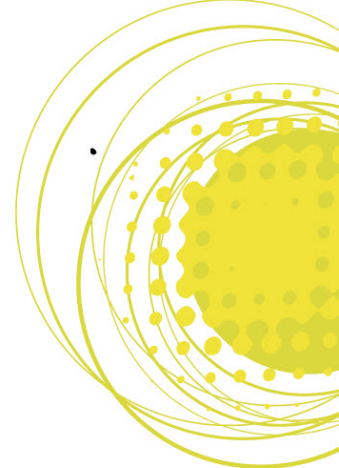
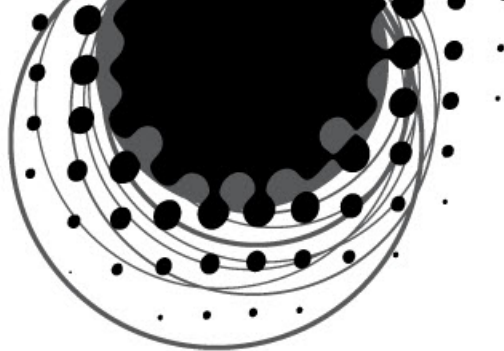




NPES-ICC Color Management Conference 2015



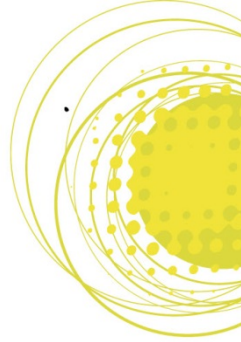
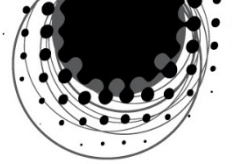
ISO Standards & ICC

Steve Smiley

SmileyColor & Associates

February 12, 2015 • India Expo Centre • Greater Noida, Delhi NCR





Overview

Today your going to see many solution, tools for aligning your printing to your customers aims. Utilizing ICC Technology provides tools for Proofing, Printing, Workflows, final process control requires some investment, don't forgot all the small pieces.

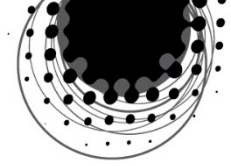
As a member of ICC, ISO, CGATS, SNAP, GRACoL, SWOP, Ghent PDF Workgroup and the FTA. We have aligned tools and workflows to align customers expectations across our shrinking planet. Newsprint to packaging, and across all parts of the supply chain. Communication is the Key!





Standards Required for Success

- Viewing - ISO 3664
 - Observer - ASTM E1499
- Instrument - ISO 13655
- File Format – ISO 15930 – series (PDF/X-4) 1.7
 - Pre-Flight – GWG-V4 2012 www.gwg.org
- Paper / Substrates ISO 15937
- Proofing – ISO 12647-7/8
- Workflows - ISO TS 10128 CGATS 21
- Printing – ISO 12647 Series
 - Inks/CxF/X-4 ISO 17972-4
- Process Control - ISO 12647 & ISO 16761 draft - Series



ISO 3664:2009

Standards viewing conditions

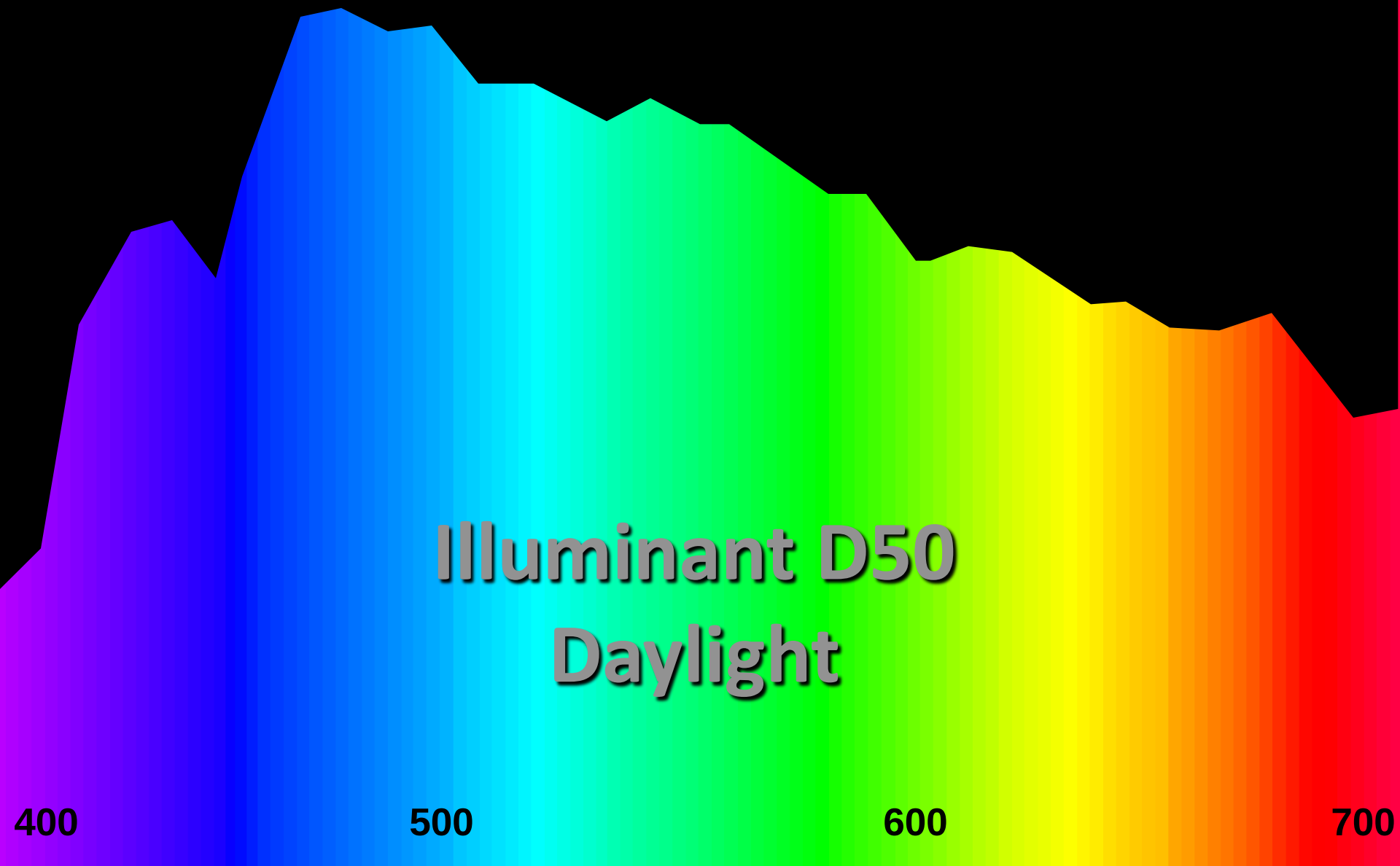
D50

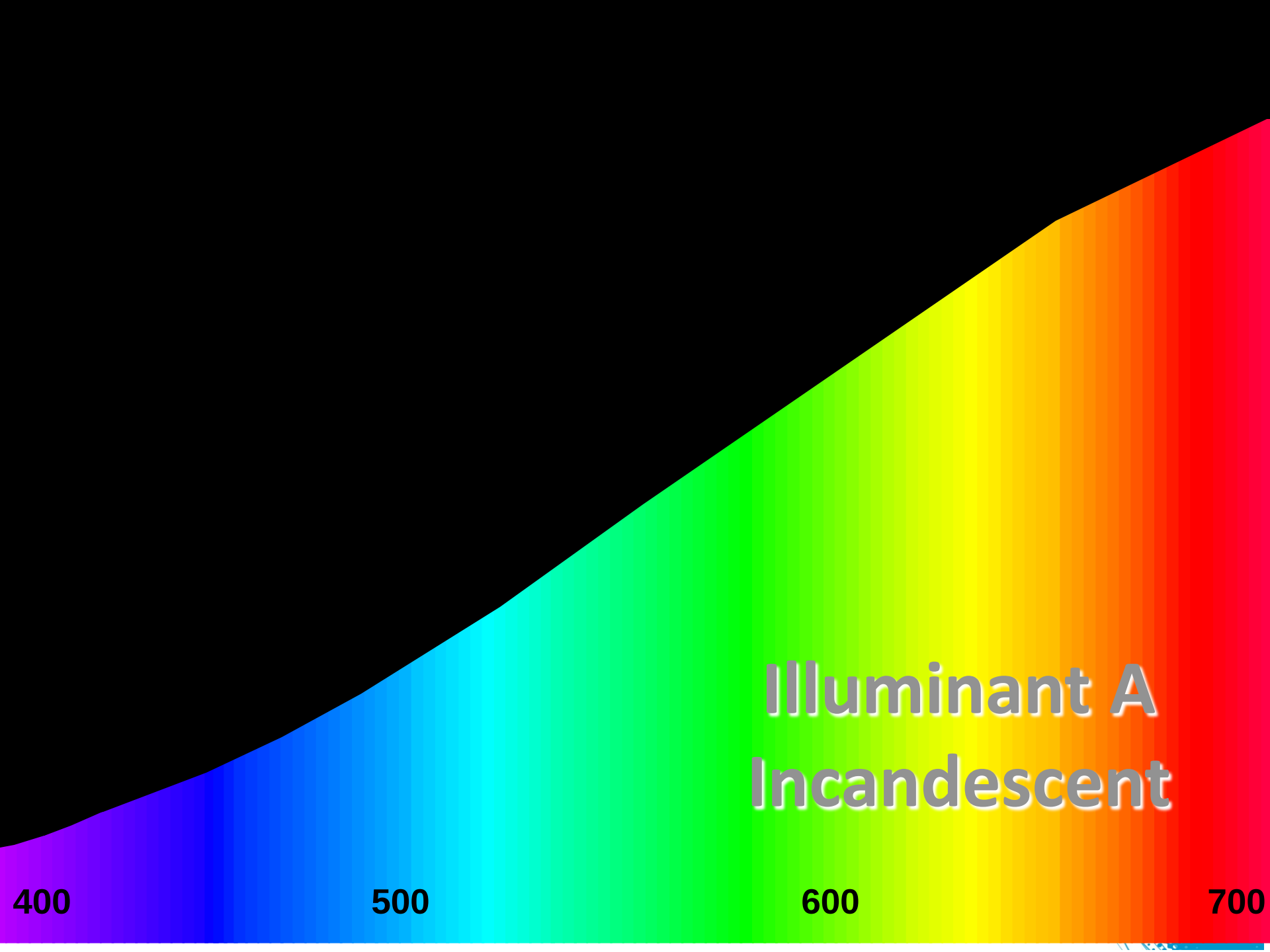
~~5000K~~



Light is Color







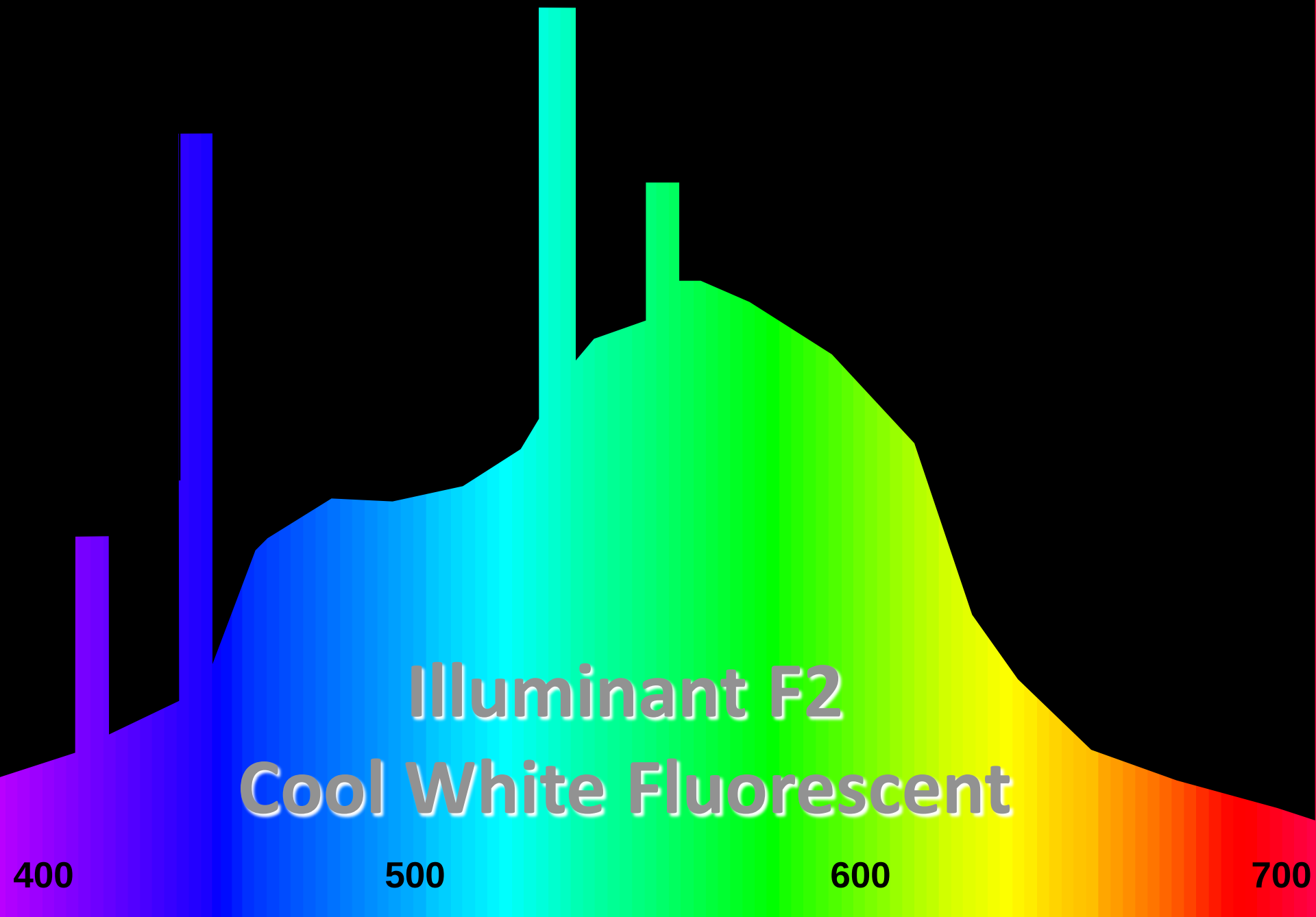
Illuminant A
Incandescent

400

500

600

700





What is necessary to see color?

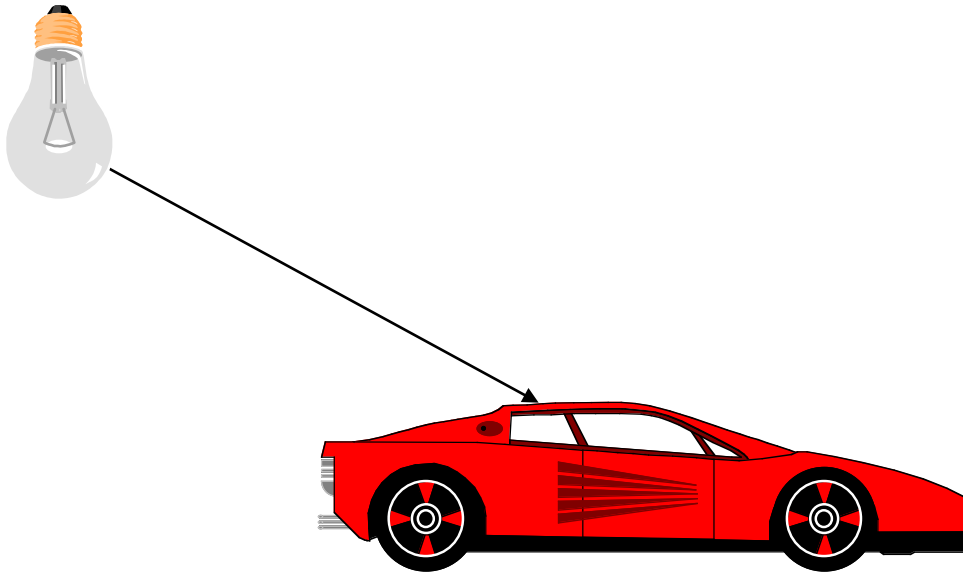


1. Illumination - a light source



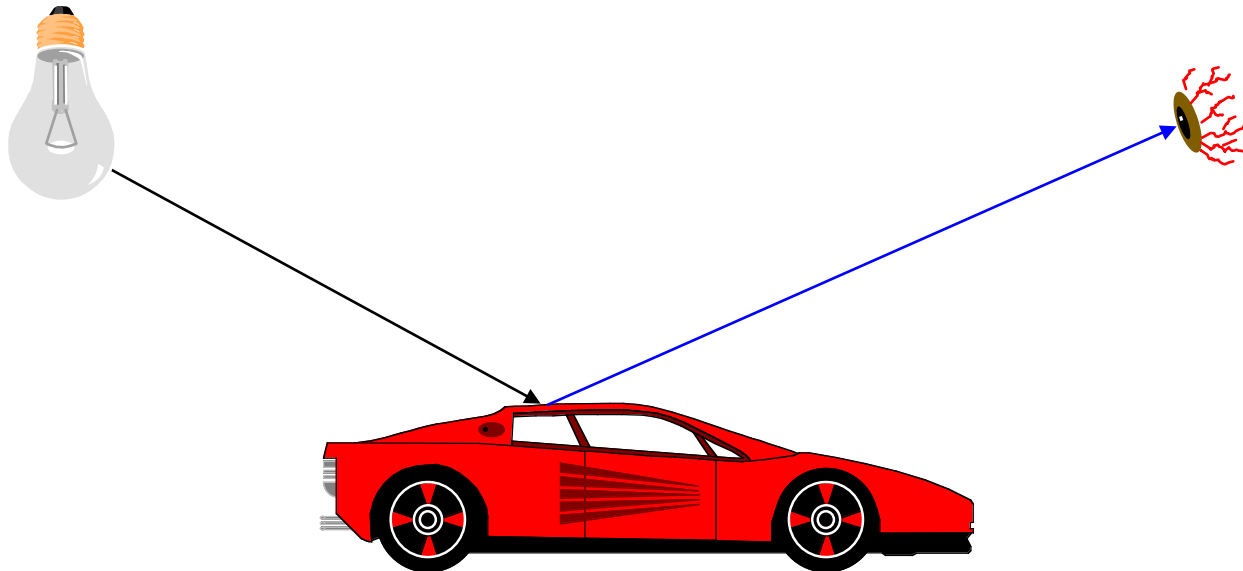
What is necessary to see color?

1. Illumination - a light source
2. Object



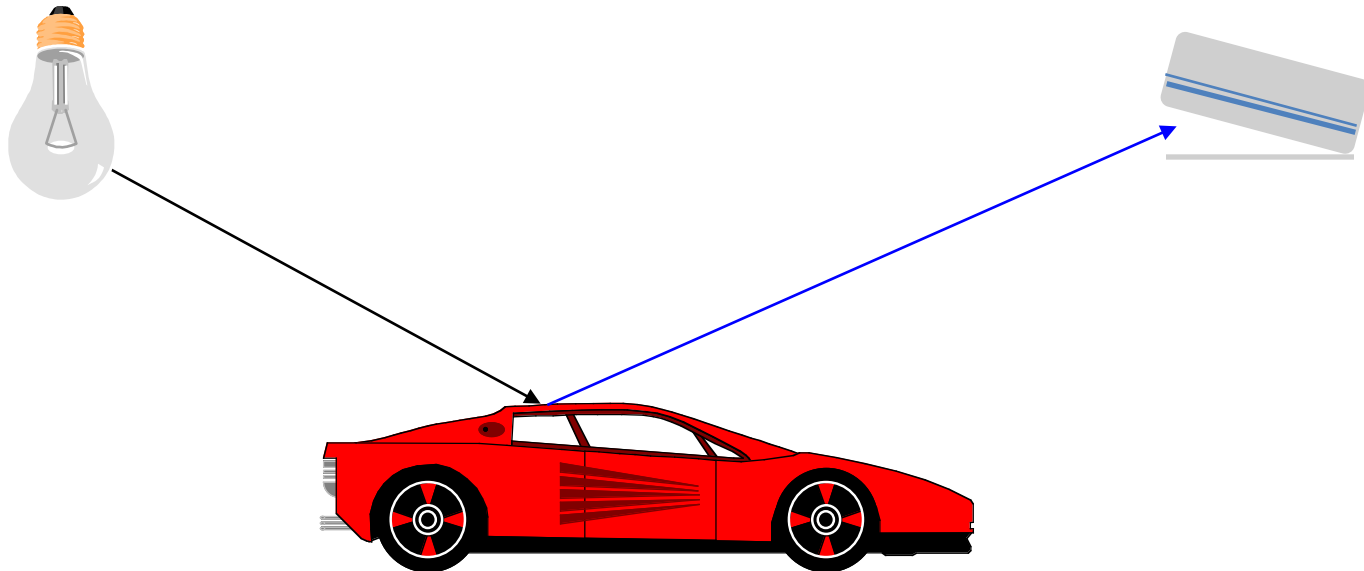
What is necessary to see color?

- ☐ Illumination - a light source
- ☐ Object
- ☐ Receiver



What is necessary to see color?

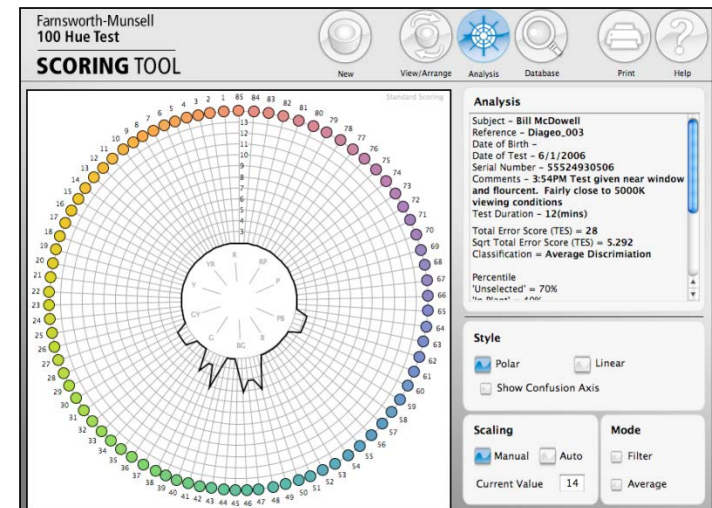
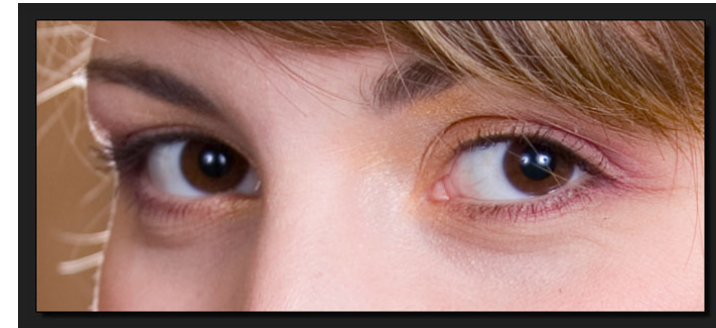
1. Illumination - a light source
2. Object
3. Receiver



Human Visual Sensory Observers

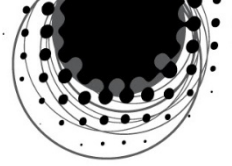
ASTM E1499

Color Discrimination (Farnsworth-
Munsell 100 Hue Test)



Using a calibrated monitor:

http://www.xrite.com/custom_page.aspx?PageID=77&Lang=en



Measurement Devices– ISO 13655

- Defines Spectral data and alignment between devices
- M Modes- Series
 - M0 Any light Source
 - M1 D50 Light Source
 - M2 UV Cut
 - M3 Polarized



File Format – ISO 15930

- PDF/X-4
 - Design
 - Pre-press
 - Pre-flight – GWG –V4 2012
 - (Ghent PDF Workgroup)
 - Gwg.org



Proofing – ISO 12647-7/8

- Contract Proofing/Defined Characterization Data
- Design Prints/Defined Characterization Data
- **REQUIRES A MEASURED COLOR BAR!**



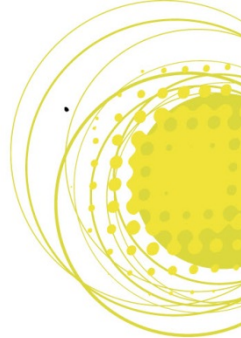


Printing ISO 12647-Series

- ISO 12647 Part 1 – Vocabulary and Format
- ISO 12647-2 Commercial Offset
- ISO 12647-3 Newsprint
- ISO 12647-4 Gravure
- ISO 12647-5 Screen and Display
- ISO 12647-6 Flexographic Print/ Packaging
- ISO 12647-7 Contract Proofs
- ISO 12647-8 Validation Prints/ Designer Proofs



Workflows - ISO TS 10128



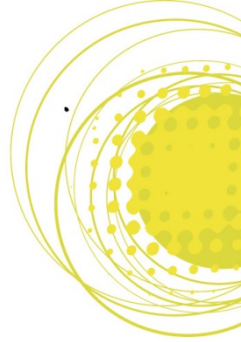
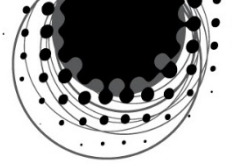
- Procedure for Near Neutral Calibration
- Tone Value Increase
- Device Link Profiles
 - ANSI CGATS TR015 – Near Neutral Calibration
 - ISO 12647 Parts 2,3,4 - TVI
 - ISO 12647 Parts 2, 5, 6, 7, 8 Characterization data

Common appearance - Aligns Print to Customers Expectations



Design Through Print – ALL COMPONENTS

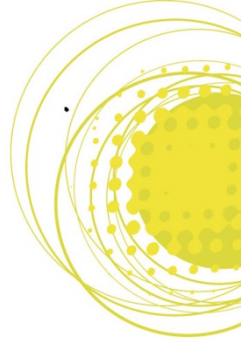
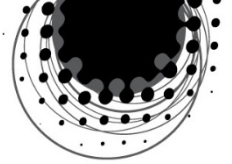




ANSI CGATS 21/ ISO 15339

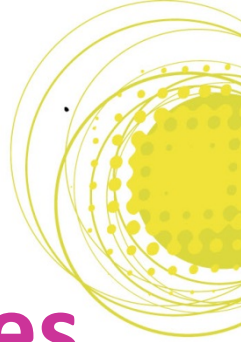
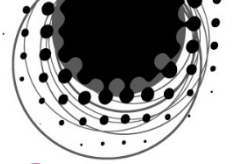
Principles for the use of colour characterization data as the definition of the intended relationship between input data and printed colour for copy preparation, job assembly, proofing, and graphic arts production printing.





Principles

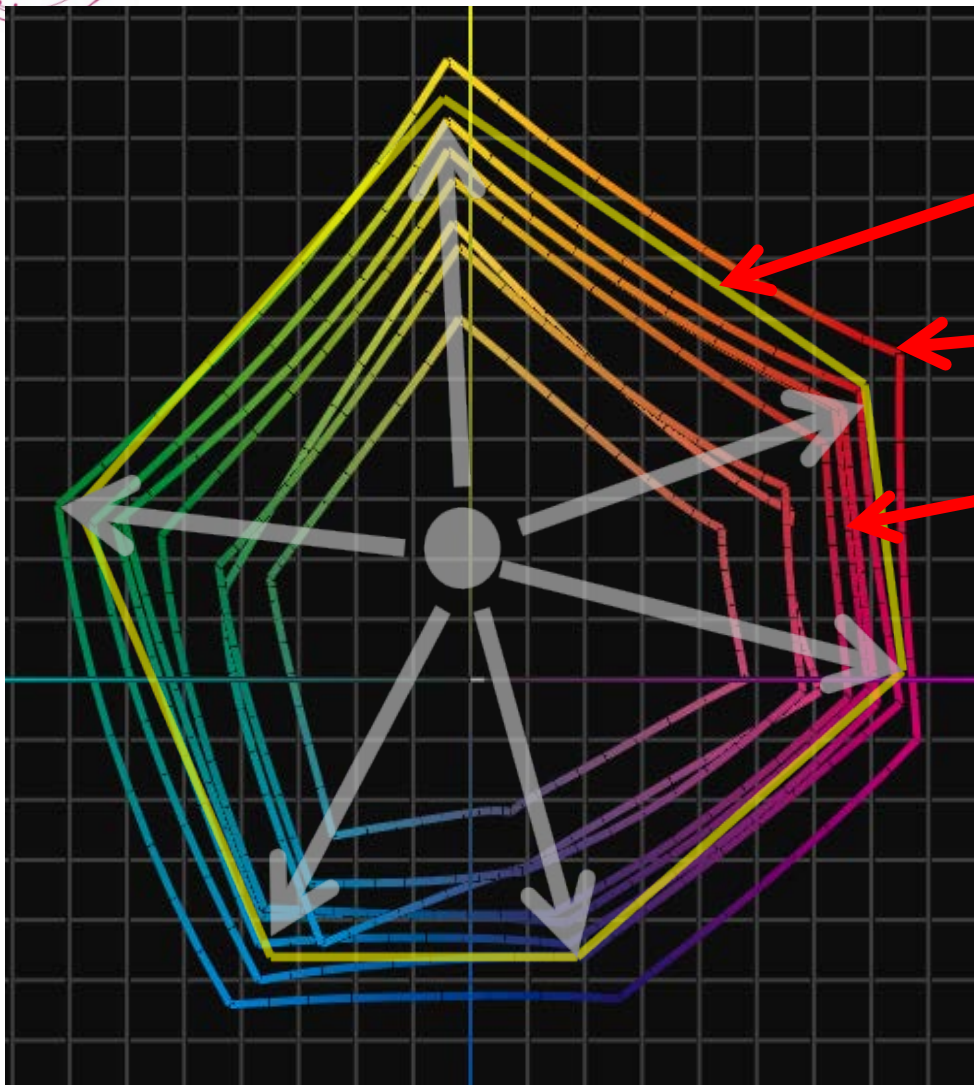
- The key principle is that colour content data can be adjusted such that any printing processes, capable of achieving a specified colour gamut, can produce the within-gamut image colours specified by the appropriate reference colour characterization data. This allows printing aims to be process independent.



Printing from digital data across multiple printing processes

- When producing printed colour reproductions, it is important that the organizations responsible for material preparation, colour separation, proofing, and printing are all working to a common set of parameters that uniquely define the intended visual characteristics of the final printed product. Such an agreement enables the correct production of suitable input data and subsequent production of proofs from these data.

Datasets -



Flexo Narrow Web
GRACoL2013

Some Digital Devices

Smaller Gamut Printing

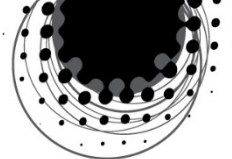
***All CMYK
Devices Can
Have a Similar
Neutral Value***



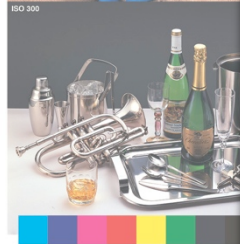
Data preparation



- All print elements shall be prepared either as device code values or as colourimetrically-defined data. Both types of data shall be prepared for a single characterized reference printing condition. This condition shall be provided in the PDF/X output intent in the case of an ISO 15930 exchange or shall be communicated by mutually agreed upon methods in other situations.
- *** Unless otherwise agreed between sender and receiver, the characterized reference printing condition shall be one of the data sets defined in a part of standard. (This allows any dataset to be used)**



CGATS 21 and ISO 15339 datasets



1

2

3

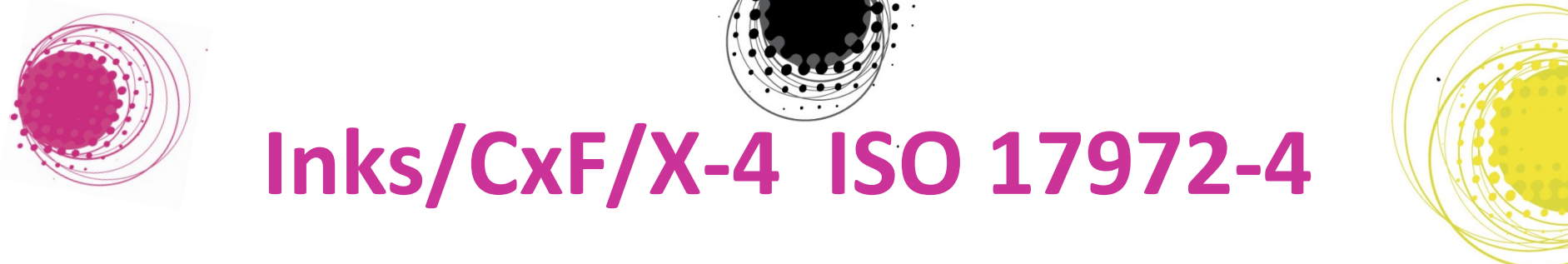
4

5

6

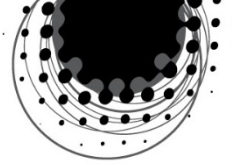
7





Inks/CxF/X-4 ISO 17972-4

- ISO 17972-1 Graphic technology — Colour data exchange format (CxF/X) — Part 1: Relationship to CxF3 (CxF/X-1)
- ISO 17972-2 Graphic technology — Colour data exchange format (CxF/X) — Part 2: Scanner target data (CxF/X-2)
- ISO 17972-3 Graphic technology — Colour data exchange format (CxF/X) — Part 3: Output target data (CxF/X-3)
- ISO 17972-4 Graphic technology — Colour data exchange format (CxF/X) — Part 4: Spot colour characterization data (CxF/X-4)



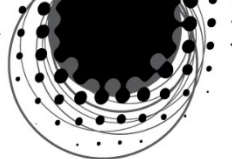
PDF/X Workflow without CxF/X-4

No Opacity
No Ink sequence

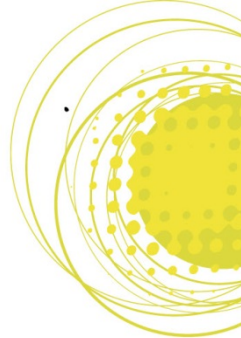


**Brand Owner / Designer -
Color Development**

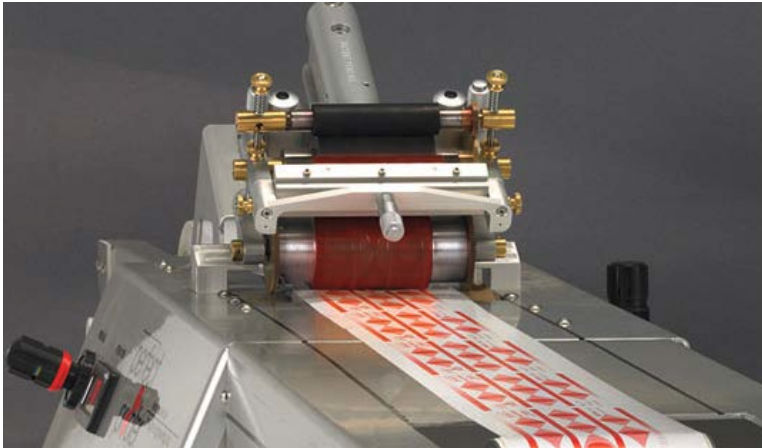


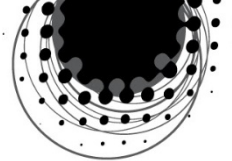


CXFX-4 Brand Management

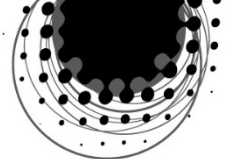


- Developing Colour to align with CPC requirement





28

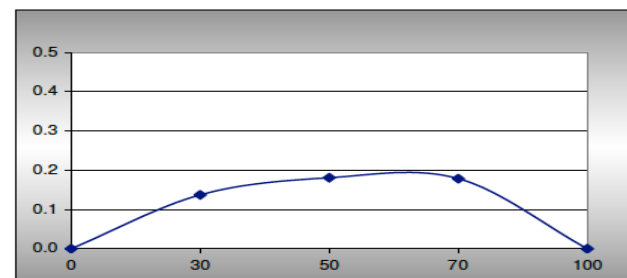
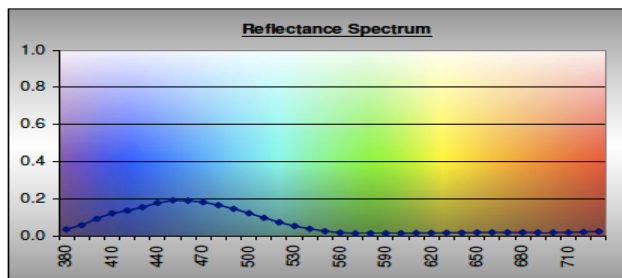


Color Definitions of Brand Colors – Physical and Digital

Spot Color Definition

Birdseye 294 Redesign

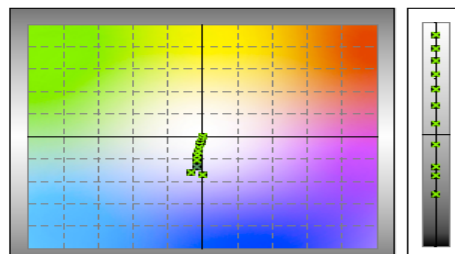
Spectral Data		
	Over White	Over Black
380	0.0345	0.0176
390	0.0569	0.0184
400	0.0916	0.0188
410	0.1209	0.0184
420	0.1352	0.0173
430	0.1539	0.0169
440	0.1772	0.0165
450	0.1910	0.0161
460	0.1897	0.0155
470	0.1807	0.0149
480	0.1655	0.0141
490	0.1453	0.0133
500	0.1217	0.0125
510	0.0967	0.0116
520	0.0726	0.0106
530	0.0525	0.0096
540	0.0371	0.0088
550	0.0246	0.0080
560	0.0163	0.0076
570	0.0132	0.0078
580	0.0133	0.0085
590	0.0135	0.0088
600	0.0136	0.0091
610	0.0143	0.0096
620	0.0152	0.0103
630	0.0159	0.0106
640	0.0166	0.0110
650	0.0175	0.0111
660	0.0184	0.0110
670	0.0187	0.0107
680	0.0181	0.0106
690	0.0177	0.0106
700	0.0176	0.0112
710	0.0186	0.0124
720	0.0207	0.0134
730	0.0237	0.0145



Spot Over White						
Dot %	L	a	b	C	H	TVI
0	94.62	0.27	0.35	0.44	52.6	0%
10	88.40	-0.48	-2.69	2.73	259.8	17%
20	82.97	-1.17	-5.58	5.71	258.2	31%
30	77.05	-1.85	-8.70	8.89	258.0	44%
40	70.30	-2.63	-12.39	12.66	258.0	57%
50	63.11	-3.38	-16.47	16.81	258.4	68%
60	54.93	-3.91	-20.92	21.28	259.4	79%
70	45.58	-4.16	-26.36	26.69	261.0	88%
80	35.71	-4.23	-33.77	34.03	262.9	95%
90	31.69	-8.32	-40.11	40.96	258.3	98%
100	23.32	-0.06	-42.80	42.80	269.9	100%

Specs	
Opacity(Y ratio)	24%
Spectral Density	1.88
DotGain @ 50%	18%
Print Cont @ 70%	50%

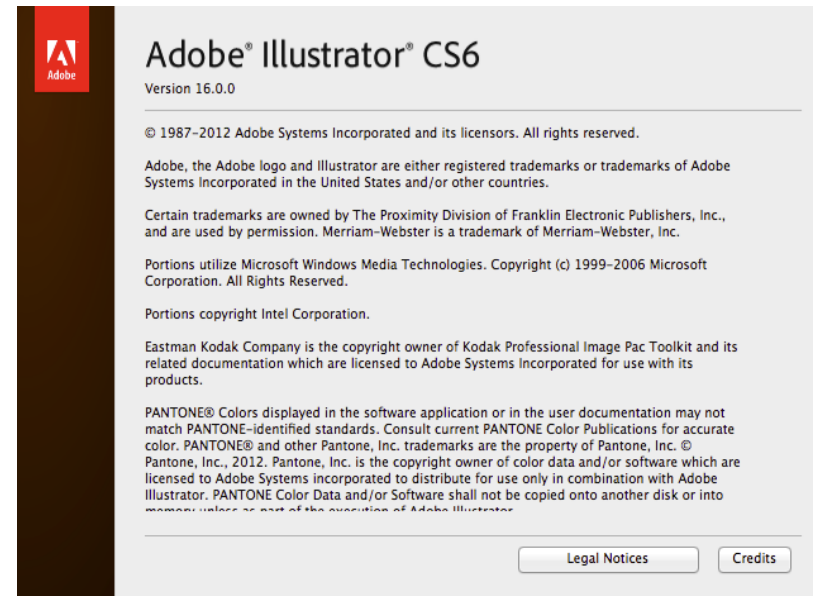
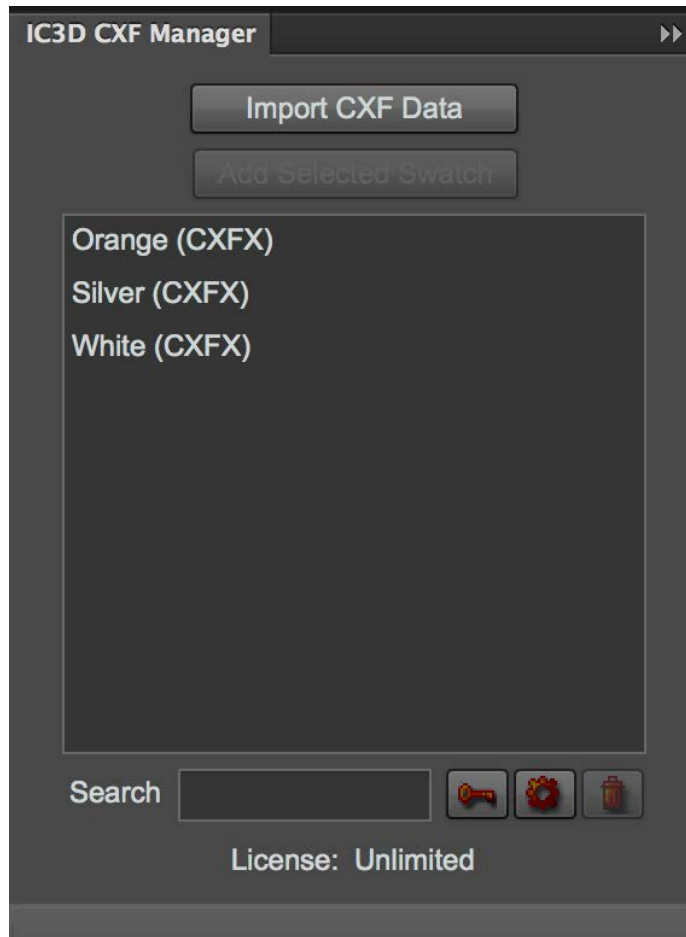
Pigments	
Reflex Blue	
Pro Blue	
Blk	
-	



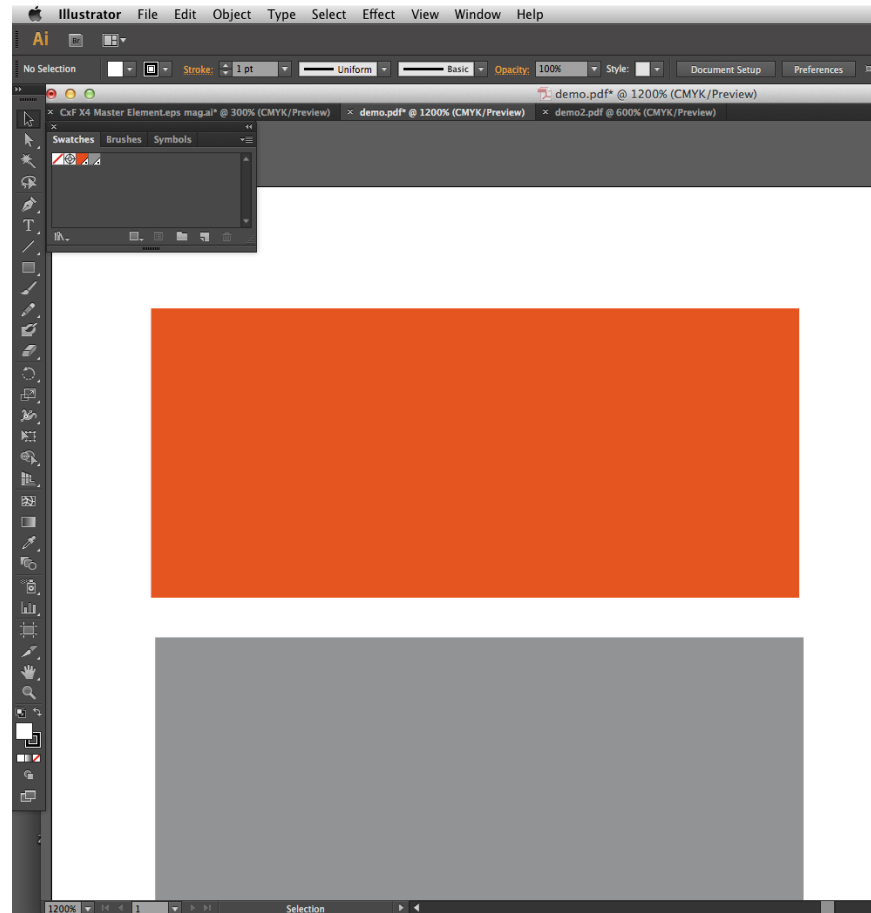
Birdseye 294 Redesign	
Brand Color	Birdseye 294 Redesign
Substrate	SBS
Backer	ISO 13655 White
Meas Device	Xrite SpectroEye (Certified: 12/2011)
Meas Conditions	5000K, 2°, No Filter
Geometry	0/45 (M0 - ISO13655)
Expiry Date	3/8/2013

Approved By	Color Engineering
Date	3/8/2012

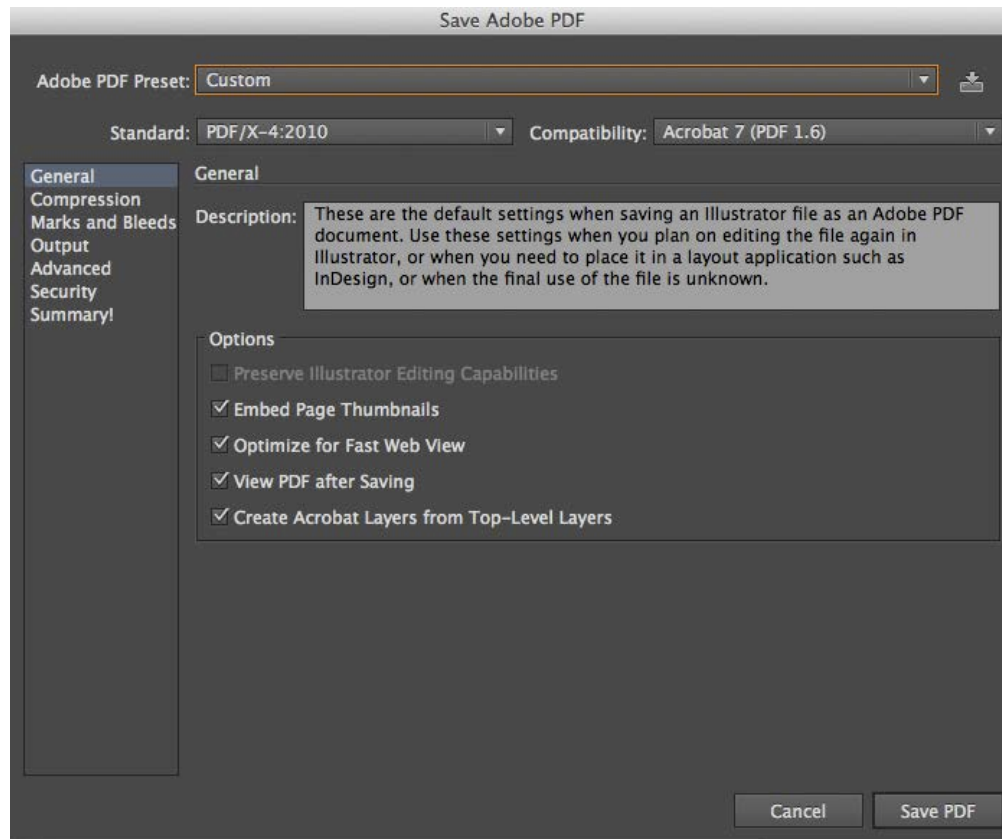
Import CxF/x4 Data to Illustrator



CxF X4 in Adobe Illustrator



Save as Adobe PDF/X



PDF X4 Output



Adobe® Acrobat® XI

Version 11.0.03

Inventory report for Document:"demo2.pdf"

Color Space 2 (out of 3)

on page 1



Color Space properties:

Separation color space: "Orange (CMYK)" Lab (ICC) (60.29/62.38/69.67)

Color name: Orange (CMYK)

Alternate color space

ICC based color space: "Lab D50"

Components range (0.0/1.0/0.0/1.0/0.0/1.0)

Number of color components: 3

Alternate color space

Lab color space

Diffuse white point

0.964

1.0

0.825

Diffuse black point

0.0

0.0

0.0

Components range

-128.0

127.0

-128.0

127.0

ICC profile data

Profile version number: "2.1.0"

Color Management Module (CMM) type: "ADBE"

Profile/Device class signature: "spac"

Color space of data: "Lab"

Profile Connection Space (PCS): "Lab"

Magic number: "acsp"

Primary Platform: "Apple Computer, Inc. (APPL)"

Device manufacturer: "none"

Device model: ""

Profile creator: "Adobe Systems Incorporated (ADBE)"

Creation date: "6/3/99 12:00 AM"

Default rendering intent: Perceptual

Profile illuminant

Illuminant X: 0.964

Illuminant Y: 1.0

Illuminant Z: 0.825

Copyright information: "Copyright 1999 Adobe Systems

Incorporated"

Profile description: "Lab D50"

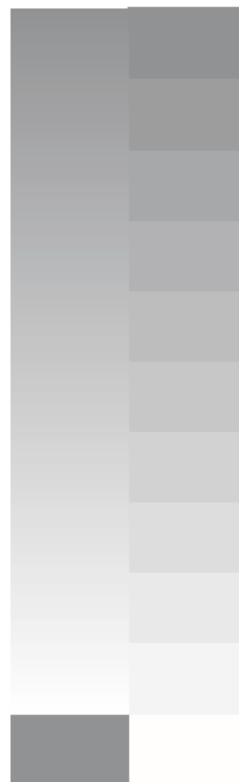
Profile ID (MDS hash):

"BC759FE4D6C84997D34103C11419E4DA"

Inventory report for Document:"demo2.pdf"

Color Space 3 (out of 3)

on page 1



Color Space properties:

Separation color space: "Silver (CMYK)" Lab (ICC) (60.83/-0.83/-1.63)

Color name: Silver (CMYK)

Alternate color space

ICC based color space: "Lab D50"

Components range (0.0/1.0/0.0/1.0/0.0/1.0)

Number of color components: 3

Alternate color space

Lab color space

Diffuse white point

0.964

1.0

0.825

Diffuse black point

0.0

0.0

0.0

Components range

-128.0

127.0

-128.0

127.0

ICC profile data

Profile version number: "2.1.0"

Color Management Module (CMM) type: "ADBE"

Profile/Device class signature: "spac"

Color space of data: "Lab"

Profile Connection Space (PCS): "Lab"

Magic number: "acsp"

Primary Platform: "Apple Computer, Inc. (APPL)"

Device manufacturer: "none"

Device model: ""

Profile creator: "Adobe Systems Incorporated (ADBE)"

Creation date: "6/3/99 12:00 AM"

Default rendering intent: Perceptual

Profile illuminant

Illuminant X: 0.964

Illuminant Y: 1.0

Illuminant Z: 0.825

Copyright information: "Copyright 1999 Adobe Systems

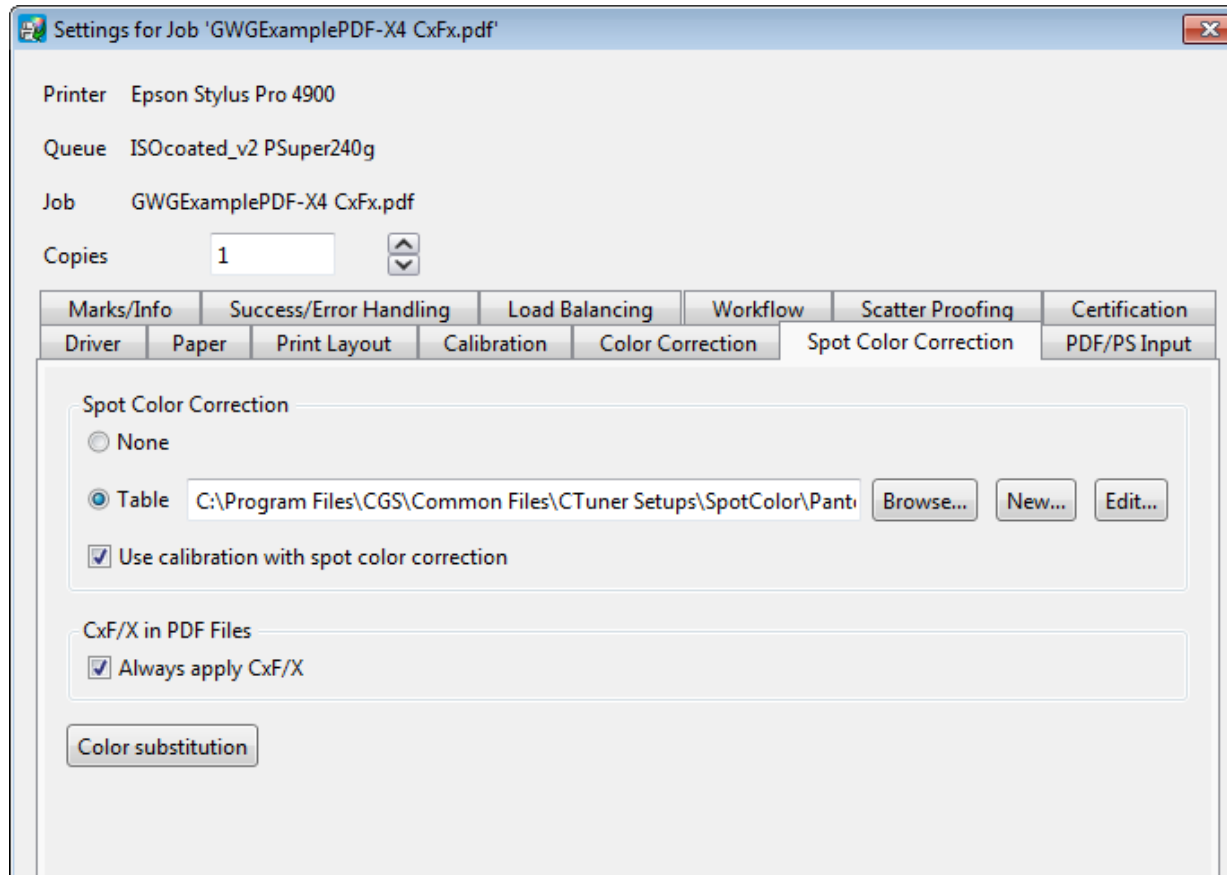
Incorporated"

Profile description: "Lab D50"

Profile ID (MDS hash):

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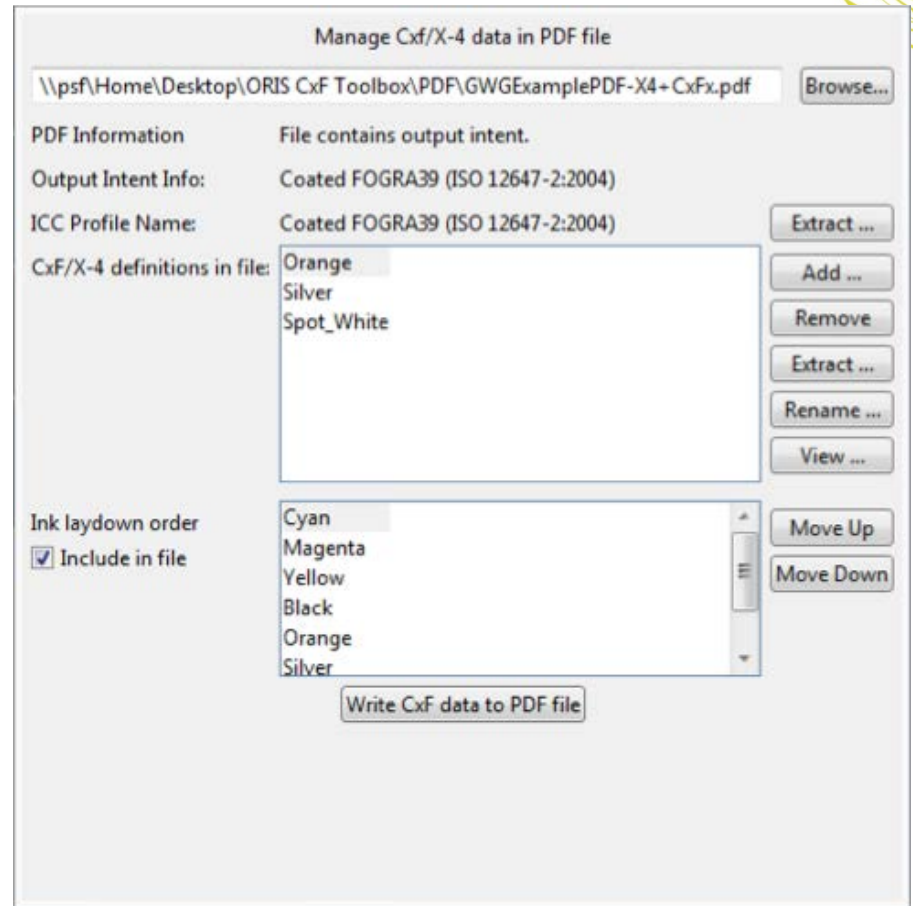
CxF X-4 Proofing



- Look for solutions that utilize CxF

CxF/X-4 Work Flows

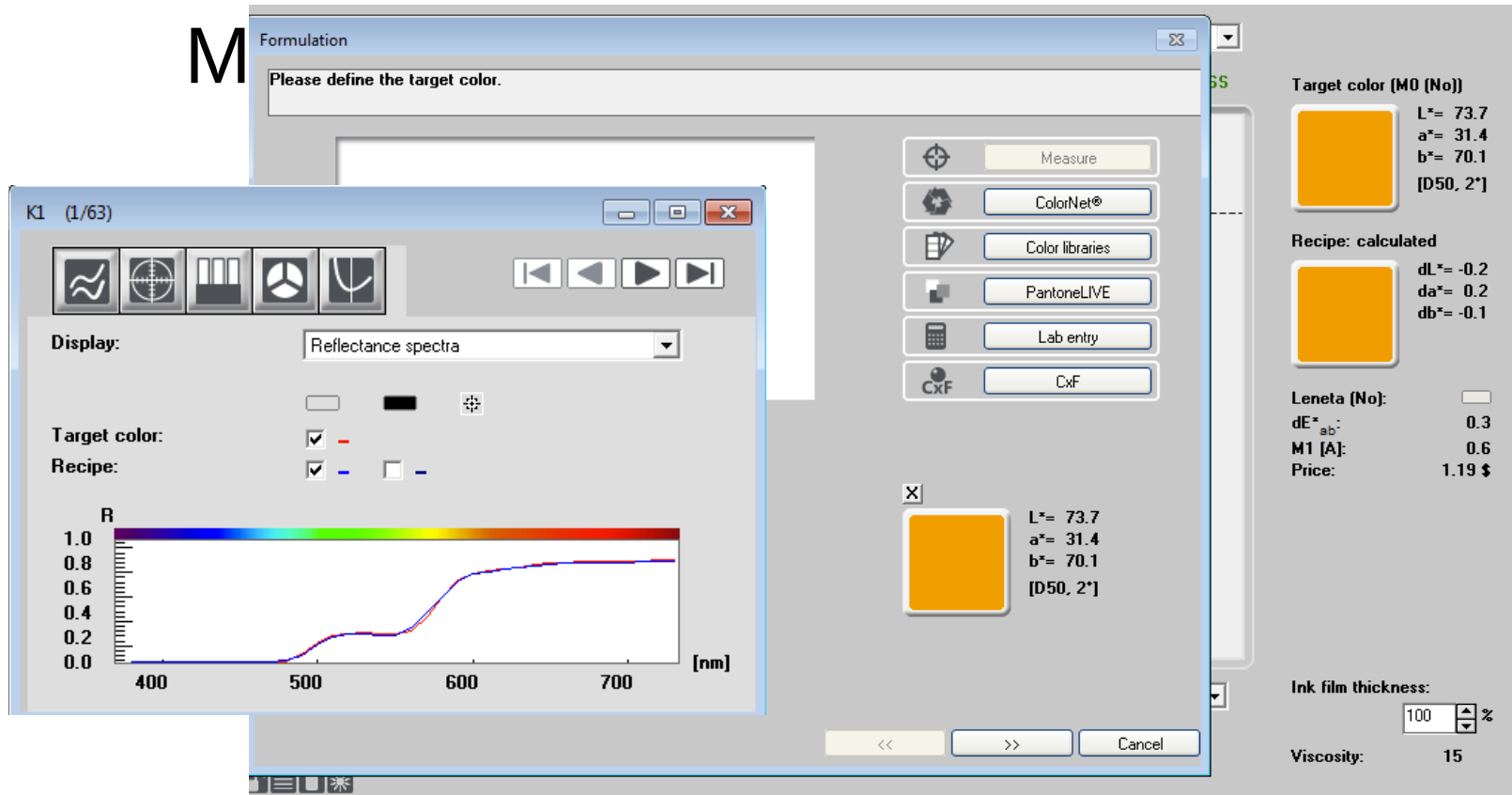
- CxFX Tools for Extracting Data
- Re-ordering Colors in PDFX

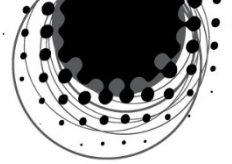


CxF X-4 Ink Formulation

- Use CxF/X-4 for ink formulation – Lowest

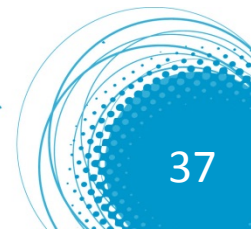
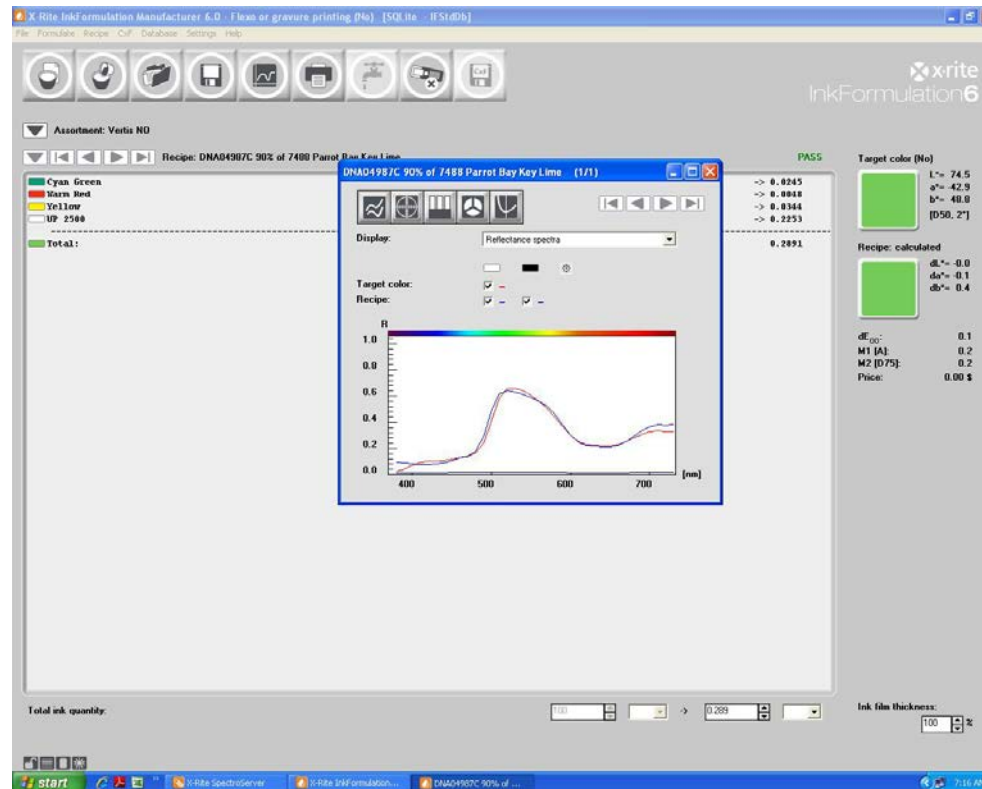
M





Ink Formulation – CxF X4 development

Matching PMS or other element

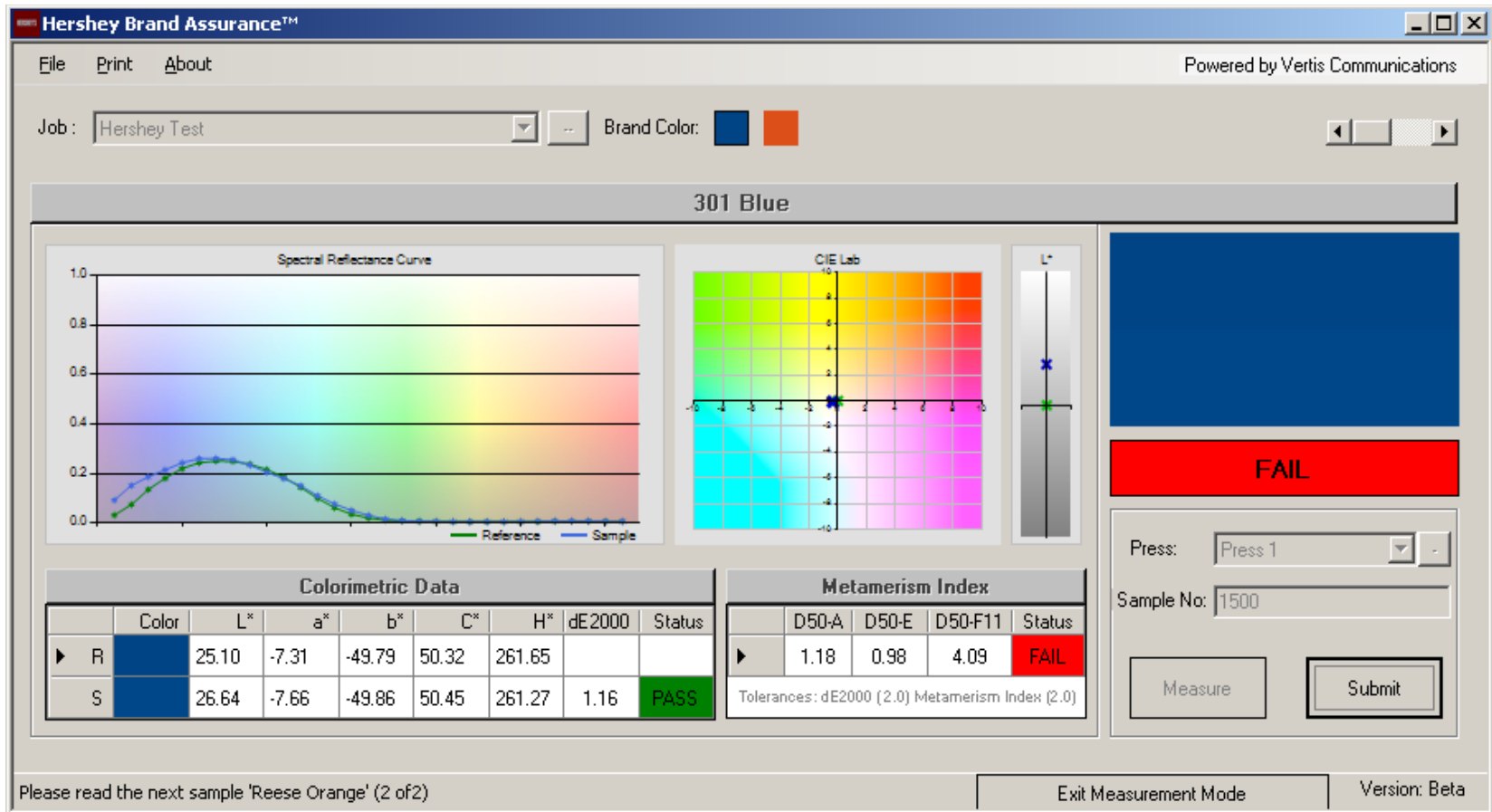


ISO 17972-4

CxF X4 Spot Colours Process Control

From Design through Print Consistency in ingredients of inks

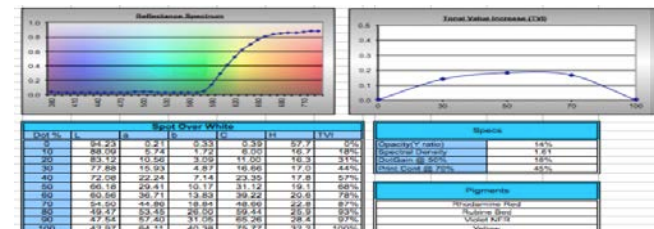
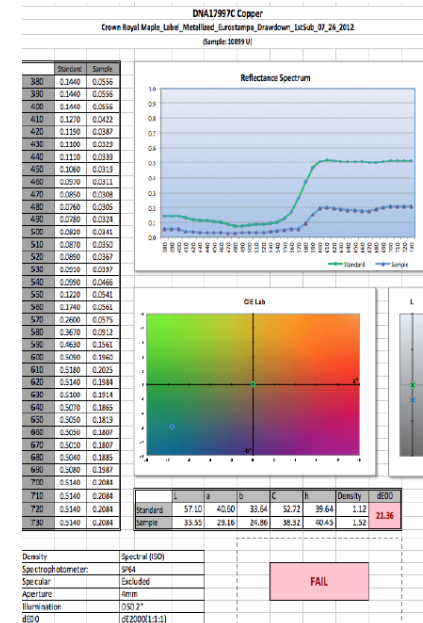
NOT only low DE00 / but satisfying metamerism match also



Printer Ink Approval Process

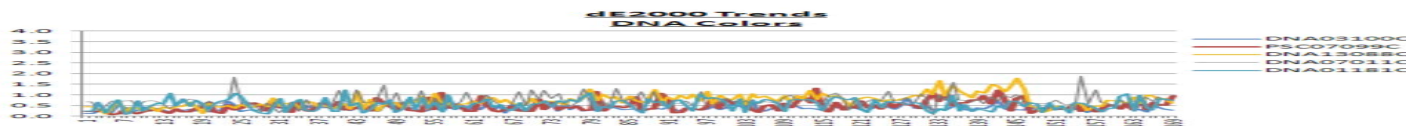
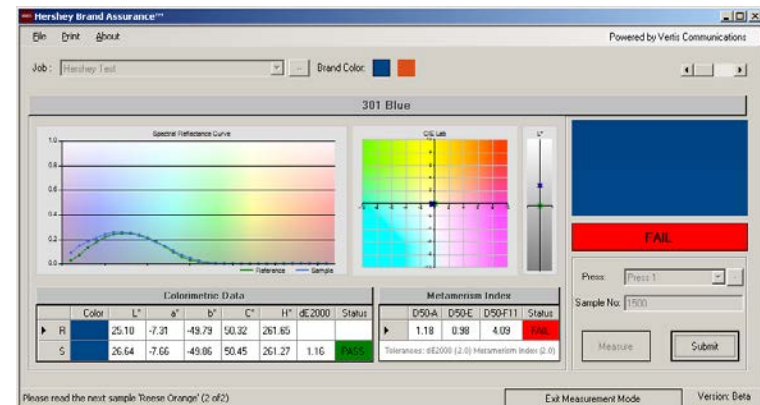
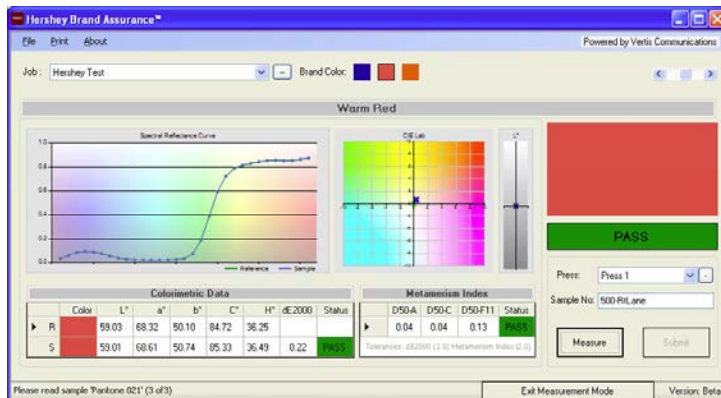


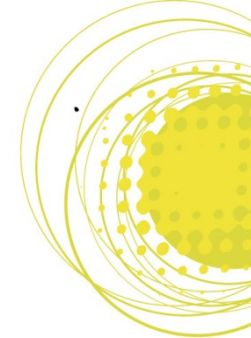
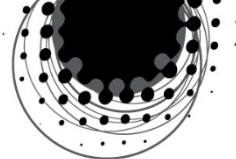
- Inks are developed to the defined spectral data –
- Customer Tolerances
- TVI curves define aims to be are in to Image Carrier – or communicated to digital rip



ICC profiles and CxF/X4 Process Control

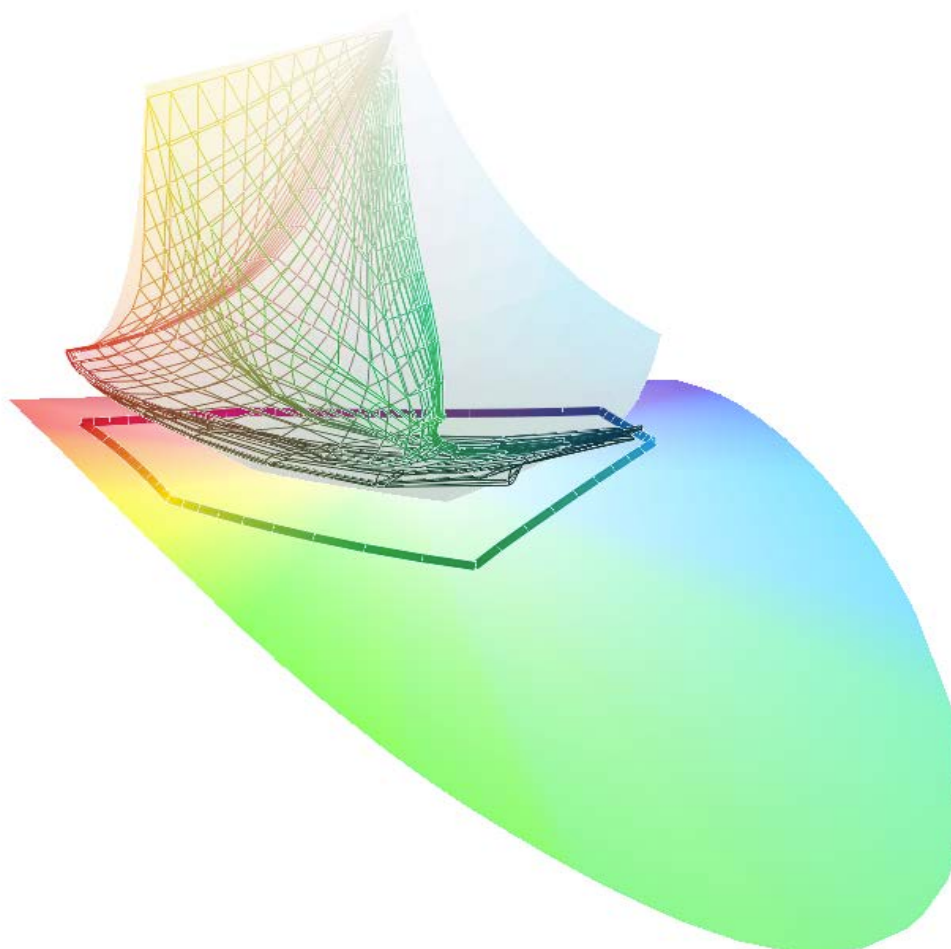
- CxF X4 as reference for brand colour process control
- Tolerances for both CIE Δ 00 < 1.5 Brand Colours
- Metameric Match CIE Δ 76 < 2 w/ 3 illuminants or spectral tolerance

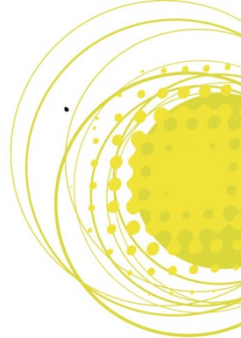
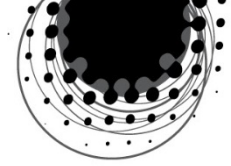




CxF/X-34 to iccMAX

Red
Green
Blue
Yellow





Process Control Upward ISO 16761

Color Definition

Design

PDF Generation,
Proofing



Color Reproduction

Color Management

PDF Production, Proofing



Prepress

Printing form

Process Control

Printer Calibration
& Conformance



Color Conformance

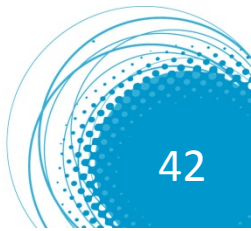
Print Control

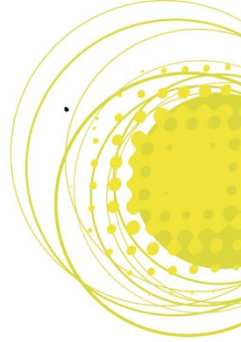
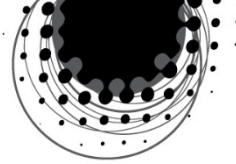
Print Assessment
& Conformance



Color Control

Color Assessment
& Conformance

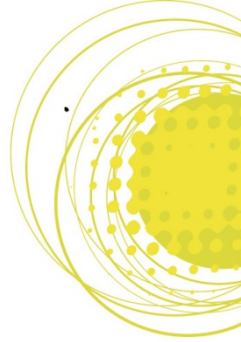
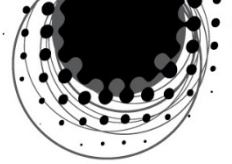




Process Control

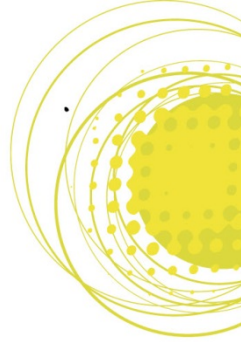
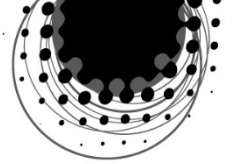
ISO WD 16761 series

- Standards and best practices for supply chain
 - Part 1 Commercial Printing
 - Part 2 Package Printing
- Utilizing ICC profiles for expectations, and aims
- Toleranceing ISO 12647-6
 - One standard deviation 68%



Conclusion

- Software is needed for ICC workflows, look for partner suppliers that understand modern tools, supporting ICC workflows, and ISO Standards
- Matching customers expectations will get you repeat business, but don't forget the small stuff.
- To align your workflow with ISO Standards and ICC workflows you can increase production and satisfy the most demanding clients.



Thanks for your attention!

12 February 2015 · New Delhi India

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