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**COMPARATIVE STUDY ON ISO STANDARDS AND BIS STANDARDS FOR
SHEET FED OFFSET PRESSES AND THEIR APPLICATIONS IN INDIAN PRINT
INDUSTRY**

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ABSTRACT

Standards are guidelines, processes and procedural instructions for production of multi-colorprinted products with repeatable quality that are recognized in the graphic arts industry and particularly in printing. International standards are also known as industry standards, which are developed by individual manufacturers or joint ventures. The central point of this study is to analysis the standards adopted by industries and the same drawn up by the ISO (International Organization for Standardization) “to facilitate the international coordination and unification of industrial standards” as well as the specifications formulated/agreed by the apex body BIS (Bureau of Indian Standards) in India.

Keywords: ISO Standards, Offset Printing, Sheet-fed Offset Printing, ISO – 12647, TC - 130.

INRTODUCTION

ISO develops and publishes standards, ranging from standards for information technology to fluid dynamics and nuclear energy. Headquartered in Geneva, Switzerland, ISO is composed of 162 members, each one the sole representative for their home country. As the largest developer and publisher of standards in the world, ISO fills the vital role of a medium for agreement between individual standards developers, spreading progress made by one country's local developers across the world to further the goal of standardization.

BIS in India is the national body for the standards dealing in various fields. As far as concern of printing, BIS representing India as member body in the TC/130 Graphic Technology and its National Mirror Committee is MSD6 (Management and Systems Department) {former was MSD 5}.

Standards documents include two broad classes of information: "normative" and "informative" Normative elements are defined as "elements that describe the scope of the document, and which set out provisions". Provisions include requirements that convey criteria to be fulfilled if compliance with the document isi to be claimed and from which no deviation is permitted.

Informative elements include supplemental information such as additional guidance, supplemental recommendations, tutorials, commentary as well as background, history, development, and relationship with other elements. Informative data is not a requirement for compliance with the standard.

The most important standards for print production are ISO 12647, ISO 2846-1, ISO3664, ISO 15930-X, ISO15076, ISO12640, Along with the most important specifications to promote harmonious development of the activities of standardization in the country by BIS are IS 15306:2003, IS 15963 (Part 2):2012 etc.

Specifications also provides standards for process monitoring in printing and proof printing including film and plate exposure, as well as standards for measurement technology and data communication. Standards are not always easy for companies to apply in practical operations. There is a great number of interdependencies between the standards. It is easy to lose track of what applies where. And even the interpretation of what is written in a standard is not always easy. This is why official bodies the “**German Printing and Media Industries Federation**” (**bvdm**), The Offset Printing Process Standard issue detailed description of the individual steps involved in print production.

Objectives of Study: The key objective of this research is to extract the wide range of standards provided by ISO for graphic art technology and compare with BIS standards and analyse their acceptance on practical grounds.

Research Methodology: In order to analyse the wide range of standards a comparative study of various standards provided by ISO & BIS on their website as well as certifications status of major printing units' needs perusal.

Comparative Study: A standard is a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose. Standards ensure that products and services are safe, reliable and of good quality. For business, they are strategic tools that reduce costs by minimizing waste and errors, and increasing productivity. They help companies to access new markets, level the playing field for developing countries and facilitate free and fair global trade.

The following table shows the published ISO standards relating to TC 130 and their identical national adoption by BIS with their Dual numbers. Each record contains document number (designation), document title, and BIS technical committee and adoption number of the standard. It is based on information available at the time. Because a review is conducted every five years, some cautions are necessary before adopting a standard.

S. No.	ISO Standard No.	Title	BIS No. / Committee
1	ISO 12647-1 : 2004	Graphic technology -- Process control for the production of half-tone colour separations, proof and production prints -- Part 1: Parameters and measurement methods	IS 15963 (Part 1) : 2012 / MSD 5 130
2	ISO 12647-2 : 2004	Graphic technology -- Process control for the production of half-tone colour separations, proof and production prints -- Part 2: Offset lithographic processes	IS 15963 (Part 2) : 2012/ MSD 5 130
3	ISO 12647-3 : 2005	Graphic technology -- Process control for the production of half-tone colour separations, proofs and production prints -- Part 3: Cold set offset lithography on newsprint	IS 15963(Part 3) :2012)/ MSD 5 130
4	ISO 12647-1 : 2004	Process Control for the / ISO 12647-1:2004 Production of Half-Tone Colour Separations, Proofs and Production Prints Part 1 Parameters and Measurement Methods	IS 15963(Part 1) : 2012 Graphic Technology
5	ISO 12647-2 : 2004	Graphic Technology - Process Control for the / ISO 12647-2:2004 Production of Half-Tone Colour Separations, Proofs and Production Prints Part 2 Offset Lithographic Processes	IS 15963 (Part 2) : 2012 Graphic Technology
6	ISO 12647-3 : 2005	Graphic Technology - Process Control for the / ISO 12647-3:2005 Production of Half-Tone Colour Separations, Proofs and Production Prints Part 3 Cold Set Offset Lithography on Newsprint	IS 15963(Part 3) : 2012
7	ISO 12647-3 : 2005	Graphic Technology - Process Control for the / ISO 12647-3:2005 Production of Half-Tone Colour Separations, Proofs and Production Prints Part 3 Cold Set Offset Lithography on Newsprint	IS 15963(Part 4) : 2012
8	ISO 12647-4 : 2005	Graphic Technology - Process Control for the / ISO 12647-4:2005 Production of Half-Tone Colour Separations, Proofs and Production Prints Part 4 Publication Gravure Printing	IS 15963(Part 4) : 2012
9	ISO 12647-5 : 2001	Graphic Technology - Process Control for the / ISO 12647-5:2001 Production of Half-Tone Colour Separations, Proofs and Production Prints Part 5 Screen Printing	IS 15963 (Part 5) : 2012
10	ISO 12647-6 : 2006	Graphic Technology - Process Control for the / ISO 12647-6:2006 Production of Half-Tone Colour Separations, Proofs and Production Prints Part 6 Flexographic Printing	IS 15963(Part 6) : 2012
11.	ISO 18 : 1981	Guidelines for contents list of periodicals	IS 11957 : 1987

Printing is a booming business in India with a large number of clients demanding good quality printing material such as books, magazines, calendars, brochures, business cards, wedding cards and the list is endless. As a result, the country has a large number of companies engaged in this business. So it is necessary to go through the current Certification analysis of various leading printing units throughout India.

1. **Thomson Press India Limited**
Thomson Press NCR is ISO 9001: 2015 certified by BSI India Limited accredited by ANAB, ISO 14001:2004 and OHSAS 18001: 2007 certified by Vexil BPS Limited accredited by JAS-ANZ and FSC CoC certified by SCA USA.
2. Replika Press Private Ltd
An ISO9001:2008 and 14001:2004, FSC, SMETA/Prelims and BSCI social audit accredited SAP ERP compliant company.
3. Srinivas Fine Arts Pvt Ltd
ISO 9001: 2008, SA 8000:2008, FSC (Forest stewardship Council) certified.
4. Pragati Art Printers : ISO 9001:2008 Certified.
5. P.R.Packaging Pvt.Ltd : ISO 9002:1994 Certified.
6. International Print O Pack : ISO 9001:2008 Certified.
7. Parksons Graphics : ISO 9000;2008,GMI (Graphic measures International), FSC[®] C122244 COC Certified.

RESULTS AND DISCUSSION

This research paper has presented an overview about the following standards

ISO 12647-2: There are various ISO 12647 standards according to the main types of printing methods. One of the sub-parts of the above mentioned is ISO-12647-2, guides the printers to achieve the desired results. As specifications do change over time, so the actual current published standards should be followed.

ISO 12647-2 is :

- directly applicable to proofing and printing processes that use color separation films as input
- directly applicable to proofing and printing from printing forms produced by filmless methods as long as direct analogies to film production systems are maintained
- applicable to proofing and printing with more than four process colors as long as direct analogies to four-color printing are maintained, such as for data and screening, for print substrates and printing parameters
- applicable by analogy to line screens and non-periodic (i.e. FM) screens.

1. ISO 12647-2 Type 1 for offset lithographic processes on gloss-coated paper specifies:

Ink: ISO 2846-1

Substrate: L* 95 a* 0 b* -2

Primary Colors (black backed): K: L* 16, a* 0, b* 0, C: L* 54 a* -36, b* -49, M: L* 46, a* 72, b* -5, Y: L* 87, a* -6, b* 90

Secondary Colors (black backed): R (M+Y): L* 46, a* 67, b* 47, G (C+Y): L* 49 a* -66, b* 24, B (C+M): L* 24, a* 16, b* -45, C+M+Y: L* 22, a* 0, b* 0

Solid ink densities: (informative information)*

Halftone screen: 133 lpi, 150 lpi, 175 lpi, 20 micron FM

Dot Gain/TVI: 12 -16% or 18 -22%

Grey Balance: 25%-19%-19%, 50%-40%-40%, 75%-64%- 64%

Neutral definition: substrate or equivalent tone of black

ISO profile: ISOcoated_v2_eci.icc

Characterization data: Fogra39L.txt

2. GRACoL 7: The General Requirements and Applications for Commercial Offset Lithography publication that is a common reference in North America and is based on ISO 12647-2 specifies

Ink: ISO 2846-1

Substrate: ISO 12647-2

Primary Colors: ISO 12647-2*

Secondary Colors: ISO 12647-2*

Solid ink densities: Not specified

Halftone screen: 175 lpi AM round dot

Dot gain/TVI: Not specified - replaced by Neutral Print Density Curve values: @ 25% Grey: CMY .25/K .22,

@ 50% Grey CMY .54/K .50, @ 75% Grey: CMY .90/K .90

Grey Balance (required): 50%-40%-40%

Neutral definition: a* 0 b* -2

ICC profile: GRACoL2006_Coated1v2.icc

Characterization data: GRACoL2006_Coated1

3. **ISO 2846-1** which describes ink color and transparency.

4. **ISO 3664** defines lighting conditions for viewing color copies and their reproduction with either incident or transmitted light.

5. **ISO 15930-X** (PDF/X) for data exchange in print production.

6. **ISO 15076** for the ICC color profile format.

7. **ISO 12640** for the data format from which ICC profiles are calculated.

As study reflects a comparative analysis between the wide range of standard provided by ISO and national adaptation by BIS but it seems a collapse of guidelines at ground. No of leading printers are manipulating these standards as per their suitability. Almost every print is running with the described unit guideline. Most of the printers are following tools and equipments for achieving quality are Quadrant Scale, GSM round cutter, Dail thickness Gauge, BS Tester, Stiffness Tester, Ford Cup, Scuff Tester, Compression Strength Tester, Digital tensile Tester, Moisture Meter, Oven, Water Cobb Tester and many more.

CONCLUSION

To fulfil the consistent demands for quality in every domain especially in printing, standardization of each process is needed according to set of fixed and proven set of rule/standards/guidelines. Mostly Offset printing presses in India are running in a non-standardize mode without any certification and rarely following the printing standards.

In every country there are apex bodies for printing who has framed various set of standards/tolerance and testing method. During the analysis it was found that it is very difficult to cope with the range of standards. So, we seek to make ourselves to get part away from the standard but this study makes us enable to differentiate among and familiarize with most useful standards e.g ISO 2846-1:1997, ISO 12647-2:2004, ISO 12642:1996, ISO 13655:1996, ISO 15076-1: 2005, ISO 15930-3:2002.

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