

MAXIMIZING YOUR COLOR POTENTIAL

DEMYSTIFYING COLOR MANAGEMENT

1



Color Communication

CMYK Is Relative (RGB too)


2



Color Communication

CMYK Is Device Dependent
(RGB too)


3



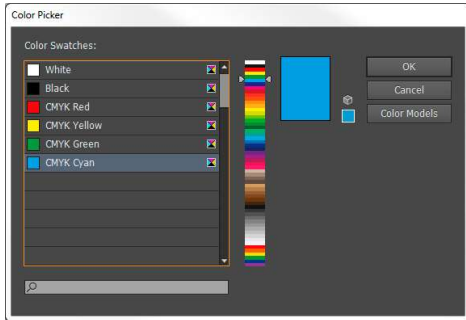
Color Communication

CMYK	<ul style="list-style-type: none">• Cyan• Solid Cyan• 100% Cyan• 100% US Web Coated SWOP Cyan
RGB	<ul style="list-style-type: none">• Red• Solid Red• 255 Red• 255 Adobe RGB (1998) Red

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Color Communication



Cyan

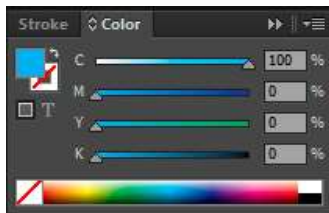


Beer

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Color Communication



100% Cyan



100% Beer

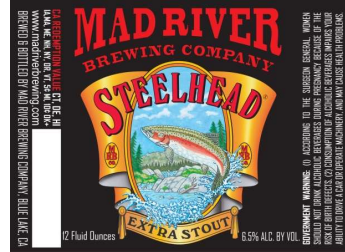
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Color Communication



100% U.S. Web Coated (SWOP) Cyan



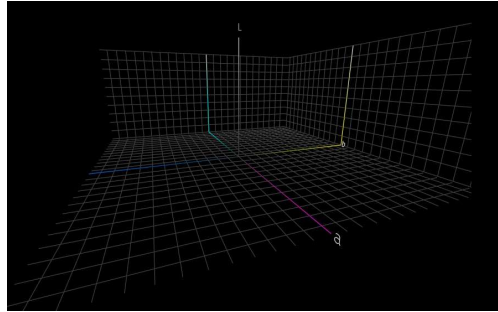
12 Oz. Mad River Steelhead Extra Stout Beer

Color Communication

It's all about the container.

Color Communication

L*a*b* is Device Independent

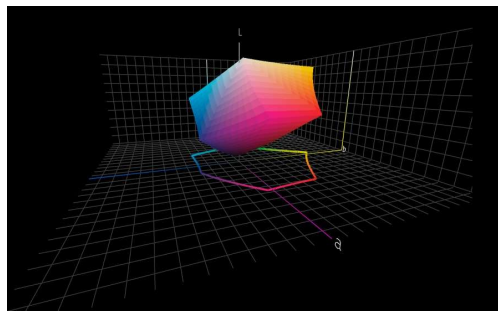


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Color Communication

L*a*b* is Device Independent



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Color Communication

L*a*b*

- Latitude & Longitude of Color
- Used as a Profile Connection Space (PCS)
- Defines colors in an absolute way

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Color Communication

- **L*a*b* is the Destination**

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Color Communication

- **L*a*b*** is the Destination
- **CMYK / RGB** values are how you get there

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Color Communication

- **L*a*b*** is the Destination
- **CMYK / RGB** values are how you get there
- **The Device is the Starting Point**

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Color Communication

- **L*a*b* is the Destination**
- **CMYK / RGB values are how you get there**
- **The Device is a Starting Point**
- **Different Starting Points require different directions to the same destination**

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Color Communication

- **Where you want to go**
 - “Mandalay Bay”
- **Resolves to absolute Latitude & Longitude**
 - 36.091878,-115.175245
- **Starting Point**
 - Oconomowoc, WI
- **Directions**
 - “Head East on I-94...”

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Color Communication

- **Address where you want to go**
 - PANTONE 165C
- **Resolves to absolute L*a*b* values**
 - L*= 65 a*= 59 b*= 68
- **Starting Point**
 - Mimaki_CJV300_ES3_BiDi_1200x1200.ICC
- **Directions**
 - 0C 73M 94Y 0K

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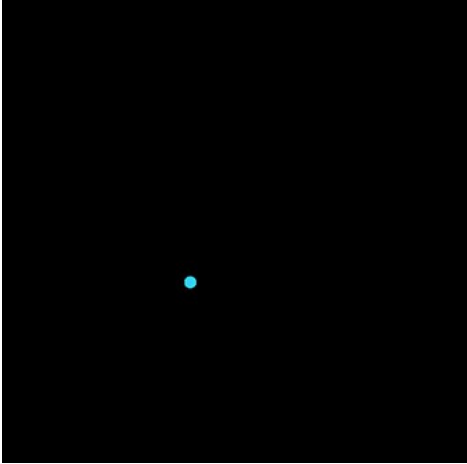
COLOR PROFILES

What Actually Happens in a RIP?

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Color Profiles



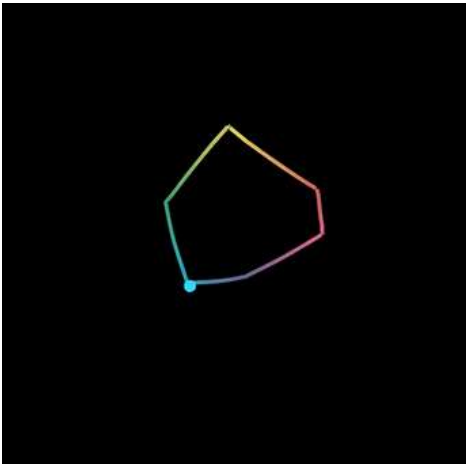
Document requests a color.

100% Cyan

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Color Profiles



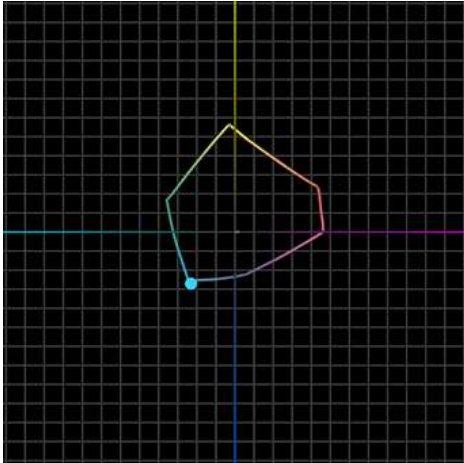
RIP looks at the document color space for a reference.

100% US Web Coated SWOP Cyan

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Color Profiles



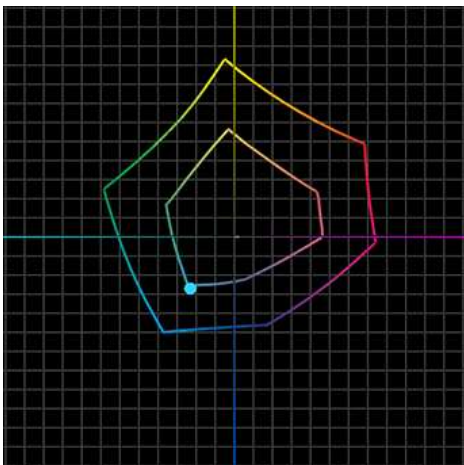
The requested color is referenced in L*a*b*

L* 57 a*-37 b*-45

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Color Profiles



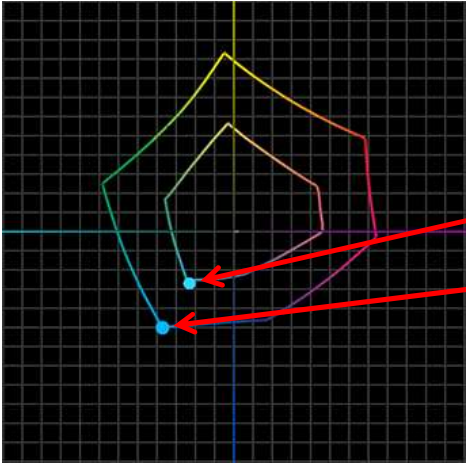
The L*a*b* value is compared to the ICC profile for the output device

L* 57 a*-37 b*-45

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Color Profiles




100% Cyan relative to the input profile may not equal 100% Cyan relative to the output profile.

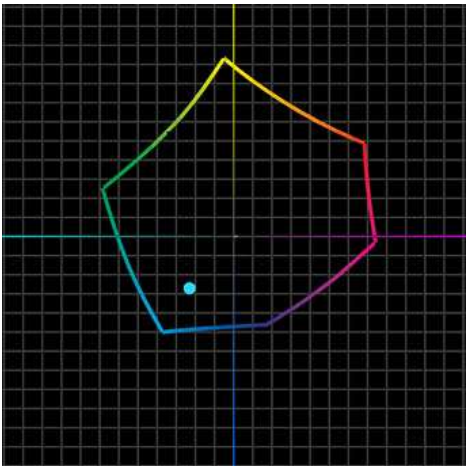
$L^* 57 a^* -37 b^* -45 = 100\% \text{ Cyan}$

$L^* 55 a^* -37 b^* -50 = 100\% \text{ Cyan}$

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Color Profiles



The RIP determines the amount of Cyan relative to the output profile needed in order to match the requested Cyan $L^*a^*b^*$ value.

83% Cyan relative to the Output device

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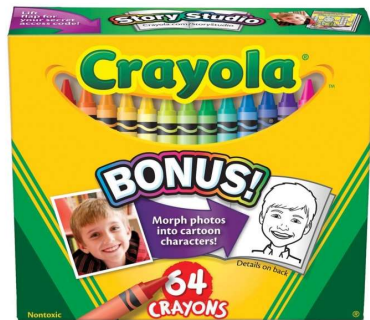
COLOR REALITIES

Pantone Spot Colors

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Color Realities



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Color Realities



www.christianfaur.com

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Color Realities



1,755 Colors



4 Colors

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Color Realities

- **Spot Colors**
- **Define Spot Colors as L*a*b***
- **Send to the RIP as Solid Spot Color**
- **Bypass the input profile and convert directly to the output profile**

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Color Management

Calibration
Characterization
Control

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Color Management

Calibration

1 - Bring the Output Device to a Repeatable State

“It is better to be consistently good, than occasionally great”

2 - Single Channel Ink Restrictions

What is 100% relative to?

3 - Linearization

Does 50% in the file print out 50% relative to the restriction?

4 - Gray Balance (optional)

What is controlling gray balance?

5 - Total Ink Limit

How much ink can be put down at once?

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Color Management

Calibration

1 - Bring the Output Device to a Repeatable State

“It is better to be consistently good, than occasionally great”

- Clean heads, clear nozzles, fresh ink, mechanically sound.

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Color Management

Calibration

2 - Single Channel Ink Restrictions

What is 100% relative to?

Define the container for a single ink.

- Visual?
- Target Density?
- Maximum Saturation?

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Color Management

Calibration

3 - Linearization

All values are relative to the Single Channel Ink Restriction

- Does 50% in the file print out 50% relative to the restriction?

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Color Management

Calibration

4 - Gray Balance (optional)

What is controlling gray balance?

“Linear” does not mean “Neutral”

- Manual curve adjustment?
- G7 curve tool?
- ICC Profile?

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Color Management

Calibration

5 - Total Ink Limit

How much ink can be put down at once?

- Total Ink Limit is relative
- Physical limitations
- Visual Cues

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Color Management

Characterization

1 – Define the behavior of the output device

Describes the measured output of a defined input.

- The profile is only valid if the output device still responds the same.
- If the response changes, either the device has to be brought back to the known state or the profile has to be redone.

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Color Communication




Calibrated
Known State

Profile
Known State

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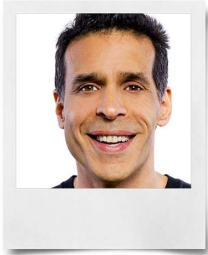


Color Communication



Machine Drift

≠




**Profile
Known State**

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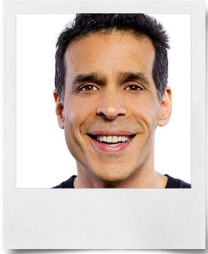
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Color Communication



**Recalibrate
(return to known state)**

=



**Profile
Known State**

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Color Communication



Machine Drift

=



New Profile

New State

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Color Management

Control

1 – Know where you are and be able to prove it.

You can't improve what you cannot measure.

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Color Management

Control

2 – Measurement removes subjectivity

You can't improve what you cannot measure.



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Color Management

Control

3 – Capture trend data to understand printer response.

Knowledge is Power.

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Color Realities

- **Best Practices**
 - Always Embed Input Profiles
 - Always Honor Embedded Profiles
 - Use L*a*b* values or RGB to expand your gamut.

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