ISO/TC 130 Graphic Technology

EXECUTIVE SUMMARY

ISO/TC 130 addresses standardization in the field of printing and graphic technologies, covering all phases of the print production process, all forms of products either virtual or physical, and the related services. These have all been reshaped greatly by digital and IT technologies and will be changed even more by AI technologies in the future. The overall size of the markets for these technologies is very large, but difficult to quantify in that, while publishing and packaging are probably traditionally the largest markets, printing plays a part in almost every industry in all parts of the world. The markets for print are affected by economic, technical, legal, environmental and social factors.

ISO/TC 130 has to date produced approximately 100 standards, which enable processes to run faster, more predictably and more efficiently, as well as being more cost-effective in terms of the following:

- providing procedures and tools that help users efficiently produce and distribute quality products reliably at a reasonable price;
- facilitating interconnectivity and process integration;
- enabling automated and eventually intelligent processes;
- improving communication between users;
- improving health, safety and environmental protection;
- reducing waste and harm to the environment;
- mitigating contributing factors to climate change and environmental impact.

There are 45 countries and 844 registered experts currently involved in the work of ISO/TC 130 (22 P members and 23 O members) and its 13 working groups and joint working groups under its lead from all parts of the world. The 22 P members are from Europe, Asia, North and South Americas, and Oceania.

The main goal of TC130 is to carry out the development, raise the visibility and aid the implementation of TC130 standards in the graphics industry, but there are challenges in a world where information is migrating from physical to electronic support. The technical committee therefore aims at developing new standards for future printing technologies, while maintaining focus on current practices and on making the industry more efficient in order to successfully exploit the digital information transition. In order to achieve this, ISO/TC 130 has defined the following objectives:

- to simplify the structure of the printing workflow standards, avoiding over-standardization;
- to focus the standardization activity on the needs and requirements of the industry during its digital transition, balancing equally the interests of all stakeholders, considering only internationally accepted standard methods and processes, and encouraging the interoperability of applications using published ISO standards;
- to avoid any kind of possible overlap and work on identified gaps.
1 INTRODUCTION

1.1 ISO technical committees and business planning

The extension of formal business planning to ISO Technical Committees (ISO/TCs) is an important measure which forms part of a major review of business. The aim is to align the ISO work programme with expressed business environment needs and trends and to allow ISO/TCs to prioritize among different projects, to identify the benefits expected from the availability of International Standards, and to ensure adequate resources for projects throughout their development.

1.2 International standardization and the role of ISO

The foremost aim of international standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

Three major bodies are responsible for the planning, development and adoption of International Standards: ISO (International Organization for Standardization) is responsible for all sectors excluding Electrotechnical, which is the responsibility of IEC (International Electrotechnical Committee), and most of the Telecommunications Technologies, which are largely the responsibility of ITU (International Telecommunication Union). For TC 130 the CIE (International Commission on Illumination) is also an important contributor of key standards. The work in CIE is coordinated in ISO through TC 274.

ISO is a legal association, the members of which are the National Standards Bodies (NSBs) of some 140 countries (organizations representing social and economic interests at the international level), supported by a Central Secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the International Standard. An International Standard embodies the essential principles of global openness and transparency, consensus and technical coherence. These are safeguarded through its development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry). ISO and its Technical Committees are also able to offer the ISO Technical Specification (ISO/TS), the ISO Public Available Specification (ISO/PAS) and the ISO Technical Report (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO offers also the International Workshop Agreement (IWA) as a deliverable which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and fora, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.

2 BUSINESS ENVIRONMENT OF ISO/TC 130

2.1 Scope

ISO/TC 130 addresses standardization in the field of printing and graphic technologies. This field covers all phases of the process, where graphic elements (image, text, line art, pattern and others) are created, manipulated, assembled, communicated, and finally delivered electronically as digital
products or physically to substrates using inks, toners and other marking or functional materials, and finished as demanded by the end applications.

ISO/TC 130 standards include but are not limited to those of terminology, evaluation of visual appearance and product quality, data exchange, process control, management, conformity assessment, impacts on the environments as well as requirements on and testing of the related materials, equipment and systems.

Note:

Where actual or potential overlap in scope with other TCs/SCs such as ISO/TC 42, TC 6, TC 256, TC 35, IEC/TC 100 and ISO/IEC JTC 1/SC 28, coordination through liaison or JWG with the concerned TC should be maintained or/and actively pursued.

2.2 Description of the Business Environment

The following economic, technical, regulatory, legal and social dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of ISO/TC 130, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

- **Economic.** The economic dynamics are…
  - The rate of change for opportunities and challenges.
  - Disruptive technologies (ePUB, digital publishing, web distribution, supply chain, run lengths, digital versus analogue, etc.)
  - Globalization of prepress and print (distributed across several geographical regions)

- **Technical.** The technical dynamics are…
  - The continued effort to enable the creation of unambiguous documents that can communicate embedded workflow parameters
  - Upstreaming of traditional prepress work to clients and designers
  - Automation of workflows and production in the printing industry

- **Legal and Regulatory.** The legal dynamics are…
  - Stricter regulations for waste management, emissions and other environmental aspects.
  - Regulatory compliance across legislative domains.

- **Social.** The social dynamics are…
  - Greenwashing, sustainability, recyclability, etc.
  - How print is perceived
  - Lack of formal training and education within the sector, need more continual learning and upgrading of skills

3 BENEFITS EXPECTED FROM THE WORK OF ISO/TC 130

The last 20 years have seen a significant change in the way information is accessed. This has inevitably affected the graphic arts industry in various ways. Essentially, all processes up to the placing of the image on the final substrate or the printing plate are now digital. In addition, the
printing and finishing workflows are now frequently digital. The standards of ISO/TC130 are thus developed appropriately.

TC 130 has produced two documents to explain how the standards are meant to be used and what the different roles are for the stakeholders in the entire printing workflow. These documents are named “Guidelines for the use of standards for print media production” and Framework for ISO TC130 standards”.

While much information is now accessed digitally, there is still a demand for printed products, both bound products, such as books and magazines, and packaging.

The 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 efficiently produce quality products for their customers;
- facilitating interconnectivity and process integration among systems;
- enable automated processes when possible;
- allowing users to communicate more 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;
- reducing the harmful effects on the environment;
- reducing waste;
- mitigating contributing factors to climate change; and
- environmental impact accountability.

Graphic arts companies can use the structure of the published standards to support their businesses and to harmonize production workflows, irrespective of the size of the company and despite the complexity of the standards.

The priority areas reflecting the above can be seen in the structure of the working groups established by ISO/TC 130. These can be seen on the TC home page: https://www.iso.org/committee/52214.html. This page also shows the joint working groups with other technical committees.

4 REPRESENTATION AND PARTICIPATION IN ISO/TC 130

4.1 Countries/ISO members bodies that are P and O members of the ISO committee

Note: For a current list of P and O members of ISO TC 130, please look at the published list:
- Countries/ISO members bodies that are P and O members of the ISO committee

ISO/TC130 is currently (2019) comprised of 45 member countries, including 22 P-members and 23 O-members, as indicated in Table 1. The member countries from Europe, Asian, Americas, Oceania and Africa account for 53.3%, 26.7%, 11.1% 2.2% and 6.7% of the total memberships, respectively. For the updated information and details, please see: https://www.iso.org/committee/52214.html.

<table>
<thead>
<tr>
<th>No.</th>
<th>Continent</th>
<th>P-member</th>
<th>O-member</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Country/ Region</td>
<td>State of Development</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Developed</td>
</tr>
<tr>
<td>1</td>
<td>N. America (6.7%)</td>
<td>Canada</td>
<td>y</td>
</tr>
<tr>
<td>2</td>
<td>USA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 ISO/TC 130 and Its member countries
Out of the 22 P-members, 19 are developed countries and the rests are developing countries, occupying 86.4% and 13.6% of the total participating memberships, respectively. They cover geographically the areas where printing and graphic technologies are most advanced and the related markets are well developed with high demands. BRICS (Brazil, Russia, India, China and South Africa) are countries with a total population of about 2.9 billion, accounting for about 39.5% of the world population, and as the two largest developing countries China and India have recorded the fastest economic growth rates over the past decade. In contrast, the O-memberships are evenly distributed between developed and developing countries. Developed and developing countries are evaluated and classified using the UN’s (United Nations) Human Development Index (HDI), and the criterion is 0.8, i.e., countries with HDI above 0.8 are classified as Developed Country and otherwise as Developing Country.

### 4.2 Analysis of the participation

Participation and activity of P-member to committee work can be assessed at two levels, one at country level and the other at individual expert level. The number of delegations of P-member countries attending committee plenary meetings and number of votes cast by P-member countries to the committee’s resolutions and documents at different stages (PWI, NP, WD, CD, DIS, FDIS) are good measures of participation of P-member country. The number of registered experts in different WGs, the number of experts attending WGs’ meetings and the number of comments contributed by experts upon voting are good measures of activity of individual expert.

#### Participation at country level

Since 2015, 3 plenary meetings have been organized by TC130 and they were the 29th Plenary Meeting in Seoul in 2015, the 30th Plenary Meeting in San Jose in 2016 and the 31st Plenary Meeting in Surakarta (or Solo), respectively. They were attended by 16, 13 and 13 delegations of P-member countries, respectively, or 42 delegations-attendances in total, accounting for 66.7% (42/(3×21)) of the total number of delegation-attendances possible if all had attended all of the meetings. This is, apparently, not a big percentage. The number of participations by a specific P-member divided by the total number of plenary meetings over the past 3 years indicates the frequency of participation by that P-member country to plenary meeting over the same period and
the result is shown by the blue columns in Fig. 1. As indicated, the participation in plenary meetings is split among American and Oceania countries and varies extremely country by country in Asia and Europe. Some of the countries have attended all the 3 plenary meetings and some of them have not even once at all.

According to voting data, 63 ballots were carried out by the committee’s secretariat in 2017 and 1317 votes were received, accounting for 99.6% of the total votes possible. The number of votes cast by a specific P-member divided by the total number of votes is a measure of the frequency of participation by that country. The calculation is carried out for all P-member countries and the results are shown in red columns in Fig. 1. In contrast to the large fluctuations in the data for attending plenary meeting, the data for voting is all above 95% and evenly distributed from one country to another. These two sets of data collaboratively reflect the activity of participation in the committee’s work by its P-member countries.

In most cases, voting is done by correspondence using internet and requires less time and financial inputs by participants, whereas physically attending a meeting overseas requires substantial input of time and for most delegates depends largely on the availability of funding. This may account for the large differences between the data of attending plenary meeting and those of voting. In one word, it would be enough to say that the participation by P-member country would be high if funding and time are available.

Participation at Individual Level

In 2017, TC130 had 13 working groups and joint working groups under its lead and the total number of registered experts was 844 or 65 experts per group on average. The country profile of registered experts is given in Fig. 2 (green column). Countries that had more 60 registered experts were those of number 2, 4, 8 and 13, accounting for 21.9, 9.0, 7.6 and 7.4% of the total. The registered experts were not distributed evenly among WGs. The most popular WGs with more experts than the average were WG3-Process Control and Related Metrology (118 or 14.0% of the total), WG2-Prepress Data Exchange (97 or 11.5%), WG11-Environmental Impact of Graphic
Technology (81 or 9.6%), WG4-Media and Materials (80 or 9.5%), WG13-Printing Conformity Assessment Requirements (67 or 7.9%) and JWG7-Colour Management, joint with ICC, (66 or 7.8%). This may reflect the importance of these areas and of the projects running in these WGs as recognized by the experts. It may also reflect the focus and concerns of the graphic technology industry where current focus is on digitalisation, virtualisation, computer integration and environmentally sensitive production.

Comments can be made upon voting, document reviewing and discussion in WG meetings, but only comments made when voting are documented and so can be retrieved. According to this data, TC130 launched 63 ballots which were accompanied by 1312 documented comments in total, or (1312/844=) 1.56 comments per expert on average. A total of 30 WG meetings including subgroups were arranged and attended by 671 experts in total or one expert attended 0.8 times. Normalizing the same number of a specific country with the corresponding total one yields the individual contribution by that specific country. The results are shown in Fig. 2, in which red and blue columns denote the normalized number of experts attending WGs’ meetings and that of the documented comments accompanying votes, respectively.

The number of comments and that of experts attending WG meetings are positively correlated with that of registered experts in most of the cases, but exceptions can be found in countries of number 5, 11, 17 and 20. Country number 16 should not be counted because of its membership change in 2017. Though fluctuating largely from one country to another, contributions by countries numbered 2, 4, 8, 13, 15 and 21 are apparently big as compared with those by other countries.

Documented comments accompanying votes are made by correspondence using internet and at much less cost as compared with physical participation in WG meetings which requires overseas-travel for most experts and is implemented only when financial support or budget is available. This would explain the differences between these two numbers in Fig.2. It is interesting that some of the countries attended more WG meetings such as those of number 4 and 6, and some of them contributed more comments such as those of number 8, 13, 15 and 22.
International organizations and other ISO/TCs in liaison with TC130

By the end of 2017, TC 130 had built 23 liaisons with 13 different ISO- or IEC-TCs or SCs. This includes 11 liaison committees to TC 130 (the committees that can access the documents of TC 130) and 12 liaison committees from TC 130 (the committees whose documents can be accessed by TC 130), as indicated in Table 2. For the updated information and details, please see https://www.iso.org/committee/52214.html.

<table>
<thead>
<tr>
<th>No.</th>
<th>Liaison Committees to ISO/TC 130</th>
<th>Liaison Committees from ISO/TC 130</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>ISO/TC 6/SC 2 Test methods and quality specifications for paper and board</td>
<td>ISO/TC 6/SC 2 Test methods and quality specifications for paper and board</td>
</tr>
<tr>
<td>4</td>
<td>ISO/TC 42 Photography</td>
<td>ISO/TC 42 Photography</td>
</tr>
<tr>
<td>6</td>
<td>ISO/TC 207/SC 7 Greenhouse gas management and related activities</td>
<td>ISO/TC 207/SC 7 Greenhouse gas management and related activities</td>
</tr>
<tr>
<td>9</td>
<td>ISO/IEC/JTC1/SC 29 Coding of audio, picture, multimedia and hypermedia information</td>
<td>ISO/IEC/JTC1/SC 29 Coding of audio, picture, multimedia and hypermedia information</td>
</tr>
<tr>
<td>10</td>
<td>IEC/TC 119 Printed Electronics</td>
<td>IEC/TC 119 Printed Electronics</td>
</tr>
<tr>
<td>11</td>
<td>IEC/TC 100/TA 13 Environmental aspects in the field of audio, video and ICT equipment</td>
<td>ISO/TC 171/SC 2 Document file formats, EDMS systems and authenticity of information</td>
</tr>
</tbody>
</table>

ISO/TC 130 has built 9 Category A-liaisons and 1 Category D-liaison with other international organizations as shown in Table 3. For the updated information and details, please login https://www.iso.org/committee/52214.html.

ISO/TC 130 updated its scope in 2017 and the new scope is more comprehensive and extendable for the area of printing and graphic technology and its possible development in the future. It includes both digital/electronic and physical forms of printing and graphic products, laying down fewer restrictions on the methods and materials by which the products are output or rendered. This may pave even wider foundations for the committee to serve the growing demands of the
industry in the new era and imply more opportunities for the committee to cooperate with other ISO- or IEC-TCs or SCs as well as other international organizations in the fields of printing and graphic technology.

5 OBJECTIVES OF ISO/TC 130 AND STRATEGIES FOR THEIR ACHIEVEMENT

5.1 Defined objectives of ISO/TC 130

TC130’s objective is to promote printed matter and standardize terminology, digital communication, process control, materials, ergonomics, sustainability, postpress, security and conformance assessment. To achieve these goals in a world where information is migrating from physical to electronic support, TC130 faces huge challenges. TC130 must maintain focus on current practices and making the industry more efficient in order to successfully exploit the digital information transition and to develop new standards for future printing technologies. The large number of participating experts and countries, and the standards developed so far, provide a consolidated resource that should not be ignored. However, the constant acceleration of technologies such as digital printing techniques, does not fit easily within TC130’s existing structure, created in the second half of the last century.

The main goal of TC30 is to raise the visibility and aid the implementation of TC130 standards in the graphics industry.

To face the challenges of the printing sector in the Industry 4.0 era, and to achieve its main goal, TC130 has set the following objectives:

- Simplify the structure of the printing workflow standards, focusing on the relevant process to standardize and avoiding an over-standardization of all the details of a production workflow;
- Focus the standardization activity on the needs and requirements in the industry identified by the TC 130 committee, in order to:
  - Equally balance the interests of producers, consumers and neutral entities;
  - Consider only internationally accepted standard methods and processes;
  - Encourage the interoperability of applications using published ISO standards
  - Avoid any kind of possible overlap.
  - Work on identified gaps

5.2 Identified strategies to achieve the ISO/TC’s defined objectives

The actual structure of the committee does not follow the SC/WG hierarchy used by most of the other ISO TCs. There are some pros and cons of the actual structure choice, but a re-organization could be studied for future adaptation to ISO recommendations.

The TC 130 is making use of joint working groups with other ISO TCs where appropriate to further the standardization work and more effectively utilize the experts. This also provides the industry with a unified message rather than competing directives.

In order to maintain the cohesion of the TC 130 and benefit from the total synergy of its members, the TC 130 should perform the following activities:

- review the work programme at each plenary meeting, to withdraw or redefine those drafts on which no progress has been made between two meetings;
- promote collaboration amongst WGs by holding meetings with the chairman, manager, convenors and secretaries when necessary;
● maintain and establish liaisons (or establish JWGs, Joint Working Groups) with the committees working on items that are also of interest to TC 130. The TC should have the responsibility, depending on the work items, either on its own authority or at the request of the WGs;
● hold meetings for the TC and its WGs annually at similar dates and at the same location, whenever possible. A WG or a TF may meet on its own if it wishes;

6 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE ISO/TC 130 WORK PROGRAMME

Many printers, publishers and suppliers feel forced to work with very short term business strategies which do not align with standardization activities, typically an activity that requires a long term strategic approach from the management. The average development period of a standard project requires at least three years, so fewer and fewer organizations are able to afford the availability of experts and money for such a long period of time.

6.1 Regional considerations

The major risks to the standards development process are not necessarily the same in different areas of the world, but there seems to be a general lack of understanding of the value of investment in training, or the use of standards. This affects standards work in several ways – if printers and publishers do not buy the ISO standards, there will be fewer resources to maintain the work. And equally problematic is, if printers and publishers do not train staff in how to implement standards in a proper way, the pool of experienced users to invite into standards work on a national level will be smaller and smaller. This will then be a threat to standards work, long term, on an international level. Equally the economic pressure on both vendors and educational institutions seems to make them reluctant to allow experts and scientists to engage in standards work.

Several graphic arts research institutes have shut down over the last ten years, and print associations are experiencing reductions in membership numbers in many countries.

The situation is different in different areas of the world, but in many countries it has been difficult to recruit young workers into the graphic arts industry for some years now. The education sector faces the same challenge, and sadly many graphic arts departments have had to cancel traditional courses in hands-on printing and prepress operations due to lack of students. This in turn means that printers and publishers often have to employ unqualified staff, and train them internally, often under time pressure.

6.2 Other challenges to the Graphic Arts industry

Unfortunately print is wrongly regarded as an unsustainable and environmentally unfriendly process, not least by large parts of the media, and this works against the industry as a whole.

The technologies used in graphic arts production are becoming more and more complex and advanced, not least within applied computing and IT, so there is a strong need for well-educated staff to enter the graphics arts industry, especially young people. More and more of the standards developed within TC 130 are concerned with IT-related processes and business automation. It is a challenge for today’s typical employee in a printing or publishing company to see the benefits of implementing ISO standards in those types of applications if they don’t have the training and skill in those areas.
6.3 Initiatives to counter some of the challenges

TC 130 uses virtual meeting technologies to allow as many members as possible to participate in the development process. Virtual meetings allow member countries that do not have funds to travel to have a voice in the development effort.

Workgroup 11 within TC 130, working with the “Environmental impact of graphic technology”, has produced a series of standards which should eventually, when implemented, counter the erroneous view among so many that print is not a sustainable or environmentally friendly process. Developing standards that help measure and reduce power consumption of printing devices and assist print buyers to raise awareness on deinkability potential of printed matter and its recyclability are among the tasks undertaken by WG11. This work will help TC 130 as a whole to communicate a more positive image of the graphic arts industry.

7 STRUCTURE, CURRENT PROJECTS AND PUBLICATIONS OF ISO/TC 130

This section gives an overview of the ISO/TC’s structure, scopes of the ISO/TCs and any existing subcommittees and information on existing and planned standardization projects, publication of the ISO/TC and its subcommittees.

7.1 Structure of the ISO committee

7.2 Current projects of the ISO technical committee and its subcommittees

7.3 Publications of the ISO technical committee and its subcommittees

Reference information

Glossary of terms and abbreviations used in ISO/TC Business Plans

General information on the principles of ISO’s technical work