PDF/X data files as defined in ISO 15930 or shall accept digital data delivered as TIFF/IT files as defined in ISO 12639. Where TIFF/IT files are used, colour information shall be included using tag 34675 or tag 34029 as defined in ISO 12639.

NOTE   PDF/X-1a requires that the intended printing condition be indicated. Where the intended printing condition is included in the registry of characterizations maintained by the International Color Consortium (ICC) and the digital data are cyan-magenta-yellow-key (black) (CMYK), the name used in the ICC registry is usually used for identification in lieu of including an ICC output profile. If the intended printing condition is not included in the said registry, PDF/X-1a requires that an ICC output profile be included.

4.2   Display requirements

The displays used for soft proofing shall meet either the class A or class B requirements of ISO 12646.

4.3 Viewing condition requirements

4.3.1 General

The visual environment should be designed to minimize interference with the viewing task. It is important to eliminate extraneous conditions that affect the appraisal of images on the display and prints in the viewing cabinet. There are many potential variations possible in soft proofing setups. To minimize variations, specific requirements are needed. In this International Standard, the final colour stimulus will be judged by instrumental measurements with specific requirements. For this reason, no additional normative requirements are provided for the position of the display.

Principally, there are two different setups. The first environment consists of a display situated next to (but not inside) a dedicated viewing cabinet. Here, the ambient shall be controlled so that stray light is not having a significant impact on the displayed image or its surround. In this situation, the illuminance level inside the viewing cabinet can be adjusted with the aid of a telespectrophotometer so that the reflected luminance from a sheet of paper (possibly containing a simulation of the intended paper) will match the displayed simulation of the intended paper. If an illuminance level is needed that differs from P1 or P2, this level should be used in the ISO 3664 evaluation test (in addition to the defined levels P1 or P2).

The second environment includes setups where illumination upon the display is intended or unavoidable. This is the case, for example, when a display is placed in a viewing cabinet next to a printing press. Here, the view booth illumination upon the display screen should be minimized as much as possible using display hoods, for example. For such systems, the cabinet illuminance, again, may not be within the limits specified in ISO 3664 when compensation is provided to achieve a match in luminance level and uniformity match between print and display.

When there is no dedicated viewing cabinet to be tested by the manufacturer in a dark room, all criteria defined in ISO 3664 shall be applied (of the objects to be soft proofed).

4.3.2 Displays to be used alone

The following guidelines should be used for cases where a display is used independently of a viewing cabinet:

a) the luminance of a perfectly reflecting diffuser placed at the position of the faceplate of the display (and behind any anti-reflection shields) with the display switched off (power off) should not be greater than 1/4 of the display white point luminance (R = G = B = 255 for 8-bit displays);

> NOTE   This correlates to a colour change due to the added display reflection of about DE00 = 1 for a typical current flat panel display.

b) the display frame, the surround of the display, desks, walls, and everything in the field of view should be near neutral to ensure that no saturated chromatic elements affect the chromatic adaptation of the observer. For the display frame, grey would be the best colour, but black or white can also be used. Silver or aluminium display frames are not suited because of the glare. For walls and desks, a neutral grey would also be best, but white can also be used;

c) display hoods should be used to minimize the influence by surrounding illumination reflecting on the display surface. The hood should cover the display face from top and both sides;

d) the desktop and the keyboard should be neutral coloured and have a low reflectance. The top hood should be reasonably deep, from display face to the front edge, but not be oppressive.

The colorimetric difference between the characterization printing condition and the measured display by using patches compliant to ISO 12647-7 control strip shall be within the tolerances stipulated in Table 3.