

## Test Report No: 18 740

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Task: Proof System Certification of "ORIS Color Tuner"

Submitted Material: 6 x 10 Test Targets A3+  
6 x 2 Test Targets A3+ (Repeatability measurement)

Case Workers: Dipl.-Ing. A. Kraushaar, Dr. F. Dolezalek

Enclosed documentation: Attachments A, B, C, D, E

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## 1 Description of the Task

Proof Certification was carried out according to the FOGRA Proof Acceptance Test Criteria.

This report concerns “ORIS Color Tuner” software with the “Epson 4000” and “Canon W2200” printers, each with three different proofing papers. For each media and device combination the standard printing conditions of FOGRA27 were simulated.

The following combinations were tested:

- 1. FOGRA27 on the Epson 4000 with Pearl Proofing Paper
- 2. FOGRA27 on the Epson 4000 with Satin Proofing Paper
- 3. FOGRA27 on the Epson 4000 with Select Proofing Paper
- 4. FOGRA27 on the Canon W2200 with Pearl Proofing Paper
- 5. FOGRA27 on the Canon W2200 with Satin Proofing Paper
- 6. FOGRA27 on the Canon W2200 with Select Proofing Paper

Certification of the proofing system follows the established FOGRA Proof Acceptance Test Criteria (see Attachment A) and with special FOGRA proof test targets (see Attachment B) including the Altona-Test-Suite 1.1.

Certification was carried out under the following climatic conditions:

Temperature: 22.1 °C and relative humidity of 44 %.

## 2 Procedure

- 2.1 Establishment of a Reference Printer Profile (RFP data) for each combination (1 through 6) by the manufacturer. This contains a printer linearization and a match to a printer-specific colour space using the ECI 2002 Test Target.
- 2.2 Calibration (PCF data) by the manufacturer according to the Reference Printer Profile for each printing condition.
- 2.3 Establishment of the colour match (CC data) by the manufacturer with reference to FOGRA27 and each calibration from step 2.2.

- 2.4 Set up of a series of hotfolders by the manufacturer. These hotfolders contain general and print-specific options as well as all relevant parameters for colour correction (Attachment C).

All steps are clearly detailed in Attachments C, D and E. The manufacturer (CGS) was exclusively responsible for the operation of the system throughout these tests.

The FOGRA Proof Test Target was used to generate colorimetric data to analyze:

- The uniformity of solid grey tone areas,
- Fading of the solid colours (CMYK RGB) with time,
- Proof repeatability,
- Paper brightness according to [7],
- The colour accuracy with respect to the FOGRA27 Characterization data (CMYK step wedge)

Further, the reproducibility of vignettes and ISO images was tested under standard lighting conditions. In addition to the FOGRA Proof Test Targets, three pages from the Altona Test Suite 1.1 were used for the Proof Certification, namely “Visual“, “Measure“ and “Technical.”

### 3 Documentation used in the Judgment Process

- [1] ISO 12647-2:2004  
Graphic technology - Process control for the production of half-tone colour separations, proof and production prints - Part 2: Offset processes  
ISO, Geneva, Switzerland
- [2] Dolezalek, F.:  
ProzessStandard Offsetdruck (Process standard offset printing)  
bvdM, Wiesbaden, 2001
- [2a] Ergänzungen zum ProzessStandard Offset (Additions to the ,process standard offset printing')  
Printing and Media Industries Federation (bvdM), Wiesbaden, 2003
- [3] Media Wedge  
Printing and Media Industries Federation (bvdM), 2004
- [4] Altona Test Suite 1.1  
Application Kit

www.eci.org

- [5] ISO 15930-6:2003  
Graphic Technology -- Prepress digital data exchange using PDF -- Part 6:  
Complete exchange of printing data suitable for colour-managed workflows  
ISO, Geneva, Switzerland
- [6] Dolezalek, F.:  
Wie prüft man einen digitalen Prüfdruck auf Farbrichtigkeit? (How to test the  
correctness of colour on a digital proof )  
Bezug: [www.fogra.org](http://www.fogra.org) / Dienstleistungen / Prüfdrucke und Prüfdrucksysteme
- [7] ISO 8257-1:2003  
Paper and Board – Determination of Brightness - Part 1: Measurement with a  
75° converging light beam TAPPI-Procedure  
ISO, Geneva, Switzerland

#### 4 System Configuration

Tables 1 through 3 describe the significant features of the tested Proof System.

Feature	Proof printer 1	Proof printer 2
<b>Proof printer</b>	Epson 4000	Canon W2200
Serial number	000614	CABC 01330
Plant number	Not known.	Not known.
Proof printer type	Inkjet printer	Inkjet printer
Proof printer driver	Epson 5.32	Canon Garo 2.10
Management Software	ORIS Color Tuner 5.1	ORIS Color Tuner 5.1
Release (RIP)	5.06	5.06
Operating System	Windows XP	Windows XP
RIP description	ORIS Color Tuner	ORIS Color Tuner
RIP number (dongle)	U3250	U3248

**Table 1: System description**

Material	Substrate 1	Substrate 2	Substrate 3
Paper type	Pearl	Select	Satin
Paper construction	Not known	Not known	Not known
Paper mass per area:	185g/m <sup>2</sup>	190g/m <sup>2</sup>	200g/m <sup>2</sup>
Printing direction	Not known	Not known	Not known

Table 2: Proofing substrates

	Ink
Epson 4000	Epson UltraChrome ink was used on the Epson 4000 printer
Canon W2200	CGS LLE (Long Life Extended) ink was used on the Canon W2200 printer

Table 3: Inks

Note to proofer calibration:

The calibration of the tested devices was carried out exclusively by the manufacturer (CGS) using a Gretag Macbeth ICColor and according to the user manual (Attachment D).

To interpret the PDF document (“Visual”) a special colour (“Orange”) had to be specified. This was accomplished by using the alternative CMYK values contained in the document for translation (CMYK: 1, 72, 88, 0). The definition of the special colours (My\_Red, My\_Blue) in the Test Target “Technical” was accomplished by the primaries CMYK: 0, 100, 100, 0 and CMYK: 100, 0, 0, 0 respectively.

## 5 Results

### 5.1 Colour Accuracy / Proof Print Simulation

Proofing simulation was produced to the following profile:

- FOGRA27-ISOCoated.icc

(Offset, 60/cm halftone screen, semi-matte coated paper (PT 1/2), positive acting plate copy)


Table 4 shows the results of the proofing simulation for each media and device combination. The values are derived from the Ugra/FOGRA test target CMYK 2.0.

	$\Delta E$ Max	$\Delta E$ Primaries.	$\Delta E$ Average	$\Delta E$ Paper	Passed?
1	3.5	1.7	1.4	0.9	OK
2	3.1	1.1	1.3	0.6	OK
3	3.4	1.6	1.4	1.1	OK
4	2.1	2.2	1.1	1.2	OK
5	1.9	1.8	1.0	0.7	OK
6	3.3	2.3	1.3	0.7	OK

**Table 4: The results of the proofing simulation for each media and device combination.**

The values for all combinations of media and device show outstanding conformity to the tolerances of the Print Media Standard Media Wedge 2004 [3]. All tested combinations are therefore certified to fulfill the proofing standards of FOGRA 27.

## 5.2 Fading of the solid tonal values CMYK and RGB

In order to measure the fading of the solid tonal values, the proofs were measured colorimetrically at a series of elapsed time intervals (5 min, 10 min, 20 min, 30, 45 min, 60 min, 120 min and 24 h). The proofs were measured on a Gretag Macbeth Spectrolino supplied by CGS (Serial no. 14252) and on white backing material [6]. Table 5 shows the results of colour of  primary and secondary colours measured at 30 min and then again at 24 hours.

	C	M	Y	K	R	G	B	Tolerance	Result
1	0.76	0.75	0.38	0.52	0.37	0.50	0.70	1	OK
2	0.92	0.41	0.83	0.21	0.34	0.42	0.36	1	OK
3	0.89	0.37	0.19	0.23	0.28	0.40	0.39	1	OK
4	0.27	0.57	0.55	0.22	0.29	0.87	0.92	1	OK
5	0.28	0.34	0.57	0.04	0.17	0.62	0.74	1	OK
6	0.54	0.52	0.65	0.39	0.27	0.69	0.84	1	OK

Table 5: Solid colour fading measured as  $\Delta E$  between 30 min and 24 h.

Therefore it can be said that the colour values after 24h are the same as the colour values 30 min after printing.

### 5.3 Vignettes

Proofs of the Vignette Test Target 8 were visually tested for banding. All vignettes were smooth and uniform and showed no signs of banding or tone reversal.

### 5.4 Reproducibility of the solid tonal values CMYK RGB

Table 6 shows the results of the test of the reproducibility of solid tonal values CMYK RGB. On two separate days Test Targets 2 and 3 were printed and colorimetrically measured. All the tested combination of media and printer showed good reproducibility (less than  $\Delta E$  1.5).

	C	M	Y	K	R	G	B	Tol.	Res.
1	0.76	0.54	0.38	0.36	0.65	0.49	0.83	1.5	OK
2	0.26	0.41	0.72	0.20	0.68	0.48	0.24	1.5	OK
3	0.46	0.58	1.10	0.14	0.27	0.46	0.56	1.5	OK
4	0.69	0.30	0.79	0.15	0.29	1.50	0.76	1.5	OK
5	0.28	0.70	1.09	0.35	0.08	0.90	0.53	1.5	OK
6	0.84	0.71	0.93	0.21	0.56	1.42	1.01	1.5	OK

Table 6: Reproducibility; Colour deviation ( $\Delta E$ ) between different printers (24 h).

### 5.5 Uniformity (Grey solid areas)

Solid Grey Test Target 1 was used to evaluate every media and device combination and was measured spectrophotometrically using “Image Control” from Heidelberg (>1000 points). Table 7 shows the average grey tone L.a.b. values, standard deviation and maximum  $\Delta E$ . The tonal variation lies well within the tolerance of  $\Delta E$  3.5.

	Average values			$\sigma_{L^*}$	$\sigma_{L^*}$	$\sigma_{L^*}$	Max $\Delta E$	Tol.	result
	$L^*$	$a^*$	$b^*$						
1	65.26	-0.19	-3.06	0.23	0.21	0.30	1.37	3.5	OK
2	65.36	-0.21	-3.08	0.25	0.30	0.44	1.76	3.5	OK
3	65.19	0.01	-2.96	0.26	0.35	0.50	1.97	3.5	OK
4	64.73	-0.46	-2.95	0.32	0.29	0.35	1.68	3.5	OK
5	64.94	-0.51	-3.34	0.27	0.27	0.32	1.81	3.5	OK
6	64.48	-1.75	-2.92	0.27	0.22	0.35	1.36	3.5	OK

Table. 7: Overview: Uniformity of the grey solid tones.

### 5.6 ISO 300 images

The visual colour match and the accuracy of reproduction of the ISO 300 images of Test Target 6 were assessed under standard lighting conditions. No noticeable differences were seen.

### 5.7 Brightness measured to ISO 8254-1 (TAPPI)

The various paper types were evaluated against TAPPI-Brightness [7] using System Lehmann Brightness measuring equipment. The evaluation conforms to [1] with an extended tolerance of 10 %.



Paper	Brightness	ISO-value	Paper	Tolerance	Result
	%	%	Type	%	
Pearl	59.4	65	1	$\pm 10$	OK
Select	57.6	65	1	$\pm 10$	OK
Satin	60	65	1	$\pm 10$	OK

**Table 8: Brightness and conformity in comparison to PT1.**

The brightness values conform to the nominal values of [1], but with an extended tolerance of  $\pm 10$ . Therefore all the tested papers are suitable for the simulation of paper type 1.

## 6 Conclusions

The “ORIS Color Tuner” Proofing System comprising the “Epson 4000” and “Canon W2200” printers, each with three different paper types (“Pearl”, “Select”, “Satin”), was tested against the FOGRA Proof Acceptance Test Criteria. The six media and device combinations have fulfilled the following criteria very well:

- The uniformity of solid grey tone areas,
- Fading of the solid colours (CMYK RGB) with time,
- Proof repeatability,
- Paper brightness according to [7],
- The colour accuracy with respect to the FOGRA27 Characterization Data (CMYK media wedge)

The evaluation of the Ugra/FOGRA Media Wedge CMYK 2.0 has shown that the ORIS Proof System produces proofs that comply with the tested printing conditions. A purchaser of this system can therefore be assured that other printing conditions that have smaller colour gamuts (e.g. FOGRA28) will also be sufficiently simulated, however the appropriate simulation of the printing stock brightness will need to be taken into account.

The Proofing System as tested therefore fulfilled all of the necessary Certification.

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## Attachment A

### Test Criteria


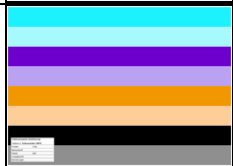
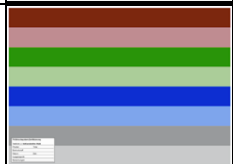
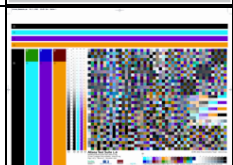
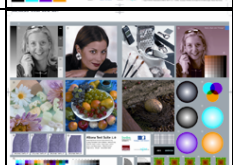

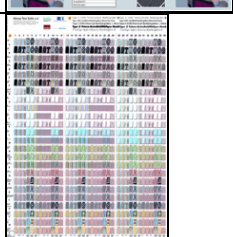
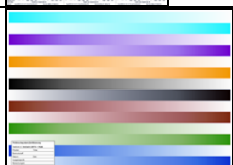
#### Measurements performed by the Manufacturer

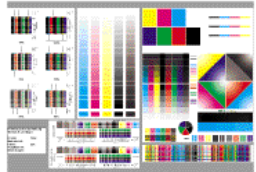
- *Fading of the Solid Colours:* Solid colour values after 24 h should be within  $\Delta E=1$  of those measured at 30min after printing.
- *Repeatability:* CMYKRGB colour variance may not exceed  $\Delta E=1.5$ .

#### Measurements performed by FOGRA

- *Ugra/FOGRA Media Wedge CMYK 2.0:*
  - Colour variations between the nominal values of the characterisation table and the measured values must not exceed the following:
    - on the average over all patches: 4
    - as a maximum: 10
    - for the primary colours CMY: 5
    - for the substrate: 3
- *Uniformity across the test target:* Colour variation across Test Target 1 must not exceed  $\Delta E = 3,5$
- *Brightness:* Brightness[7] must lie within 10% of the corresponding tolerance.

**Attachment B, Description of the Proof Acceptance Test Target**

<b>Test Target 1: Solid Grey</b> The test target consists of a solid grey tone area (C 40%, M 30%, Y 30%, K 0%)		
<b>Test Target 2: Solid strips CMYK</b> The test target consists of full tone (100%) and half tone (50%) strips each of Cyan, Magenta, Yellow and Black.		
<b>Test Target 3: Solid strips RGB</b> The test target consists of full tone (100%) and half tone (50%) strips each of Red (M+Y), Green (C+Y) and Blue (C+M) as well as one equal tone grey (140 R, 140 G, 140 B)		
<b>Test Target 4: Altona Test Suite 1.1 “Measure”</b> See the Altona Test Suit documentation for details.		
<b>Test Target 5: Altona Test Suite 1.1 “Visual”</b> See the Altona Test Suit documentation for details.		
<b>Test Target 6: ISO-Images</b> The test target consists of several ISO-images on a grey-scale background (C 20%, M 12%, Y 12%, K 0%) and includes the Ugra/FOGRA-Media Wedges CMYK V 2.0 and CIELAB V 1.1		
<b>Test Target 7: Altona Test Suite 1.1 “Technical”</b>		
<b>Test Target 8: Vignettes CMYK and RGB</b>		

<b>Test Target 9:</b> Test elements to determine ink and paper specific criteria (“bleeding“, “bronzing”)	
<b>Test Target 10:</b> Machine and paper independent test elements to evaluate the correct application of ICC profiles and rendering intents.	