



Color Control Characterization

Presented by: David Hunter

STEPS TO DEFINING PROCESS DISCIPLINE

How to meet or exceed E-Factor?

Third of the 5 C's of Color Control

Capture — assess instrumentation capabilities

Calibration- make device consistent to itself & over time

Characterization — define device gamuts & create profile

Conversion — map one gamut to another in the workflow

Conformance — verify new results and meet expectations

Characterization (ICC Profile Creation)

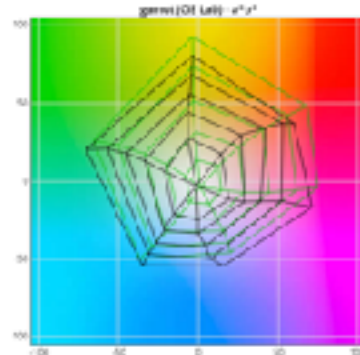
Characterization process is demanding- Requires:

- Ensuring printing devices are precise and repeatable
- Assessing/grouping effect of paper stock on color result
- Measuring a lot of color patches
- Using ICC Profile creation software (\$\$) to create profile
- Compatible workflow/RIP to accept ICC Profiles
- Understanding how to configure profiles in workflow
- **Benefits-** More accurate result over any type of calibration

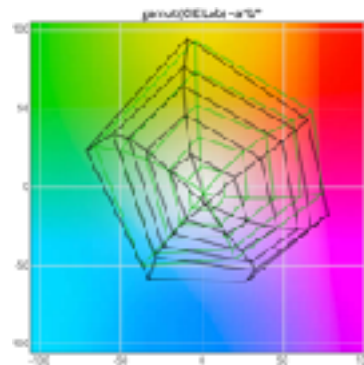
Characterization (ICC Profile Creation)

Defines Color Space of Printing Condition

- Defines gamut (range of color) of ink, substrate, calibration



C M Y K
3. 62. 19. 0



C M Y K
3. 62. 19. 0



Characterization (ICC Profile Creation)

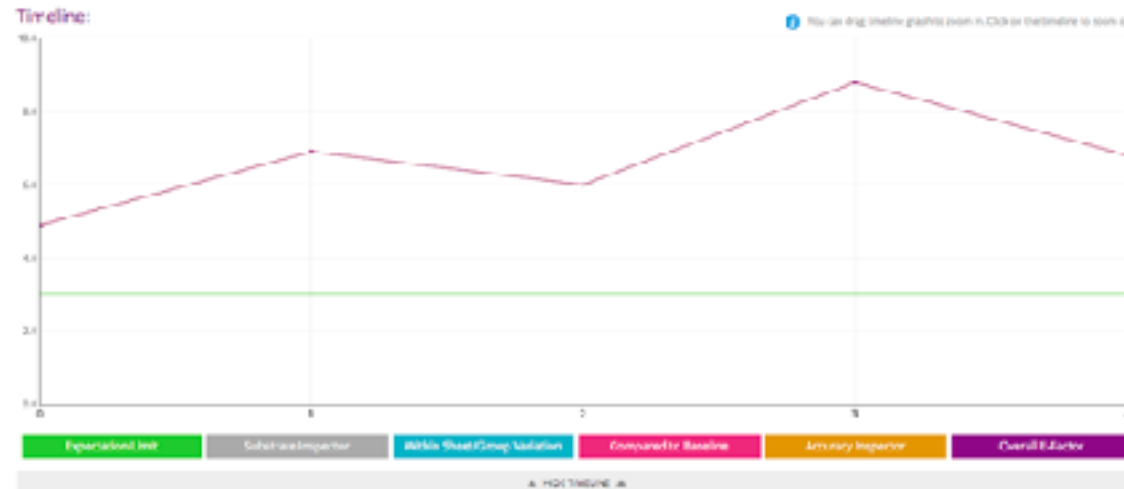
Defines Color Space of Printing Condition

- Each device speaks a different language- define language
- Defines gamut (range of color) of ink, substrate, calibration
- Each substrate affects printed gamut/condition
- Qualify most frequently used substrates:
 - *Determine substrates that share similar color gamut*
 - *Reduces number of profiles to create, easier to manage*
 - *Relevant to E-Factor, tighter tolerance the more profiles*

Qualifying Substrate Color affect on Print

Steps:

1. Qualify substrates- Print target on all important substrates
 - *Use ChromaChecker substrate qualifier to group substrates per EF*



File List:

Measurement	# Shots	Dropped					
TC1617 H HP5emGloss.cof	9	2011-10-101007		68	6.8		
TC1617 H Only.cof	9	2011-10-101013		88	8.8		
TC1617 H HighGlossPharm.cof	9	2011-10-1010431		60	6.0		
IL1617 H Internal.cof	9	2011-10-1010142		92	9.2		
TC1617 H Kindness.cof	9	2011-10-10101346		49	4.9		
Selbic.cococof							

Qualifying Substrate Color affect on Print

Steps:

1. Qualify substrates- Print target on all important substrates
 - *Use ChromaChecker substrate qualifier to group substrates per EF*

Print Condition Qualifier

EF = 9

Mode: 95%

Files:

Filename	Backing	Measure	Mode
TC1617_U_UBPsemiGloss.cof	white	M0	production
TC1617_H_Polycof	white	M0	production
TC1617_H_HighGlossPsemi.cof	white	M0	production
TC1617_U_Thermal.cof	white	M0	production
TC1617_H_Kimura.cof	white	M0	production

[confirm](#)

Qualifying Substrate Color affect on Print

Steps:

1. Qualify substrates- Print target on all important substrates
 - *Use ChromaChecker substrate qualifier to group substrates per EF*

Print Condition Qualifier

Device:

Track:

Number of files:

Number of groups:

 = ΔE threshold:

Mode:

Group qualification

Group 1:		CRPC
2	TC1617_H_Polyol	CRPC4 1

Group 2:		CRPC	max. ΔE	avg. ΔE	std. dev. ΔE
1	TC1617_H_HPSemiGlass.pdf	CRPC5	2.60	2.60	0.00
3	TC1617_H_HighGlossPharma.pdf	CRPC4 1	2.60	2.60	0.00


Group 3:		CRPC	max. ΔE	avg. ΔE	std. dev. ΔE
4	TC1617_H_Thermal.pdf	CRPC5	2.91	2.91	0.00
5	TC1617_H_Kimluna.pdf	CRPC4	2.91	2.91	0.00

Qualifying Substrate Color affect on Print

Steps:

1. Qualify substrates- Print target on all important substrates
 - *Use ChromaChecker substrate qualifier to group substrates per EF*

Print Condition Qualifier

Device:	Printer Audit
Track:	Compare Printing Substrates
Number of files:	5
Number of groups:	1
 = ΔE threshold:	<input type="text" value="5.0"/>
Mode:	<input type="button" value="0.0%"/>
<input type="button" value="Calculate"/>	

Group qualification

Group 1:		CRPC	max. ΔE	avg. ΔE	std. dev. ΔE
2	TC1517_H_Poly.tif	CRPC4 	5.04	4.42	0.49
3	TC1517_H_High Gloss Plastic.tif	CRPC4 	3.66	3.12	0.37
1	TC1517_H_HPSemGloss.tif	CRPC5	4.33	3.42	0.79
4	TC1517_H_Thermal.tif	CRPC5	4.45	3.27	0.79
5	TC1517_H_Kindara.tif	CRPC4	5.04	3.75	0.93

Qualifying Substrate Color affect on Print

Steps:

1. Qualify substrates- Print target on all important substrates
 - *Use ChromaChecker substrate qualifier to group substrates per EF*

Print Condition Qualifier

Device:	Printer Audit
Topic:	Compare Printing Substrates
Number of files:	5
Number of groups:	5
EF =  ΔC threshold:	2.9
Model:	900-9

Group qualification

Group 1:		CRPC
1	TCT1612_H_Polymerized	CRPC
Group 2:		CRPC
2	TCT1612_H_Polymerized	CRPC
Group 3:		CRPC
3	TCT1612_H_High Gloss Thermalized	CRPC
Group 4:		CRPC
4	TCT1612_H_Thermalized	CRPC
Group 5:		CRPC
5	TCT1612_H_Silver Metal	CRPC

Characterization (ICC Profile Creation)

Steps:

1. Qualify substrates- Print target on all important substrates
 - *Use ChromaChecker substrate qualifier to group substrates per EF*
2. Choose Characterization software to use: ChromaChecker

Characterization (ICC Profile Creation)

Steps:

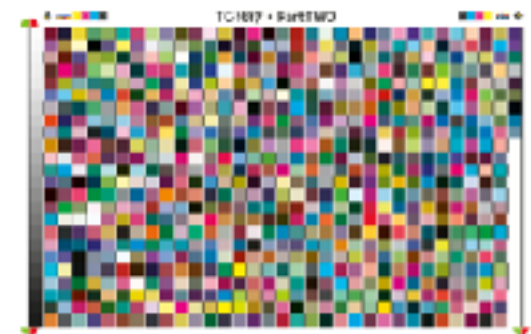
1. Qualify substrates- Print target on all important substrates
 - *Use ChromaChecker substrate qualifier to group substrates per EF*
2. Choose Characterization software (ChromaChecker)
3. Choose print target (IT8 7/5) compatible w/capture device



iSIS & FD9 target



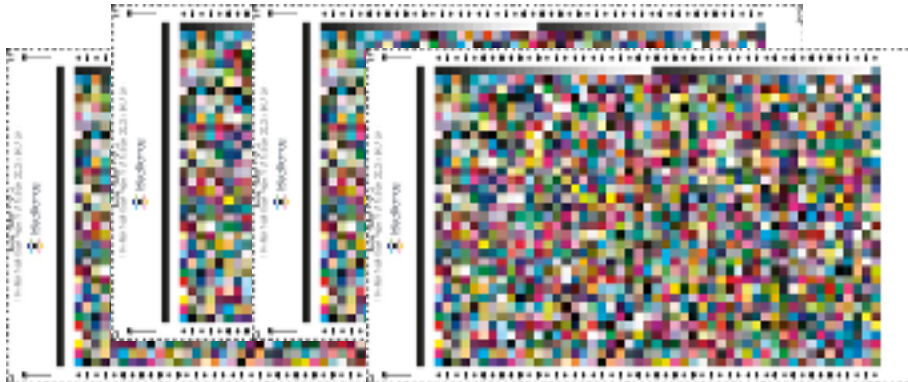
i1iO & Barbieri target



Characterization (ICC Profile Creation)

Steps:

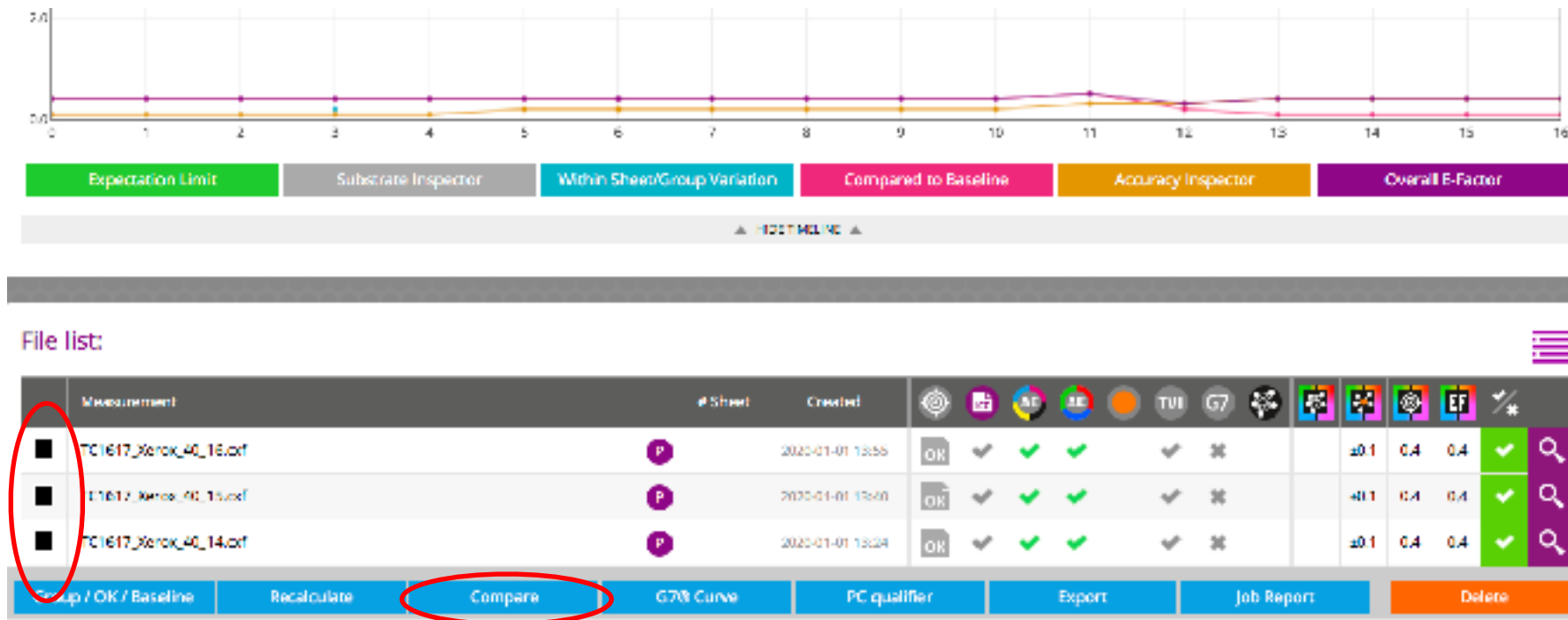
1. Qualify substrates- Print target on all important substrates
 - *Use ChromaChecker substrate qualifier to group substrates per EF*
2. Choose Characterization software (ChromaChecker)
3. Choose print target (IT8 7/5) compatible w/capture device
4. Print multiple times immediately after calibration done
 1. Ensure color management turned off in RIP, Record Calibrations



Characterization (ICC Profile Creation)

Steps:

5. Measure multiple targets, **Compare** differences, Average

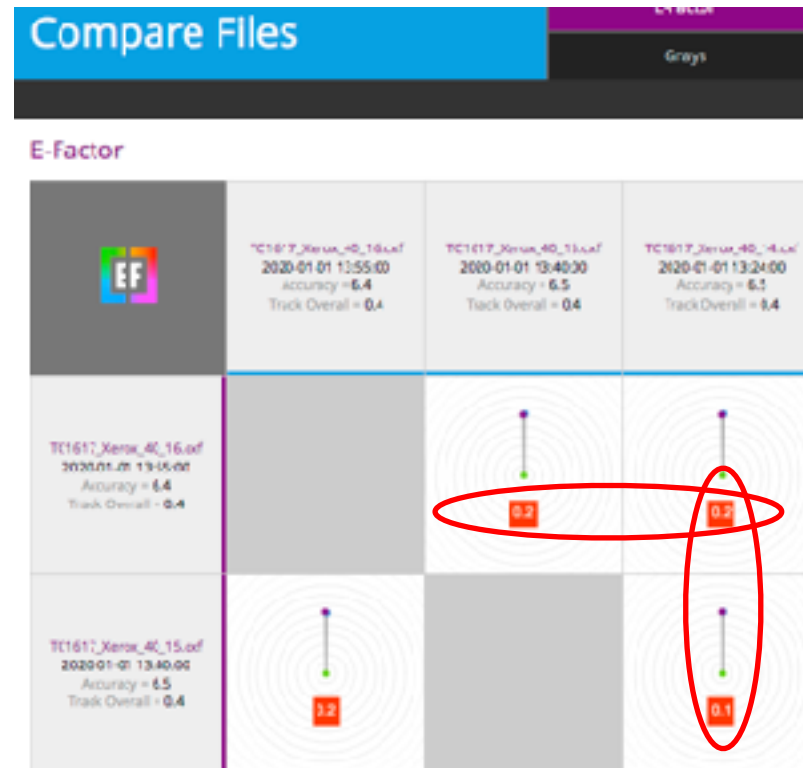


Characterization (ICC Profile Creation)

Steps:

5. Measure multiple targets, **Compare differences**

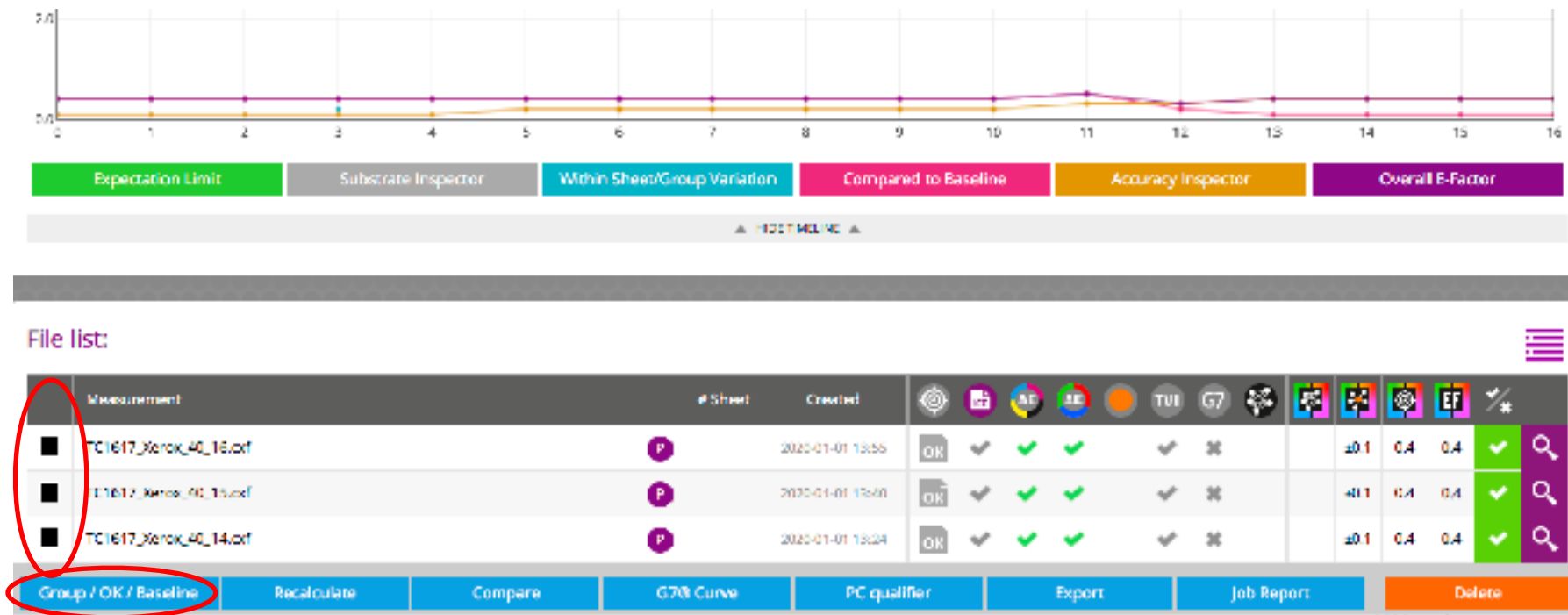
All values are within acceptable E-Factor values= .2



Characterization (ICC Profile Creation)

Steps:

5. Measure multiple targets, Compare differences, **Average**
*Choose **Group**- it will average all measurements*



Characterization (ICC Profile Creation)

Steps:

5. Measure multiple targets, Compare differences, **Average**
Name Group- Confirm

New Group

Group name

Flag

Baseline

☒ Create variation baseline
☒ Set as current baseline

OK Sheet

☐ OK Sheet
☐ Set as current OK sheet

Global / track specific

☐ Make global OK Sheet / Baseline

Group files:

File name	Backing	Media cond.	Mode
TC1617_Xena_40_11.pdf	white	N0	production
TC1617_Xena_40_11.pdf	white	N0	production
TC1617_Xena_40_14.pdf	white	N0	production
TC1617_Xena_40_11.pdf	white	N0	production

confirm

Characterization (ICC Profile Creation)

Steps:

6. Create ICC Profile for given print condition (substrate)

Click on magnifying glass:

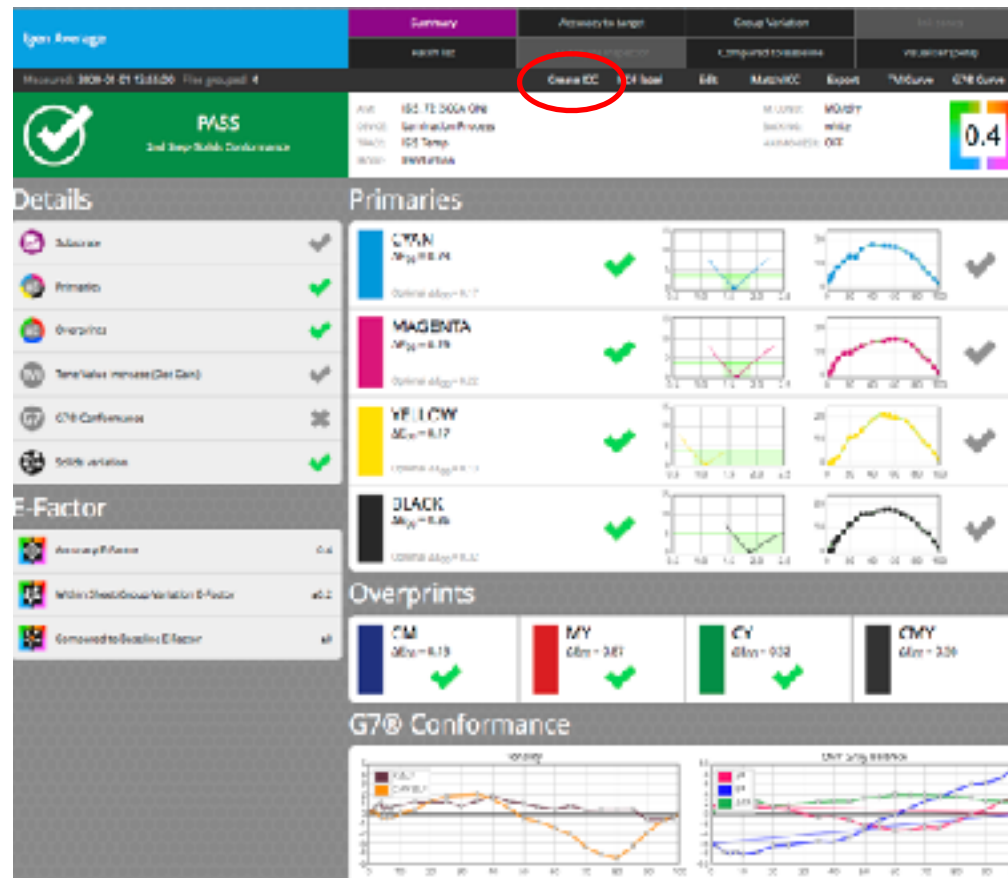
File list:

	Measurement	# Sheet	Created															
	IC1817_Xerox_40_16.cdf	P	2020-01-01 13:55	OK	✓	✓	✓		✓	✗			±0.1	0.4	0.4	✓		
	Igen Average	P	0	2020-01-01 13:55	OK	✓	✓	✓		✓	✗	✓	±0.2	±0	0.4	0.4	✓	

Characterization (ICC Profile Creation)

Steps:

6. Create ICC Profile for given print condition (substrate)



Characterization (ICC Profile Creation)

Steps:

6. Create ICC Profile for given print condition (substrate)
*Customize ICC Profile settings if necessary- **Export ICC Profile***

Measured: 2020-01-01 13:55:00 Files grouped: 4

Summary Accuracy to target Group Variation Ink zones

Patch list Substrate Inspector Compared to Baseline Visualizer (beta)

Create ICC PDF label Edit Match ICC Export Tint Curve G7B Curve

AIM: (SCCA DN) M. COND: M0 /dry
DEVICE: Lamination Process BACKING: white
TRACE: ISIS Temp HARMONIZER: OFF
MODE: Production

0.4

Export ICC

ICC creation parameters

Ink Limit

Total Ink Limit: 295

Black

Start Black: 10

Max Black: 85

Black Intensity: 80

GCR

GCR Neutral: 80

GCR Color: 80

EXPORT

Igen_Coated.icc

ICC Profile Inspector (Optional Assessments)

Evaluate Many Aspects of ICC Profiles




- Gamut Size

Profile built-in info

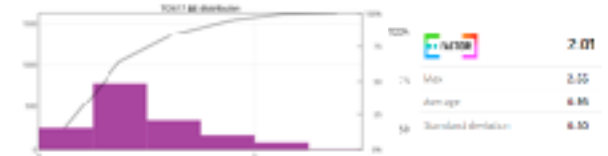
Profile class	Output device profile
Color space	CMYK (14 channels)
Connection space	Lab (3 channels)
Gamut volume	520,270

- Profile Match Integrity (LAB Round trip calculation)

 E-FACTOR	0.77
Max	2.09
Average	0.20
Standard deviation	0.28

- Profile Comparisons- Gamut and Color Rendering

Difference between the two ICC Profiles



- More... Review ICC Profile Inspector

ICC Profile Inspector

Characterization Summary

Planning and Execution is Critical for Success

- Qualify how many profiles to create based on substrates
- Choose correct target for print and capture device
- Measure multiple targets precisely
- Compare measurements, make sure they are precise
- Create ICC Profile, evaluate integrity
- Next, you will load in your workflow conversion tools



Color Control Conversion

Presented by: David Hunter

STEPS TO DEFINING PROCESS DISCIPLINE

How to meet or exceed E-Factor?

Fourth of the 5 C's of Color Control

Capture — assess instrumentation capabilities

Calibration — make device consistent to itself & over time

Characterization — define device gamut and create profile

Conversion — map one gamut to another in the workflow

Conformance — verify new results and meet expectations

Conversion Requirements- RIP or Server

Make Conversion work... Requires Workflow software:

- Software that performs conversion (RIP, Color Server)
 - *Choose Rendering Intent, Black Point Compensation, CMM*
- Defined Input/Source ICC Profile: RGB, CMYK, nColor
- Defined Output/Destination ICC Profile: RGB, CMYK, nColor
- Spot Color Conversion- need “Named color” LUT support
- Direction analogy, have to know where file is starting from to know how to get it (convert) to the destination

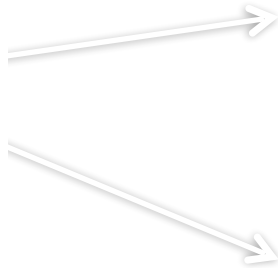
Conversion of Images and PDFs

Characterization Defines Gamuts (Languages): Convert

- If No Conversion- Color is *different*, every printer *different*
- Goal- Reproduce the Original Color



C M Y K
3, 62, 19, 0



C M Y K
3, 62, 19, 0



C M Y K
3, 62, 19, 0



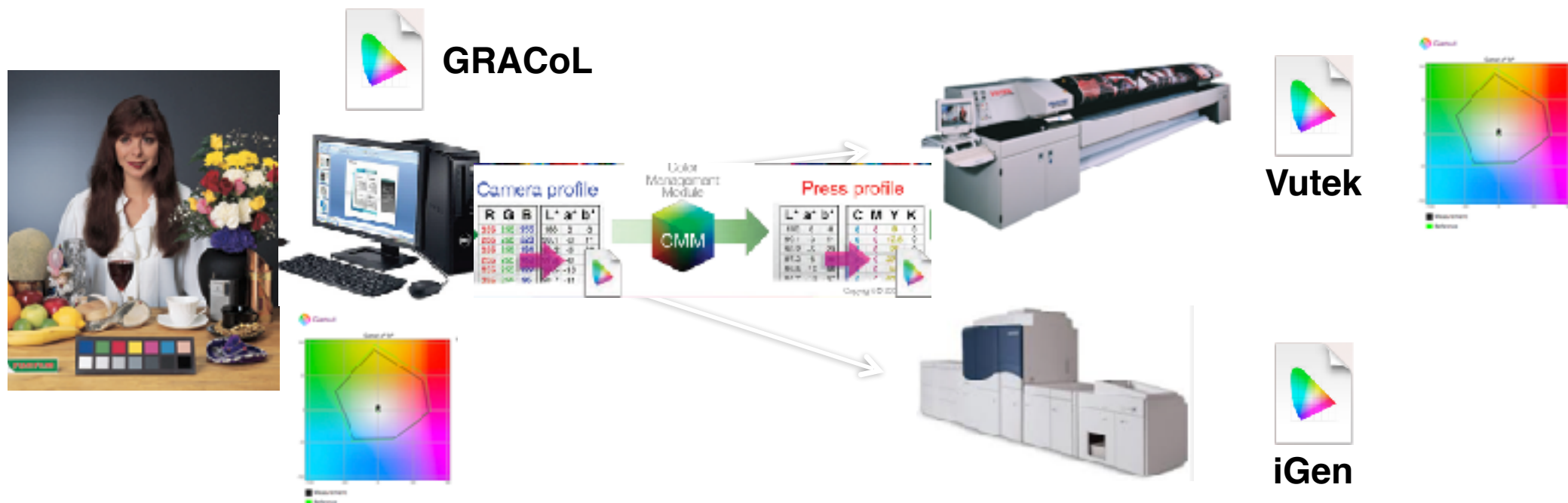
Conversion of Images and PDFs

Characterization Defines Gamuts (Languages): Convert

- Goal- Reproduce the Original Color

Input/Source Profile

Output/Destination Profile



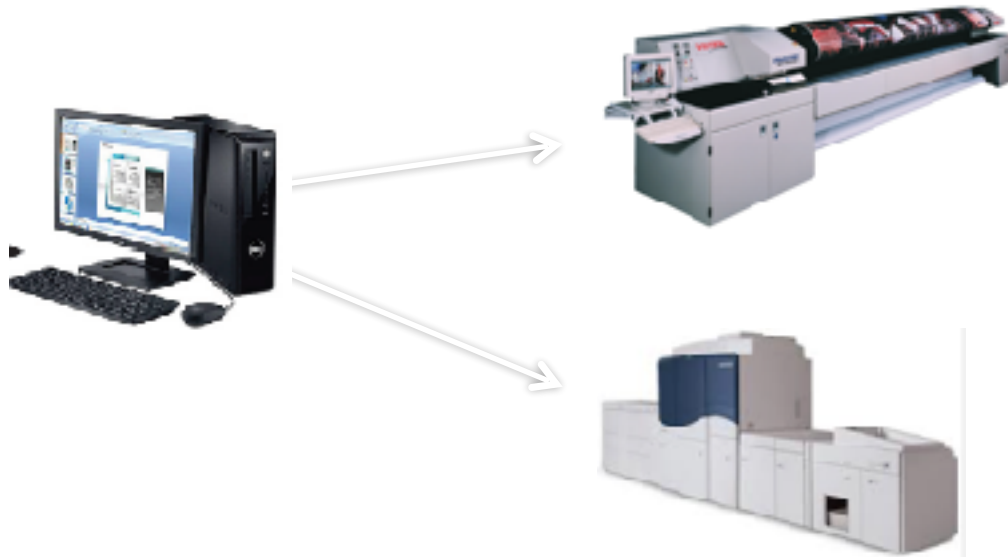
Conversion of Images and PDFs

Characterization Defines Gamuts (Languages): Convert

- Goal- Reproduce the Original Color



C M Y K
3, 62, 19, 0



C M Y K
10, 53, 9, 0



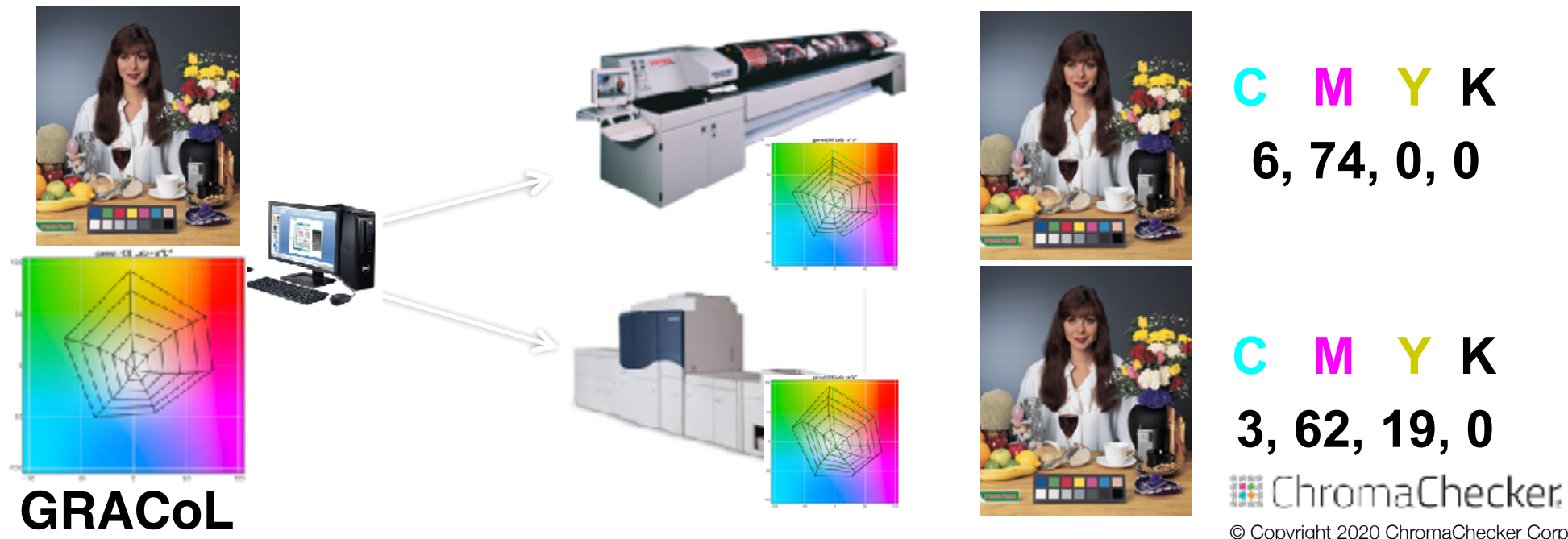
C M Y K
6, 74, 11, 0



Conversion of Files and Documents

Converting from current space to desired print space

- Convert pages and images, *Universal Translator*
- Convert brand colors- Named colors to look up table (LUT)
- Workflow/RIP function, some support, some don't



Conversion of Brand Colors

Same CMYK values render differently on different printers

- Need to Convert specific to different ICC Profiles



Conversion of Brand Colors

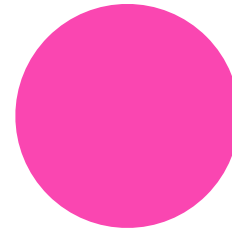
Spot Color Look Up Table (LUT)

- Renders Brand color (Lab) to device CMYK values

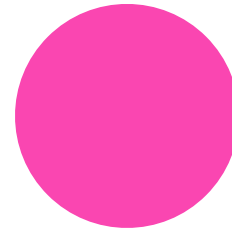
RIP or Server has
to support LUTs



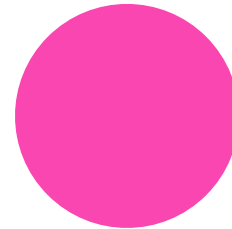
C M Y K
6, 74, 0, 0



C M Y K
3, 62, 19, 0



C M Y K
1, 75, 1, 0





Color Control Conformance

Presented by: David Hunter

STEPS TO DEFINING PROCESS DISCIPLINE

How to meet or exceed E-Factor?

Fifth of the 5 C's of Color Control

Capture — assess instrumentation capabilities

Calibration- make device consistent to itself & over time

Characterization — define device gamut and create profile

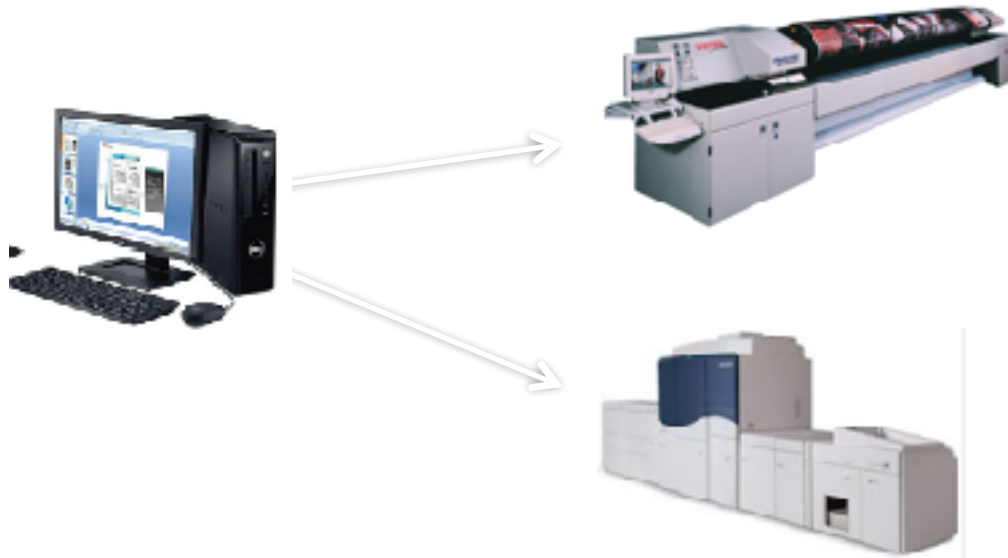
Conversion — map one gamut to another in the workflow

Conformance — verify new results and meet expectations

Conformance of Workflow

Assess that Salable color is Manufactured

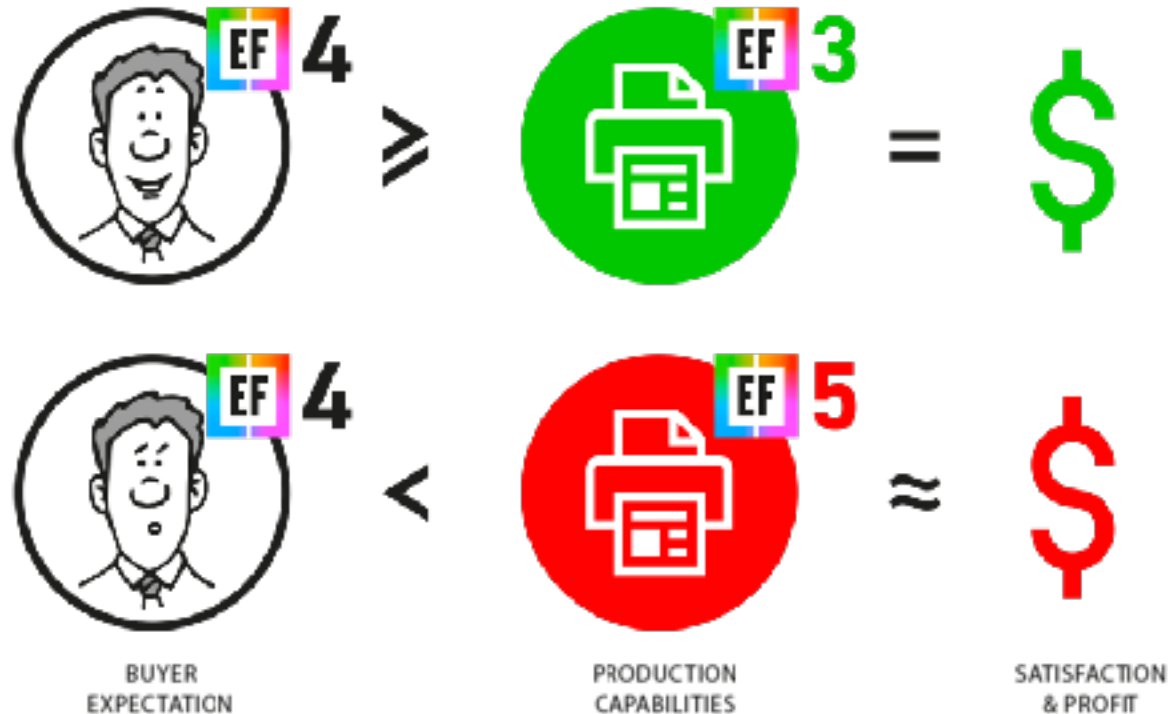
- Goal- Reproduce the Original Color



Conformance- is it Salable?

Summary/Result of all 5 C's - is the print salable?

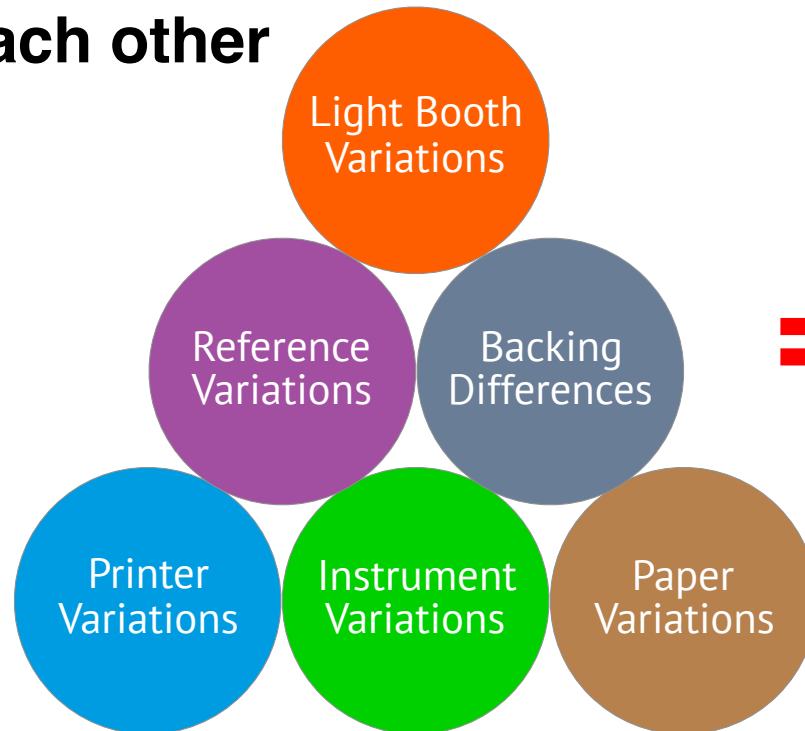
- Does Print meet customer expectations (E-Factor)?
- Provide Job reports proving to customer job success



Each Variable Stacks on Top of Each Other

Cumulative Process:

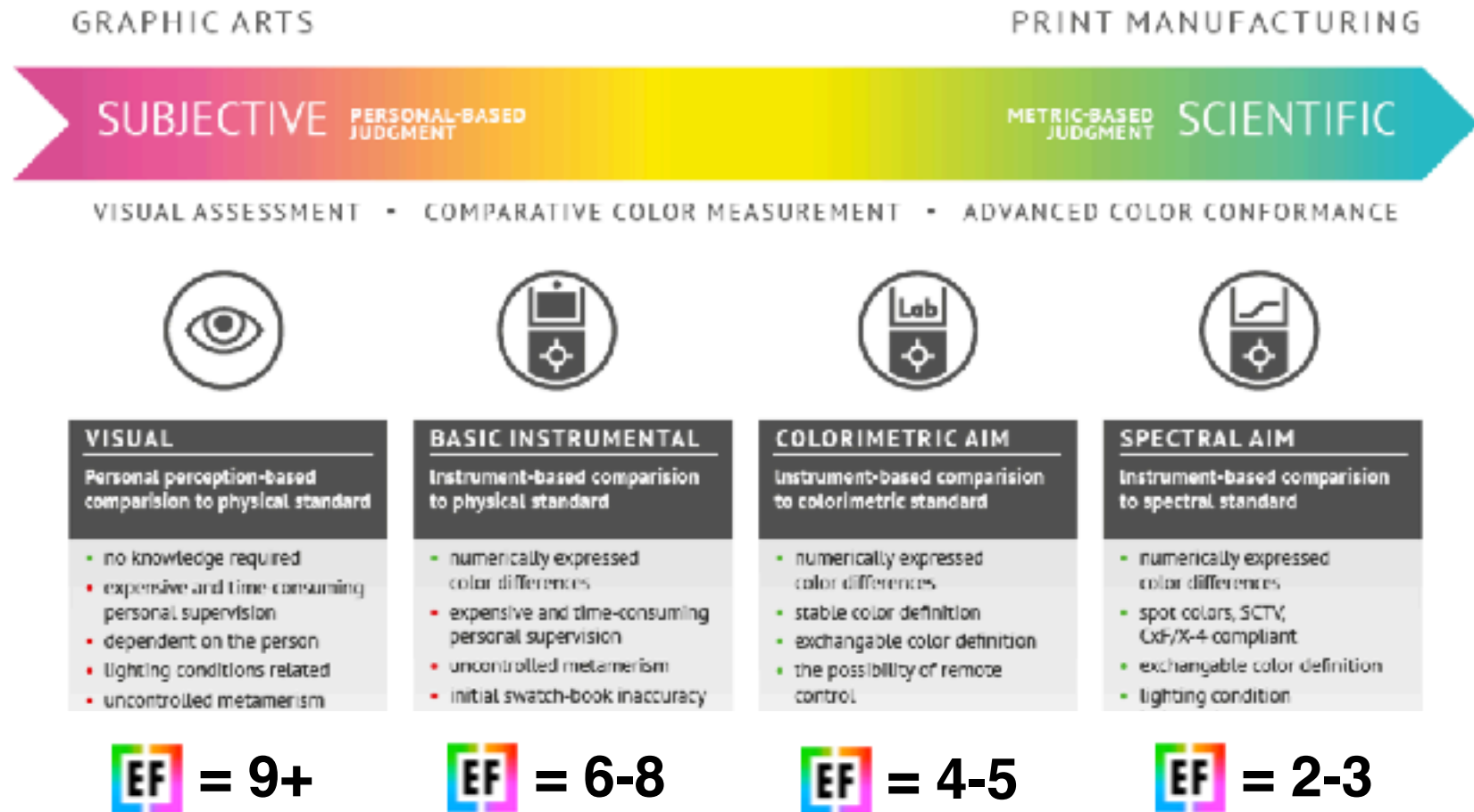
- Each Workflow Component is tracked using ΔE or E-Factor
- They all stack on each other



$$\text{or } 12 \text{ EF} = 8 \text{ EF} \text{ or } 5 \text{ EF}$$

Salable Print Manufacturing

Road Map to Analytics Based Print Manufacturing



EPSON PROOFER

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	815 files 3.0		Epson Inline SUB	0.1	GRACoL2013_CRPC6	2.1	
<input type="checkbox"/> Uncoated	21 files 3.0		Epson Inline		GRACoL2013UNC_CRPC6	2.0	

SHOW HIDDEN SETUP ASSISTANT

HP INDIGO 09

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	24 files 3.0				SCCA GRACoL2013_CRPC6	2.0	
<input type="checkbox"/> Uncoated	4 files 3.0				SCCA OKAverage	2.5	
<input type="checkbox"/> Indigo Baseline	7 files 3.0				SCCA GlobalHPIndigoTonge_v2	1.7	

SHOW HIDDEN SETUP ASSISTANT

CANON_ARIZONA 360

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	1 files 4.0			3.0	GRACoL2013_CRPC6	3.4	
<input type="checkbox"/> Canon_Arizona_Full Gamut	3 files 4.0				SCCA Arizona360_Styrene_V316_1 bit	0.5	

SHOW HIDDEN SETUP ASSISTANT

MANROLAND

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	15 files 4.0		ARC Litho Resene	1.2	SCCA GRACoL 2013_CRPC6	3.6	
<input type="checkbox"/> PP film	9 files 5.0				SCCA CGATS21_CRPC6	3.8	
<input type="checkbox"/> Metalized (printed white)	14 files 6.0				SCCA CGATS21_CRPC6d	4.0	
<input type="checkbox"/> Uncoated Offset	33 files 6.0				SCCA GRACoL2013UNC_CRPC6	6.1	

SHOW HIDDEN SETUP ASSISTANT

EPSON PROOFER

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	815 files 3.0		Epson Inline SUB	0.1	GRACoL2013_CRPC6	2.1	
<input type="checkbox"/> Uncoated	21 files 3.0		Epson Inline	0.3	GRACoL2013UNC_CRPC6	2.0	
SHOW HIDDEN SETUP ASSISTANT							

HP INDIGO 09

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	24 files 3.0		High-Gloss	0.5	SCCA GRACoL2013_CRPC6	2.0	
<input type="checkbox"/> Uncoated	4 files 3.0		Cougar_Smooth_text	0.3	SCCA OKAverage	2.5	
<input type="checkbox"/> Indigo Baseline	7 files 3.0		PVC	1.2	SCCA GlobalHPIndigoTerge_v2	1.7	
SHOW HIDDEN SETUP ASSISTANT							

CANON_ARIZONA 360

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	1 file 4.0		Textile Banner	1.7	GRACoL2013_CRPC6	3.4	
<input type="checkbox"/> Canon_Arizona_Full Gamut	3 files 4.0		Water Resistant Matte Canvas 375	0.3	SCCA Arizona360_Styrene_V316_1 bit	0.5	
SHOW HIDDEN SETUP ASSISTANT							

MANROLAND

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	15 files 4.0		ABC Litho House	1.2	SCCA GRACoL2013_CRPC6	3.6	
<input type="checkbox"/> PP film	9 files 5.0		Film Ultra-white Gloss	0.3	SCCA CGATS21_CRPC6	3.8	
<input type="checkbox"/> Metalized (printed white)	14 files 6.0		MW 24	1.7	SCCA CGATS21_CRPC6	4.0	
<input type="checkbox"/> Uncoated Offset	33 files 6.0		Williamsburg Offset	0.3	SCCA GRACoL2013UNC_CRPC6	6.1	
SHOW HIDDEN SETUP ASSISTANT							

EPSON PROOFER

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	815 files 3.0		Epson Inline SUB	0.1	GRACoL2013_CRPC6	2.1	
<input type="checkbox"/> Uncoated	21 files 3.0		Epson Inline	0.3	GRACoL2013UNC_CRPC3	2.0	

SHOW HIDDEN SETUP ASSISTANT

HP INDIGO 09

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	24 files 3.0		High-Gloss	0.5	SCCA GRACoL2013_CRPC6	2.0	
<input type="checkbox"/> Uncoated	4 files 3.0		Cougar_Smooth_text	0.3	SCCA OKAverage	2.5	
<input type="checkbox"/> Indigo Baseline	7 files 3.0		PVC	1.2	SCCA GlobalHPIndigoTerge_v2	1.7	

SHOW HIDDEN SETUP ASSISTANT

CANON_ARIZONA 360

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	1 file 4.0		Textile Banner	1.7	GRACoL2013_CRPC6	3.4	
<input type="checkbox"/> Canon_Arizona_Full Gamut	3 files 4.0		Water Resistant Matte Canvas 375	0.3	SCCA Arizona360_Styrene_V316_1 bit	0.5	

SHOW HIDDEN SETUP ASSISTANT

MANROLAND

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	15 files 4.0		ABC Litho House	1.2	SCCA GRACoL2013_CRPC6	9.3	
<input type="checkbox"/> PP film	9 files 5.0		Film Ultra-white Gloss	0.3	SCCA CGATS21_CRPC5	3.8	
<input type="checkbox"/> Metalized (printed white)	14 files 6.0		MW 24	1.7	SCCA CGATS21_CRPC6	4.0	
<input type="checkbox"/> Uncoated Offset	33 files 6.0		Williamsburg Offset	0.3	SCCA GRACoL2013UNC_CRPC3	6.1	

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EPSON PROOFER

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	815 files 3.0		Epson Inline SUB	0.1	GRACoL2013_CRPC6	2.1	
<input type="checkbox"/> Uncoated	21 files 3.0		Epson Inline	0.3	GRACoL2013UNC_CRPC3	2.0	

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HP INDIGO 09

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	24 files 3.0		High-Gloss	0.5	SCCA GRACoL2013_CRPC6	2.0	
<input type="checkbox"/> Uncoated	4 files 3.0		Cougar_Smooth_text	0.3	SCCA OKAverage	2.5	
<input type="checkbox"/> Indigo Baseline	7 files 3.0		PVC	1.2	SCCA GlobalHPIndigoTonge_v2	1.7	

SHOW HIDDEN SETUP ASSISTANT

CANON_ARIZONA 360

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	1 file 4.0		Textile Banner	1.7	GRACoL2013_CRPC6	3.4	
<input type="checkbox"/> Canon_Arizona_Full Gamut	3 files 4.0		Water Resistant Matte Canvas 375	0.3	SCCA Arizona360_Styrene_V316_1 bit	0.5	

SHOW HIDDEN SETUP ASSISTANT

MANROLAND

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	15 files 4.0		ABC Litho House	4.3	SCCA GRACoL 2013_CRPC6	9.3	
<input type="checkbox"/> PP film	9 files 5.0		Film Ultra-white Gloss	0.3	SCCA CGATS21_CRPC5	3.8	
<input type="checkbox"/> Metalized (printed white)	14 files 6.0		MW 24	1.7	SCCA CGATS21_CRPC6	4.0	
<input type="checkbox"/> Uncoated Offset	33 files 6.0		Williamsburg Offset	0.3	SCCA GRACoL2013UNC_CRPC3	6.1	

SHOW HIDDEN SETUP ASSISTANT

EPSON PROOFER

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	815 files 3.0		Epson Inline SUB	0.1	GRACoL2013_CRPC6	2.1	
<input type="checkbox"/> Uncoated	21 files 3.0		Epson Inline	0.3	GRACoL2013UNC_CRPC6	2.0	

SHOW HIDDEN SETUP ASSISTANT

HP INDIGO 09

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	24 files 3.0		High-Gloss	0.5	SCCA GRACoL2013_CRPC6	2.0	
<input type="checkbox"/> Uncoated	4 files 3.0		Cougar_Smooth_text	0.3	SCCA OKAverage	2.5	
<input type="checkbox"/> Indigo Baseline	7 files 3.0		PVC	1.2	SCCA GlobalHPIndigoTonge_v2	1.7	

SHOW HIDDEN SETUP ASSISTANT

CANON_ARIZONA 360

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	1 file 4.0		Textile Banner	1.7	GRACoL2013_CRPC6	3.4	
<input type="checkbox"/> Canon_Arizona_Full Gamut	3 files 4.0		Water Resistant Matte Canvas 375	0.3	SCCA Arizona360_Styrene_V316_1 bit	0.5	

SHOW HIDDEN SETUP ASSISTANT

MANROLAND

Track name		Tools	Substrate		Reference Printing Condition		Details
<input type="checkbox"/> Coated	15 files 4.0		ABC Litho House	4.3	SCCA GRACoL2013_CRPC6	9.3	
<input type="checkbox"/> PP film	9 files 5.0		Film Ultra-white Gloss	0.3	SCCA CGATS21_CRPC6	3.8	
<input type="checkbox"/> Metalized (printed white)	14 files 6.0		MW 24	1.7	SCCA CGATS21_CRPC6	4.0	
<input type="checkbox"/> Uncoated Offset	33 files 6.0		Williamsburg Offset	0.3	SCCA GRACoL2013UNC_CRPC6	6.1	

SHOW HIDDEN SETUP ASSISTANT



Color Control

Define Conformance

Presented by: David Hunter

5 C'S OF COLOR CONTROL AGENDA

Process Discipline for each color printer

Conformance — assess where your printers are at...

Capture — assess instrumentation capabilities

Calibration — make device consistent to itself & over time

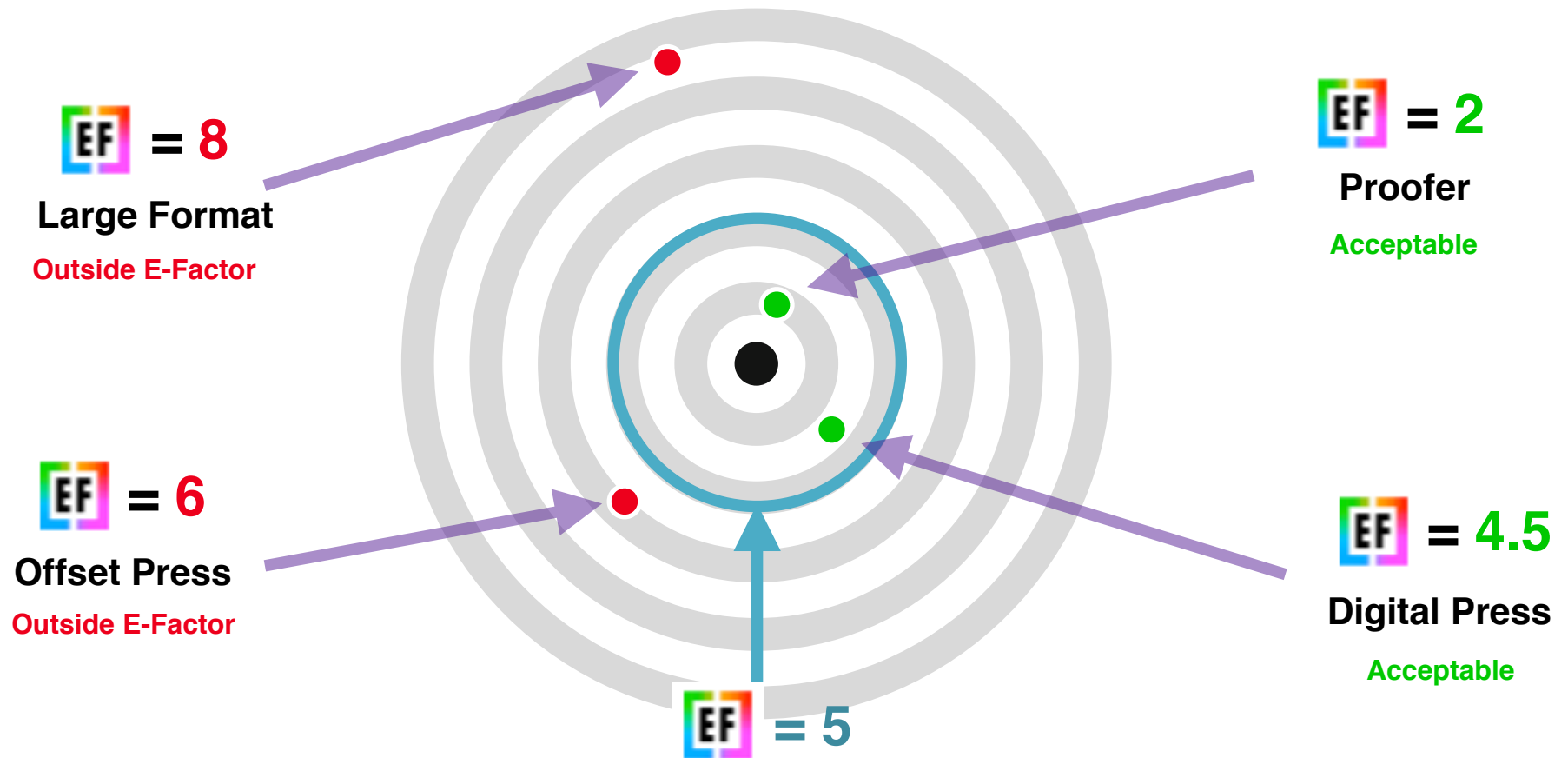
Characterization — define device gamut and create profile

Conversion — map one gamut to another in the workflow

Conformance — verify new results and meet expectations

HOW CLOSE IS “CLOSE ENOUGH”?

What’s your color “match” Expectation Factor



Expectation Factor **EF** is the distance from the bullseye which is salable

Conformance Expectations

Quantify Color Expectations

- Baseline how printing devices are performing
- Visually understand where printers are at today
- Determine if you need to improve any of them
- Look at 5C's to improve printers if required
- Prioritize resources based on expectations

Conformance Expectations

Baseline Kit Purpose

- Visual images to assess color expectations
 - Compare to GRACoL* and to one another
- Easily measure using CC Capture
 - Will assess E-Factor and G7 compliance
 - Works with most measurement instruments
 - Works on Mac or Windows
- Includes PDF (to print) and software to measure

* Requires E-Factor Exercise (\$99) to compare to GRACoL

Conformance Expectations

Baseline Printing Devices

- Register and Download Benchmark App and files
- Print ChromaChecker PDF out on all printers
 - Use Normal Production settings
- Measure using CC Capture
- Record E-Factor value at top
- Lower E-Factor- closer to GRACoL
- Compare to one another



Video Showing How to Use CC Capture S/W

Measure the 3 row target

■ Result:



Determine Conformance Expectations

Visually compare prints to one another

- EF number shows how different from GRACoL*



Proofer

EF = 2



**Large
Format**

EF = 8



**Digital
Press**

EF = 4.5



**GRACoL
Sample**

Included with
E-Factor Exercise
\$99

 **ChromaChecker**

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Determine Expectations

Compare prints to reference and one another

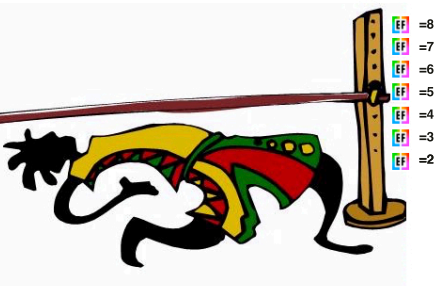
- E-Factor Difference to GRACoL



Determine E-Factor: Expectations

Factors to Consider

- Different customers have different expectations
- Evaluate how satisfied current customers are
- Nothing wrong with having high E-Factor if salable
- Start with higher E-Factor, reduce if necessary
- Don't set the bar too hard to begin with
- Will lose support of operators and staff
- Need to provide more time, tools, training to lower



5 C'S OF COLOR CONTROL SUMMARY

E-Factor affects all aspects of Printer's workflow

Conformance — assess where your printers are at...

Capture — assess instrumentation precision and accuracy

Calibration — how often and what type of calibration required

Characterization — requirement and quality of ICC profile

Conversion — how the conversion is applied to files

Conformance — verify new results and meet expectations