TECHNICAL REPORT

ISO/TR 19300

Graphic technology — Guidelines for the use of standards for print media production

Technologie graphique — Lignes directrices pour l'utilisation des normes pour la production de supports d'impression

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

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

Standards are documented consensus agreements containing safety, technical specifications, or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics for materials, products, processes, and services. In many cases, they provide uniformity, which allows worldwide acceptance and application of a product or material. The aim is to facilitate trade, exchange, and technology transfer. Standards help to remove technical barriers to trade leading to new markets and economic growth for the industry.

Today, companies are facing fundamental changes in the way they do business. Strategies and business practices are continuously being evaluated to determine how to maintain and increase market share, reduce costs, increase productivity and safety, and achieve and maintain a competitive edge.

Graphic arts companies face these changes starting from a point at which the standards are not completely adopted by the market even if they provide complete technical guidelines. Graphic industries are only a small part of the graphic market made up of micro and small handcraft companies throughout the world. During recent years, many transformations have occurred in the market. Digital communications and digital media technology have driven restructuring in the graphic arts industry. ISO/TC 130 is working to reflect these changes in the standard development structure with new approaches and ideas to follow today's market and trends and anticipate future requirements.

All graphic arts companies can use the structure of the published standards to support their business and to harmonize production workflows irrespective of the size of the company. Published standards for the printing, publishing, and finishing industries enable processes to run faster, more predictably and more efficiently, and to be more cost effective by

— providing uniform, defined procedures, and tools that help users produce quality products for their customers,

— facilitating interconnectivity and process integration among systems,

— allowing users to communicate easily with one another,

— enhancing product quality and reliability at a reasonable price,

— increasing distribution efficiency and ease of maintenance,

— improving health, safety, and environmental protection, and

— reducing waste.

The language used to write standards in recent decades mainly reflects the needs of printers and the printers' suppliers, ignoring the other actors in the printing supply chain. This Technical Report tries to describe the relationship between standards with all the actors in the graphic supply chain taken into account, preparing the market for tomorrow's standards structure.

The composition of the graphic arts supply chain varies depending on the kind of product manufactured and the size of the graphics project measured in terms of the number of copies, but tends to be similar around the world. Every actor or stakeholder in the supply chain may be a single person, a small company, or a big organization. In every case, thanks to the digitalization of the graphic arts supply chain achieved mainly over the past 20 years, instruments, methodology, and production standards can be the same irrespective of the size of the stakeholder's organization. Today, a single freelance designer can use the same software and provide the same results as a gigantic multi-national agency and there is no technical reason why they should not use the same standards. The same is true for printers. A small printing company with the ability to produce at the same quality level can compete or collaborate with big companies if both follow the ISO standards. .

All the ISO/TC 130 standards, particularly the process control standards, aim to describe the so-called "standard quality". Many people in the graphic arts industry think that this "standard quality" is good for big production companies distributed worldwide, but not for small regional production companies.

This was not the intention of ISO/TC 130 because if the "standard quality" reflects the minimum set of warranties that a supplier needs to give to customers, in terms of fulfilling the expectation of a small variability within printing runs, most of the companies that ignore ISO standards have big problems in maintaining a constant level of predictable quality of the final results. Without such predictability, the result is likely to change in every printing run and the final product will be a unique handcrafted printed product, which in most cases, is unlikely to fulfill the needs of customers in any scenario.

The set of parameters used to define the print quality attributes of a final graphic product have not been described in any document up to now, but ISO/TC 130 is working with other ISO committees to define such a set. ISO/TC 130 standards describe and define certain parameters for a printing product, together with their tolerances, but ignore most of them. Since most ISO standards are related to properties of materials and to process control, the quality is here defined by parameters related to single and unfinished print. Within ISO aims and tolerances, there is the possibility of delivering different products so that small companies making regional products can benefit from standardization and produce something both unique and precious. At the same time, big companies can follow ISO aims and tolerances strictly to guarantee predictability and consistency around the world. Quality control of the final product is not, in most cases, standardized so finishing processes such as lamination, varnishes, and binding, which affect customer satisfaction, will depend on the ability of printers, finishers, or converters.

Digital printing is more and more widely used in graphic arts production and its processes interrelate and overlap with traditional printing. There are many different fast-changing digital printing technologies and it is now included in many conventional printing companies. We can consider a printing process as digital either when the image is transferred to the substrate by a digital technology and there is no printing form or when the process has the ability to change the image with every print. Digital printing influences workflows and process control. International Standards that support digital printing are under development within ISO/TC 130, for instance, the ISO 15311 (all parts). Other ISO documents can be used in a digital printing workflow, for instance, the ISO PAS 15339 (all parts).

Graphic technology — Guidelines for the use of standards for print media production

1 Scope

This Technical Report provides guidelines to enable print industry stakeholders to use ISO/TC 130 and related standards in print media production workflows. The use of these standards is intended to enhance production quality, business performance, profitability, and sustainability.

2 Terms and definitions

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

2.1
International Colour Consortium profile
ICC profile
collection of transforms, encoded as specified in the ICC profile specification which is used to convert image data between device space and profile connection space

[SOURCE: ISO 12637-2:2008, 2.71]

2.2
preflighted press-ready file
prepress file which contains all technical elements required by printing and postpress processes defined for the production, verified by a preflight software

2.3
proof
hard or soft copy reproduction made using various technologies to simulate an intended printing output

[SOURCE: ISO 12637-2:2008, 2.104]

2.4
use case
category that combines graphic products that have been developed for the same marketing purpose

2.5
validation print
print produced directly from digital data early in the production chain, meeting the requirements of ISO 12647-8 representative of the concept for the final product

[SOURCE: ISO 12647-1:2013, 3.42]

2.6
stakeholder
any person or organization that is involved in graphic supply chain or can give inputs for print process

3 Graphic supply chain

3.1 Stakeholders, roles, and responsibilities

A complete and coherent description of the graphic supply chain, as referenced by ISO/TC 130 standards, is not explicitly declared in any document. Depending on the use case and the product concerned, stakeholders may play different roles and share different responsibilities as stated in Table 1.

Table 1 — Description of stakeholders, roles, and responsibilities

Stakeholder	Description, roles, responsibilities
Print buyer	The purchaser of a single graphical product or of some coordinated graphical products. Their role may include the following: — communicate the customer expectation to all relevant stakeholders; — contracts to confirm technical specifications compatible with printing production standards; — approval of validation prints and proofs; — approval of OK sheets or OK samples; — approval of the print run; — approval of the finished job. Has the responsibility to communicate the specifics of graphic design in a manner consistent with relevant standards.
Designer	A person who plans the appearance and/or structure of a graphic project prior to it being produced. Their role is not covered in existing ISO/TC 130 standards.
Prepress company/ operator	A person or organization that enables the printing of a generic graphic project using a specific printing process. Their role may include the following: — digital file conversion; — content adaption; — composition, page layout; — colour transformations; — generation of a digital reference file; — production of printing forms. Has the responsibility to follow pertinent ISO/TC 130 standards during any transformation, including the following:. — assurance of data integrity; — providing the correct preflighted press-ready data or the correct printing forms to the printer; — responsibility for communication between stakeholders if there are any technical problems between the graphic project being received from designer and technical information about the printing process being received by the printer.
Printer company/ operator	A person or an organization that prints the job using a specific printing process. Their role may include the following: — communication to the prepress operator of the technical details of the printing process; — printing the job according to the technical specification of the print run; — delivery of the job to the next process responsible. Has the responsibility either to follow ISO/TC 130 standards relating to the printing process or to follow other agreements between the parties. In every case, it has the following responsibilities: — use printing substrates and inks compatible with ISO/TC 130 standards or with agreement between parties, any process compatible substrates, and inks; — communicate to the prepress operator and/or designer and/or print buyer about any visual differences between the proofs provided and the current print run; — ensure that process variability is under control and within the tolerances specified in the appropriate ISO/TC 130 standards. A printing quality management system is recommended.

Table 1 *(continued)*

Stakeholder	Description, roles, responsibilities
Postpress company/ operator	A person or an organization that takes the final communication step which allows full exchange of the specification of the printing product receiving printing material to be finished, assembled, bound, or converted. Their role may include the following: — communication to the prepress operator about technical details of the required operations in order to ensure creation of the correct digital data or forms; — carrying out the requested finishing, converting, assembly, and binding operations; — delivery of the final product. In addition, the operator — has the responsibility either to follow ISO/TC 130 standards relating to any postpress operation process or to comply with any other agreements between parties, — has the responsibility to communicate to the printer and/or the prepress operator and/or the print buyer about any defects in received or processed materials, and — ensure that process variability is under control and within the tolerance specified by appropriate ISO/TC 130 standards. A quality management system is recommended.

3.2 Use cases and product relationships

The boundaries between different printing processes are becoming very blurred because of new technologies and innovations. However, Table 2 shows a possible example of categorization of print products as seen from a print buyer's side that links final product and process used to print.

Table 2 — Possible example of categorization of print products organized by use cases

Category	Use case	Sub-case	Example of product	Typical printing process[a]
Commercial production printing	Publishing	Magazines	Monthly magazine	Gravure or offset
			Weekly magazine	Offset
				Offset Letterpress
		Monograph	Picture/photo book	Offset
			Comic, paperback, textbook, directory	Offset
		Magazine cover	Monthly/weekly magazine (cover)	Offset
[a] Digital technology is not stated because it could be used in every production shown in the table.				

Table 2 *(continued)*

Category	Use case	Sub case	Example of product	Typical printing process[a]
Commercial production printing	Commercial	Catalogue	Catalogue of product or services	Offset or Gravure
		Advertisement	Flyer, pamphlet, leaflet	Offset or Gravure
			Direct marketing	Offset
			Free magazine	Offset
		Others	Manual	Offset
	Business form and card	Business form	Slip, Carbon copy	Offset
		Transaction	Transaction for cellphone	Offset
		Stationery	Notebook, envelope business card, postcard	Offset Letterpress
		Card	Magnetic stripe card, IC card	Offset screen
	Newspaper	Colour, B/W, tabloid	Daily newspaper	Web offset (cold set)
Signage printing	Indoor use	Poster	Poster	Inkjet Offset
		POP-up	Banner, tapestry, textile	Inkjet offset screen
	Outdoor use	Billboard	Billboard	Inkjet screen
		Wrapping decoration	Wrapping decoration, bus	Inkjet screen
Packaging	Packaging (carton, label)	Carton	Beverage carton, cardboard container, box	Offset
		Corrugated	Corrugated box	Offset flexo
		Label	Label Sticker	Flexo
	Flexible packaging	Flexible	Snack pouch, retort pouch	Gravure flexo
[a] Digital technology is not stated because it could be used in every production shown in the table.				

4   Base concepts

ISO standards for graphic arts and the related workflows described in this Clause imply some basic concepts that have significantly evolved over the recent years. The intended audience for these concepts, as described in the actual ISO standards, is mainly technical. The summary provided would be an index of arguments and references.

4.1 Viewing conditions

While colour measurements play an important role in the control of colour reproduction, they cannot replace the human observer for final assessment of the quality of complex images. Paper and other substrates contribute to the perceived colours and controlling these is equally critical.

ISO 3664:2009 contains all the necessary specifications and information about viewing conditions for critical and practical comparison of printed samples such as reference illuminant, illuminance level, colour rendering index, and other parameters that should be used by all stakeholders to assess the lighting environment of working places.

An important update in ISO 3664:2009 includes a better specification of the light in the ultraviolet (UV) and visible spectrum range to avoid distorting the appearance of samples in comparison with the appearance under commonly used sources of illumination such as daylight. The UV content is important where fluorescent samples are encountered, a phenomenon associated with many of the paper substrates on which images are reproduced as well as with some of the dyes and pigments themselves. The new measurement conditions described in 3.2 are defined with reference to this aim and specify tolerances that provide consistency between visual judgment and colour measurement.

4.2 Colour measurements

To assess the quality of a coloured printed product and to control the process, all the standards refer to colour aims and tolerances. It is not expected that measured colorimetric data will provide an absolute correlation with visual colour appearance, although recent improvements in lighting equipment and measurement instrument technology provide stakeholders with a good level of correlation if all the standards are applied.

ISO 13655:2009 contains all the necessary specifications for spectral measurements and colorimetric computation, and even if these are intended for use by instrument and systems suppliers, it is very important that the base concepts are clear to all stakeholders so as to achieve conformity in the equipment and methods used.

The four measurement conditions (M0, M1, M2, and M3) may provide different spectral values and colorimetric interpretations (CIELAB) for the same sample depending on the degree to which they fluoresce. It is very important that the stakeholders agree on which kind of condition is to be used to exchange data, adding information about the backing that can be extrapolated from process standards.

Condition M0 refers to all spectrophotometers or densitometers compliant with old versions of ISO 13655 or optimized with density measurements according to ISO 5-3. If there is a lack of information about colour measurements, M0 should be assumed.

Condition M1 defines UV content more accurately and makes it possible to minimize variations in measurement results between instruments due to fluorescence (arising from optical brighteners in the substrate and/or fluorescence of the printing and/or proofing colorants). Condition M1 also improves the consistency between measurement results and visual assessment in viewing booths that meets the requirements of ISO 3664:2009.

Condition M2 was previously called "UV-cut" and is adopted when the fluorescence needs to be excluded from the measurements. The effect is that there is poor consistency with visual assessment. However, M2 is still used to make characterizations in some digital printing environments where proofing is not commonly used.

Condition M3 refers to polarized densitometers which are used for process control, especially in sheet-fed offset printing. Even if it is possible to manage spectral or colorimetric M3 data, there is no practical application in any process standard.

4.3 Printing condition

A printing condition is defined by a set of primary process parameters that have a direct bearing on the visual appearance of a printed product. For every printing process, specific parameters are defined that