

# What? by Whom? with Whom? And How Does It All Fit Together?

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Listening to some of the questions and comments on the IPA and other PrintPlanet forums it appears that there is very little understanding of the current standards activities that have an impact on the printing and publishing industry. I realize that, for some time, most standards articles and presentations have focused on specific topics, with little in the way of an overview of the larger issues.

It is time we went back and identified the key groups involved in standards for printing and publishing, how they relate to each other, and the type of standards that are being developed.

I would like to be able to say that we will keep the acronyms and *alphabet soup* to a minimum. But, given the nature of standards, that is impossible. However, there are several sidebars that will provide “translations” for those less familiar with what has been going on. The listing of the full titles of most of the standards being developed by TC130 or that directly have an impact on our industry is shown on page 26. (I say most because it is hard to be sure

that you have them all.) The grouping, which is somewhat arbitrary, is simply an attempt to make it easier to relate various standards to each other. Readers who would like more information about these standards are referred to [www.npes.org/standards/Standards-Technical-PubDes.pdf](http://www.npes.org/standards/Standards-Technical-PubDes.pdf) and [www.iso.org/iso/](http://www.iso.org/iso/)

*Some of our most successful standards have resulted from the linkage of a variety of these types of specifications into a coordinated grouping.*

[en/CatalogueListPage.CatalogueList](#) where listings of standards may be found along with summaries of their contents.

Because the whole issue of organizations and standards (and specifications) is multi-dimensional, there is no right place to start. So we will start with definitions of classes of standards and specifications.

**Standards/Specification Classes**  
Standards and specifications are nothing more than written agreements that describe how something

should be done or the agreed upon characteristics of, or interfaces between, devices or software. The principal way in which the various types of agreements differ is largely determined by “who is allowed to participate in the decision making process.”

At one end of the spectrum we have what are often referred to as “consensus” or “accredited” standards. Participation in the consensus standards process is completely open. Consensus standards are developed by ISO, IEC or a national

standardizing body, such as ANSI in the United States. The standards developed by some of the international standardizing groups recognized by ISO and IEC also fall into this class of standards. In the case of the printing and publishing industry, the only two such groups of interest are the CIE, for color related standards, and the ITU, for communications standards.

For the printing and publishing industry the key international consensus standards committees are ISO/TC130, Graphic technology;

ISO/TC42, Photography; and CIE Division 8, Image Technology. In the United States we also have several ANSI committees that have an impact on our industry: CGATS, Committee for Graphic Arts Technologies Standards, which also takes care of the IT8 standards; B65, Graphic Arts Safety Standards; and I3A, International Imaging Industry Association, which is an ANSI accredited standards developing organization for photography.

In the middle are those agreements/specifications developed by industry trade groups such as SWOP or consortia such as the ICC. These groups do not seek broad consensus, but only approval of their own interest or membership group. Some groups have very open membership policies while others are more restrictive, either by requirements for participation or by cost of membership.

The other end of the spectrum is represented by what is often referred to as “de facto” or private specifications. These are usually controlled by a single company or group of companies, with little opportunity for individual input. These are often critical parts of the imaging chain and, depending on the owner, can/are used either beneficially or to competitive advantage. The classic examples of this type of specification are PDF, PostScript, Windows, DCS, OPI, and TIFF.

In the printing and publishing industry we depend upon, and use, standards and specifications from all of these levels. In fact, as we will see later, some of our most successful standards have resulted from the appropriate linkage of a variety of these types of specifications into a coordinated grouping.

There is a general feeling among many people that consensus standards take the longest to complete

and private or de facto standards can be prepared much faster. The truth is, the two things that determine how quickly a standard or specification can be completed are (1) the number of people that must agree and (2) the number of people that are actively working to develop solutions to the areas of disagreement and to document the agreements. This is validated by the classic examples of de facto standards that seem to never get updated and consensus standards that get completed very quickly.

### **Logical Grouping of Standards**

As I look at the spectrum of standards that support the printing and publishing industry, from a digital systems point of view, they seem to me to form a logical hierarchy. First we have file formats that define the encoding of content data. Then we have a broad range of standards that help define the meaning of the data being exchanged. These in turn are supported by a myriad of standards that provide metrology, tools for process control, input data for document creation and prepress, many other ancillary and supporting functions, and safety.

A whole different family of standards provide business and production information totally independent of the content data. We will not touch on those in this summary.

### **File Formats for Content Data**

Development of file formats for content data was the first U.S. consensus standards activity, outside the area of equipment safety, in the printing and publishing industry. Their development began in the early 1980s with an activity called Digital Data Exchange Standards (DDES), which quickly became the ANSI IT8 Committee. File formats for content data were also the basis for reactivation of ISO/TC130 in 1989 and have been central to the ongoing standards efforts. (The IT8

Committee was merged into CGATS in 1995.)

As we look at encoding of content data we have three basic file formats: TIFF/IT (ISO 12639) and the PDF/X family (ISO 15930 Parts 1 to 3) for pre-defined printing, and PPML/VDX (CGATS.20) for variable data printing.

- TIFF/IT is being maintained and revised by TC130/WG2/TF1.

- Work on the PDF/X family of standards is primarily the responsibility of TC130/WG2/TF2 but CGATS/SC6/TF1, which created the initial PDF/X standard, is playing a significant development and supporting role. In addition, several European printing groups are also providing support, particularly to PDF/X-3.

- The PPML/VDX work, currently being developed by CGATS/SC6/TF2, is being offered for consideration as an international standard at the next meeting of TC130/WG2.

The initial content data file format standards focused on CMYK data only. The newer standards, like PDF/X-3, still support CMYK data exchange but also enable what is being referred to as color managed data. Color managed data use ICC profiles, or references to ICC characterization data registries, to allow the content data to be defined in almost any color space and for the output rendering to be to device spaces other than CMYK.

It is important to note that all of these standards in turn draw upon industry or private specifications for a large part of their content. TIFF and PDF from Adobe, the PPML specification from PODi, and the JDF specification from CIP4 are an integral part of these standards.

In addition, many industry groups have played a major role in defining

requirements, providing test and evaluation tools, and providing implementation tools and evaluations of application packages. Most noteworthy is the DDAP Association which has been actively supporting this work for more than 10 years.

### **Defining the Meaning of Content Data**

All of the data content standards include the requirement that the data within a given file be prepared for a single identified output rendering definition. (The PPML/VDX standard does interpret this to mean a single output condition for each substrate to be used.)

Since most output in the printing and publishing industry is CMYK ink-on-paper, relating CMYK data to printed color becomes the key definition of the content data. The way that this definition is implemented in the PDF/X standards is through the use of ICC output profiles or pointers to ICC characterization data registries, which may also link transforms from 3-component data spaces to CMYK as part of the output definition.

These profiles and/or characterization data registries, in turn, point to and build upon standard characterization data sets such as CGATS TR 001 and/or characterization data from groups like FOGRA and IFRA. Characterization data in turn are usually based on printing process control definition standards and specifications, such as the ISO 12647 family of standards or industry specifications such as SWOP, GRACoL, SNAP, IFRA, etc. ISO 12647 defines “Process control for the manufacture of halftone colour separations, proof and production prints” for a variety of printing processes and paper types.

*CGATS TR 001:1995*, which provides a digital definition of SWOP printing, is the first of a series of

characterization data sets. CGATS/SC3 and CGATS/SC4 are working on additional data sets in this series in conjunction with SNAP and GRACoL. Other groups such as FOGRA and IFRA have also published reference characterization data, usually based on parts of the ISO 12647 family.

These process control standards and characterization data sets make use of the ISO 5 series of density standards from TC42 and the colorimetry standards from CIE. These are both further defined for use in the printing and publishing industry by several TC130 and CGATS metrology standards. Together these standards, along with standard viewing conditions defined in ISO 3664, are used to define process control aims for the various printing conditions as well as to define the measurements conditions for the characterization data.

The data set (test target) used to develop most characterization data is ISO 12642. It is better known by the name of its parent, the IT8.7/3 data set. This is the target used for the characterization data provided by the standards bodies.

Content data definition, therefore, uses standards from ISO/TC130, ISO/TC42, CIE, and CGATS, as well as a number of trade associations and graphic research groups in the United States and internationally.

### **Metrology**

We have already noted the two major metrology standards that we use—the CIE colorimetry definitions and the ISO 5 series of density standards. Incidentally the ISO 5 family is undergoing a major revision to add the derivation of density from spectral data. This work is being done in JWG21, a joint effort of TC42 and TC130. However, the real heart of the metrology standards for the printing and publishing

industry are the standards that define how to use the basic measurements to derive the data needed. These include CGATS.4, CGATS.9, and ISO 13656, which describe the use of densitometric or colorimetric data. CGATS.5 and ISO 13655 define measurement conditions and parameters to be used in calculating colorimetric data.

ISO 15994 is being developed to specify visual gloss for printing applications. A TC42 standard, ISO 14807, provides methods for evaluating densitometer performance and ISO 14981 from TC130 adds specific requirements for printing and publishing use.

### **Tools for Process Control**

The two key families of standards that impact process control are the ISO 2846 series, which defines the color and transparency requirements for four-color printing inks, and the ISO 12647 series, which specifies printing aims. Many of the industry specifications such as SWOP, GRACoL, SNAP, IFRA, etc., are either based upon these ISO standards or were part of the input to their creation.

Metrology standards are clearly used as part of process control, but in addition many contain recommendations and/or requirements for control elements for the printing process.

### **Input Data for Document Creation & Prepress**

As we move more and more into an all digital world, many other standards come into play in helping define and/or characterize the inputs into the printing process—particularly at the creation stage. Everything from editing marks (ISO 5776) to definitions of digital camera data and file formats (ISO 12234, ISO 22028, IEC 61966) and test images (ISO 12640, ISO 12641) play a role in better defining the traditional and the digital workflow.

Often the targets and/or color space definitions are conveyed using ICC profiles in color managed workflows. Fortunately, many of these standards, and the requirements that they convey, are being incorporated into applications so that they are invisible to the end user.

Applications in this part of the workflow also build on many standards that are not unique to the printing and publishing industry. These are too numerous to even track, so are not mentioned or included here. Just stop for a minute and think about all of the computer, electronic and optical media, communication, and data standards that impact everything we do digitally. Most of these are controlled by standards that we are not even aware of, unless something goes wrong.

### **Ancillary & Supporting Functions**

There are many other standards we have developed that are unique to either photography or graphic technology that are important, but simply do not fit into my earlier categories. Things like test print preparation (ISO 2834 and ISO 5737), ink resistance to various things (ISO 2835, ISO 2836, ISO 2837, ISO 12040, etc.), material package sizes (ISO 3772) or handling requirements (CGATS.7) that are critical to ensure that the larger world of printing and publishing can operate efficiently.

### **Safety**

There is another part of our standards world that is almost invisible to all but the printing equipment manufacturers and operators—this is the area of equipment safety. Many of the safety standards that have an impact on our industry are defined by organizations and agencies outside of the printing and publishing industry. However, there is a small group of dedicated folks working on standards unique to printing and finishing equipment in ANSI B65 and WG5 of TC130. We

## **Stages of Standards Development**

Following are the stages an international standard goes through on its way from an initial idea to a published standard. While these stages are defined for standards developed in the International Standards Organization, there are equivalents in virtually every other standards and specification development process or organization.

**NWI - New Work Item Proposal:** A proposal to a standards committee that a new standard(s) be developed.

**WD - Working Draft:** The early draft(s) of a standard, developed by and for the group of people directly involved in the creation process. Comments and suggestions on the WD insure that everyone's inputs are heard.

**CD - Committee Draft:** The first draft of a standard the developing group feels is ready for review and balloting by a larger group that was not actively involved in the creation process. In ISO the balloting of a CD is by all of the National Bodies included in the parent Technical Committee of the sub group developing the standard. This is the stage that the proposed standard gets circulated to industry trade groups, other standards committees, company experts, etc. Wide visibility at this stage usually ensures that if there are problems they will be identified.

**DIS - Draft International Standard:** This is the point at which the technical people involved in the development and writing of the standard essentially say “we think we are done.” Have we got it right? In ISO the DIS is distributed to all 140 nations that are involved in ISO.

**FDIS - Final Draft International Standard:** This is a “proof copy” to be sure that the things that were fixed in response to the DIS ballot were done correctly.

**Review cycle:** Once a standard is published it must be reviewed on a periodic basis (every 5 years in ISO) to be sure that it is still applicable. However, the committee responsible may initiate a revision at any time.

The process for Technical Reports (TR) and Technical Specifications (TS) is similar.

must not overlook or forget their work. The key standards in this area are listed in the sidebar.

### **Committees & Their Structure**

As has been noted earlier, the success of the graphic arts standards activity has been the blending of industry specifications, de facto standards, and consensus standards. Two consensus standards groups have been central to these activities are ANSI/CGATS and ISO/TC130,

our two graphic arts standards committees. The sidebar on the next page outlines some of the various subcommittees, working groups and task forces that make up these committees. In the United States, there has been close cooperation between CGATS and industry organizations such as DDAP, SWOP, SNAP and GRACoL in the definition of requirements for and development of the standards for the industry.

ISO TC42, Photography, has shared concerns in a number of technical areas and there are several Joint Working Groups between TC130 and TC42. The key Working Groups in TC42 that have an impact on, and/or interact with, our industry are also listed in the sidebar.

CIE is another group that, although less visible to our industry, plays an important role as we move more into the realm of color managed workflows. The key divisions of the CIE that have an impact on us are Division 1, 2, and 8.

The Technical Committees of the recently formed CIE Division 8-Image Technology are listed in the adjacent sidebar. The work of the TCs in CIE Division 8 has the potential for providing us with approaches to some of our classic problems of image comparison and evaluation.

Clearly the work of the ICC is also critical as we move forward with color management in not only the printing and publishing industry but also in the whole image area. We have become dependent on their work as a tool to enable color definition and characterization of both input to, and output from, the printing and publishing industry.

**How Does it All Fit Together?**

It all fits together because there are unselfish, dedicated people in the various standards/specifications organizations who are working together for the greater good of the industry. These people are supported by their companies, and their work is promoted by trade associations like GAA, IPA, NAA, NAPIM, NPES, etc., too numerous to try to name them all. Many of these people overlap several different groups and provide the liaison and synergy between groups to make the whole greater than the sum of the parts.

**Key Standards Committees for Graphic Arts**

**ISO TC130-Graphic technology**

- WG1: Terminology
- WG 1/ TF1: Correction marks
- WG2: Prepress data exchange
- WG2/TF1: TIFF/IT
- WG2/TF2: PDF/X
- WG3: Process control and related metrology
- WG4: Media and materials
- WG4/TF1: Colour
- WG5: Ergonomics: Safety
- WG5/TF1: Symbology
- JWG6 : Joint TC130-TC42 WG: Certified reference materials

**CGATS: Committee for Graphic Arts Technologies Standards**

- EXCOM: Executive Committee
- SC3: Metrology
- SC3/TF1: Objective Match Evaluation
- SC4: Process Control
- SC5: Materials Handling
- SC6: Digital Content Exchange
- SC6/TF1: PDF/X
- SC6/TF2: Variable Data Exchange
- SC7: Data Exchange
- SC7/TF1: Revision of IT8.6, Diecutting data
- SC8: Color Data Definition
- STF1: Electronic Design Workflow for Packaging
- STF2: Ink and Color Characterization for Packaging

**TC42: Photography**

- WG3: Sensitometry, image measurement and viewing
- WG18: Electronic still picture imaging
- WG20: Joint ISO/TC 42-TC130-IEC/TC100 WG: Digital still cameras
- WG21: Joint TC 42-TC 130 WG: Density measurements (Revision of ISO 5 series)
- WG22: Joint IEC/TC 100-ISO/TC 42-TC 130 PT : Colour management
- WG23: Joint TC 42-TC 130-CIE WG: Extended colour encodings for digital image storage, manipulation and interchange

**CIE: International Commission on Illumination**


- Division 1-Vision and Colour
- Division 2-Measurement of Light and Radiation
- Division 8-Image Technology

- TC8-01: Colour Appearance Modeling for Colour Management Applications
- TC8-02: Colour Difference Evaluation In Images
- TC8-03 Gamut Mapping
- TC8-04 Adaptation Under Mixed Illumination Conditions
- TC8-05 Communication of Colour Information
- TC8-06 Image Technology Vocabulary

**Summary**

This has been a brief overview of our standards activities. For more detail on specific topics, refer to the standards Web sites mentioned earlier or to the standards articles that have appeared in earlier issues of the *IPA Bulletin* that are available at [www.ipa.org/bulletin/standards.php3](http://www.ipa.org/bulletin/standards.php3).

A “Blue Book” called “Standards for the Printing Publishing and converting Industries is available at [www.npes.org/standards/blue-book.html](http://www.npes.org/standards/blue-book.html).

As always I am happy to provide assistance. You may contact me at either [mcdowell@npes.org](mailto:mcdowell@npes.org) or [mcdowell@kodak.com](mailto:mcdowell@kodak.com). 

## Terms and Abbreviations

**TC** -Technical Committee

**SC**-Sub-Committee: A subgroup within a TC

**WG**-Working Group, A subgroup within an SC or a TC

**TF**-Task Force, A subgroup within a WG or an SC.

**JWG**-A Working Group that involves participants from multiple TCs.

**ISO**-International Standards Organization: A network of national standards institutes from 140 countries working in partnership with international organizations, governments, industry, business and consumer representatives. It is responsible for all standards area not specifically assigned to IEC.

**IEC**-International Electrotechnical Commission: Standards for electrical, electronic & related technologies.

**ITU**-International Telecommunication Union: The United Nations chartered organization for coordinating global telecom networks and services. (A treaty organization as opposed to a consensus standards body.)

**CIE**-International Commission on Illumination: Devoted to cooperation and exchange of information among member countries on matters relating to lighting. Recognized by ISO as an international standardization body.

**ISO/TC 130**-Technical Committee 130, Graphic technology: Responsible for standards for printing/publishing industry.

**ISO/TC 42**-Technical Committee 42, Photography: Responsible for standards for the photographic industry

**ANSI**-American National Standards Institute: Industry organization (non-government but endorsed by the government) that coordinates standards development in the United States and U.S. involvement in ISO and IEC. (Within the United States all standards activities must be organized, administered, and funded by an industry organization. This role is called the Secretariat. NPES The Association for Suppliers of Printing, Publishing and Converting Technologies is the Secretariat for virtually all printing and publishing industry accredited standards activities.)

**USTAG/TC130**-U.S. Technical Advisory Group for ISO TC130:The U.S. group that coordinates U.S. involvement in ISO TC130 on behalf of ANSI. NPES is the Secretariat.

**USTAG/TC42**-U.S. Technical Advisory Group for ISO TC42:The U.S. group that coordinates the U.S. involvement in ISO TC42 on behalf of ANSI. I3A is the Secretariat.

**CGATS**-Committee for Graphic Arts Technologies Standards: The ANSI committee responsible for U.S. standards for the printing and publishing industry. NPES is the Secretariat

**IT8**-Image Technology Committee 8, also known as DDES (Digital Data Exchange Standards Committee): IT8 was merged into CGATS in 1995 and CGATS is now responsible for standards bearing both the IT8 and the CGATS logo.

**B65**-Graphic Arts Safety Standards:ANSI Committee responsible for U.S. standards for printing equipment safety. NPES is the Secretariat.

**I3A**-The International Imaging Industry Association: Formed by the merger of PIMA (Photographic & Imaging Manufacturers Association) and DIG (Digital Imaging Group). It is chartered by ANSI as a standards developing organization. Administers development of ANSI standards in the area of photography. Secretariat for USTAG/TC42.

**ICC**-International Color Consortium: Develops color management specifications.

**DDAP**-Digital Distribution of Advertising for Publications Association: A user-driven organization working toward enabling exchange of digital ads through open process integration and use of accredited standards. ([www.ddap.org](http://www.ddap.org))

**PODi**-Print On Demand Initiative: A market education/development initiative sponsored by digital printing vendors.

**CIP4**-International Cooperation for the Integration of Processes in Prepress, Press and Postpress.

**SWOP**-Specifications for Web Offset Publications Committee:The primary focus of SWOP is the specification of those parameters necessary to ensure consistent quality of advertising in publications. ([www.swop.org](http://www.swop.org))

**GRACoL**- General Requirements for Applications in Commercial Offset Lithography Committee: A committee of the IDEAlliance whose mission is to promote quality printing through process control. ([www.gracol.com](http://www.gracol.com))

**SNAP**-Specifications for Newspaper Advertising Production: Committee to improve quality in newsprint production and provide guidelines for exchange of information.

**FOGRA**-Graphic Technology Research Association: The objective is to undertake research into, to develop and to apply printing technology and to help the printing industry to use the results obtained.

**IFRA**-Deals with issues related to production of publications in general but primarily focused on newspaper printing.

# Standards Developed by or Have an Impact on Graphic Technology

## File Formats for Content Data Exchange

**ISO 12639:1998:** Graphic technology-Prepress digital data exchange-Tag image file format for image technology (TIFF/IT)

**ISO 15929:2002:** Graphic technology-Prepress digital data exchange-Guidelines and principles for the development of PDF/X standards

**ISO 15930-1:2001:** Graphic technology-Prepress digital data exchange-Use of PDF-Part 1: Complete exchange using CMYK data (PDF/X-1 and PDF/X-1a)

**ISO TS 15930-2:** Graphic technology-Prepress digital data exchange-Use of PDF-Part 2: Guidelines for partial exchange of printing data (PDF/X-2)

**ISO 15930-3:2002:** Graphic technology-Prepress digital data exchange-Use of PDF-Part 3: Complete exchange suitable for colour-managed workflows (PDF/X-3)

**CGATS.20-2002:** Graphic Technology-Variable printing data exchange using PPML and PDF (PPML/VDX)

## Content Data Definition

**ISO 3664:2000:** Viewing conditions-Graphic technology and photography

**ISO 12642:1996:** Graphic technology-Prepress digital data exchange-Input data for characterization of 4-colour process printing (Identical to IT8.7/3)

**ISO/DIS 12646:** Graphic technology-Displays for colour proofing-Characteristics and viewing conditions

**ISO 12647-1:1996:** Graphic technology-Process control for the manufacture of half-tone colour separations, proof and production prints-Part 1: Parameters and measurement methods

**ISO 12647-2:1996:** Graphic technology-Process control for the manufacture of half-tone colour separations, proof and production prints-Part 2: Offset lithographic processes

**ISO 12647-3:1998:** Graphic technology-Process control for the manufacture of half-tone colour separations, proofs and production prints-Part 3: Coldset offset lithography and letterpress on newsprint

**ISO/WD 12647-4:** Graphic technology-Process control for the manufacture of half-tone colour separations, proofs and production prints-Part 4: Publication gravure process

**ISO 12647-5:2001:** Graphic technology-Process control for the manufacture of half-tone colour separations, proof and production prints-Part 5: Screen printing

**ISO/WD 12647-6:** Graphic technology-Process control for the manufacture of half-tone colour separations, proofs and production prints-Part 6: Flexographic printing

**ISO/WD 12647-7:** Graphic technology-Process control for the manufacture of half-tone colour separations, proof and productions prints-Part 7: Processes using digital printing or reproductions made on various traditional printing processes from digital files

**CGATS.6-1995:** Graphic technology-Specifications for graphic arts printing-Type 1

**IT8.7/3-1993:** Graphic technology-Input data for characterization of 4-color process printing

**ICC.1:2001-12:** File Format for Color Profiles (Version 4.0.0)

**SWOP:2001:** Specifications for Web Offset Publications

**GRACoL:2002:** General Requirements for Applications in Commercial Offset Lithography

**SNAP:2000:** Specifications for Newspaper Advertising Production

**Japan Color 2001:** Characterization Data for printing as defined in ISO 12647-2 as practiced in Japan

**FOGRA:** Characterization Data for printing as defined in ISO 12647-2 and ISO 12647-3 as practiced in Germany

**IFRA:** Characterization Data for printing as defined in ISO 12647-3 as agreed to by IFRA.

## Metrology

**ISO 5-1:1984:** Photography-Density measurements-Part 1: Terms, symbols and notations

**ISO 5-2:2001:** Photography-Density measurements-Part 2: Geometric conditions for transmission density

**ISO 5-3:1995:** Photography-Density measurements-Part 3: Spectral conditions

**ISO 5-4:1995:** Photography-Density measurements-Part 4: Geometric conditions for reflection density

**ISO 12634:1996:** Graphic technology-Determination of tack of paste inks and vehicles by a rotary tackmeter

**ISO 12635:1996:** Graphic technology-Plates for offset printing-Dimensions

**ISO 12644:1996:** Graphic technology-Determination of rheological properties of paste inks and vehicles by the falling rod viscometer

**ISO 12645:1998:** Graphic technology-Process control-Certified reference material for opaque area calibration of transmission densitometers

**ISO 13655:1996:** Graphic technology-Spectral measurement and colorimetric computation for graphic arts images (Based on CGATS.5)

**ISO 13656:2000:** Graphic technology-Application of reflection densitometry and colorimetry to process control or evaluation of prints and proofs

**ISO 14807:2001:** Photography-Transmission and reflection densitometers-Method for determining performance

**ISO 14981:2000:** Graphic technology-Process control-Optical, geometrical and metrological requirements for reflection densitometers for graphic arts use

**ISO/DIS 15790:** Graphic technology and photography-Reflection and transmission metrology-Certified reference materials-Documentation and procedures for use, including determination of combined standard uncertainty

**ISO/CD 15994:** Graphic technology-Testing of prints and printing paper-Determination of the visual gloss number

**ISO/CD TR 16066:** Graphic technology-Standard object colour spectra database for colour reproduction evaluation (SOCS)

**ISO/WD 20101:** Graphic technology-Process control-Cell volume measurement

**CGATS.4-1993:** Graphic technology-Graphic arts reflection densitometry measurements-Terminology, equations, image elements and procedures

**CGATS.5-1993:** Graphic technology-Spectral measurement and colorimetric computation for graphic arts images

**CGATS.9-1994:** Graphic technology-Graphic arts transmission densitometry measurements-Terminology, equations, image elements and procedures

**CGATS.11/PIMA IT2.11-1999:** Graphic technology and photography-Reflection and transmission metrology-Certified 2 reference materials-Documentation and procedures for use, including determination of combined standard uncertainty

#### **Tools for Process Control**

**ISO 2846-1:1997:** Graphic technology-Colour and transparency of ink sets for four-colour-printing-Part 1: Sheet-fed and heat-set web offset lithographic printing

**ISO 2846-2:2000:** Graphic technology-Colour and transparency of printing ink sets for four-colour-printing-Part 2: Coldset offset lithographic printing

**ISO/FDIS 2846-3:** Graphic technology-Colour and transparency of printing ink sets for four-colour-printing-Part 3: Publication gravure printing

**ISO 2846-4:2000:** Graphic technology-Colour and transparency of printing ink sets for four-colour-printing-Part 4: Screen printing

**ISO/CD 2846-5:** Graphic technology-Specification for colour and transparency of printing ink sets-Part 5: Flexographic printing

**ISO 11084-1:1993:** Graphic technology-Register systems for photographic materials, foils and paper-Part 1: Three-pin systems

**ISO/WD 11084-2:** Graphic technology-Register pin systems-Part 2: Metallic printing plates

**ISO 12218:1997:** Graphic technology-Process control-Offset plat making

**ISO 12636:1998:** Graphic technology-Blankets for offset printing

**ISO/WD 20101:** Graphic technology-Process control-Cell volume measurement

**IT8.6-1991:** Graphic technology-Prepress digital data exchange-Diecutting data

#### **Definition of Input Data for Document Creation and Prepress**

**ISO 5776:1983:** Graphic technology-Symbols for text correction

**ISO 12234-1:2001:** Electronic still-picture imaging-Removable memory-Part 1: Basic removable-memory module

**ISO 12234-2:2001:** Electronic still-picture imaging-Removable memory-Part 2: TIFF/EP image data format

**ISO 12640:1997:** Graphic technology-Prepress digital data exchange-CMYK standard colour image data (CMYK/SCID)

**ISO/CD 12640-2:** Graphic technology-Prepress digital data exchange-Part 2: XY/sRGB encoded image data (XYZ/SCID)

**ISO/WD 12640-3:** Graphic technology-Prepress digital data exchange-Part 3: CIELAB encoded image data(CIELAB/SCID)

**ISO 12641:1997:** Graphic technology-Prepress digital data exchange-Colour targets for input scanner calibration (Equals IT8.7/1 and IT8.7/2)

**ISO TR 14672:2000:** Graphic technology-Statistics of the natural SCID images defined in ISO 12640

**ISO/CD 22028-1:** Photography and graphic technology-Extended colour encodings for digital image storage, manipulation and interchange-Part 1: Architecture and requirements

**IEC 61966-2-1:1999:** Multimedia systems and equipment-Colour measurement and management-Part 2-1: Colour management-Default RGB colour space-sRGB

**IEC/DIS 61966-2-2:** Multimedia systems and equipment-Colour measurement and management-Part 2-2: Colour management-Extended RGB colour space-scRGB

**IT8.7/1-1993 :** Graphic technology-Color transmission target for input scanner calibration

**IT8.7/2-1993 :** Graphic technology-Color reflection target for input scanner calibration

**CGATS TR 011-2002:** Graphic technology-Package development workflow-Design concept through approved production file

### **Ancillary and Supporting Functions.**

**ISO 2834:1999:** Graphic technology-Test print preparation for offset and letterpress inks

**ISO 2835:1974:** Prints and printing inks-Assessment of light fastness

**ISO 2836:1999:** Graphic technology-Prints and printing inks-Assessment of resistance to various agents

**ISO/CD 2836:** Graphic technology-Prints and printing inks-Assessment of resistance to various agents

**ISO 2837:1996:** Graphic technology-Prints and printing inks-Assessment of resistance to solvents

**ISO 3772:2000:** Photography-Rolls of sensitized material for the prepress industry-Dimensions and related requirements

**ISO 5737:1983:** Prints-Preparation of standard prints for optical tests

**ISO 11628:1995:** Graphic technology-Prints and printing inks-Determination of resistance of prints to acids

**ISO 12040:1997:** Graphic technology-Prints and printing inks-Assessment of light fastness using filtered xenon arc light

**ISO/CD 12637-1:** Graphic technology-Multilingual terminology-Part 1: Fundamental term

**ISO 12637-5:2001:** Graphic technology-Multilingual terminology of printing arts-Part 5: Screen printing terms

**ISO/WD 20462:** Photography-Psychophysical experimental method to estimate image quality

**CGATS.7-1995:** Graphic technology-Pallet loading for printed material

**CGATS.10-1995:** Graphic technology-Perforations for printing plates

### **Safety**

**ISO 12648-TBD:** Graphic technology-Safety requirements for printing press systems

**ISO/CD 12649:** Graphic technology-Safety standard for binding and finishing systems and equipment.

**ISO/WD 15847:** Graphic technology-Symbols for graphic arts equipment

**B65.1-1995:** Safety standard-Printing press systems

**B65.2-1999:** Safety standard-Binding and finishing systems

**B65.3-2001:** Safety standard-Guillotine paper cutters, mill trimmers and integral handling equipment

**B65.4-2002:** Safety standard-Three-knife trimmers, including rotary, and single- and multiple-knife trimmers

**B65.5-1996:** Safety standard-Stand-alone platen presses