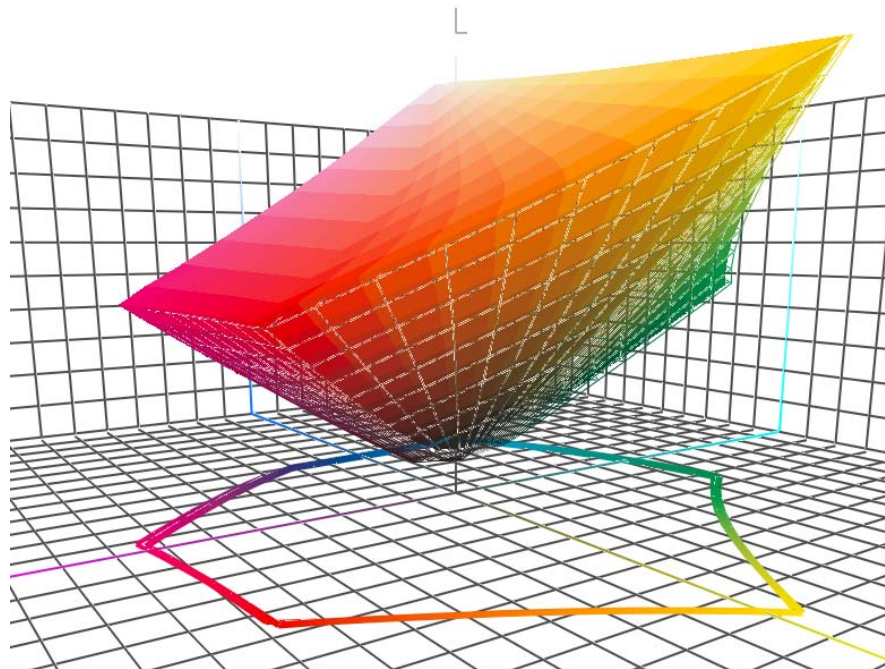


Using standard printing conditions and characterization data



Agenda

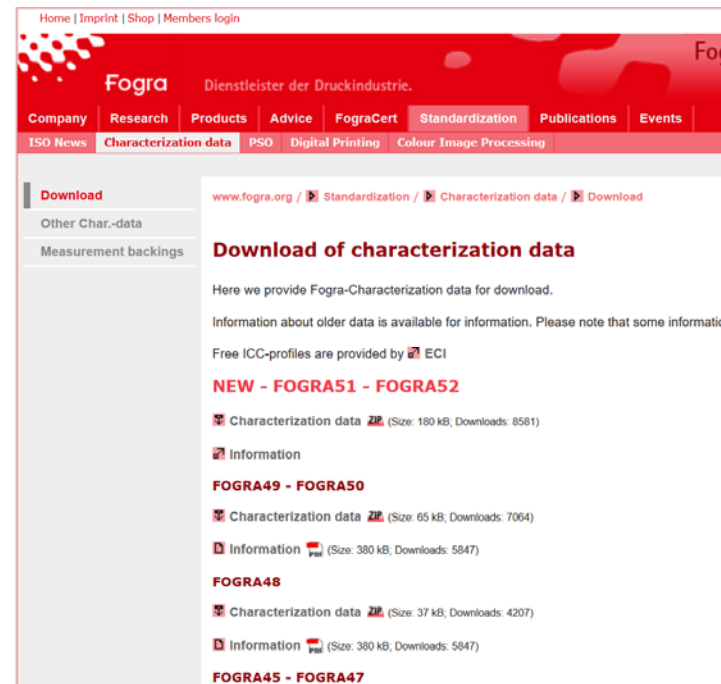
1. The Fogra Institute
2. Fogra-Standards
3. Outlook

1. The Fogra - Institute



Fogra - the service provider for the graphic arts industry for over 60 years

- Applied Research & development
- Expert opinions, Testing & Certification
- Consultancy and Training
- Standardisation**



<https://www.fogra.org/Char.-Data/>

2. Fogra-Standards (characterization data)

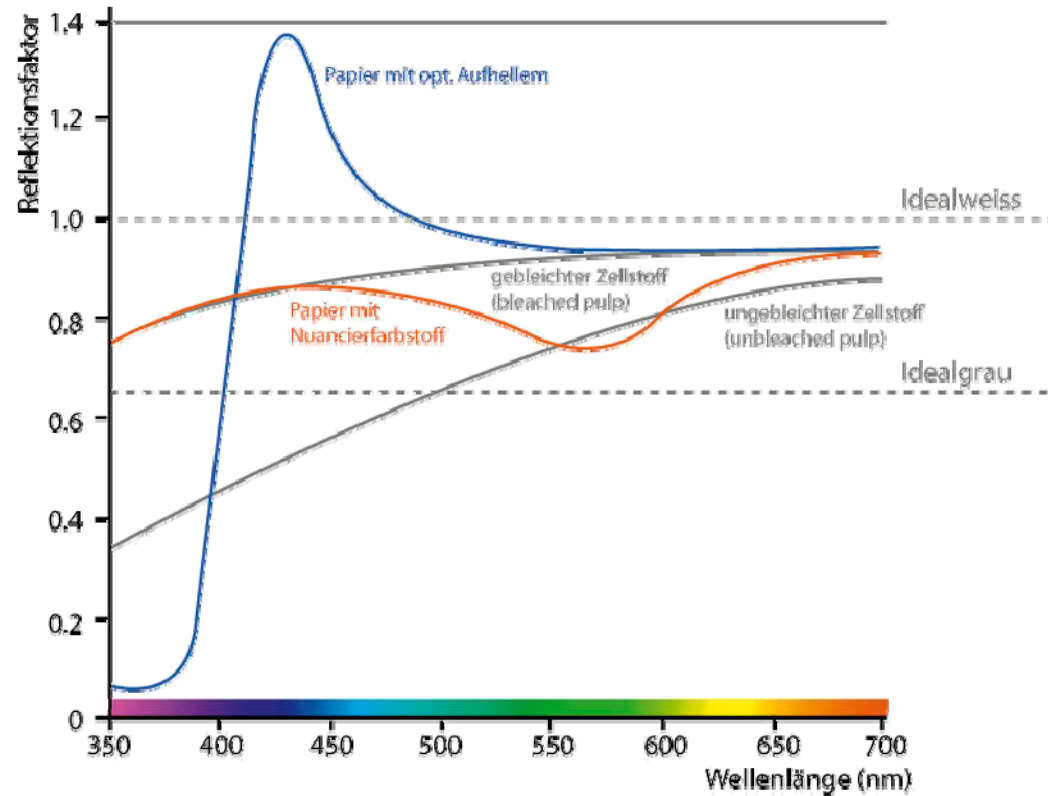
Development of a Fogra-Standard (characterization data) if needed and relevant

Example: FOGRA52 replaces FOGRA47 to allow Proof to Print Match:

Viewing cabinet - "D50"



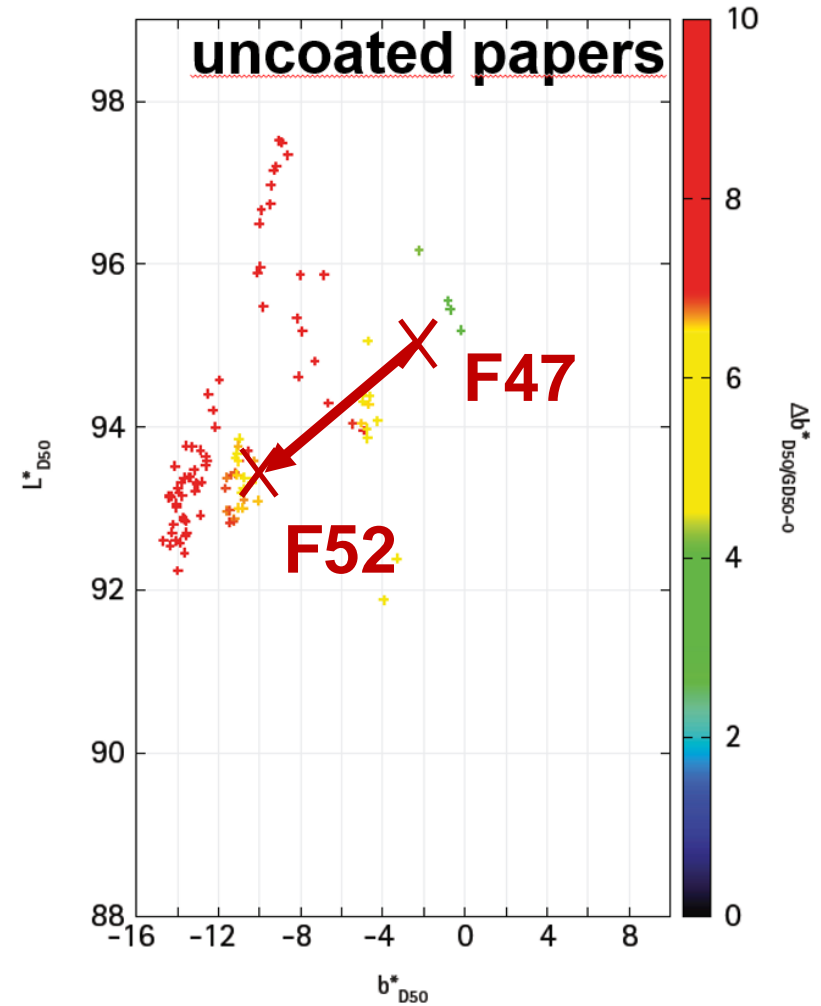
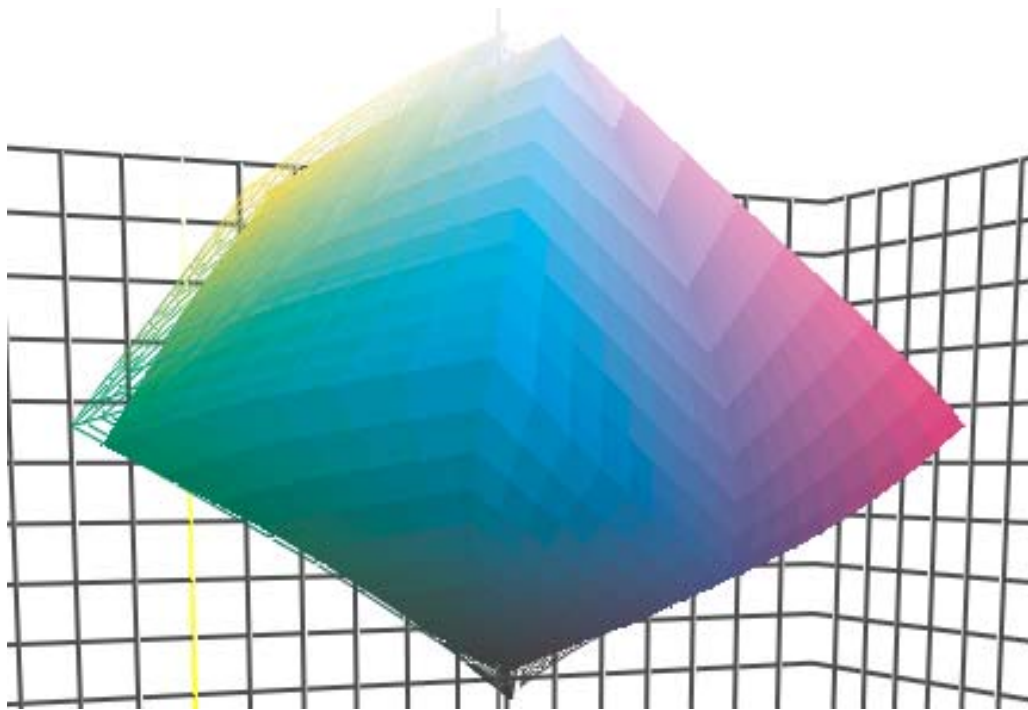
Viewing cabinet - "UV-Only"



2. Fogra-Standards (characterization data)

Development of a Fogra-Standard (characterization data) if needed and relevant

Example: FOGRA52 replaces FOGRA47 to allow Proof to Print Match for uncoated OBA papers:



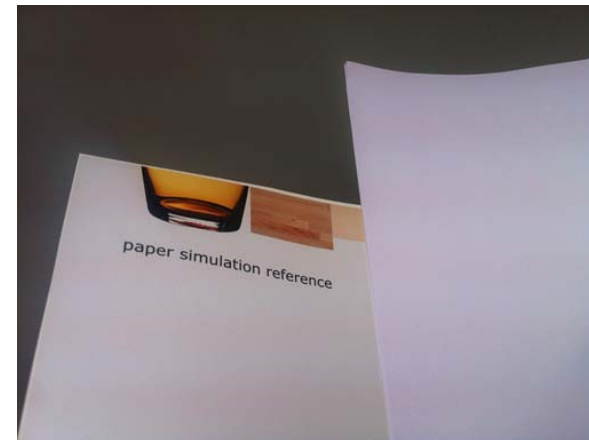
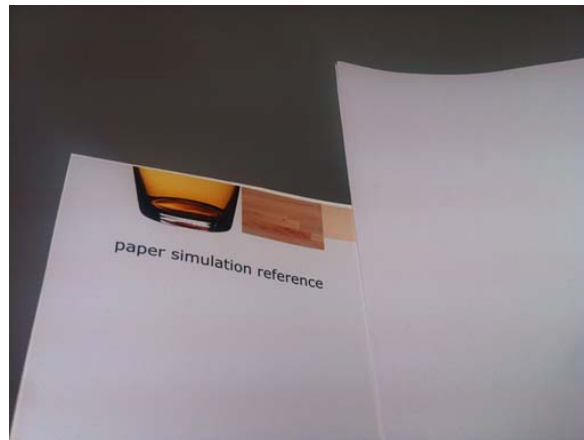
Source: GMG

2. 1. Example F52

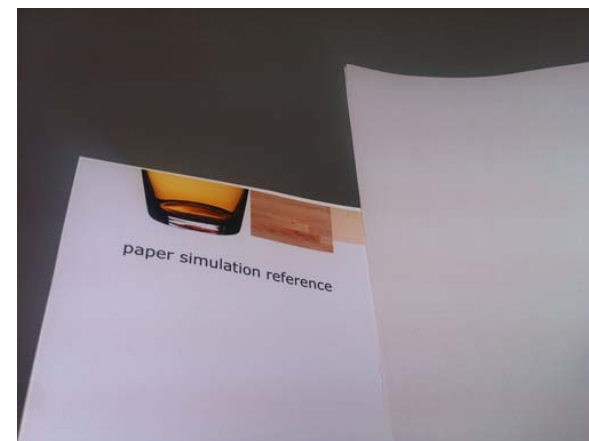
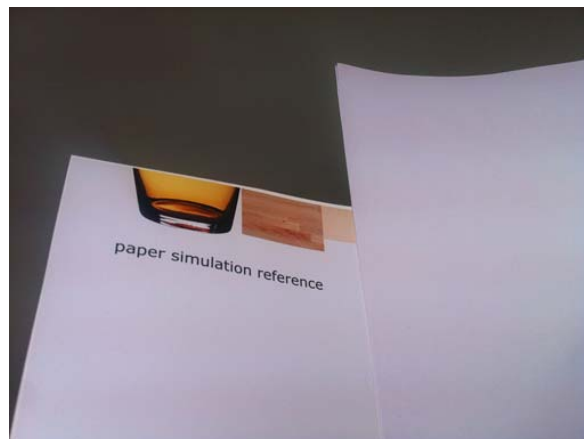
- The gamut of F52 is shifted towards blue ($b = -10$) and therefore allows proof-to-print match
- Consider Measurement (M1 - ISO 13655:2009), viewing conditions (ISO 3664:2009) and OBA-content (ΔB)

Left: Proof – Right: Print

No UV:



UV:



2. 2. Creating characterization data



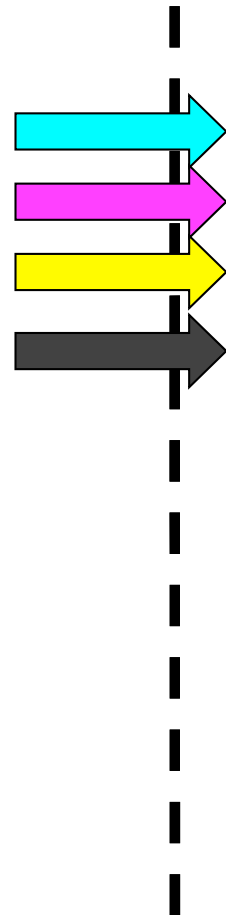
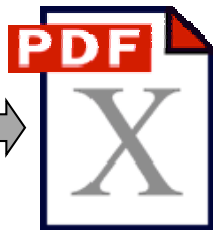
First press then prepress!

prepress

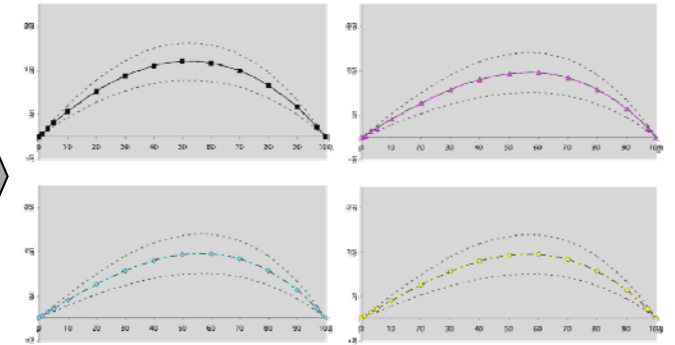
Press [process control]



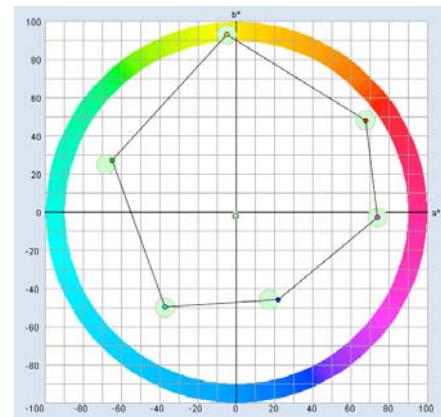
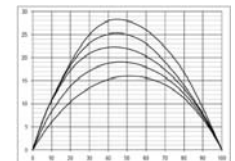
PSOcoated_V2



RIP-curves [1D]



+



= FOGRA51

- Resolution OK?
- Colour Space [CMYK] OK?
- Fonts embedded?
- Interpreting [Transparency, ..]

2. 2. Example

- Request at Fogra: Our customers are very sensitive; We need individual offset-printing conditions for two substrates!
- Both substrates were Wood-free uncoated, therefore FOGRA47 was used as reference data.

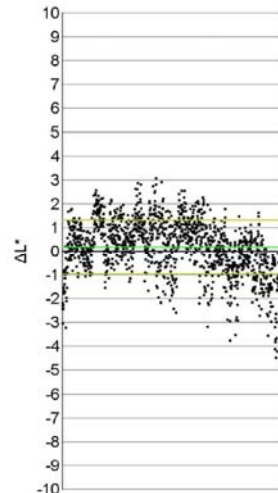
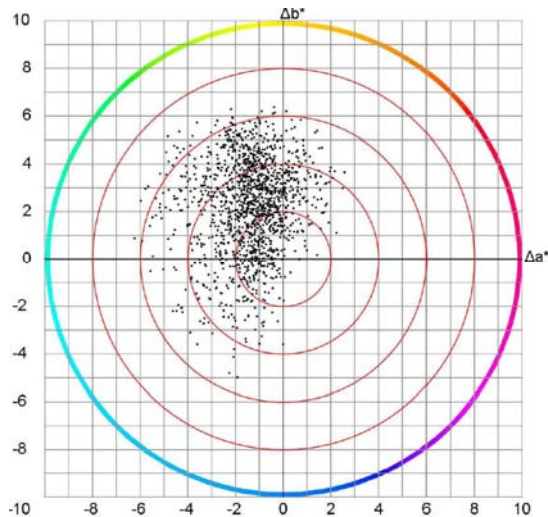
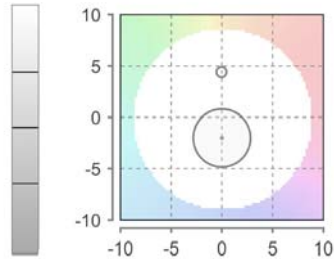
Substrate 1:

Compared to F47:

CIELAB color values (paper)

dEab				6.4
Lab	94.9	-0.0	4.4	

dE00	6.1
dL*	-0.1
dA*	-0.0
dB*	6.4

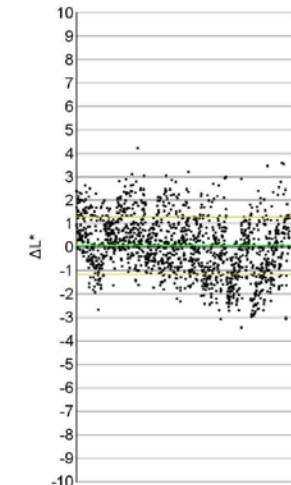
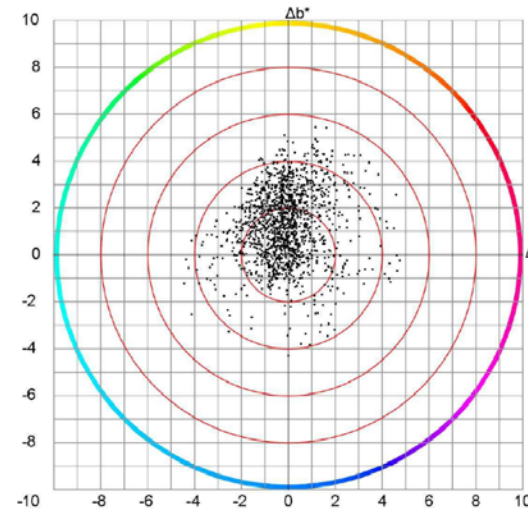
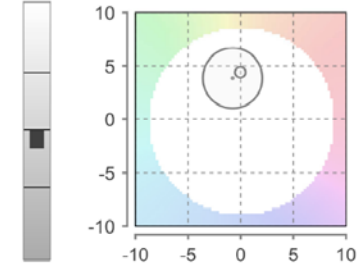


Compared to F30:

CIELAB color values (paper)

dEab				1.3
Lab	94.9	-0.0	4.4	

dE00	1.3
dL*	-1.0
dA*	0.7
dB*	0.5

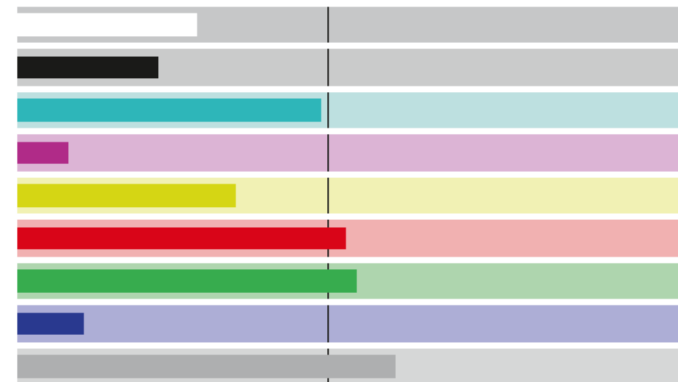


2. 2. Example

Substrate 2:

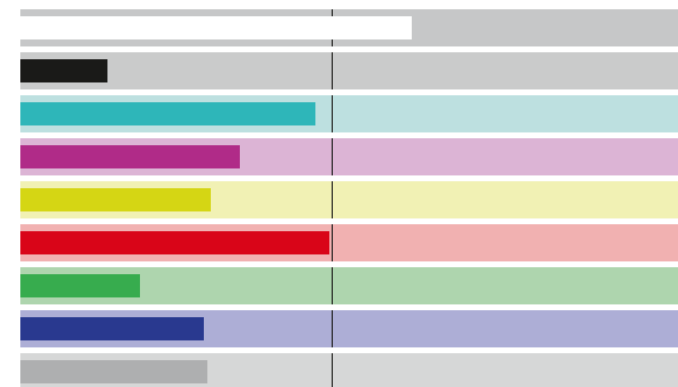
Compared to F47:

	Lab Reference			Lab Comparison			dE*ab
	L*	a*	b*	L*	a*	b*	
Paper	95.01	2.13	-3.94	95.00	-0.01	-1.98	2.91
Black	33.16	1.57	1.36	31.00	1.03	0.98	2.26
Cyan	56.17	-22.98	-44.18	60.00	-25.98	-43.98	4.86
Magenta	56.41	61.36	-1.59	56.00	61.01	-1.00	0.80
Yellow	89.61	-3.00	74.68	89.00	-3.99	78.01	3.53
Red	53.61	59.45	28.86	54.00	55.04	26.02	5.26
Green	50.29	-42.02	10.52	54.00	-44.01	14.01	5.47
Blue	37.15	7.49	-30.60	38.00	7.95	-30.98	1.04
Overprint	33.81	-1.88	-5.74	33.01	-0.00	0.01	6.10



Compared to F52:

	Lab Reference			Lab Comparison			dE*ab
	L*	a*	b*	L*	a*	b*	
Paper	95.01	2.13	-3.94	93.50	2.50	-10.00	6.25
Black	33.16	1.57	1.36	32.69	1.24	0.11	1.38
Cyan	56.17	-22.98	-44.18	58.70	-22.35	-48.12	4.73
Magenta	56.41	61.36	-1.59	54.54	60.07	-4.30	3.54
Yellow	89.61	-3.00	74.68	87.66	-2.65	72.38	3.03
Red	53.61	59.45	28.86	52.59	55.96	25.52	4.94
Green	50.29	-42.02	10.52	51.97	-41.41	11.25	1.93
Blue	37.15	7.49	-30.60	38.47	9.76	-31.96	2.96
Overprint	33.81	-1.88	-5.74	34.61	0.58	-4.25	2.99



2. 2. A case for PSD-tolerances



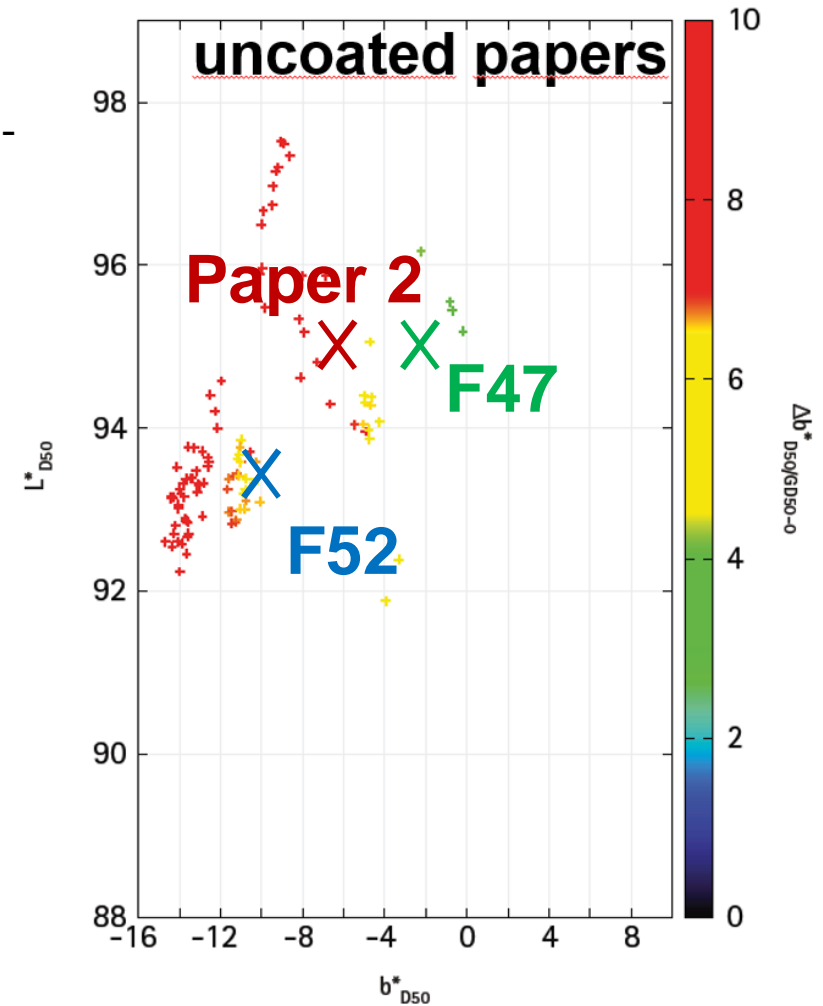
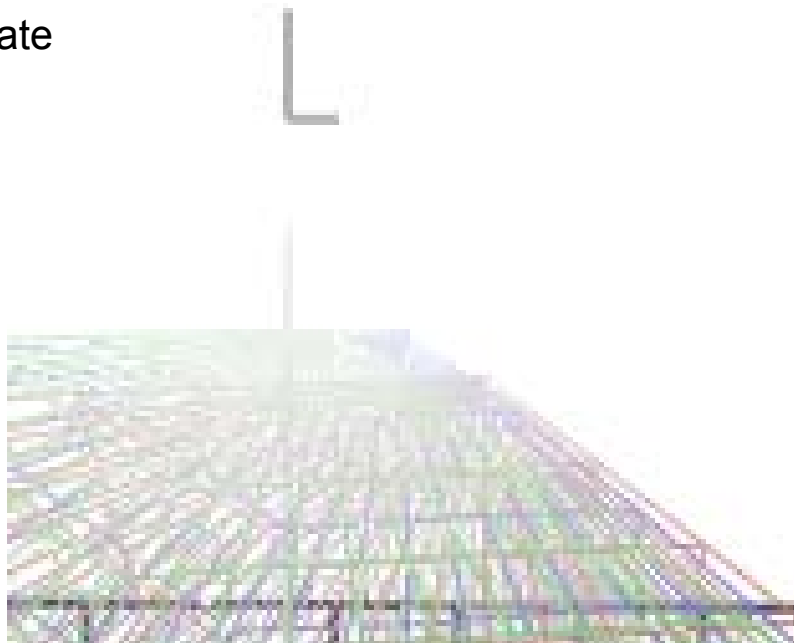
→ PSO only sais inside or outside; PSD on the other hand ...

Colour Accuracy (closeness of match)																										
Use Cases	Side-by-Side			Media Relative																						
	A	B	C	A	B	C																				
commercial printing	→ Tolerances: <table border="1"> <thead> <tr> <th>Patch in digital printing form</th> <th>Quality Type C</th> <th>Quality Type B</th> <th>Quality Type A</th> </tr> </thead> <tbody> <tr> <td>Substrate</td> <td>$\Delta E_{00}^* < 3.5$</td> <td>$\Delta E_{00}^* < 3.5$</td> <td>$\Delta E_{00}^* < 3.5$</td> </tr> </tbody> </table>			Patch in digital printing form	Quality Type C	Quality Type B	Quality Type A	Substrate	$\Delta E_{00}^* < 3.5$	$\Delta E_{00}^* < 3.5$	$\Delta E_{00}^* < 3.5$	→ Tolerances: <table border="1"> <thead> <tr> <th>Patches in digital printing form</th> <th>Quality Type C</th> <th>Quality Type B</th> <th>Quality Type A</th> </tr> </thead> <tbody> <tr> <td>All Patches</td> <td>Average $\Delta E_{00}^* < 6.5$ 95% Quantile $\Delta E_{00}^* < 8.5$</td> <td>Average $\Delta E_{00}^* < 4.5$ 95% Quantile $\Delta E_{00}^* < 6.5$</td> <td>Average $\Delta E_{00}^* < 2.5$ 95% Quantile $\Delta E_{00}^* < 4.5$</td> </tr> <tr> <td>Grey Balance patches*</td> <td>Maximum $\Delta C_h \leq 5.5^b$</td> <td>Maximum $\Delta C_h \leq 4.5^b$</td> <td>Maximum $\Delta C_h \leq 3.5^b$</td> </tr> </tbody> </table> * ΔC_h is explained in chapter 2.3.			Patches in digital printing form	Quality Type C	Quality Type B	Quality Type A	All Patches	Average $\Delta E_{00}^* < 6.5$ 95% Quantile $\Delta E_{00}^* < 8.5$	Average $\Delta E_{00}^* < 4.5$ 95% Quantile $\Delta E_{00}^* < 6.5$	Average $\Delta E_{00}^* < 2.5$ 95% Quantile $\Delta E_{00}^* < 4.5$	Grey Balance patches*	Maximum $\Delta C_h \leq 5.5^b$	Maximum $\Delta C_h \leq 4.5^b$	Maximum $\Delta C_h \leq 3.5^b$
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semi-commercial printing	→ Reproduction of Spot Colours: <table border="1"> <thead> <tr> <th></th> <th>Quality Type C</th> <th>Quality Type B</th> <th>Quality Type A</th> </tr> </thead> <tbody> <tr> <td>Maximum colour difference</td> <td>$\Delta E_{00}^* < 5.5$</td> <td>$\Delta E_{00}^* < 3.5$</td> <td>$\Delta E_{00}^* < 2.5$</td> </tr> </tbody> </table>				Quality Type C	Quality Type B	Quality Type A	Maximum colour difference	$\Delta E_{00}^* < 5.5$	$\Delta E_{00}^* < 3.5$	$\Delta E_{00}^* < 2.5$	→ There is no media-relative evaluation for the reproduction of spot colours.														
	Quality Type C	Quality Type B	Quality Type A																							
Maximum colour difference	$\Delta E_{00}^* < 5.5$	$\Delta E_{00}^* < 3.5$	$\Delta E_{00}^* < 2.5$																							
newspaper like printing	<table border="1"> <thead> <tr> <th></th> <th>Quality Type C</th> <th>Quality Type B</th> <th>Quality Type A</th> </tr> </thead> <tbody> <tr> <td>Maximum colour difference</td> <td>$\Delta E_{00}^* < 5.5$</td> <td>$\Delta E_{00}^* < 3.5$</td> <td>$\Delta E_{00}^* < 2.5$</td> </tr> </tbody> </table>				Quality Type C	Quality Type B	Quality Type A	Maximum colour difference	$\Delta E_{00}^* < 5.5$	$\Delta E_{00}^* < 3.5$	$\Delta E_{00}^* < 2.5$															
	Quality Type C	Quality Type B	Quality Type A																							
Maximum colour difference	$\Delta E_{00}^* < 5.5$	$\Delta E_{00}^* < 3.5$	$\Delta E_{00}^* < 2.5$																							
Image Quality (uniformity, resolution etc)																										
PSD 2016	Visual Inspection																									
Future	Measurements (M-Score, L-Score, P-Score etc) for different use cases ...																									

2. 2. Example

→ Neither F47 nor F52 meet the high standards of the customers:

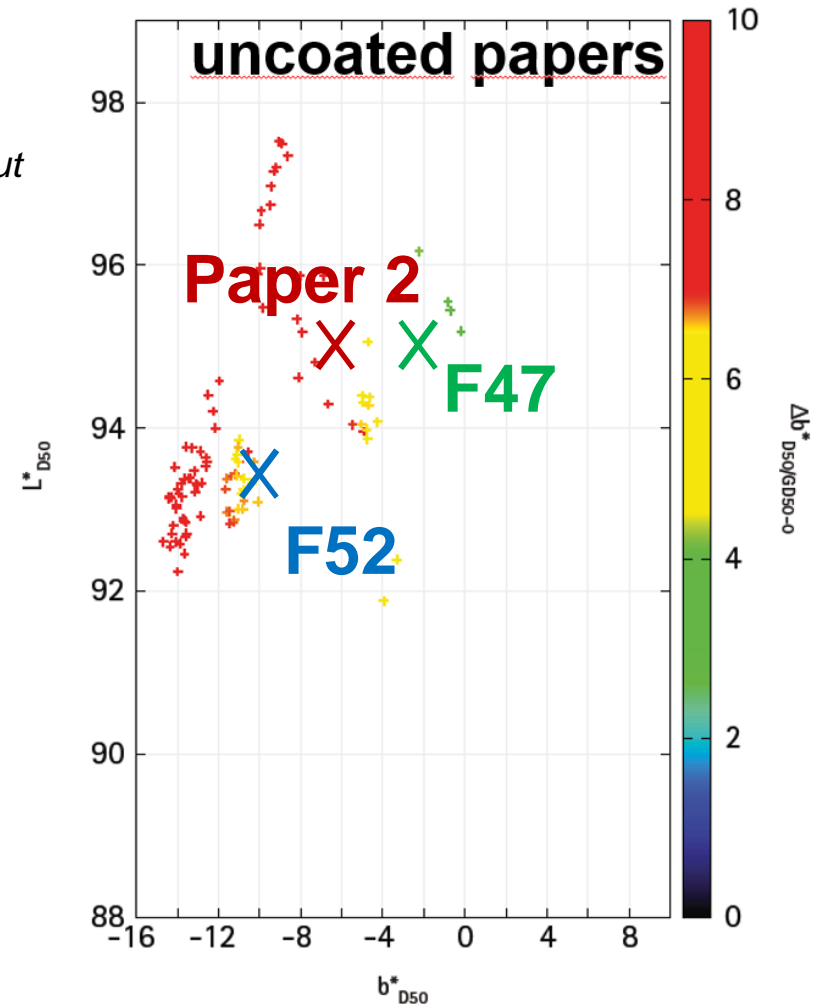
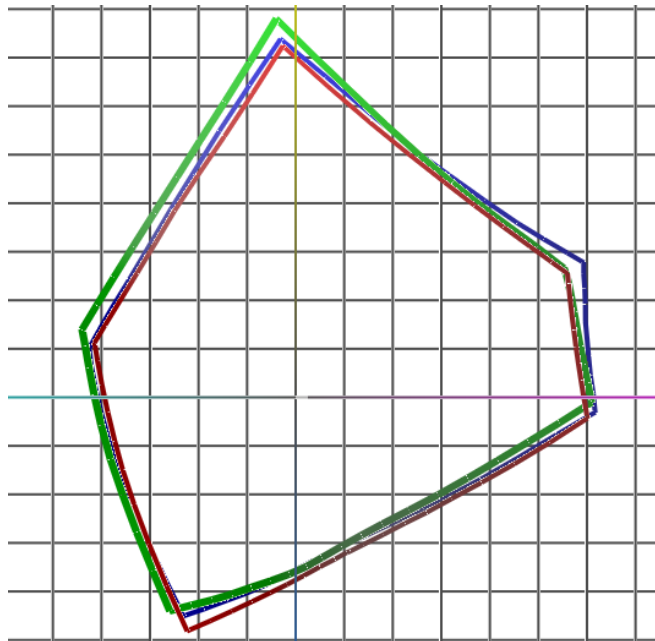
- Solution is an individual printing condition
- Told the print-operator to use TVI – curves C (ISO 12647-2:2013) and the Lab-values of FOGRA52 (except white)
- Created smoothed characterization data for this specific substrate



Source: GMG

2. 2. Example

„The proof was printed directly on substrate 2? I realize some minor differences, the proof is more open and not as heavy, but the tone is met very nicely “.



Source: GMG

3. Near Future: FOGRA 53 and FOGRA 54



Jürgen Seitz (GMG) : *„Den Markt auf die natürliche Notwendigkeit von Kommunikationsfarbräumen/ Austauschfarbräumen hinzuweisen und mit ersten Arbeitsmitteln zu versorgen, das ist eigentlich schon längst überfällig.“*

Jürgen Seitz (GMG) : *„Suggesting an exchange color space to the market and providing the right equipment is long overdue.“*

→ FOGRA53 is an exchange space (CMYK) that fulfills:

1. Including the full gamut of wide-gamut-systems (ist larger)
2. Proofability on established Proofing systems
3. Similar characteristics in shape and tone-value like F39 and F51

<https://www.fogra.org/FOGRA53/>

3. Near Future: FOGRA 53 and FOGRA 54



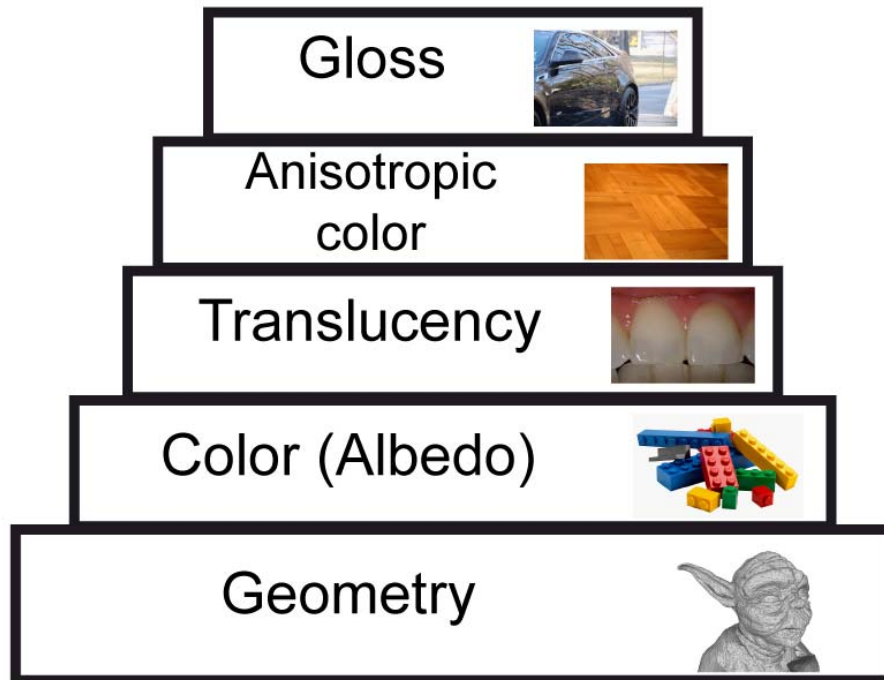
FOGRA54 is a web-offset printing standard according to ISO12647-2:2013:

1. AM-screen (48-70'cm)
2. Super-calandered B-material (SC-B)
3. Ink without mineral oil

Thanks to: Weiß-Druck, Stark-Druck, WKS, Körner und Eversfrank, Bagel, Mohnmedia, Baumann und Gotha-Druck and WOWG, Web Offset Working Group) und GMG

4. Future: 3D-Printing

<https://www.fogra.org/3D-print/>



Thank you for your attention!