

Development of a Standard for Digital Print (ISO 15311)

Craig Revie, Fujifilm
Johanna Kleinmann, Inca Digital
Andreas Kraushaar, Fogra

The need for a standard for digital printing

- **Objectives**
 - ensure that what is printed is what the document creator intended
 - define expectations for different kinds of print
 - provide a basis for print and printing system certification
- **Conventional printing standards are widely adopted**
 - Standard measuring and viewing environments
 - Certification to ISO 12647 currently a hot topic
- **Existing standards are not suitable for digital printing**
 - ISO 12647 series specified process control for each printing technology
 - Digital Printing is not just another printing technology

Proposed ISO 15311 structure

- **Part 1: Parameters and measurement methods**
- **Part 2: Commercial production printing**
- **Part 3: Large Format Printing (Signage)**
- **Parts 4... additional parts based on use case (in discussion)**
 - Editorial Newspaper, magazines, books, manuals
 - Photography Small and large format photos, photobooks
 - Visual Communication Poster, cardboards, signage, banner, transparent displays, blueback, flags
 - Labels Labels, all flexible small band applications
 - Flatbed Direct printing on plastic, transparents, alluminium, cardboards, wood, ...
 - Industrial Sublimatic on textile, direct printing on ceramic tiles, other printing processes with heat/cook postprocess

Part 1: Parameters and measurement methods

- **Colour and surface finish**

- Colour accuracy (process colours), Colour accuracy (spot colours), Tone value reproduction limits, Number of tonal steps (P-score), Ink Set Gloss, Line density

- **Homogeneity**

- Streakiness, Streakiness (M-Score), Graininess, Graininess (alternative method), Mottle, Inking variation across the format and in the printing direction

- **Resolution**

- Line width, Native addressability, Effective addressability, Raggedness, Blurriness, Modulation transfer function (MTF), Register, Patterning

- **Artefacts**

- Contouring, Spreading (misdirected dots, satellites)

- **Permanence**

- Indoor light stability, Outdoor weathering, Thermal stability, Arrhenius prediction

Summary table – invitation to participate

PQ Attribute	the name of the print quality attribute.
Definition	the definition of the attribute.
Measurement	the measurement proposed and an indication of whether this is a subjective or an objective measure. In the case of an objective measure an indication of how well the measure correlates with visual perception should be provided.
Units	the measurement units for the attribute.
Interpreting the numbers	provides further details of how the numbers should be interpreted, for example range of values. Where possible an example is provided.
Priority / Status	an indication of whether the measure is being considered a priority by TC130.

Table

	PQ Attribute	Definition	Measurement (Subject / Objective evaluation)	Units	Example / Interpreting the Numbers	Status
Colour and surface finish	Colour	is a psychophysical process as it is the human eye/brain response to the physical stimulus of light.	ISO 13655 ISO 11664	CIE L*a*b*		Included by reference: a basis for other metrics
	Colour difference	Difference between two colours.	CIE 015:2004 (Objective)	ΔE_{1976} ΔE_{00}	The larger the value of DE, the more colour difference between the two specimens.	Included by reference: a basis for other metrics
	Unprinted substrate	Multiple parameters that describe the unprinted substrate	ISO 15397	Various	[Japanese comment that substrate choice is client requirement.]	Included in draft
	Colour accuracy (process colours)	Average colour difference and 95% percentile colour difference of ISO 12642-2	ISO 15339-1 (Objective)	ΔE_{00}	EXAMPLE: Colour accuracy for Fogra39: ISO 12642-2 chart, average 5 ΔE_{00} , 95 percentile 8 ΔE_{00} (media relative).	Included in draft
	Colour accuracy (spot colours)	Currently no details specified				Included in draft (poor specification)
	Gamut volume	Calculating all reproducible colours of a device by means of a given colour space	"Green Method"	1 cube unit = $DL * Da * Db$ with DL = 1 Da = 1 Db = 1	The larger the value of GV, the more colours can be reproduced.	Open

Participation in the development of ISO 15311

- **Project leader: Andreas Kraushaar (Fogra)**
- **Responsible committee: ISO TC130/WG3**
- **Next meeting of ISO TC130**
 - 16-22 September 2011 at DIN in Berlin, Germany
 - attendance limited (national body approval required)
- **Contributors**
 - Fogra Digital Printing Working Group
 - chaired by Andreas Kraushaar
 - IDEAlliance print properties group
 - Japanese ISO TC130 shadow committee
 - UK ISO TC130 Technical Advisory Group
 - digital printing input coordinated by Johanna Kleinmann
 - ISO TC130 national bodies