Fogra Multicolor Forum 2018

https://www.fogra.org/MulticolorForum/

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Agenda

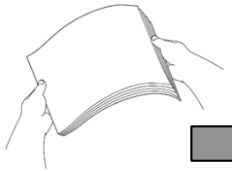
1. Idea and Aim
2. Procedure
3. Ranking and Evaluation
4. Presentation of results
5. Organisational aspects
6. Partners

1. Idea and Aim

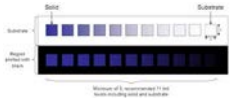
- Show the potential of state of the art multicolour solutions
  1. Characterising
  2. Proofing
  3. Spectral Prediction
  4. Separation of images
  5. Separation of spot colour
- Use actual print samples (wet offset) under controlled environments
- Rely on agreed upon procedure among participants
- Use Fogra as independent platform for planing, organising and showcasing

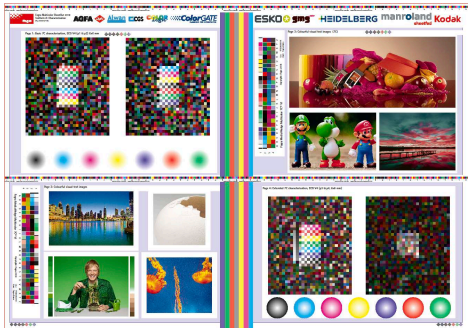
2. Workflow

KCMYVOG



+ KCMYOGB





Print Testform A
(Characterisation)

Submit to participants

- print samples, Testform (PDF) and M1 measurements (4200 patches ECG V4)
- Testform B (RGB + Spots)
- CxF/X-4b for Blue72

Submit PDF (B_{AGFA}, B_{CGS} etc.), spectral predictions and Proofs to Fogra

Fogra composes Testform C

Print Testform C
(Separated RGB+Spots)

No „winner“ but presentation of results (table)

Colour Management Café

Presentation of results + Webpage
(German/English)

21.8.2018 — 17.9.2018 — Oct. 4th — t

2. Printing Condition

man roland sheetfed press
wet on wet

Colorant designation:

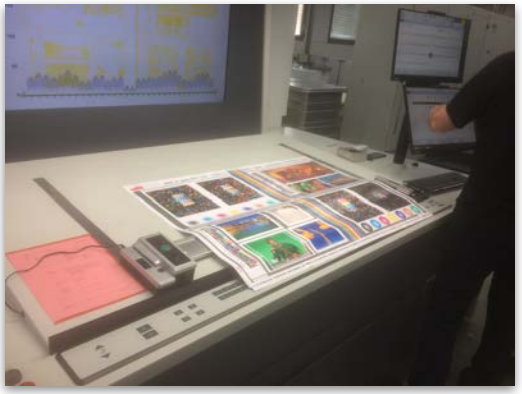
7CLR_1 - Cyan
7CLR_2 - Magenta
7CLR_3 - Yellow
7CLR_4 - Black
7CLR_5 - Orange 21C
7CLR_6 - Green C
7CLR_7 - Violet C / Blue 72

Sequence: KCMYVOG

Screening: 70/C

Screen angle:
K = 45°
Cyan = 15°
Magenta = 75°
Yellow = 0°
Violet (as Black) = 45°
Orange (as Cyan) = 15°
Green (as Magenta) = 75°

2. Printing press: man roland evolution



Reference Print
KCMYVOG

- Incredible PANTONE Violet C+U

Spectral Prediction Print
KCMYOGB

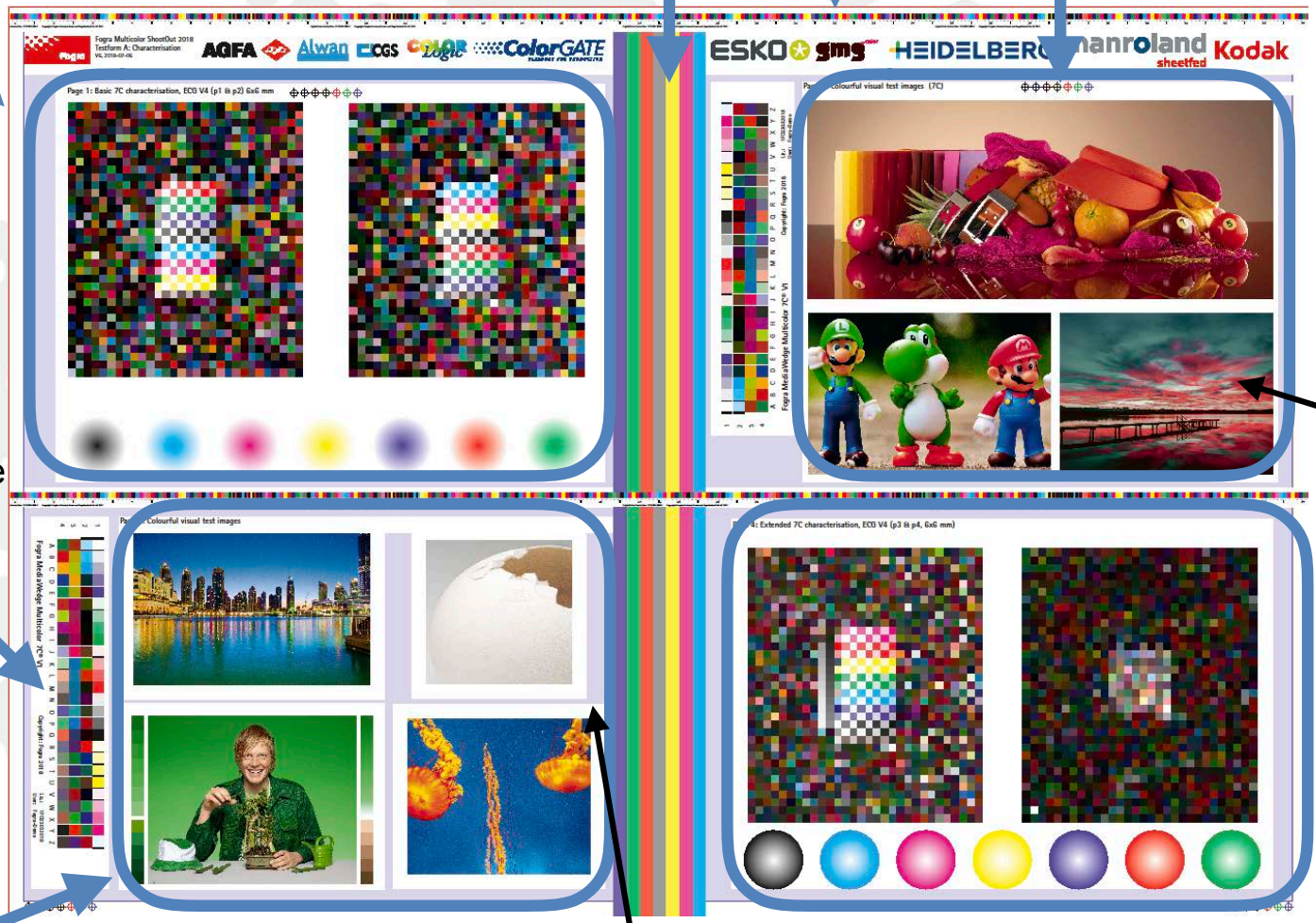
- Incredible Rapide Cofree Schwarz (43 RP250)
- Incredible Rapide Cofree Cyan
- Incredible Rapide Cofree Magenta
- Incredible Rapide Cofree Gelb
- Incredible PANTONE Green C+U
- Incredible PANTONE Orange 021 C+U
- SunChemical INTENSE Blue 072 B26400 NPS 72

2. Testform A: Characterisation

Technical Elements for print control

Page 1: ECG V4 pages 1&2

8C print control strip



Page 3: High Chroma 7C test images

OGV-only separation

Fogra MediaWedge MultiColor 7C

Page 2: High Chroma 7C test images

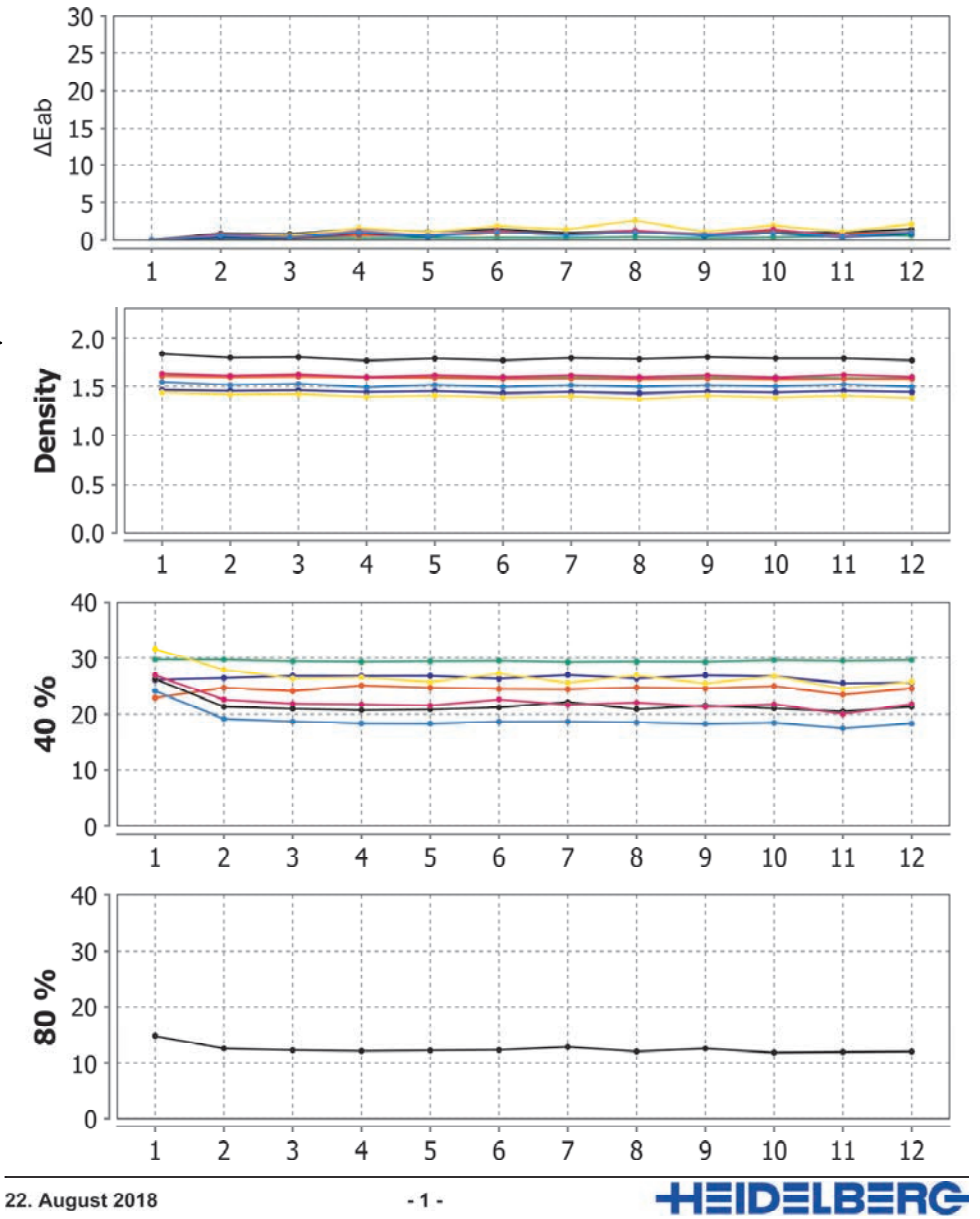
CMYK separation

Page 4: ECG V4 pages 3&4

2. Testform A: Print Evaluation

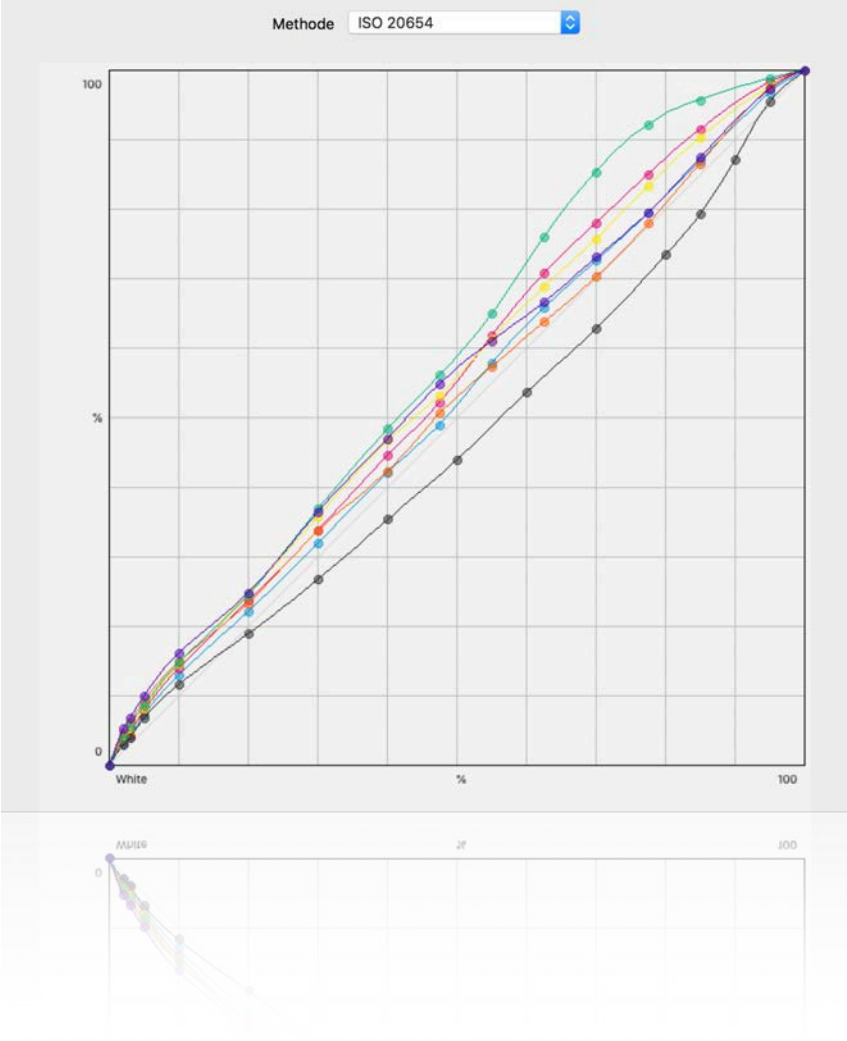
- Print run: 400 (evaluation based on 30 selected sequential prints)
- Samples will be sent to Fogra after print of testform B (to be printed on September 17th)
- approx. 30 samples per participant (if requested)
- print stability quite good - see evaluation
- see sheet ID and status in attached XLS

ID	Comments	Media Wedge measured	ECG-V4 measured	sheet has been cut
1	scatches		Yes	Yes
2	Measurement		Yes	Yes
3	AGFA			
4	AGFA			
5	Measurement		Yes	Yes
6	ALWAN			
7	ALWAN			
8	Measurement		Yes	Yes
9	CGS			
10	CGS			
11	Measurement		Yes	Yes
12	ColorLogic			
13	ColorLogic			
14	Measurement		Yes	Yes
15	ColorGate			
16	ColorGate			
17	Measurement		Yes	Yes
18	Measurement		Yes	Yes
19	Measurement		Yes	Yes
20	ESKO			
21	ESKO			
22	Measurement		Yes	Yes
23	GMG			
24	GMG			
25	Measurement		Yes	Yes
26	Heidelberg			
27	Heidelberg			
28	Measurement		Yes	Yes
29	KODAK			
30	KODAK			

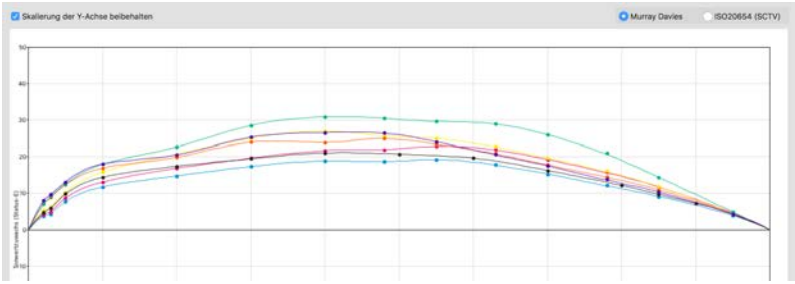


2. Testform A: Print Evaluation

tonal response close to linear SCTV

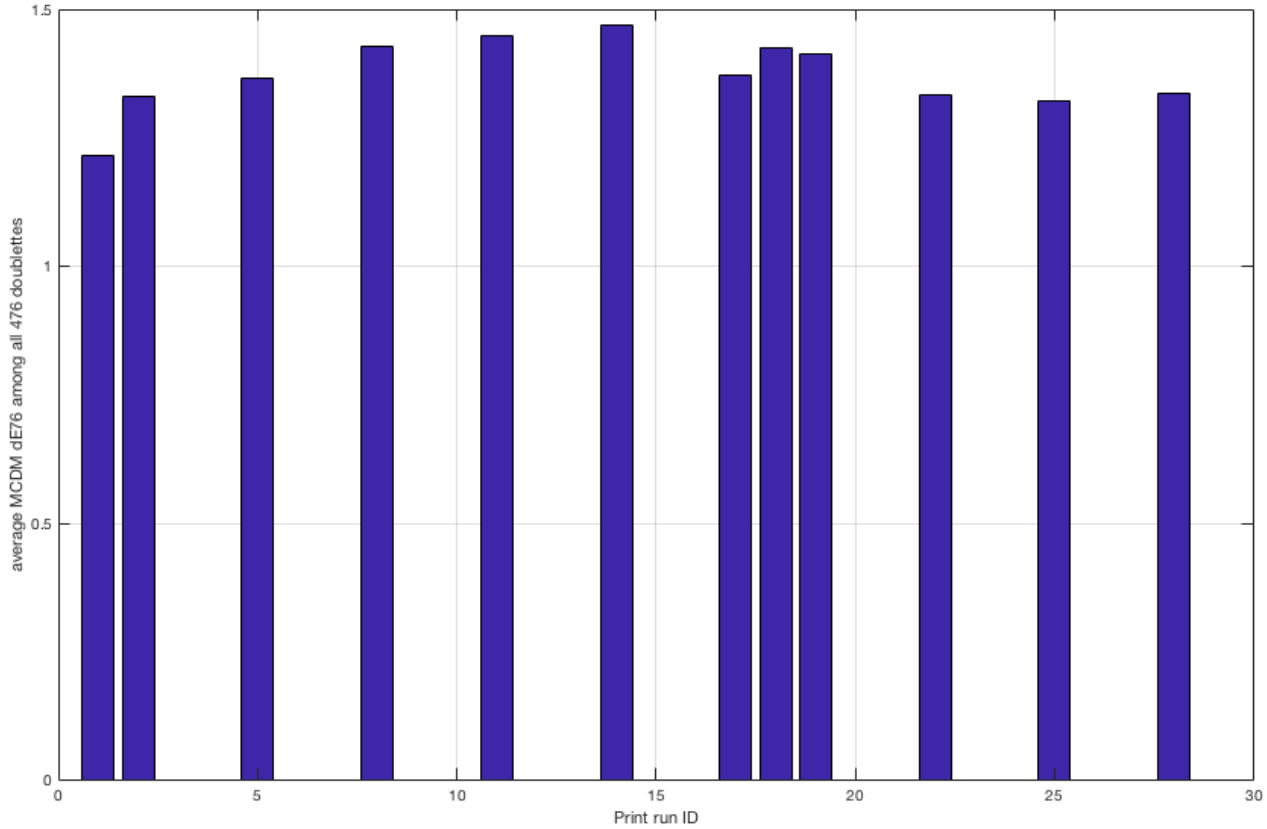


„old“ TVI graph



2. Testform A: Print uniformity

- Print run: 400 (evaluation based on 30 selected sequential prints)
- Print run uniformity quite good (Dmax/Dmin <= 10% for all colours)
- 476 doublets within the 4200 tone values patches (2, 3, 4 and 8 occurrences)
- for all 476 doublets the mean colour difference of mean (ΔE76) has been calculated per sheet
- for each sheet the 476 MCDM-values have been averaged again to get a figure of merit for uniformity



2. Testform B: RGB + Spots

Technical Elements for print control

Page 1: Spot colours (solids)

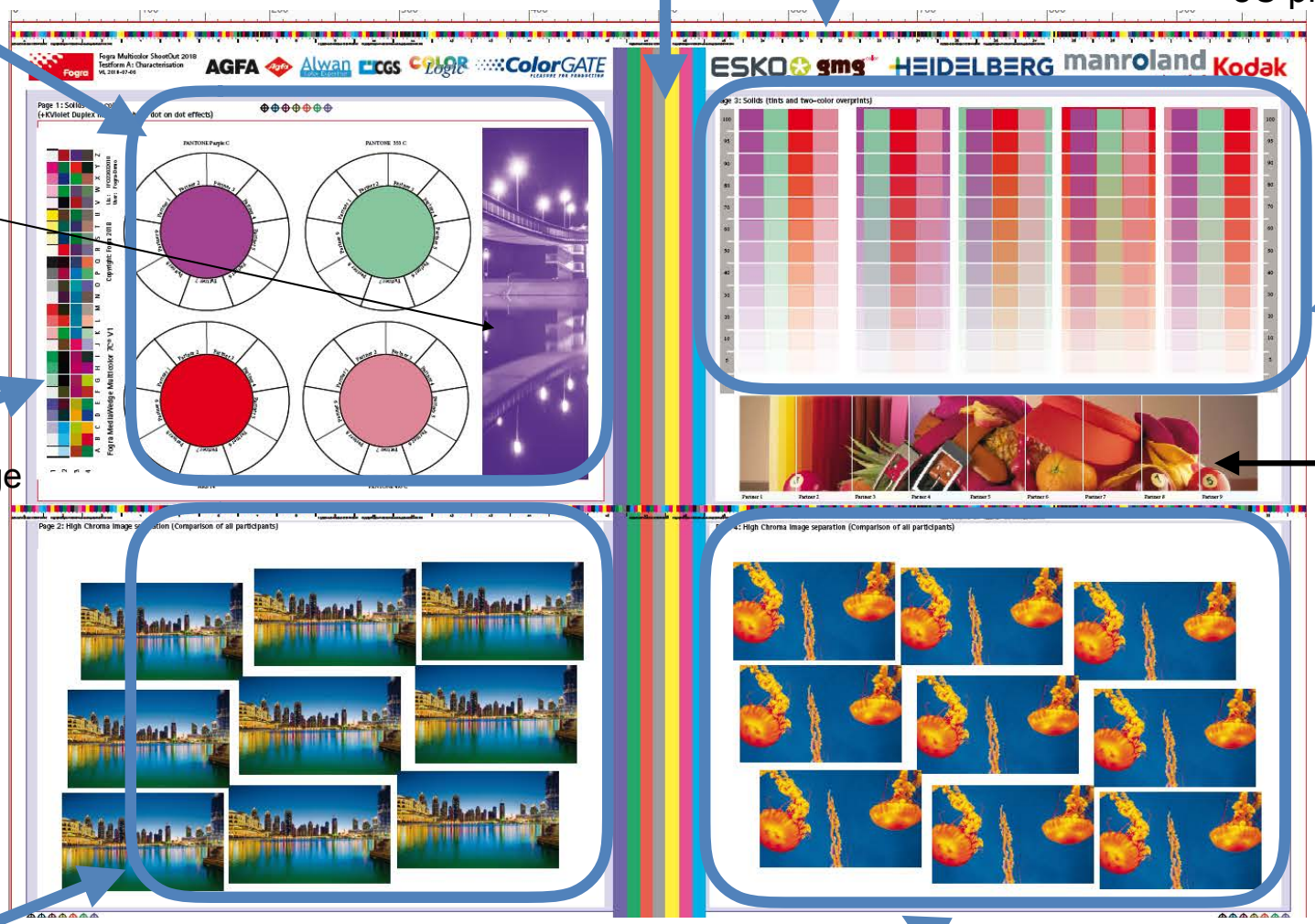
8C print control strip

Duplex image for checking moiré pattern (Black + Violet)

Page 3: Solids (tints + 2C overprints)

Fogra MediaWedge MultiColor 7C

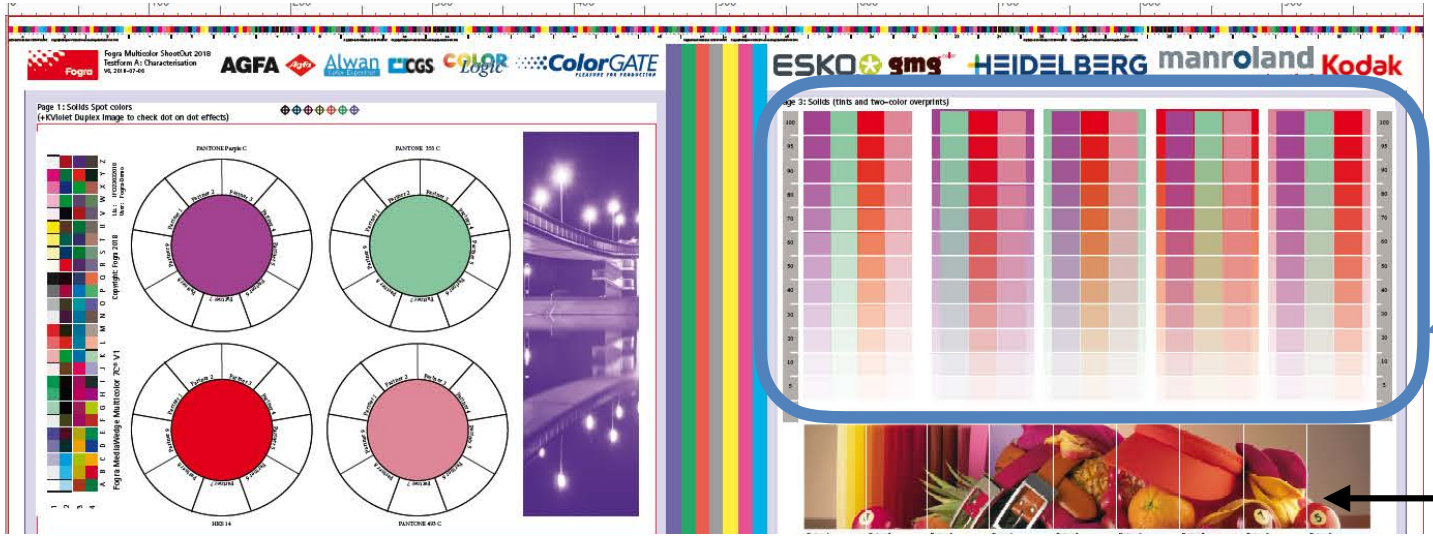
Landscape image, where separations from parti. are put next to each other



Page 2: high chroma visual test images (9 participants)

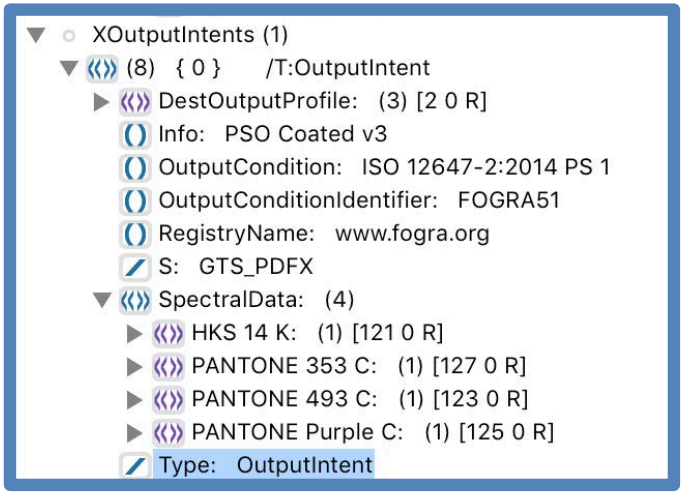
Page 4: high chroma visual test images (9 participants)

2. Testform B: RGB + Spots



Page 3: Solids (tints + 2C overprints)

- Print order of used spots:
  - 1. HKS 14 K, 2. P353 C, 3. P493 C and 4. Purple C.
  - Required to predict spot colour overprints (which are only informative in this test)
- Rendering Spot colour ramps is not defined
  - it is recommended to use linear SCTV behaviour



2. Testform B: Spot colour references

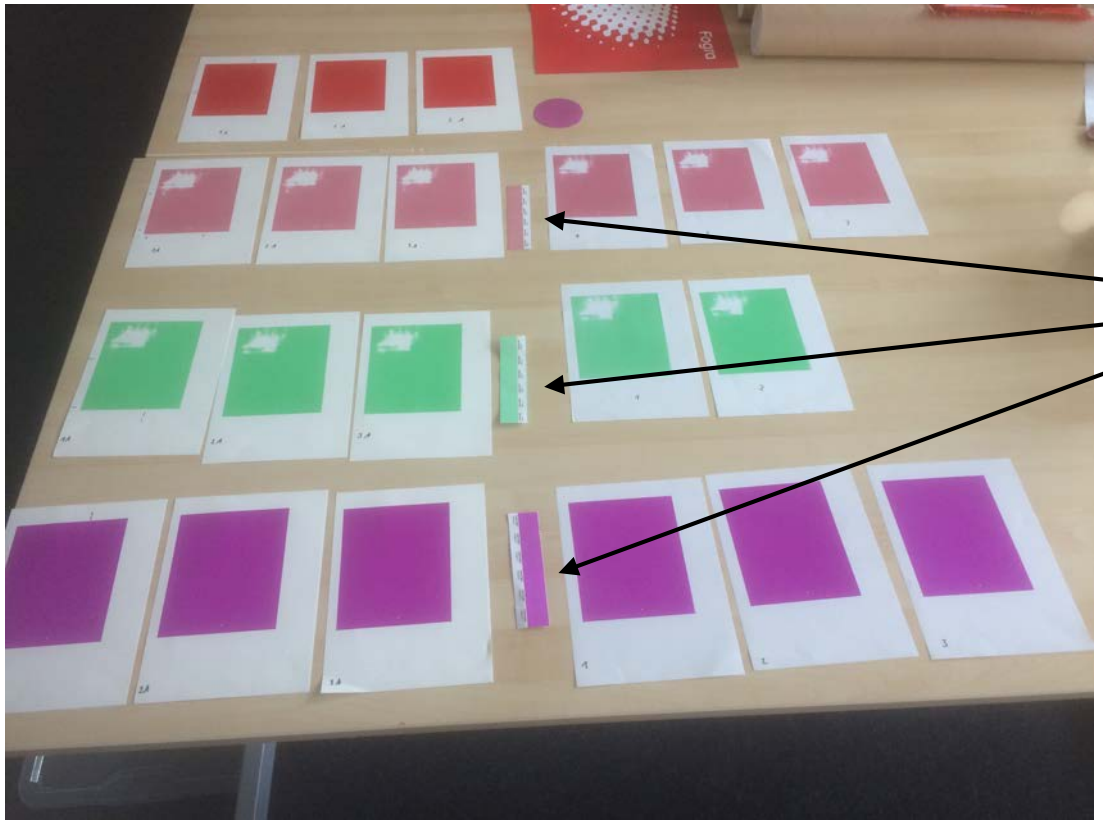
- Spots have been printed by huber group on two substrates (Apco replacement termed „C2846“ and MaxiGloss)
- 3 prints („1“, „2“ and „3“ and „1A“, „2A“ and „3A“ ➡️ A stands for Apco), HKS 14 only on 2846
- Prints on OBA-free 2846 has been used (uniform parts)
- Later a circle (radius = 7 cm) will be used for reference

HKS 14 K

P493 C

P253 C

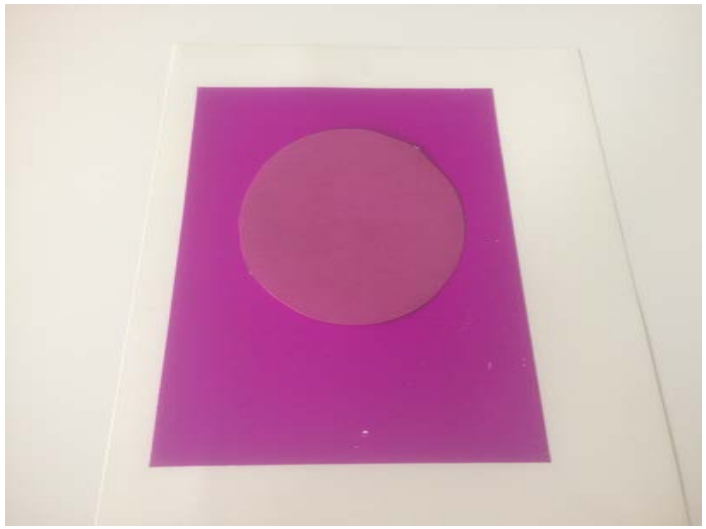
P Purple C



Pantone swatch book samples

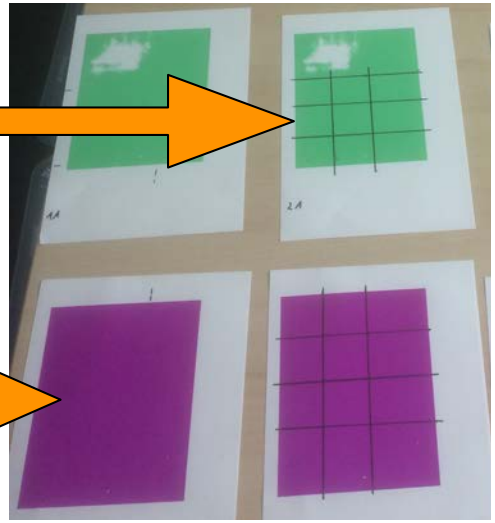
on 2846 paper on Maxigloss

2. Testform B: Spot colour references



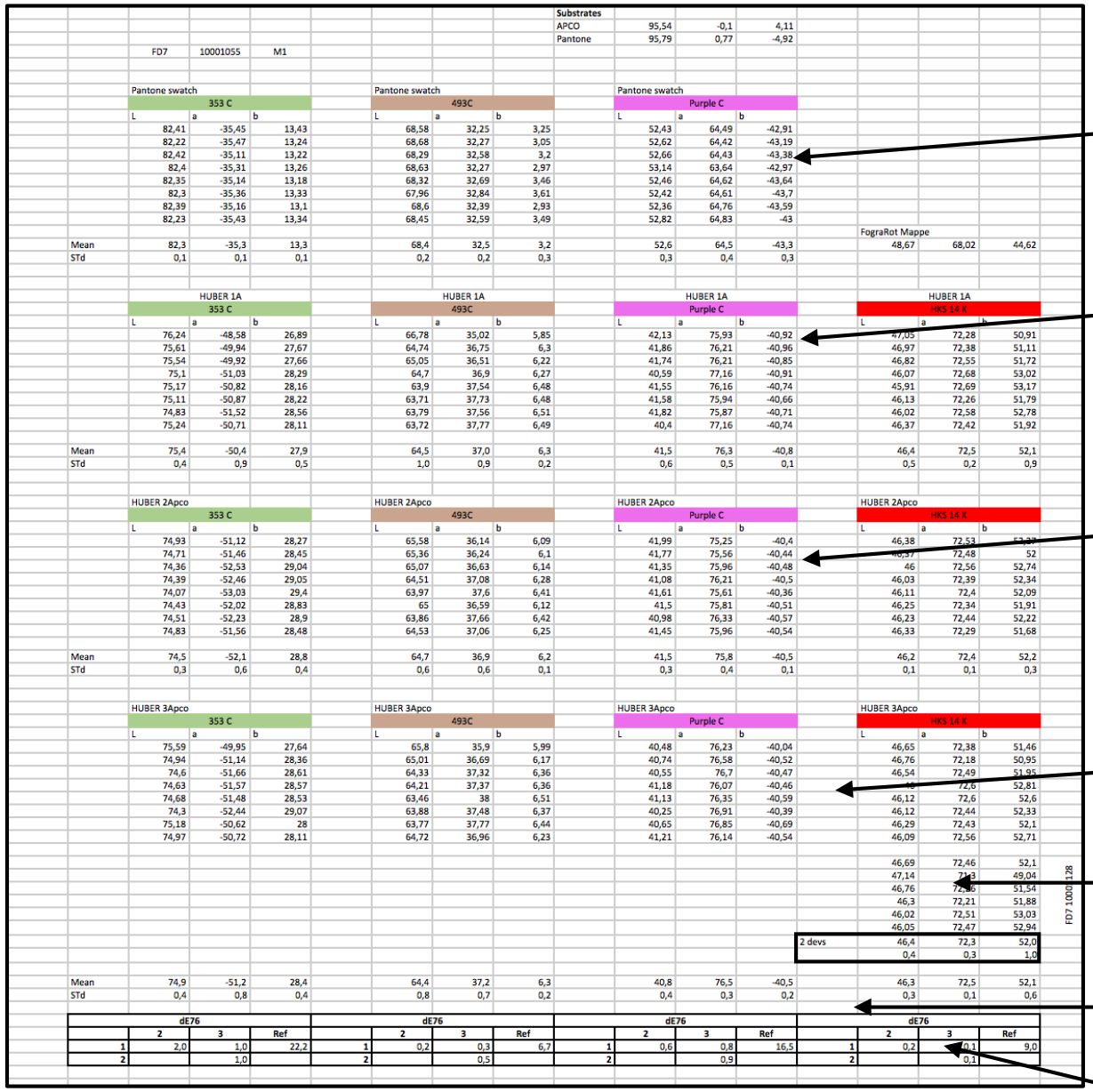
Samples sent to 9 participants

Reference used for Café on Oct. 4th



2 examples

2. Testform B: Spot colour uniformity (XLS)



Substrates			
APCO	95,54	-0,1	4,11
Pantone	95,79	0,77	-4,92

FD7 10001055 M1

Pantone swatch 353 C

	L	a	b
	82,41	-35,45	13,43
	82,22	-35,47	13,24
	82,42	-35,11	13,22
	82,4	-35,31	13,26
	82,35	-35,14	13,18
	82,3	-35,36	13,33
	82,39	-35,16	13,1
	82,23	-35,43	13,34
Mean	82,3	-35,3	13,3
STd	0,1	0,1	0,1

Pantone swatch 493C

	L	a	b
	68,58	32,25	3,25
	68,68	32,27	3,05
	68,29	32,58	3,2
	68,63	32,27	2,97
	68,32	32,69	3,46
	67,96	32,84	3,61
	68,6	32,39	2,93
	68,45	32,59	3,49
Mean	68,4	32,5	3,2
STd	0,2	0,2	0,3

Pantone swatch Purple C

	L	a	b
	52,43	64,49	-42,91
	52,62	64,42	-43,19
	52,66	64,43	-43,38
	53,14	63,64	-42,97
	52,46	64,62	-43,64
	52,42	64,61	-43,7
	52,36	64,76	-43,59
	52,82	64,83	-43
Mean	52,6	64,5	-43,3
STd	0,3	0,4	0,3

FograRot Mappe: 48,67 | 68,02 | 44,62

HUBER 1A 353 C

	L	a	b
	76,24	-48,58	26,89
	75,61	-49,94	27,67
	75,54	-49,92	27,66
	75,1	-51,03	28,29
	75,17	-50,82	28,16
	75,11	-50,87	28,22
	74,83	-51,52	28,56
	75,24	-50,71	28,11
Mean	75,4	-50,4	27,9
STd	0,4	0,9	0,5

HUBER 1A 493C

	L	a	b
	66,78	35,02	5,85
	64,74	36,75	6,3
	65,05	36,51	6,22
	64,7	36,9	6,27
	63,9	37,54	6,48
	63,71	37,73	6,48
	63,79	37,56	6,51
	63,72	37,77	6,49
Mean	64,5	37,0	6,3
STd	1,0	0,9	0,2

HUBER 1A Purple C

	L	a	b
	42,13	75,93	-40,92
	41,86	76,21	-40,96
	41,74	76,21	-40,85
	40,59	77,16	-40,91
	41,55	76,16	-40,74
	41,58	75,94	-40,66
	41,82	75,87	-40,71
	40,4	77,16	-40,74
Mean	41,5	76,3	-40,8
STd	0,6	0,5	0,1

HUBER 1A HKS 14 K

	L	a	b
	47,05	72,28	50,91
	46,97	72,38	51,11
	46,82	72,55	51,72
	46,07	72,68	53,02
	45,91	72,69	53,17
	46,13	72,26	51,79
	46,02	72,58	52,78
	46,37	72,42	51,92
Mean	46,4	72,5	52,1
STd	0,5	0,2	0,9

HUBER 2Apco 353 C

	L	a	b
	74,93	-51,12	28,27
	74,71	-51,46	28,45
	74,36	-52,53	29,04
	74,39	-52,46	29,05
	74,07	-53,03	29,4
	74,43	-52,02	28,83
	74,51	-52,23	28,9
	74,83	-51,56	28,48
Mean	74,5	-52,1	28,8
STd	0,3	0,6	0,4

HUBER 2Apco 493C

	L	a	b
	65,58	36,14	6,09
	65,36	36,24	6,1
	65,07	36,63	6,14
	64,51	37,08	6,28
	63,97	37,6	6,41
	65	36,59	6,12
	63,86	37,66	6,42
	64,53	37,06	6,25
Mean	64,7	36,9	6,2
STd	0,6	0,6	0,1

HUBER 2Apco Purple C

	L	a	b
	41,99	75,25	-40,4
	41,77	75,56	-40,44
	41,35	75,96	-40,48
	41,08	76,21	-40,5
	41,61	75,61	-40,36
	41,5	75,81	-40,51
	40,98	76,33	-40,57
	41,45	75,96	-40,54
Mean	41,5	75,8	-40,5
STd	0,3	0,4	0,1

HUBER 2Apco HKS 14 K

	L	a	b
	46,38	72,53	53,27
	46,51	72,48	52
	46	72,56	52,74
	46,03	72,39	52,34
	46,11	72,4	52,09
	46,25	72,34	51,91
	46,23	72,44	52,22
	46,33	72,29	51,68
Mean	46,2	72,4	52,2
STd	0,1	0,1	0,3

HUBER 3Apco 353 C

	L	a	b
	75,59	-49,95	27,64
	74,94	-51,14	28,36
	74,6	-51,66	28,61
	74,63	-51,57	28,57
	74,68	-51,48	28,53
	74,3	-52,44	29,07
	75,18	-50,62	28
	74,97	-50,72	28,11
Mean	74,9	-51,2	28,4
STd	0,4	0,8	0,4

HUBER 3Apco 493C

	L	a	b
	65,8	35,9	5,99
	65,01	36,69	6,17
	64,33	37,32	6,36
	64,21	37,37	6,36
	63,46	38	6,51
	63,88	37,48	6,37
	63,77	37,77	6,44
	64,72	36,96	6,23
Mean	64,4	37,2	6,3
STd	0,8	0,7	0,2

HUBER 3Apco Purple C

	L	a	b
	40,48	76,23	-40,04
	40,74	76,58	-40,52
	40,55	76,7	-40,47
	41,18	76,07	-40,46
	41,13	76,35	-40,59
	40,25	76,91	-40,39
	40,65	76,85	-40,69
	41,21	76,14	-40,54
Mean	40,8	76,5	-40,5
STd	0,4	0,3	0,2

HUBER 3Apco HKS 14 K

	L	a	b
	46,65	72,38	51,46
	46,76	72,18	50,95
	46,54	72,49	51,95
	46	72,6	52,81
	46,12	72,6	52,6
	46,12	72,44	52,33
	46,29	72,43	52,1
	46,09	72,56	52,71
	46,69	72,46	52,1
	47,14	71,3	49,04
	46,76	72,46	51,54
	46,3	72,21	51,88
	46,02	72,51	53,03
	46,05	72,47	52,94
2 devs	46,4	72,3	52,0
	0,4	0,3	1,0
Mean	46,3	72,5	52,1
STd	0,3	0,1	0,6

FD7 10001128

dE76

	2	3	Ref
1	2,0	1,0	22,2
2		1,0	

	2	3	Ref
1	0,2	0,3	6,7
2		0,5	

	2	3	Ref
1	0,6	0,8	16,5
2		0,9	

	2	3	Ref
1	0,2	0,1	9,0
2		0,1	

Pantone samples

Huber samples 1A

Huber samples 2A

Huber samples 3A

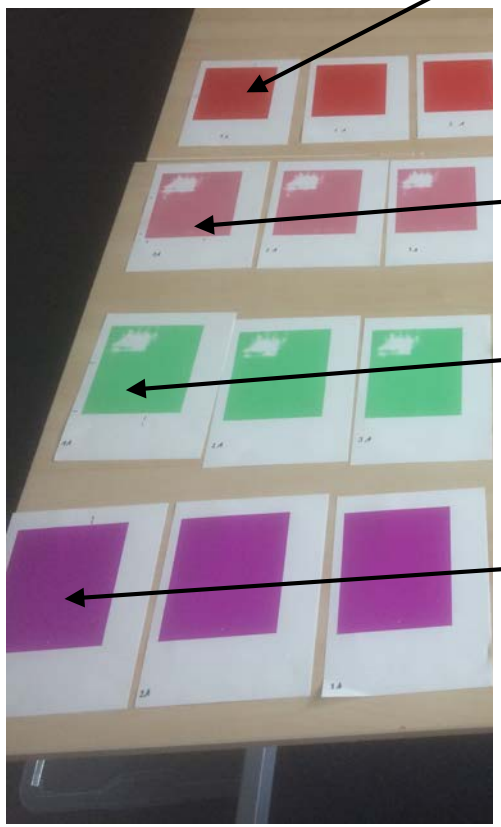
Different FD7

Average values

Comparison „each with each“

2. Testform B: Spot colour uniformity (XLS)

Spectral readings for final spot reference
(average of 10 measurements)



MultiColor_2018_HKS14K_FD7_avg.cxf
MultiColor_2018_PANTONE_PurpleC_FD7_avg.cxf
Multicolor_2018_PANTONE_493C_FD7_avg.cxf
PANTONE 353C.cxf

3. Evaluation & Ranking: 1. Characterisation

- Participants provide a characterisation of the 7C printing process (by means of an ICC profile, if present)
- Fogra evaluates profile statistics (AtoB and BtoA directions)
  - The statistic tests the profile integrity and some profile properties.
  - The profile integrity indicates how precisely a profile converts between the color spaces. The integrity values show as average and maximum deviations.
  - Further statistics (black point etc.)

Results: Table of profile statistics

Display: Nothing special - but participants can show details on their table

3. Evaluation & Ranking: 2. Proofing

- Proof the 7C PDF according to the provided KCYMYVOG printing condition
- Add your licensed Fogra MediaWedge Multicolor 7C
- Measure both MediaWedges and compare average against reference (Fogra measurement of „A“ being available for all participants - 104 MediaWedge 7C patches)
- ISO 12647-7 evaluation schema (measuring reference and actual with the same device ➡️ Konica Minolta FD7)
- Provide proof label if possible (show Multicolor capability of your proofing QA-software)

Results: Table of ISO 12647-7:2016 proof tolerances

Display: Show proof to print matches at Fogra foyer
(daylight but there is one ISO 3664 cabinet namely Just LED station)

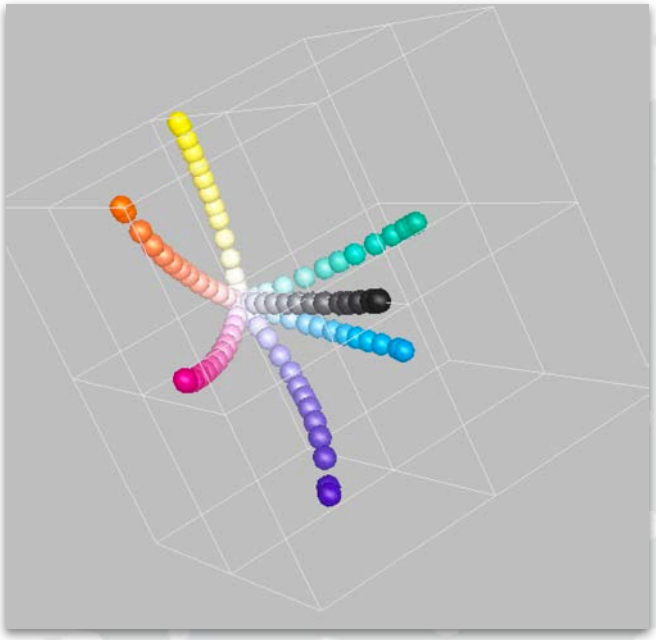
3. Evaluation & Ranking: 3. Spectral Prediction

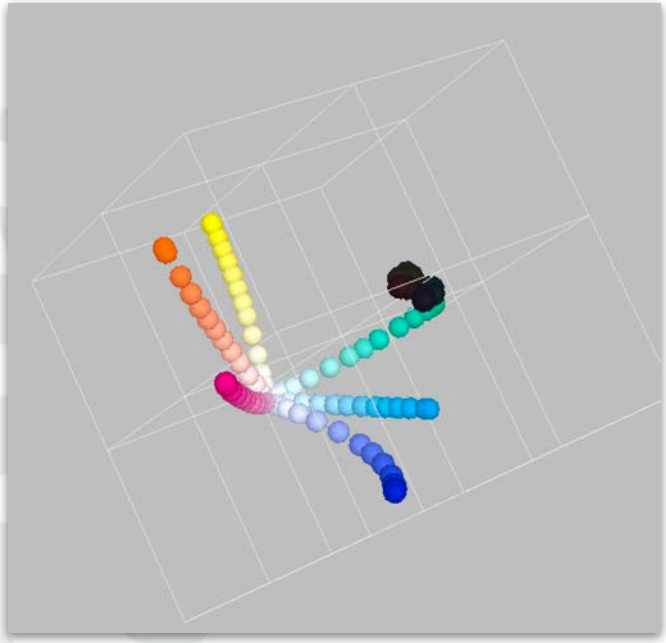
- After the reference print KCMYVOG additional prints will be made by replacing the 5th unit (violet) with the 8th unit (using Pantone Blue 72)
- That leads to KCMYOGB prints of Testform A (they will stay at Fogra)
- From these prints the tint ramp (Blue 72) will be extracted and provided as CxF/X-4b data
- Participants provide the full ECGV4 grid for the new KCMYOGB printing condition
- Only the 1650 tone value combinations that use violet (Blue) - 7CLR_7 - will be used for colorimetrical evaluation
- Evaluation against M1 measurement of KCMYOGB prints (full ECG V4)

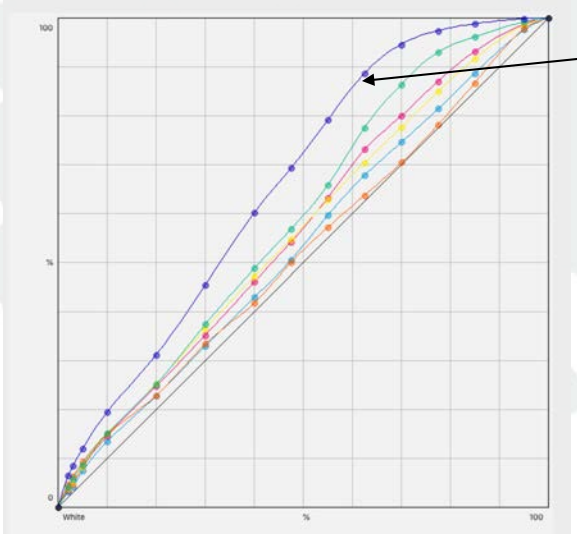
Results: Table of colorimetrical accuracy (min, max, median)

Display: Participants are invited to also proof testform A with respect to KCMYOGB printing condition (This is an option)

3. Evaluation & Ranking: 3. Spectral Prediction



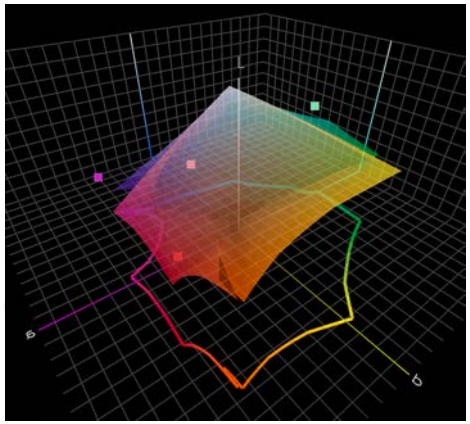




tone response for Blue 072 C
„TVI“ not linear :-(
but that is reality, hence a good practical test

MultColor2018_ShootOut_TonalRamp_Blue72C_avg.cxf

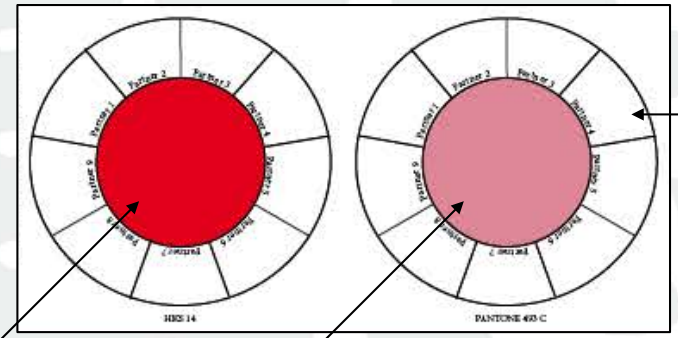
3. Evaluation & Ranking: 4. Separation of Spots



- Participants receive from Fogra Testform B „RGB +Spots“
- 4 spot colours are used
  - 2 out of gamut: PANTONE Purple C and PANTONE 353 C
  - 2 within gamut: HKS 14 and Pantone 493 C
- Spectral reflectance values of physical samples (to be used at Fogra) will be provided (M1, FD7) - it is subject for discussion to use one reference for all or individual samples per participant (that any participant has access to the physical reference being used for final presentation)
- Participants are requested to separate the spot colours to 7C (KCMYVOG) for the closest visual match
- Print samples will also scanned with a 300 dpi scanner and evaluated against graininess ISO/TS 18621-21)

3. Evaluation & Ranking: 4. Separation of Spots

- In addition Testform B contains tint ramps and overprints (each with each = 12 combinations)
- Since there is no reference (Testform B will be printed exactly as Testform A = KCMYVOG) there is no extra test beside visitors see the range of different interpretations
- Participants are invited to proof print their 7C separations



Fogra places 7C separation from each participant manually

physical reference

Results: ΔE00 and graininess values for the 4 spot colours

Display: Visitors see different 7C separations next to original (solids) and optionally different proof prints.

3. Evaluation & Ranking: 5. Separation of images

- Participants receive from Fogra Testform B „RGB +Spots“
- It contains three different high chroma Adobe RGB images
- They should be separated as for normal/default multicolor production printing
- Participants provide the 7C PDF to Fogra
- Fogra composes the different separations into one new PDF Testform C, to be printed as Testform A (KCMYVOG)
- Since Black and Violet are printed dot-on-dot this might lead to unpredictable moire patterns. However if participants use separations containing K and V they achieve a larger gamut in the very dark blue colour space. This is for an AM offset production not considered as industrial typical and should not be used in this test. In order to show potential moiré patterns a K-V-duplex image is added to Testform B. It is planed to fan out the different samples along the print run to show the actual patterns for the specific printing condition used.

Results: No objektive measurements

Display: Prints of Testform C will be shown allowing a side by side comparison among all participants

3. Evaluation & Ranking: Summary

No „winner“, but presentation of results per category (table)

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3. What to deliver?

1) characterisation:
- please send us the 7C ICC profile
- we currently test how to do the test for the "black box based solutions" (so please wait a bit) that are not using ICC profiles

2) proofing:
- please send 4xA3 proofs of the Testform A (cut it on your own :-)
Optional:
- please add your licensed MediaWedge 7C
- please add a proof label (using ISO 12647-7 as is)
- please also proof the Testform B

3) Spectral predcition:
- please submit a measurement file ("CGATS-file“) that contains the spectral reflectance values for the 4200 ECG-V4 tonal combinations for the KCMYOGB printing condition
optional:
- proof testform A for this printing condition

4) separation of spots:
- please provide 7C separations (7C PDF of testform B). It does not need to be a PDF/X5n.
- you might also provide the separations of the 4 spot colours via PSD files or other ways (since we manually fill the „sectors“ here at Fogra to get Testform C)
optional:
- you can proof print (match) the small patches we submitted to you

5) separation of images:
- same as 4: - please provide 7C separations (7C PDF of testform B). It does not need to be a PDF/X5n.

4. Presentation of results

- Presentation in lieu of a colourmanagent Café
- Thursday, October 4th
- Afternoon event from 3 to 6 p.m. + get together
- Introduction talk by Fogra and presenting the rules and findings
- Speakers slots (approx. 5 min for each participants)
- Presentation of test prints at Fogra Foyer
  - One 3664 cabinet showing Testform C & Testform A (+ proofs for all participants)
  - Each participant will get a table to show their solutions
- Panel discussion among participants and observers at the end

5. Organisational aspects

- Participant fee = 1000€ (1430€ for non members)
  - 5 Options (freely selectable, no price difference):
- Visitors will get free entrance and the presentation will be in English language
- The café will be shared also online via GoToWebinar and recorded for later viewing
- Live coverage will be free of charge
- the recording will be part of the Fogra media library (free for Fogra members, non-member get full access for 99€ p.a.).

6. Partners


AGFA
Agfa
Alwan
Color Expertise
CGS
ColorGATE
COLOR
Logic
ESKO
artwork
gmg
color
HEIDELBERG
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manroland
sheetfed