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Graphic technology — Guidelines for schema writers —

Part 1: Packaging printing

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

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

A list of all parts in the ISO 19303 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

Packaging brand owners and procurement teams are experts in their products and are often not experts in printing technology. This document is intended to be used as a tool to develop global and technically consistent requirements by, for example, certification bodies certifying packaging, national certification groups, trade associations, or brand owners to communicate their expectations throughout the supply chain.

This document recognizes a set of best practices and International Standards related to packaging printing. This document points to those International Standards to align requirements defined inside schemes used in certification programs. See the Bibliography for the list of these International Standards. Packaging and packaging graphics have a significant influence on the consumer buying decision. The packaging printing industry is made up of a large supply chain with many workflows, which produce a variety of printed products.

To ensure tone and colour reproduction quality, many ISO TC 130 standards specify the aims and tolerances that are necessary for the implementation of colour-managed workflows. Even though technical standards specify aims and tolerances, the printer's ability to demonstrate conformity of his production workflow to these standards is both a technical issue and a conformity assessment issue.

The packaging printing industry has unique technical and conformity assessment requirements that are common to its stakeholders.

Certification schemes are developed by certification bodies, such as national certification groups, trade associations, or brand owners, to address market needs. They are regional, workflow-dependent, and with varying technical requirements. This document provides technical and conformity assessment to allow that the various certifications are based on common principles and are comparable. As such, this document enables the individual organizations to more readily agree to mutual recognition of the certifications of other bodies as well as enable international trade organizations to identify comparable competencies on a worldwide basis.

This document provides a framework for typical packaging printing workflow, either using CMYK, CMYK with spot colour, non-CMYK, spot colour only, and multi-colour printing. It also provides a corpus of International Standards, including aims, tolerances, and test methods, applicable at each stage of packaging printing workflow. In addition, supply chain communication guidelines and process-dependent checklists are also included in this document.

This document is also intended to aid the following stakeholders in understanding packaging printing conformity assessment at an international level.

— Print buyers and brand owners

— Printing associations

— Printing organizations

— Printing production personnel

— Printing equipment manufacturers and suppliers

— Printing professionals, including auditors, consultants, etc.

Graphic technology — Guidelines for schema writers —

Part 1: Packaging printing

1 Scope

This document provides recommended guidelines for the evaluation of colour reproduction capability in the printing of packaging materials. It provides a basis for the development of colour certification schemes by individual brand owners and/or industry associations and for the evaluation of printed results against those schemes.

Because the package printing supply chain involves multiple partners, both the potential impact of each partner on the overall colour control and the individual responsibilities of each partner are identified in this document. The unique requirements of the individual reproduction processes and their impact on colour reproduction are also identified.

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 19302, *Graphic technology — Colour conformity of printing workflows*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 19302 and the following apply.

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

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

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

3.1
actual printing condition
APC
condition of the actual system printing the job defined by colourimetric and/or densitometric parameters

3.2
comp
proof formed to the shape of the final productNote 1 to entry: It is also called mock up.

3.3
certificate of conformance
CoC
document that certifies that the supplied services or goods meet the required specifications

Note 1 to entry: The CoC is normally issued by a recognized authority and is also known as a certificate of compliance.

3.4
certificate of analysis
CoA
document that provides all the required specification and test results about a particular material, including a description of the test or examination method(s) used, limits of the test or examinations and actual results of the tests or examinations, to demonstrate that the requirements of the end user/ customer are met

3.5
consumer product company
CPC
company that delivers merchandise or other item of common or daily use, ordinarily bought by individuals or households for private consumption

3.6
device colour
colour designed to be printed using a specific devices process inks

Note 1 to entry: Device colour is typically used to define device specific values that allow reproduction of a spot or brand colour using only process inks, not spot inks

3.7
pre-media
part of the printing or publishing process preceding preparation of a printing plate

3.8
print buyer
organization, individual or group of individuals that prepares data for printing and delivers digital materials to the *print service provider* (3.9)

Note 1 to entry: The print buyer may be the distributor of digital files, the designer, a consumer products company or a trade shop.

3.9
print service provider
organization, individual or group of individuals that receives the files and is responsible for print product delivery

Note 1 to entry: The print service provider may be a prepress company, a printer or a converter.

3.10
process colour
colour that is the outcome of a colour separation operation

Note 1 to entry: A process colour typically requires one or more printing units and process inks to be reproduced.

3.11
process ink
ink that is used to print *process colours* (3.10)

3.12
characterized reference printing condition
CRPC
identified printing condition and its colour characterization data that is used as the aim for a particular printing task (job)

[SOURCE: ISO/PAS 15339-1:2015, 3.4]

3.13
special effect
object inside a PDF that has an impact on colour but is not defined as an ink (for example a varnish) or any non-printed element that should be processed specifically (for example by a cutting line)

3.14
special metamerism index
extent to which colour matching changes with a change of illuminant

[SOURCE: CIE Publication 15]

3.15
spot colour
colour originally designed to be printed using one printing unit and a spot ink

Note 1 to entry: When associated with a corporate product identity, a spot colour is also known as brand colour.

Note 2 to entry: Spot colours are sometimes replicated with process colours or extended process colours.

3.16
spot ink
ink that is primarily used to print a *spot colour* (3.15)

Note 1 to entry: A spot ink may replace or be mixed with process inks to achieve a desired gamut.

3.17
system qualification
assessment operations used to qualify the ability of a print device or a printing process to reproduce a defined colour data set

Note 1 to entry: This qualification is also named “extended scrutiny”, because it cannot usually be performed by producers during production as it requires specific testing conditions and protocols.

3.18
total indicated runout
TIR
measure of the out-of-roundness of a printing press roller or cylinder

Note 1 to entry: The difference in the lengths of a roller’s radius as measured from the centre to the outside surface. A perfectly round roller would have zero TIR.

4 Principles

4.1 General

The printing of packaging is the most diverse and complicated of any of the many segments of the printing industry. It makes use of any (and all) of the marking technologies available, both analogue and digital, and can use virtually any material as a substrate. The key participants in the packaging workflow are the consumer products companies, the design firms that support them and finally the printer that produces the packaging product. This document provides a collection of packaging industry best practices that may be used as a source for the any stakeholder to build a certification scheme.

While each individual package printed should meet the individual specifications associated with its design, the most important issue is related to the methods used to specify the intended colour appearance of the final product, the exchange of the data necessary for that to be accomplished, and finally the procedures for evaluation of the printed product against the specified aims.

This is often further complicated by the requirement that products printed on different substrates or by different processes may be expected to match colourimetrically.

Certification schemes may be established by any individual consumer product company, groups of consumer product companies, trade associations, or national certification bodies. These guidelines are based on an understanding of the typical workflow, the standards available, and the perceived needs of the industry. It is anticipated that the use of these guidelines will facilitate a commonality between the various schemas prepared.

It is expected that each of the participants associated with the application of a specific schema will demonstrate their ability to conform to the requirements of the schema both during a specific performance evaluation and on an ongoing basis.

Clause 4 describes the guidelines for each of the various tasks in the workflow. Individual schemas may involve some or all of these guidelines, depending on the specifics of the application for which the schema is intended. Subclause 4.2 describes the basic support requirements that all participants may be expected to meet. Subclause 4.3 provides guidance on the definition of the intended colours to be printed and 4.4 describes the encoding of both content data and colour data in the digital file.

Subclause 4.5 covers proofing requirements that may be required. Subclause 4.7 provides for incoming material verification and the printing itself is defined in 4.6

While individual printing processes are expected to produce results that meet common requirements, it is recognized that each process has specific unique requirements and/or options. These are described in Annexes A to D.

4.2 Example of guidelines associated with specific tasks

Each partner in the supply chain has responsibilities to provide one or two communications from the CPC through the supply chain; the base responsibilities for each partner are examples of responsibilities. These requirements should be complied to across multiple CPC's and supply chain partners in order to provide communication across all partners. Subclauses 4.3 to 4.7 define a schema and deliverables from each partner in the supply chain so that deliverables are aligned.

4.3 Consumer product company (CPC)

The consumer product company (CPC) should define:

— viewing conditions according to ISO 3664;

— instrument and settings for measurement verification conforming with ISO 13655;

— specification of aims and tolerances;

— CMYK – aims ICC profile or characterization data;

— spot or brand colours – CxF/X-4 or CxF/X-1 with spectral reflectance;

— minimum size and type of acceptable defect;

— registration – requirements;

— design guide – overview of objectives;

— structural requirements;

— print sequence – (creating an overprint simulation profile);

— die lines indications;

— minimum requirements for print and reporting;

— certificate of analysis (CoA) and certificate of conformance (CoC) testing requirements and reporting requirements;

— standard operating procedure (SOP), documenting all procedures and equipment upgrades.

4.4 Designer, comp house and photographer

The designer, comp house and photographer are responsible for:

— viewing conditions according to ISO 3664;

— instrument for measurement verification according to ISO 13655;

— file format (native files or PDF/X-4)

— validation print protocol – validation of colour accuracy – Verified according to ISO12647-8;

— soft proofing according to ISO 12646 and ISO 14861;

— software compatible with vector/raster formats;

— pre-flighted file delivery – PDF/X-4 – GWG Packaging 2015;

— photography RAW and TIFF with embedded colour profiles;

— standard operating procedure (SOP) documenting all procedures and equipment upgrades.

4.5 Pre-media

Pre-media partners are responsible for:

— viewing conditions according to ISO 3664;

— pre-flight with reporting to supplier the procedure for process improvement;

— instrument for measurement verification according to ISO 13655;

— file format – according to ISO 15390-7 PDF/X-4;

— pre-flighted file delivery – PDF/X-4 – GWG Sheet Spot 2015;

— validation print protocol – validation of colour accuracy – Verified according to ISO12647-8;

— contract proofs per ISO 12647-7 with documentation;

— soft proofing according to ISO 12646 and ISO 14861;

— workflow according to ISO TS 10128;

  a) the matching of tone value curves,

  b) the use of near-neutral scales, and

  c) the use of CMYK to CMYK multi-dimensional transforms;

— Pre-flighted file delivery – PDF/X-4 – GWG Packaging Specification or agreed specification;

— SOP documenting all procedures and equipment upgrades.

Plate supplier should provide:

— micro enlargement and measurement on minimums, and 50 % – all plate delivery.

4.6 Printer

Printer partners are responsible for:

— pre-flighted- conforming that elements received are accurate – with reporting to supplier the procedure for process improvement;