



# Colour Quality Assurance

*for Printers and Print Buyers*

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# Introduction

- Common colour problems
- Printing standards
- ISOLithO
- Benefits for
  - *Print Buyers*
  - *Printers*

# Common colour printing problems

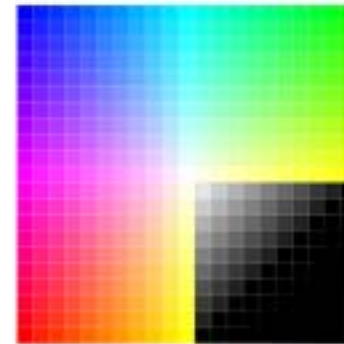
- Colour communication
- Quality
  - *Matching the proof*
  - *In-run print appearance*
  - *Run to run print appearance*
  - *Payment issues – customer expectation*
- Waste
  - *Make-ready time and materials – machine utilisation*

# Print standards

- ISO 3664 Viewing conditions
- ISO 2846 Ink colour and transparency
- ISO 12647 Family of print specifications I through 7
- Industry Specifications
  - SWOP
  - GRACoL
  - SNAP
  - IFRA
- Characterisation Data
  - CGATS TR001
  - FOGRA
  - IFRA
- <http://www.ipa.org/bulletin/standards>

# Print standards

**DUPONT** Eurostandard Digital CROMALIN®



DuPont 24 pt. DuPont 20 pt. DuPont 16 pt. DuPont 12 pt. **DuPont 24 pt. DuPont 20 pt. DuPont 16 pt. DuPont 12 pt.**

# Print standards

## ISO 12647

4 ISO ISO 12647-2:1996(E)

### 4.2.4 Tone value increase

#### 4.2.4.1 Aim values

The tone value increase for printing and proofing shall be specified for every process colour other than quoting one of the categories A to F listed in table 4 (shown as graphs in figure 1) or by the values themselves. Alternatively, the tone value increase functions may be specified by graphs such as those of figure 1.

In the absence of specified values, the aim values for the 50 % control patch of the control strip shall be as listed in table 5 for the printing categories shown.

#### NOTES

24 The tone value increase of the black colour is typically 2 % to 3 % higher than those of the chromatic colours. Black is usually printed on the first press unit and at a higher ink film thickness.

25 If conversion of tone value increase data from one screen ruling to another is desired, see annex C in the diagram figure C.1 and figure C.2, corresponding values can be substituted for other press printing and control patches of 40 % or 50 % tone value on the film. Conversions for off-press proofing may require different curve sets.

26 The values given in table 5 refer to measurement in a control strip with a screen ruling of 80 cm<sup>-2</sup>, with a 50% response (this is to the wider side of the two responses specified in DIN 15398:1999), with polarization, using the method specified in figure 5. For developments without polarization and with ISO Screen T response, the tone value increase data for cyan, magenta, and black are approximately equal to those shown in table 5; the value for yellow are 2 % smaller.

Table 4 — Tone value increase relative to a control strip (in percent)

Munsell	Tone value increase on print							
	A	B	C	D	E	F	G	H
38	9	12	15	18	20	22	24	26
40	13	16	18	22	25	28	31	34
50	15	17	20	23	26	29	31	33
56	14	16	17	18	20	21	22	24
76	15	14	15	16	17	18	19	20
85	12	12	13	14	14	15	16	17

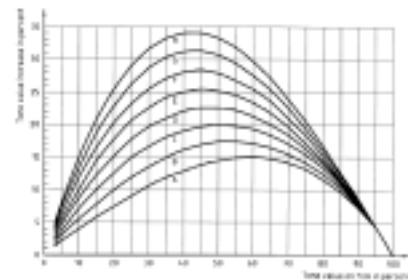


Figure 1 — Tone value increase curves for the categories defined in table 4 (if the latter contains rounded numbers whereas the curves depend on original data.)

ISO 12647-2:1996(E) 4 ISO

Table 2 — CIE L\*a\*b\* coordinates of colours for the colour sequence cyan magenta yellow (unit: %)

Paper type <sup>1)</sup>	1	2	3	4	5
	L* <sub>1</sub> /a* <sub>1</sub> /b* <sub>1</sub>	L* <sub>2</sub> /a* <sub>2</sub> /b* <sub>2</sub>	L* <sub>3</sub> /a* <sub>3</sub> /b* <sub>3</sub>	L* <sub>4</sub> /a* <sub>4</sub> /b* <sub>4</sub>	L* <sub>5</sub> /a* <sub>5</sub> /b* <sub>5</sub>
Black	18 0 -1	18 1 1	28 0 0	28 0 1	35 1 2
Cyan	50-20-50	50-20-40	50-20-42	62-20-28	66-26-28
Magenta	40 75 -6	40 73 -2	40 71 -2	52 58 -2	53 55 1
Yellow	88 -52 95	88 -52 90	82 -52 90	88 -52 88	84 -52 78
Past	49 59 41	49 59 41	49 51 42	51 52 22	50 49 24
Green	48-60 30	48-60 30	52-62 20	52-58 17	52-58 17
Blue	29 23-83	29 23-83	29 22-81	38 12-26	35 14-26

<sup>1)</sup> Paper types according to 4.2.1.1.  
<sup>2)</sup> The colours were derived from those of ISO 9904-1 for the method given in annex 5.  
<sup>3)</sup> Measurement according to ISO 11654-1:1996, 5.6. Black backing,  $B_{40}$  (minimum 2° observer, D65 or D50 geometry).

NOTE 23 The secondary values red, green, blue can vary depending on conditions that include the mechanics of the press, the surface characteristics of the print substrate and the mechanical and tolerancing properties of the ink. Thus, conformance of the primary C, M, Y to specifications is not sufficient for the conformance of the secondaries to the values given in table 2.

Table 3 — CIE L\*a\*b\* tolerances for the solids of the process colours (unit: %)

	Black	Cyan	Magenta	Yellow
Deviation tolerance	4	5	5	5
Tolerance tolerance	2	2,5	4	3

NOTE 23 Tolerances for special liquid colours and for package printing should be lower than those given in ISO 12647-2, depending on the colour difference attributable to differences of L\*.

#### 4.2.1.4 Ink set gloss

The gloss of solid tone colours may be specified if deemed necessary.

The specular gloss of the print substrate or ink set (single DYT solid areas) shall be measured with light incident at 75° (13° from the plane of the print substrate) and measured at 75°. The instrument used shall conform to ISO 8554-1. Report values in percent, quoting "ISO 8554-1" as the method.

#### 4.2.2 Tone value reproduction limits

Half-tone dot patterns within the following tone value limits (on the film) shall transfer onto the print in a consistent and uniform manner:

- screen ruling between 40 cm<sup>-2</sup> and 70 cm<sup>-2</sup>, 3 % to 87 %;
- screen ruling of 80 cm<sup>-2</sup> or proof printing for the half-tone gravure process, 5 % to 95 %.

No significant image parts shall rely on tone values outside of the above ranges on the colour separation film.

#### 4.2.3 Tolerance for image positioning

The inter-dot deviation between the image centres of any two primary colours shall not be larger than one half of the smallest screen width of the four colour separation films.

# ISOLithO

- Engineers say of any manufacturing process:
  - *“If you can measure it, you can control it, and if you can control it you can reproduce it”*

# ISOLithO

- ISOLithO
  - A comprehensive quality assurance system based on ISO 12647
- ISOLithO
  - Enables customers to specify exactly they *need*
- ISOLithO
  - Enables printers to improve efficiency and colour QA.
  - Provides marketing tools for active promotion of the business.

# ISOLithO

- A Typical Implementation
  - Tune print process to target ISO 12647 or in-house derivative)
  - Tune pre-press colour systems to ISO 12647.
    - accurate upstream viewing, proofing and colour separation
  - Generate ISOLithO Reports – from proofs and press
  - Train operators in use of ISOLithO tools and procedures

# The ISOLithO Report

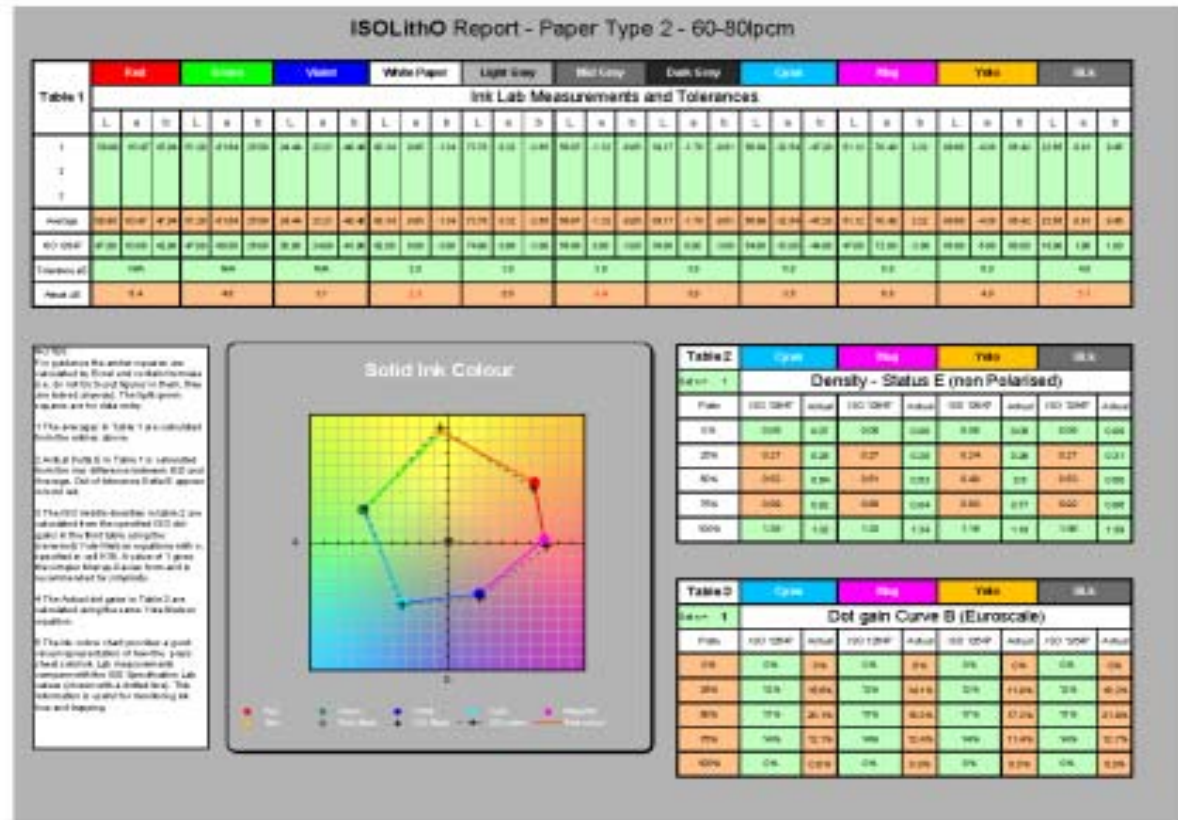
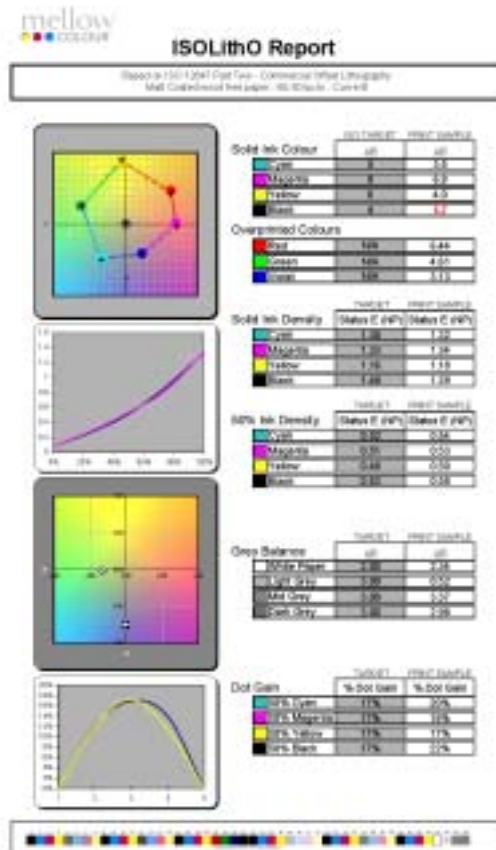


Hardware				
Manufacturer	Technology	Measurement	Cost	Speed
ColorSavvy	Colorimeter	Single point	£300	5 minutes
X-Rite	Spectrophotometer	Single point	£1200	3 minutes
Techkon	Spectrophotometer	Scanning	£3000	10 seconds

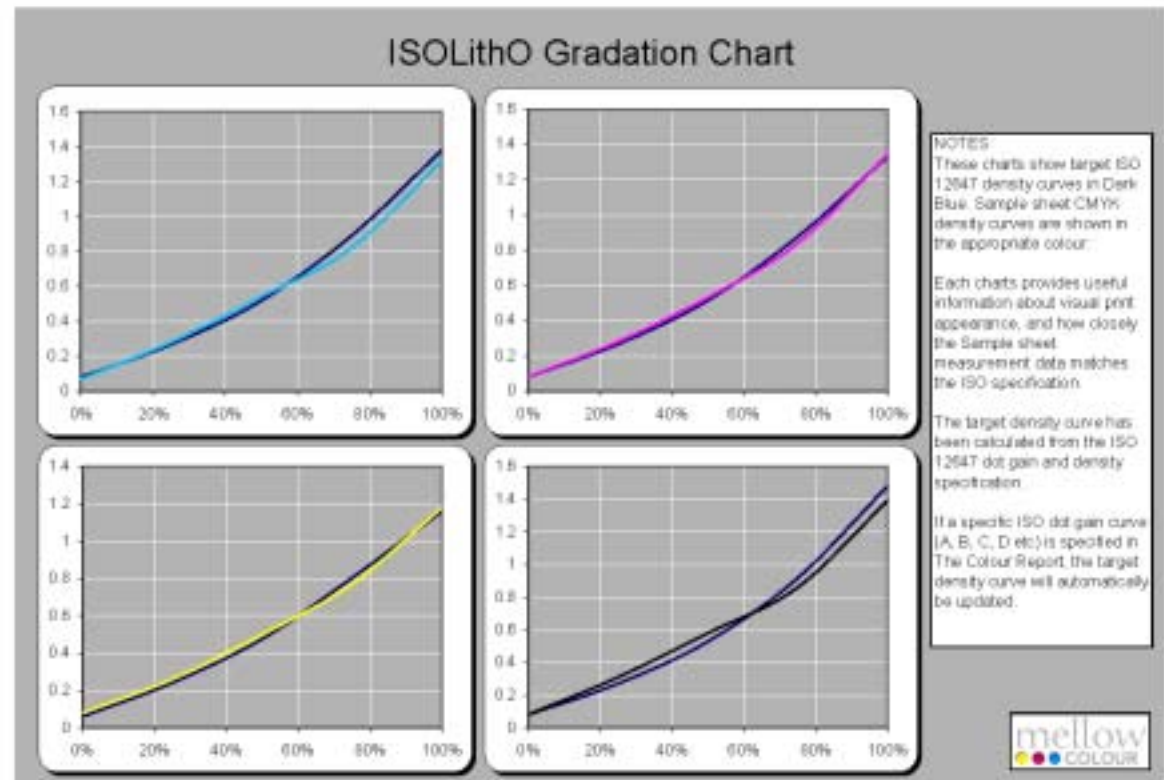
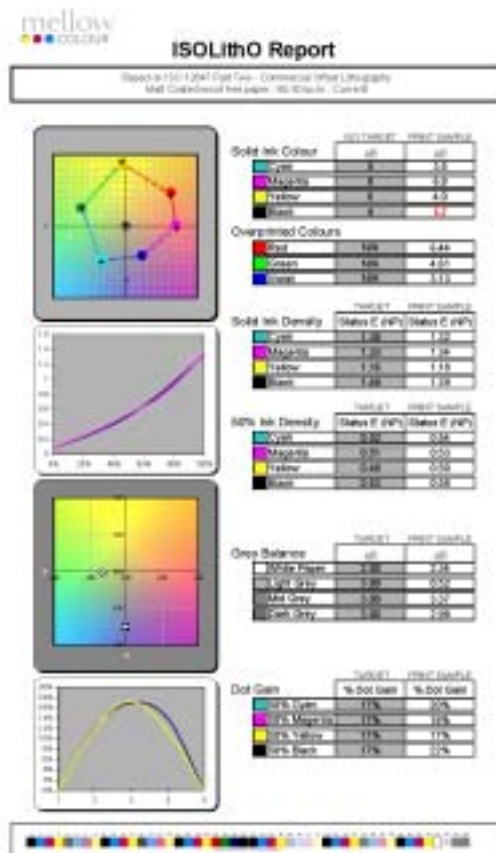
Software				
Manufacturer	Technology	Sampling	Cost	Speed
Mirosoft Excel	Windows or Mac	All	£99	N/A



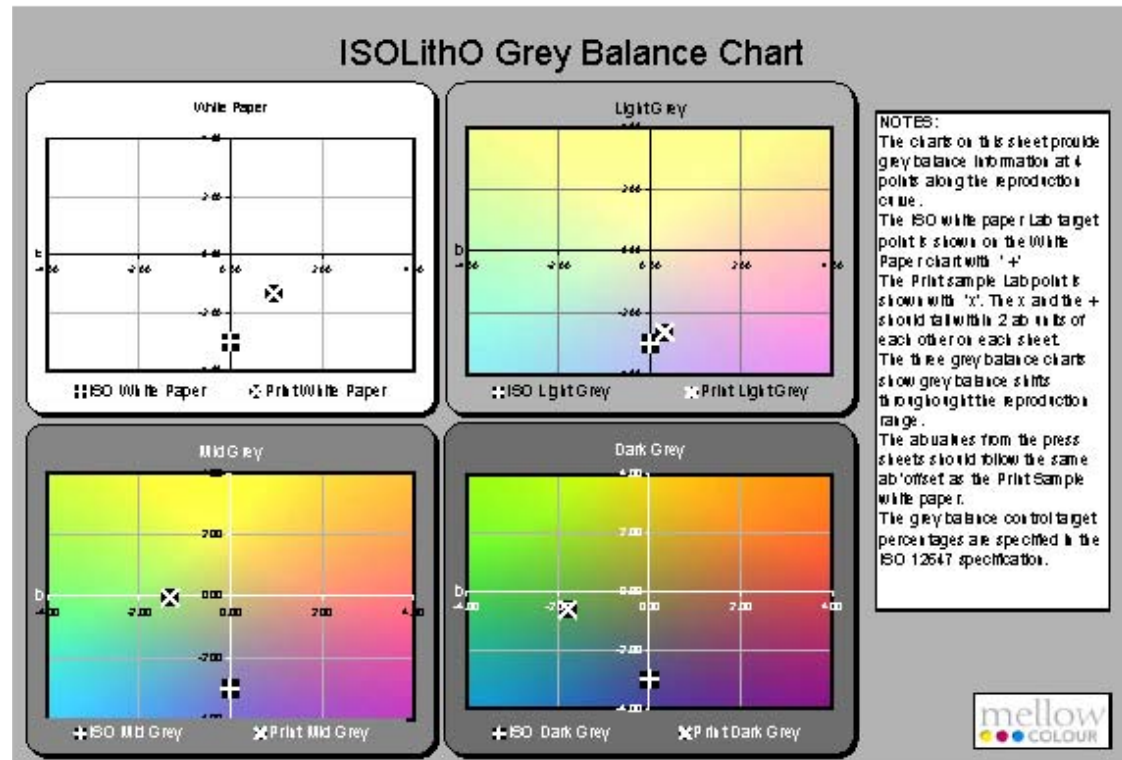
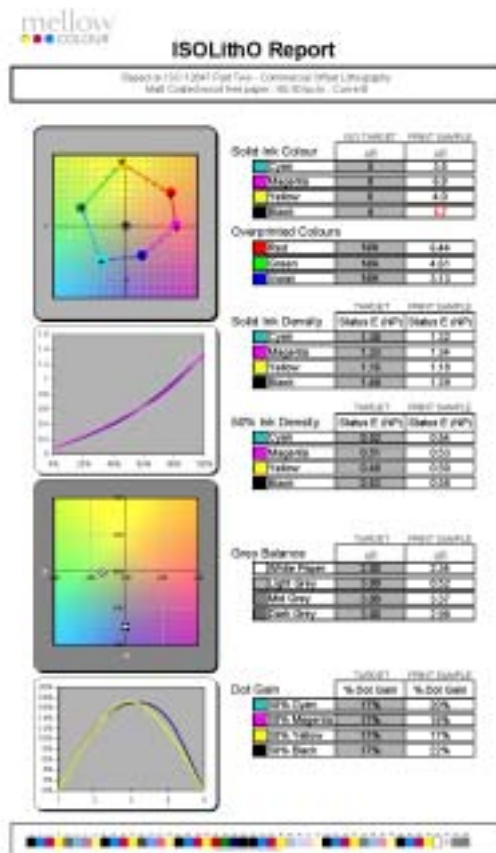
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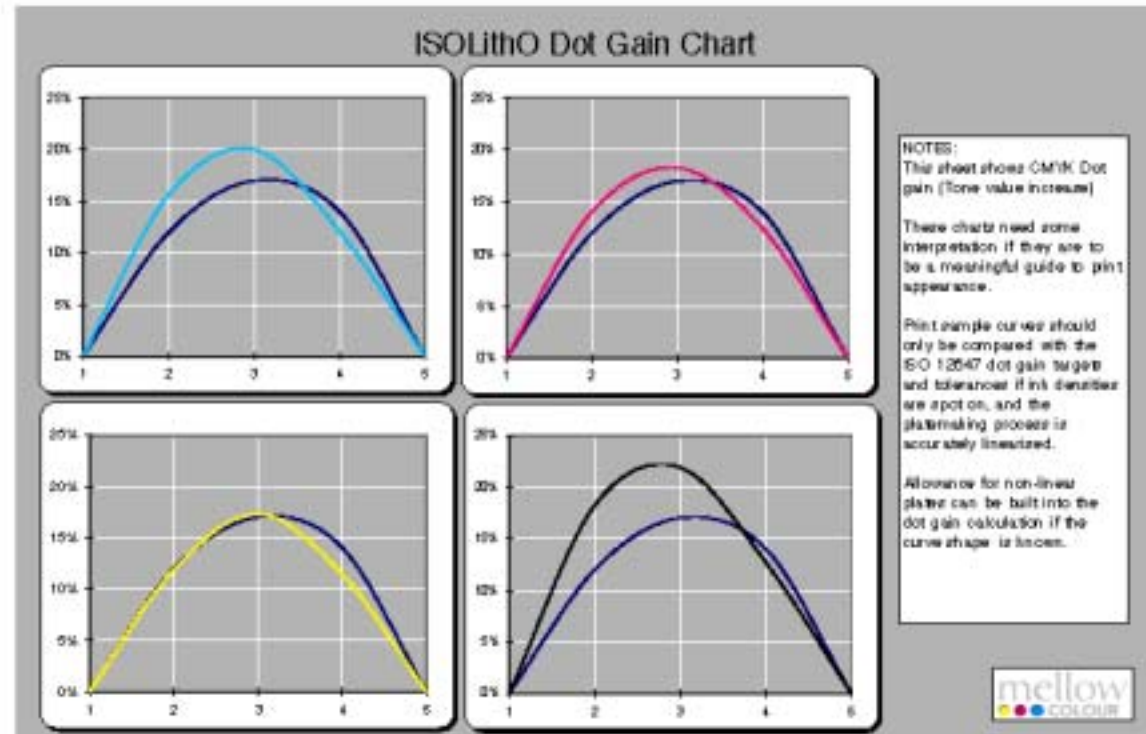
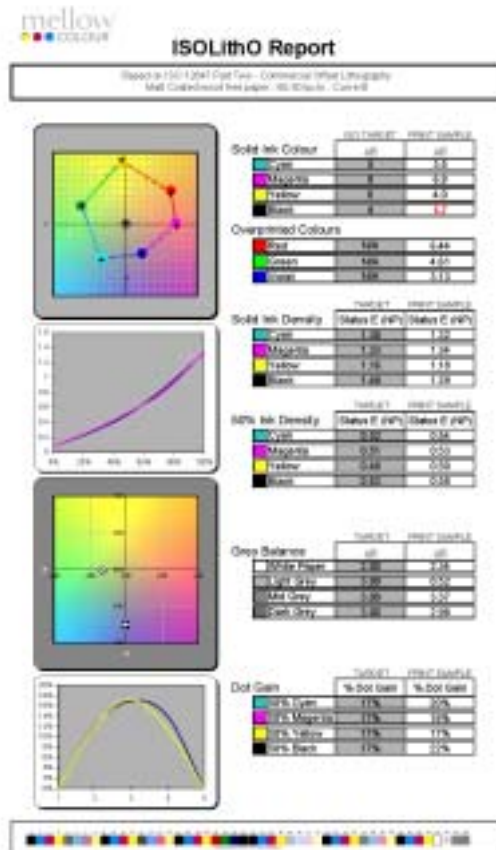
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# The ISOLithO Report



# Summary – Using Standards

- Predictability
  - Fidelity of run to proof
  - Specify quality needed
  - Avoid disappointment
- Consistency
  - Measurement - the key
  - Reduce disputes
- Efficiency
  - Fast metrology
  - Faster make-ready
  - Less waste
- Profit
  - Monitor the process
  - Quality price structure

