

Graphic progress in the printing industry

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Standardization for the printing industry secures the profitability and technical progress worldwide. On the technical side, standards make important contributions to the clear communication between producer and user, particularly as concerns technical specifications and interface descriptions for production processes. A recent research study carried out in Europe has shown that standards contribute one-third to the growth of an economy, more than patents and licenses.

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ISO/TC 130, *Graphic technology* was revitalized in 1989 after it had been practically dormant for nine years. Since then, the committee has put out an impressive number of new standards as well as revised older ones. The scope of the committee work comprises the standardization of terminology, test methods and specification in the field of printing and graphic technology in general, from the original to finished products. The scope includes in particular

- pre-press;
- printing;
- finishing;
- materials.

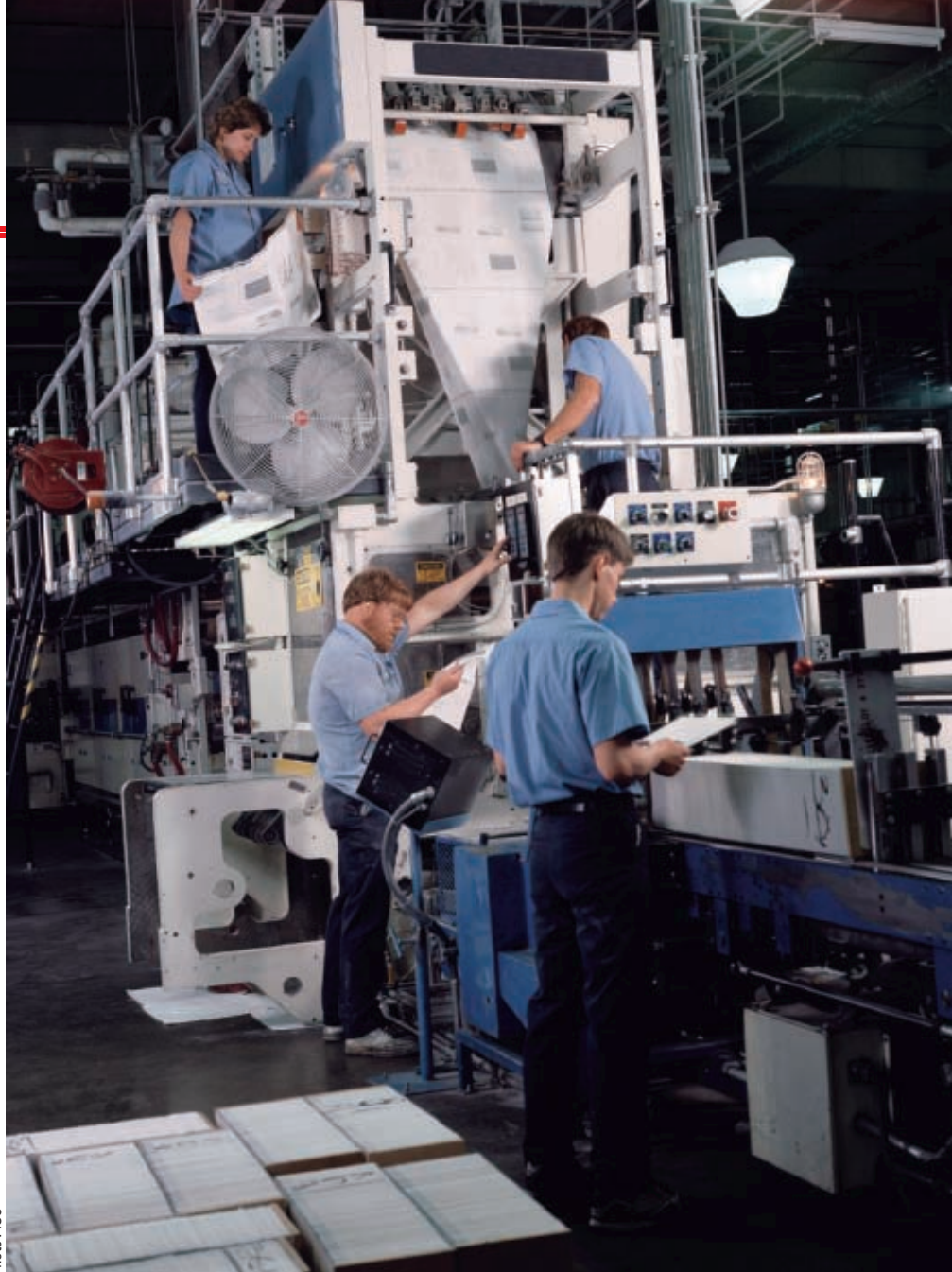


Photo: ISO

Because graphic technology is intimately connected to other fields like paper, colour, photography, etc., liaison activities are being kept up with a large number of other technical committees and standards bodies, comprising

- ISO/TC 6, *Paper and board*;
- ISO/TC 42, *Photography*;
- ISO/IEC/TC 100, *Multimedia systems and equipment*;
- CIE (International Commission on Illumination).

About 50 international standards and standards projects have been developed for the benefit of the printing and media industries.

The right term

Terminology, the work of WG 1, is of fundamental importance to international standardization. Many specialized terms used in the graphic arts often have different meanings in different languages. This makes international cooperation more difficult; translation is at times rather complicated and requires very experienced translators. As an example let us take simple, ubiquitous English terms like “raster image”, “halftone” and “continuous tone”. Translated into German they become, in the same order, “Pixelbild”, “Raster” and “Halbton”. Evidently, words that sound and look almost identical may have very different meaning in another language.

In graphic technology – still much closer to being a trade than an



industry – the same term may have a large number of synonyms. This is a nightmare for any outsider who is not intimately acquainted with the subtleties of the trade. There is a genuine need for international guidance in this field, so that information can flow more freely across language barriers without confusion. This is why WG 1, with the help of experts from Brazil, China, Japan, Germany, United Kingdom and USA, is engaged in producing ISO/DIS 12637, *Multilingual terminology of printing arts*. The first part, “Fundamental terms”, is a draft International Standard. Three more parts on prepress, printing and postpress are being worked on. For screen printing, ISO 12637-5, *Multilingual terminology – Part 5: Screen printing terms* has already existed for some time.

Prepress digital exchange

ISO/TC 130 came to life again as a result of the desktop revolution that began in the early 1980s. To the vendors of digital equipment for the graphic arts, it became evident that standardization was absolutely necessary to enable the free combination of

various pieces of modularized equipment and software programmes. At that time, scanners, monitors, printers, work stations for retouching, and image setters had still to be bought from the same vendor, or they would not be able to work together. If the equipment and the software were to be modularized, standards had to be established for the digital data format, especially for the treatment of colour information. ISO/TC 130 developed a special variant of TIFF files, namely TIFF/IT (see ISO 12639), which became a very reliable and much-used encoding, especially for offset and gravure publications.

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A simple prerequisite for colour management as we know it today is that the device-related colour information of a scanner or a printing process could be linked to absolute colour co-ordinates like CIELAB. For this purpose, ISO 12641 provided the content of colour charts and the data format to be used for the characterization and profiling of input scanners. For the output side, ISO 12642 provided a well-known colour table with 928 colour patches. This will soon be complemented by an extension to roughly 1 500 patches.

Control instruments and control strips are essential for the digital workflow. Suppliers of input, image editing and processing and output systems rely on the values measured with them. Users benefit from the added information that measurements supply – they may use it for process control. The multi-part stand-

ard ISO 12640 provides well-selected, sensitive control images in digital form. They may be used to visually check output channels that accept CMYK, sRGB, CIEXYZ or CIELAB colour formats.

ISO 15930 is a particularly useful multi-part standard that defines a special subset of PDF tailored to the needs of graphic technology; PDF/X-3, Parts 3 and 6, contains specifications which allows a fully colour-managed workflow with media independent data. The new version of Adobe Acrobat already contains a tool for checking the conformance of exported data versus the PDF/X-3 specification. PDF/X-1a, described in Parts 1 and 4, deals with media specific exchanges of CMYK data PDF/X-2, Part 5, pertains to incomplete data exchange and is especially applicable to two-byte-fonts.



About the author



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in physics from Leicester University, UK, and is the recipient of the Reed Technology Medal by GATF. His work at FOGRA revolves mostly around colour process control for graphic arts and metrology. The same applies to his ISO work where he serves as chair of TC 130, *Graphic Technology* and as convener of WG3, *process control*.

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New projects currently being tackled by WG 2 are ISO/DIS 16612, *Graphic technology – Variable printing data exchange using PPML and PDF (PPML/VDX)*, and ISO/CD17972, *Graphic technology – Prepress data exchange – Colour data exchange format*.

Process control and related metrology

Because the graphic arts rely heavily on the viewing and measurement of colour, it became essential to unify the conditions for both. The viewing standard ISO 3664, from working group 3, requires reflection material to be illuminated with 5000 K at 2000 lx for critical comparison. For measurements, it became soon evident that the present CIE standards were not stringent enough and did not provide data for abridged spectrophotometers as used in the graphic arts industry. ISO 13655 describes in detail how the colorimetric measurement should be made and how the CIE co-ordinates should be calculated. The equivalent of ISO 13655 for densitometry is ISO 14981. This standard deviates partly from the historical requirements of photography, which are laid down in the ISO 5, *Photography – Density measurements* series, presently under revision.

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Before it makes sense to profile a printing process, it is a prerequisite that the parameters that determine the visual attributes of an image, or a whole page, have been standardized. For this purpose it is essential to standardize the materials, namely ink and paper, and the process itself. The old offset ink standard ISO 2846 was rejuvenated and extended into a series of standards. ISO 2846-1 describes testing, colour and transparency of offset sheet and web inks; ISO 2846-2 does the same for newsprinting inks, ISO 2846-4 is for screen inks, ISO 2846-5 for flexo inks.

For process control, a similar series of standards was developed. ISO 12647-1 describes measurement methods and principles, ISO 12647-2 offset and four-colour business forms printing, ISO 12647-3 news printing by coldset-offset, and ISO 12647-5 screen printing. Standards for publication gravure and flexo are underway.

Media and materials

The main need in the area of working group 4, *Media and materials*, is for standards for the ink manufacturers, as the paper industry has a special ISO Technical Committee, namely ISO/TC 6, *Paper and board*. Other areas of WG 4 are plates, blankets and measurement instruments for the evaluation of materials.

In the beginning, the most pressing need was to establish the colorimetric properties of the inks to be used for process printing. The old offset ink standard ISO 2846:1975 had to be rejuvenated and extended into the multi-part standard ISO 2846, *Colour and transparency of ink sets for four-colour printing*. Part 1 deals with inks for sheet-fed and heatset-web offset, part 2 specifies inks for coldset offset newsprinting, part 3 pertains to publication gravure, part 4 to screen inks and, finally, part 5 to flexo inks. These standards describe how the colour and transparency of the inks should be tested under laboratory conditions, mostly on a special paper without whitening agents. It fully relies on colorimetry, no densities and no dot gain (tone value increase) values are specified. The actual colours of such inks, as they appear on prints, are specified elsewhere, namely in the process control standards ISO/DIS 12647.

An interesting development is a new method for gloss assessment which works on printed and unprinted surface alike. The aim of ISO/NP 15994, *Testing of prints and printing paper – Determination of the visual gloss number*, is to define a new measure of gloss that correlates well with the visual impression and that can be used for high and low gloss specimens alike.

New projects comprise the measurement of cell volumes for flexo and gravure printing.



Ergonomics/Safety

The ergonomics and safety group, WG 5, with experts from Brazil, Germany, Japan, United Kingdom and USA, mainly serves the need of machinery suppliers and users. The present machine safety regulations differ very much in the various countries mainly because there are no well-recognized international recommendations in this field. The work of WG 5 serves this need; great care is taken to ensure that the rules adopted on the one hand do not reduce the safety level reached in the most advanced countries but on the other hand are sensible and practical, in the best interests of the machine operator. Two voluminous standards have been produced so far. ISO 12648 on the safety of printing presses and finishing machinery and ISO 12649 on the safety specifications for binding and finishing systems and equipment.

As has been pointed on with WG 1, *Terminology*, correct translation of printing terms is often difficult, and puts a considerable burden on the machine manufacturer who needs to label all controls in an easily understandable way. Pictogram symbols are self-explanatory so that there is no need to translate written labels. Draft standard ISO/DIS 15847, *Symbols for graphic arts equipment*, is under development.

Certified reference materials

Working Group 6 was formed to accompany and finish the work on ISO 15790, *Graphic technology and photography – Reflection and transmission metrology – Certified reference materials – Documentation and procedures for use*, including determination of combined standard uncertainty, it comprised experts from both ISO/TC 130 and ISO/TC 42, *Photography*. With the publication of the standard, WG 6 will be disbanded.

Colour management

In the mid-1990s, at the initiative of FOGRA of Germany, the International Color Consortium (ICC) was formed. Its purpose was the establishment of a specification for colour management profiles and rules for its application. Recently, a formal working agreement between TC 130 and the ICC was approved by ISO. Working group 7 was established to facilitate the conversion of the present ICC specification into a document suitable for publication by both ISO and the ICC. The ISO version of this document is ISO 15076. Experts from ISO/TC 42, *Photography* and the ICC are also participants in this group. Close liaison ties have been established with CIE (International Commission on Illumination). ■

Photo : Pierre Granier



Demystifying photography: digital capture imaging performance

by Don Williams, Eastman Kodak Company, Rochester, NY, USA, Co-convenor for ISO 16067-1, ISO 16067-2, and ISO 21550

With capture performance claims of digital imaging devices, one is beckoned by a cacophony of vendor specifications. Loud, confusing (and unregulated), they are, ironically, seductive. For the inexperienced, evaluating these assertions in a consistent, scientific sense is futile. Indeed, even the experienced are disadvantaged without the appropriate tools and guidelines. Let's face it, for the most part, we use these mar-

keting specifications, along with brand name and price, as imaging performance guides. Given the competitive state and relatively low imaging performance expectations of today's consumer digital cameras and scanners, this selection paradigm may actually be reasonable – especially for low-demand imaging tasks.

However, for serious amateurs and professionals with demanding projects or clients, relying on this formula as an imaging performance indicator is precarious, especially in the context of high productivity workflow constraints. The difference between sampling frequency (dpi), and true resolution, is confusing. Improved "optical" resolution claims remain suspect. Bit-depth alone is far from a sufficient criterion for specifying dynamic range, and the existence of artifacts and noise are dismissed with a shrug. Unlike the world of analog imaging, where one could confidently rely on the history-rich reputation of a few manufacturers for performance integrity, today's digital imaging landscape offers fewer assurances.