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UL PROSPECTOR

How to Meet Quality and Sustainability Goals with Digital Color Management Tools

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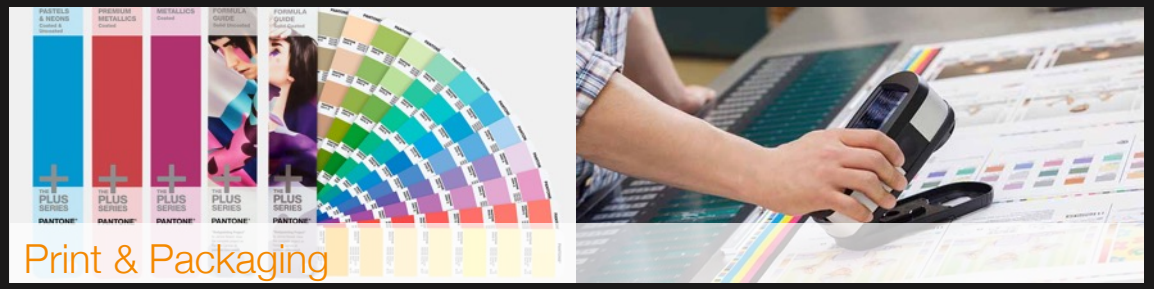
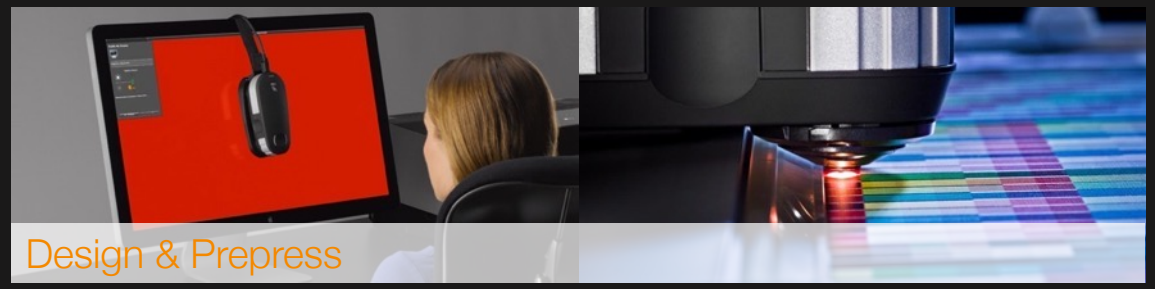
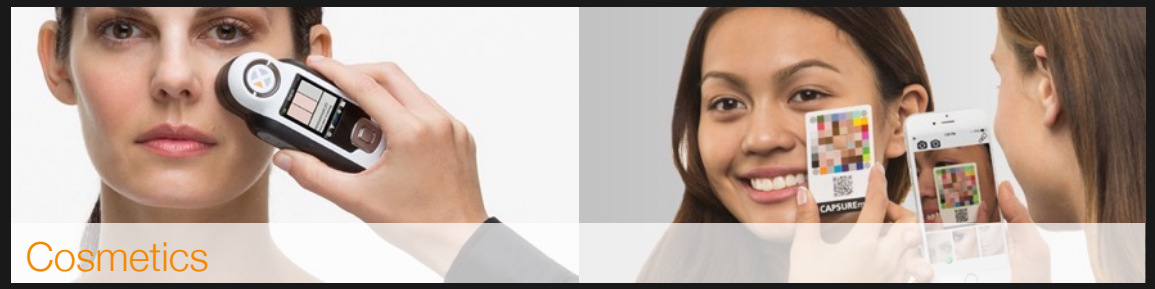
X-RITE / PANTONE®

Advance the Creation, Communication and Delivery of Color and Appearance







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Poll question

Do you currently use color measurement instrumentation?

1. Yes, an X-Rite device
2. Yes, a different industry device
3. Yes, I'm not sure the make
4. No

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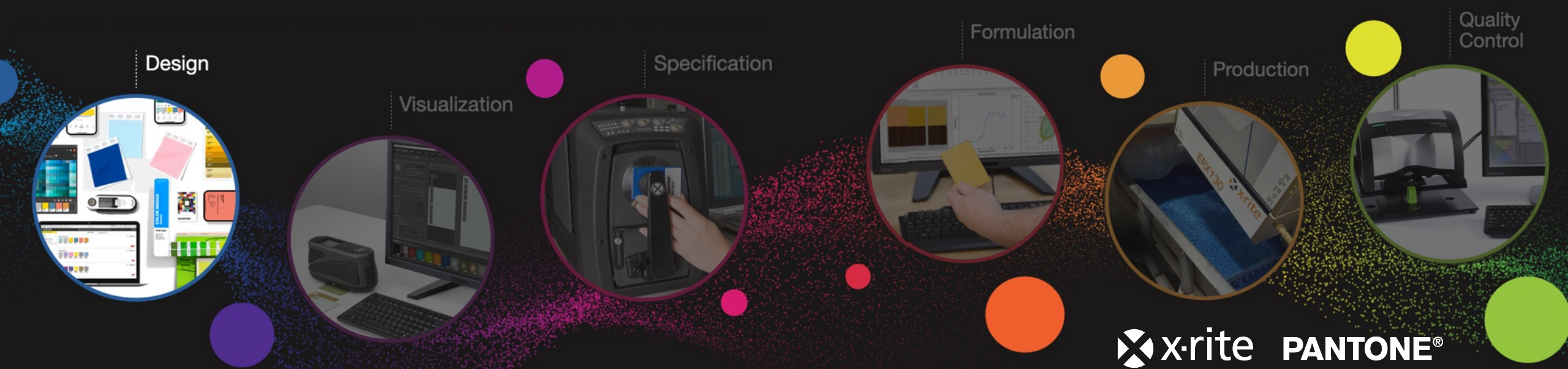

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The Story of Lisa and Mike

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Lisa is a designer and has to create new colors almost daily.

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She’s collecting all kinds of inspirational items for her color choices.

Mostly she shares them with her suppliers, like Mike to get a prototype sample of the material she needs in that color.

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But she doesn’t know how to specify the color for a material in a way that she finally gets what she wants.

Quite often she gets …

this …

… and not that.

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What has happened here?

Lisa provided a painted sample to Mike, who made a manual match of that fleece fabric. She looked at her reference under a fluorescent light source, He had an incandecent light source.

Incandecent

Fluorescent

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What has happened here?

1. Lisa and Mike had mismatching lighting conditions
2. Materials and colorants have been different

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What has happened here?

3. Lisa and Mike have been facing «METAMERISM»

Metamerism is caused by matching a color made of one combination of colorants with different colorants.
Hence colors might match under one lightsource, but not under another

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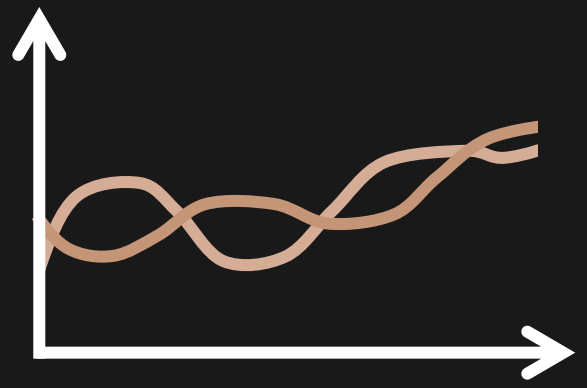
What has happened here?

3. Lisa and Mike have been facing «METAMERISM»



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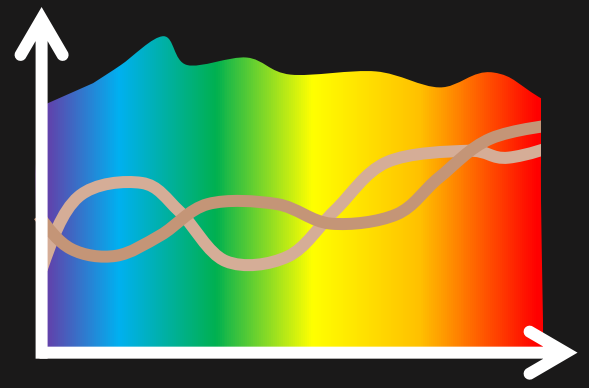

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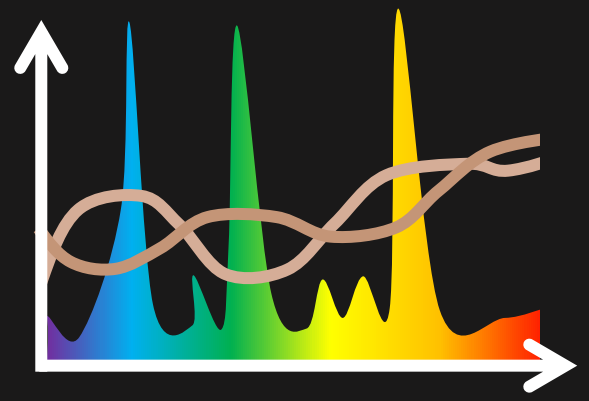

Metamerism is caused by matching a color made of one combination of colorants with different colorants.
Hence colors might match under one lightsource, but not under another

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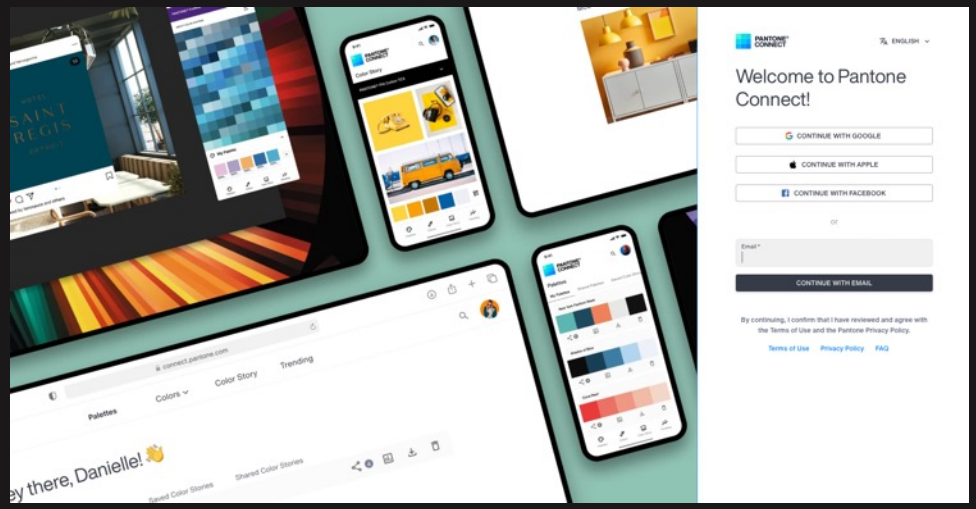
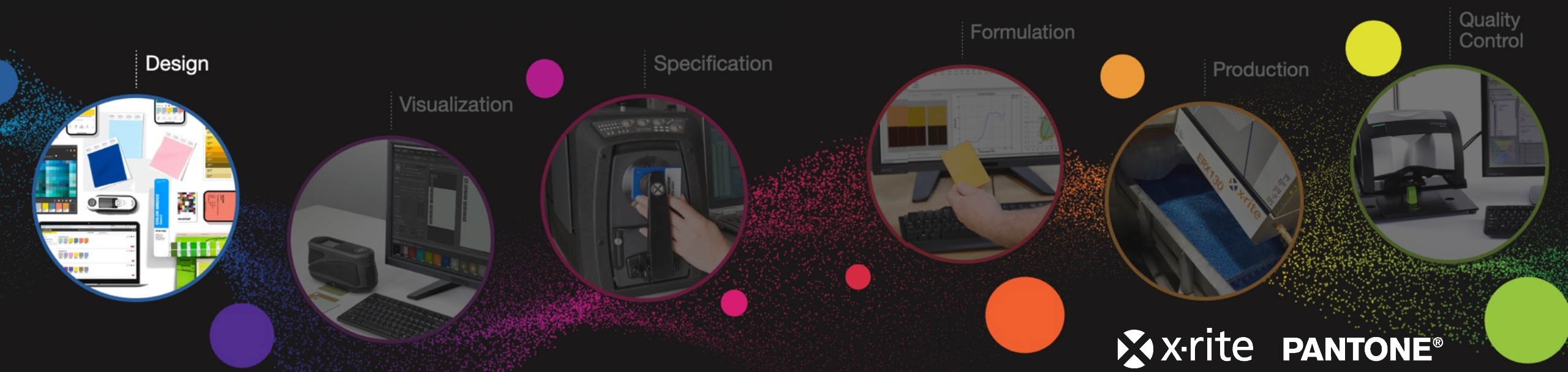
How to solve Lisa's Problem?

Go digital!

Use digital color references to physically accurate color specification, like PANTONE Colors



PANTONE® Connect



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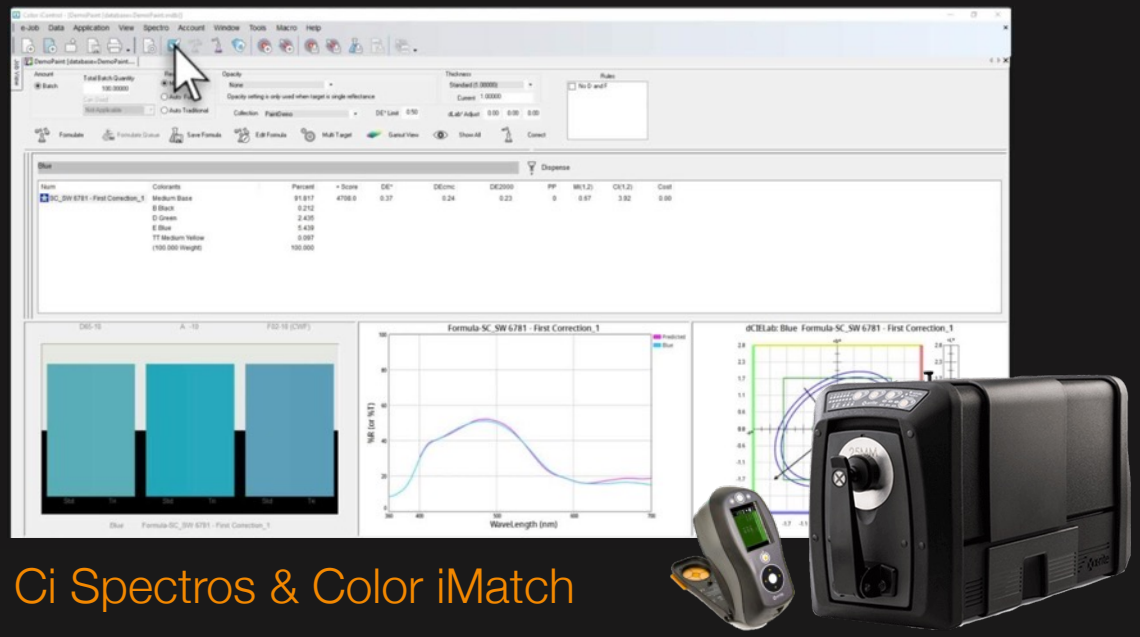
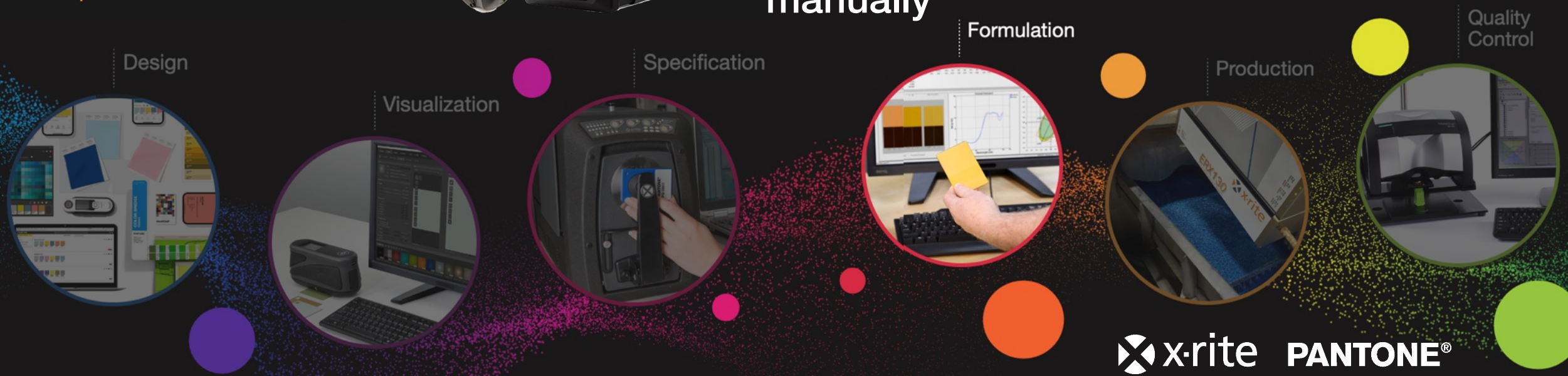


Ci Spectros & Color iMatch

How to solve Mike's Problem?

Go digital!

Use Computer Aided Color Formulation to match colors metamerism free and with the required accuracy much faster than manually



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Benefits

Task	Manual	Computer aided
Steps to Match	10 – 15	1 – 3
Extra Steps to match Transparency	2 – 5	0
Pigment loading	up to 50% too high	100% correct
Reproduction speed incl. batch correction	60 minutes	5 minutes
Overall time to colour match	up to 4 hours	1 hour
Rejection risk	very high	very low

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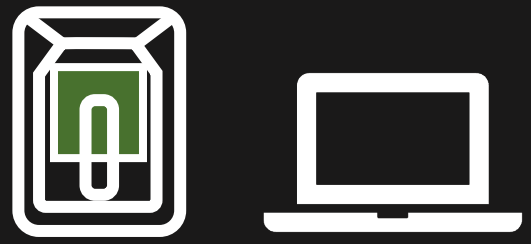
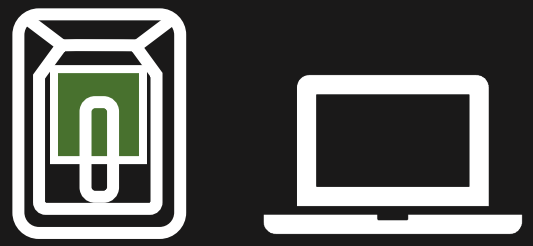
How does it work?



Measure Customer Sample

x-rite PANTONE® UL PROSPECTOR

How does it work?

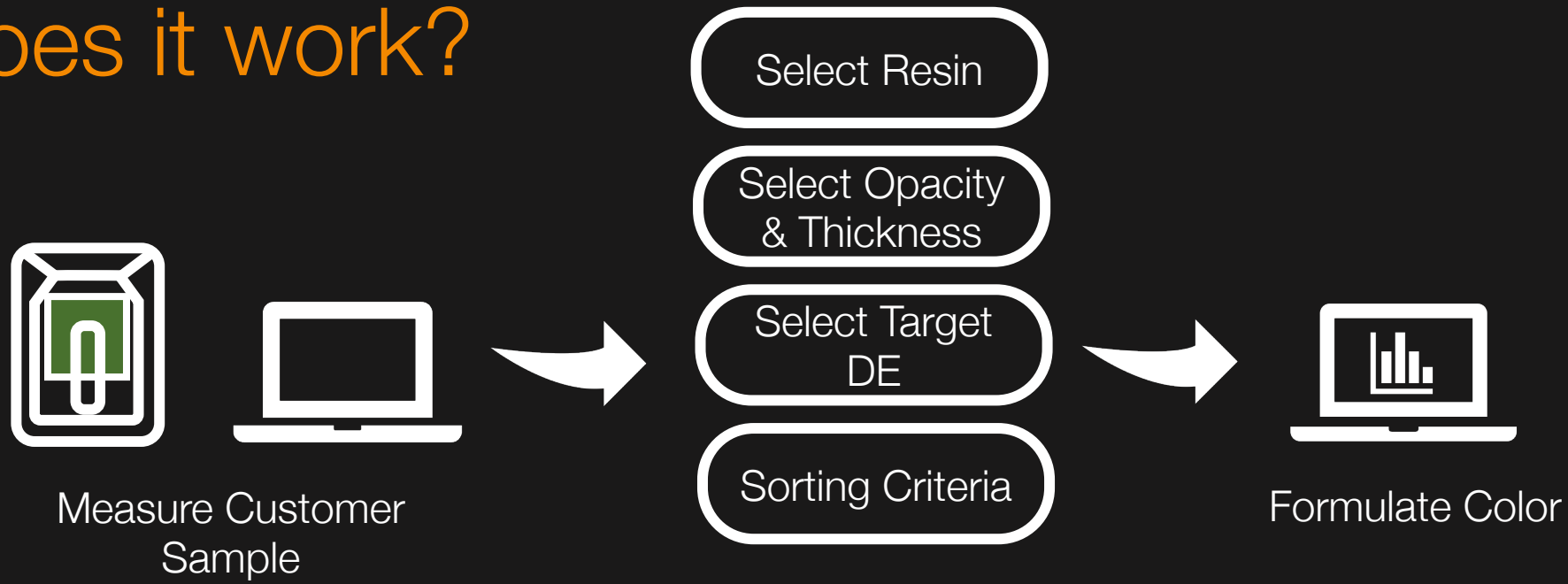


Measure Customer Sample

- Select Resin
- Select Opacity & Thickness
- Select Target DE
- Sorting Criteria

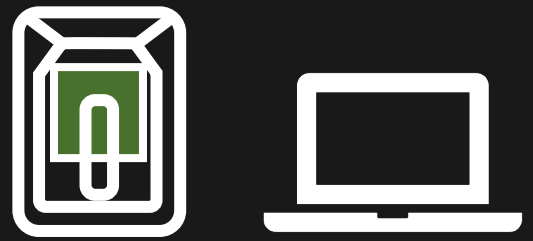
x-rite PANTONE® UL PROSPECTOR

How does it work?



x-rite PANTONE® UL PROSPECTOR

How does it work?



Measure Customer Sample

Select Resin

Select Opacity & Thickness

Select Target DE

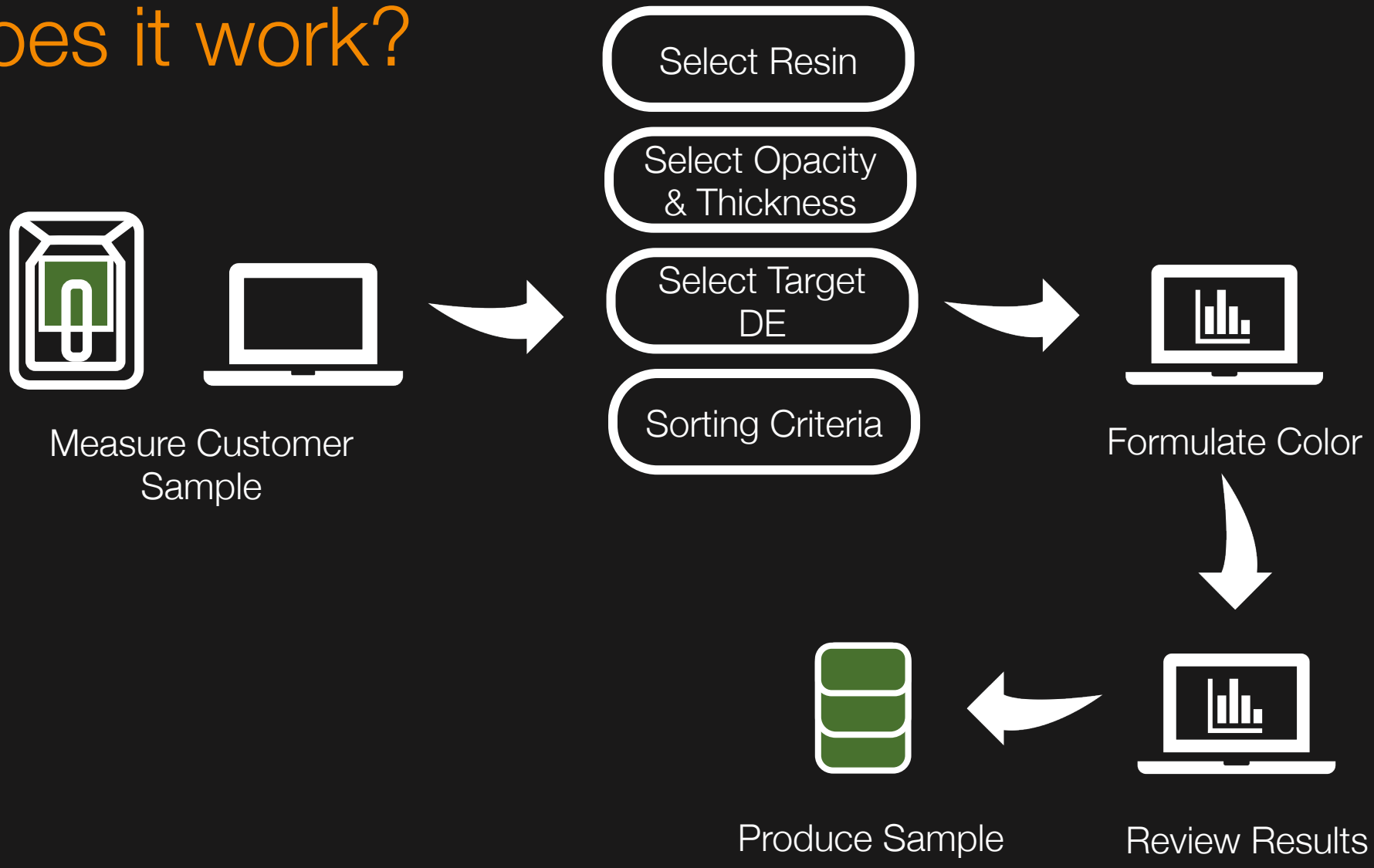
Sorting Criteria

Formulate Color

Review Results

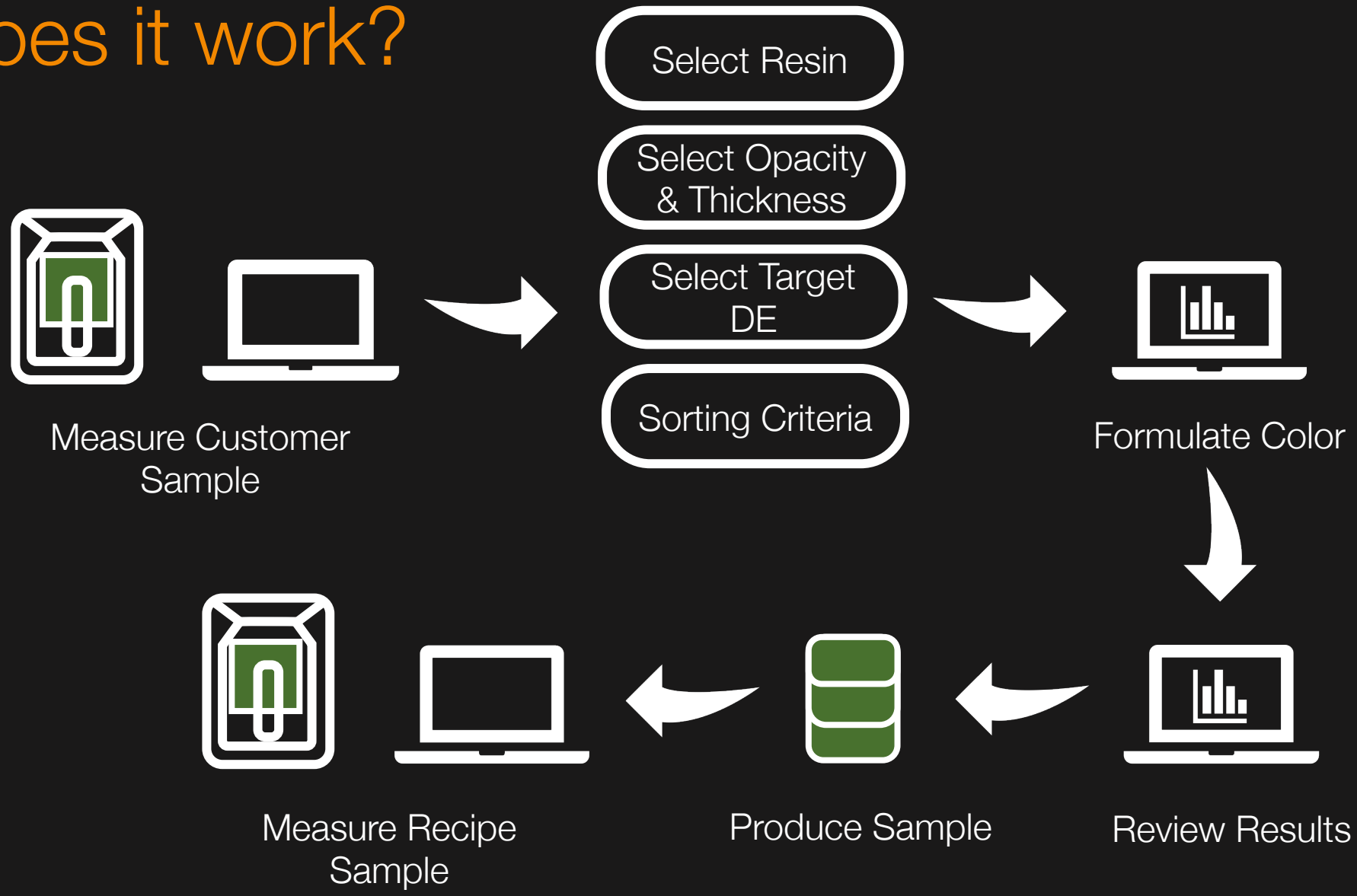
x-rite PANTONE® PROSPECTOR

How does it work?



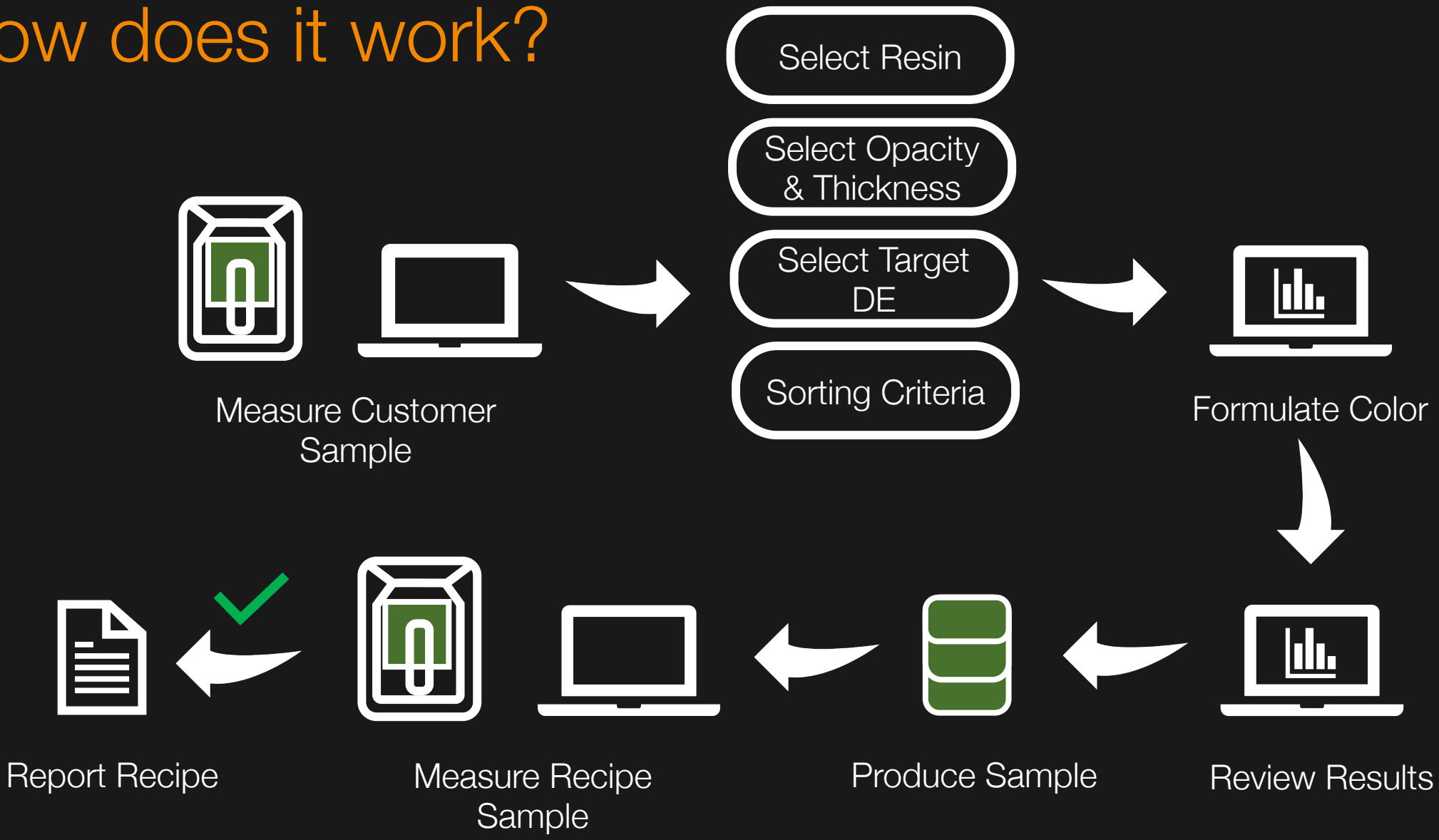
x-rite PANTONE® PROSPECTOR

How does it work?



x-rite PANTONE® UL PROSPECTOR

How does it work?



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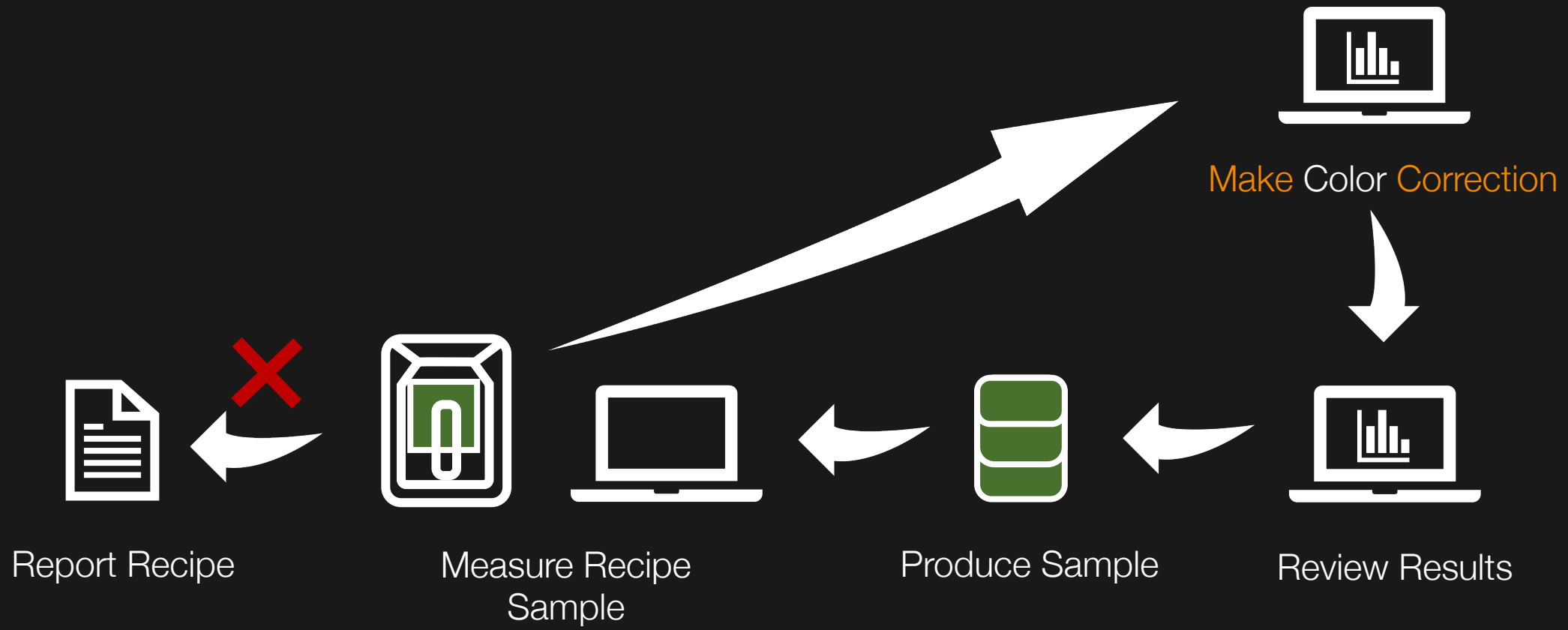
How does it work?

x-rite PANTONE® PROSPECTOR

How does it work?



Besides that go for defined lighting conditions for your visual assessments

Now Lisa and Mike both use an X-Rite SpectraLight QC lightbooth to assess physical samples


Daylight

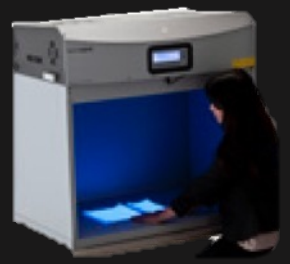

CWF


TL84


Ultralume


Incandecent


Horizon


Ultraviolet

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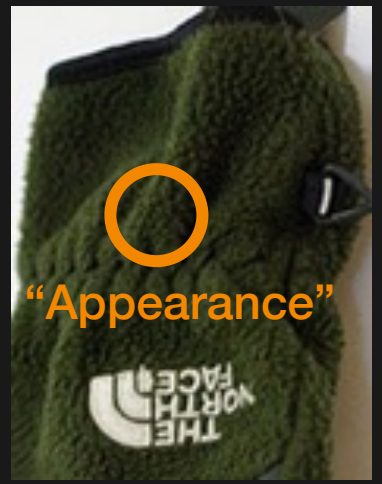
UL PROSPECTOR

Moving DIGITAL, Lisa today wants to even go one step further and rather work with Digital Materials than just only Digital Color. So could Lisa get a “Digital Twin” of that fleece material she’s aiming for which actually looks like the real material on screen?



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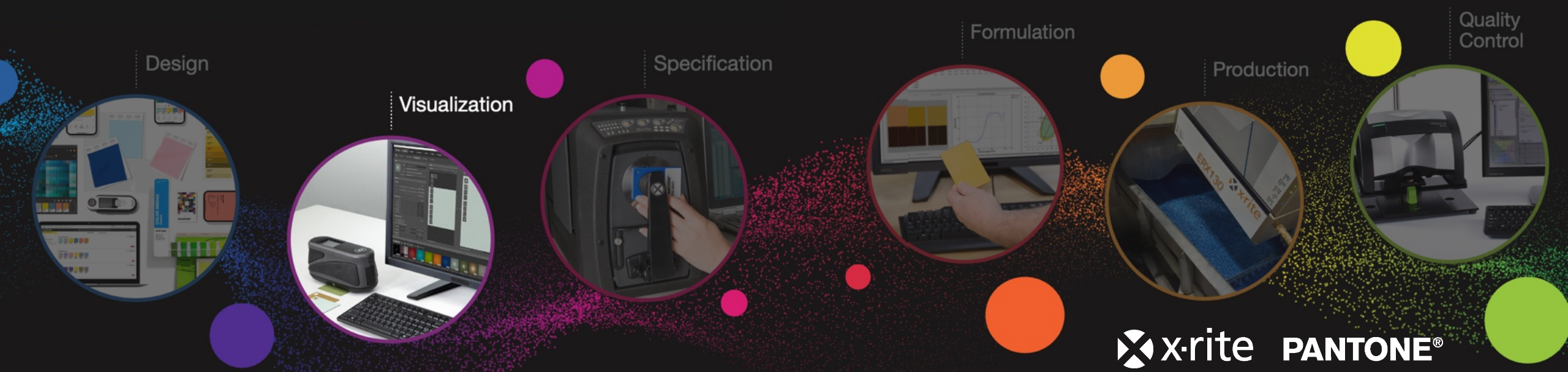
How to Meet Quality and Sustainability Goals with Digital Color Management Tools



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FUNDAMENTALS

WHAT IS MATERIAL APPEARANCE?

APPEARANCE

≠ JUST COLOR!

≠ JUST A PICTURE!

= THE VISUAL SENSATION THROUGH WHICH AN OBJECT IS PERCEIVED TO HAVE ATTRIBUTES AS

COLOR, TEXTURE, GLOSS, TRANSPARENCY, TRANSLUCENCY, ETC.!

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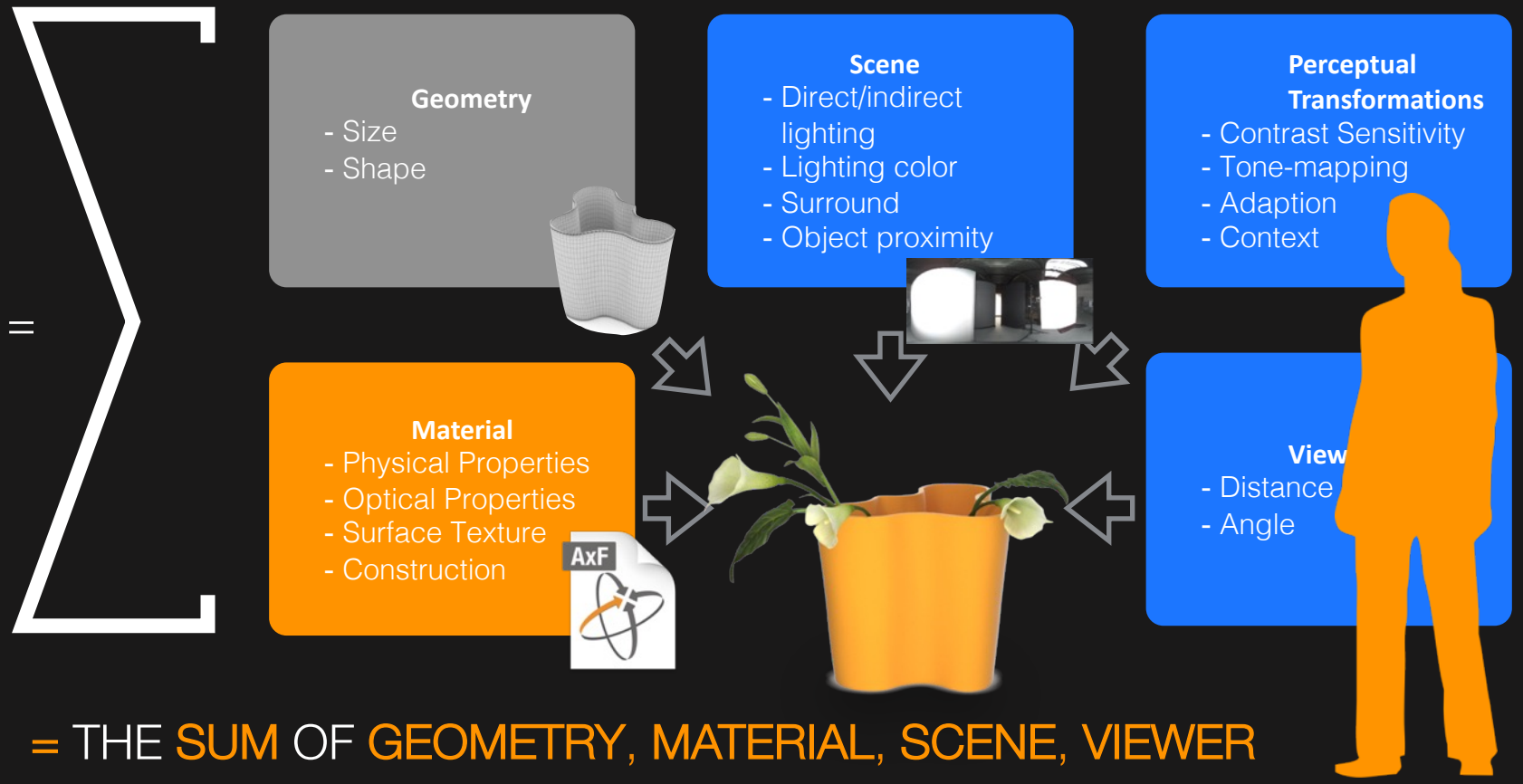
- FUNDAMENTALS
- **WHAT IS MATERIAL APPEARANCE?**

APPEARANCE =



= THE SUM OF GEOMETRY, MATERIAL, SCENE, VIEWER AND PERCEPTUAL TRANSFORMS.

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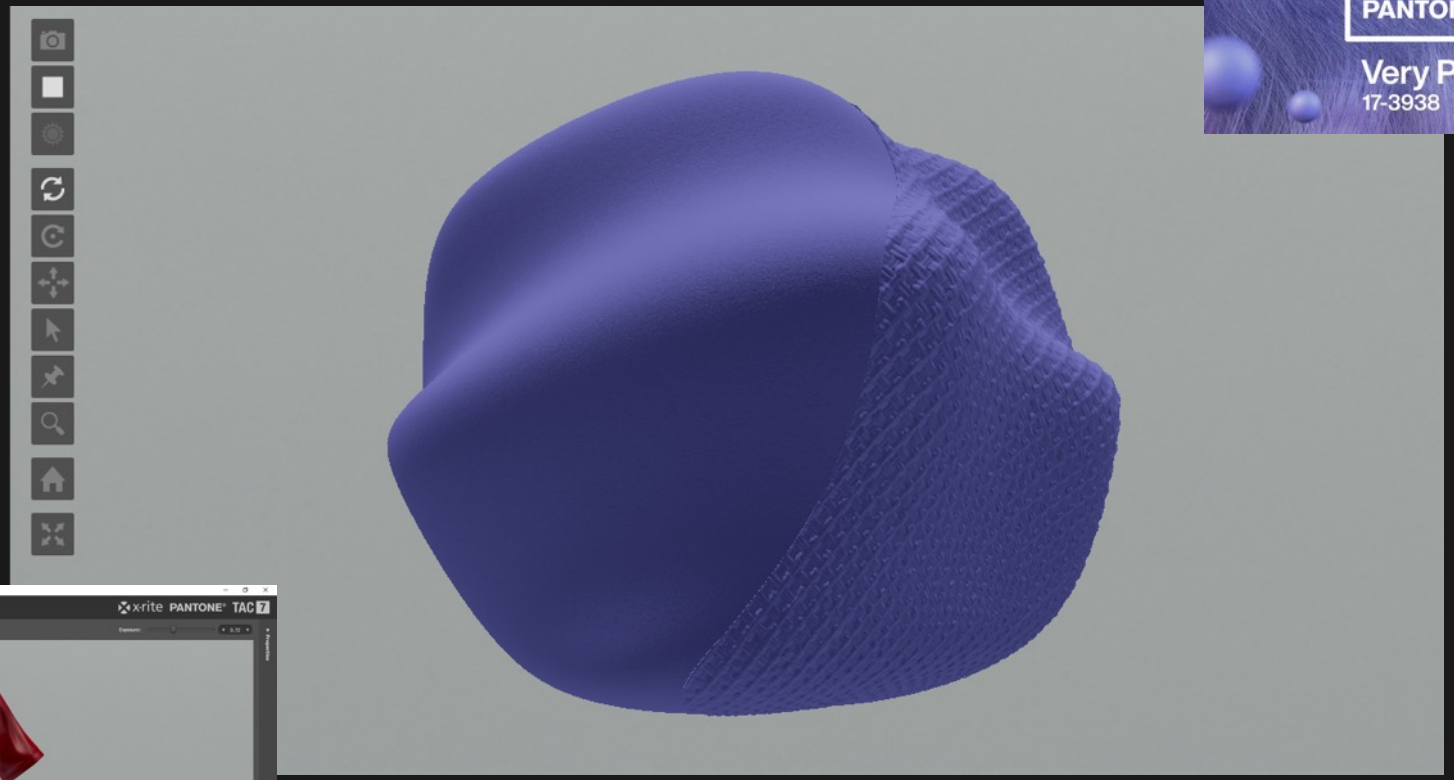
YES SHE CAN!

X-Rite Total Appearance Capture (TAC) Technology



3D Texture, Surface-Gloss, Pattern & Color combined to make Design reality

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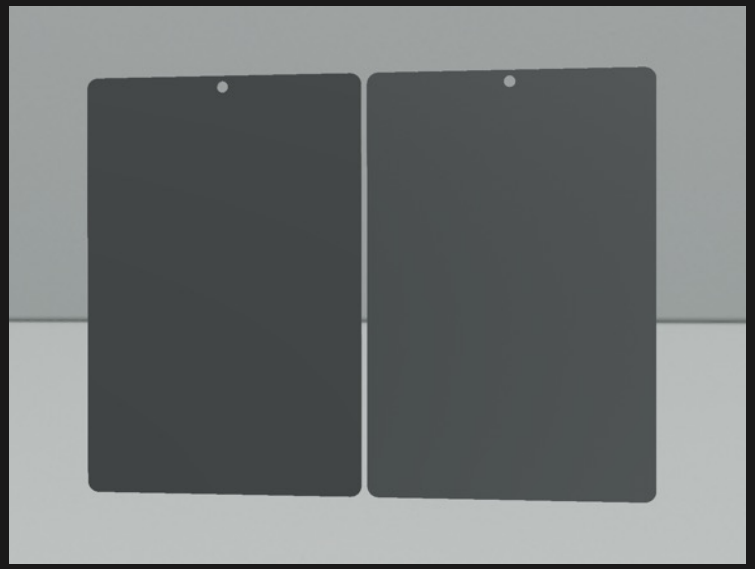
YES SHE CAN!

X-Rite Total Appearance Capture (TAC) Technology

Gray or Silver?



x-rite PANTONE® UL PROSPECTOR

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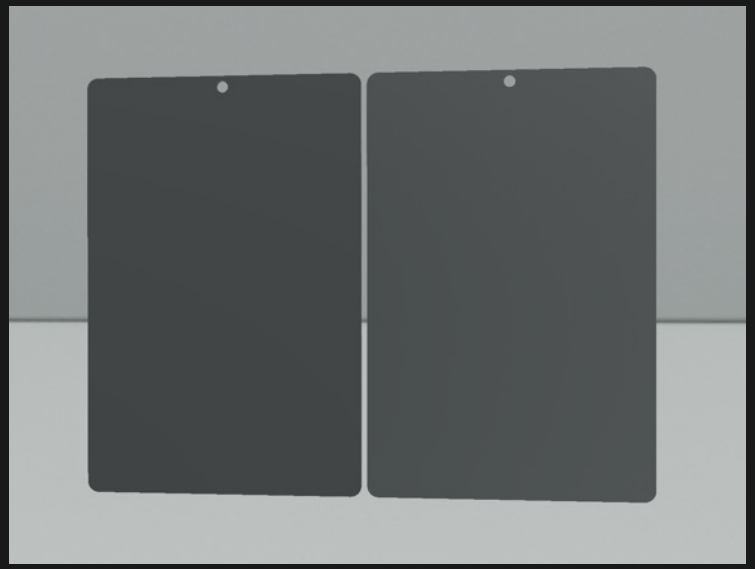

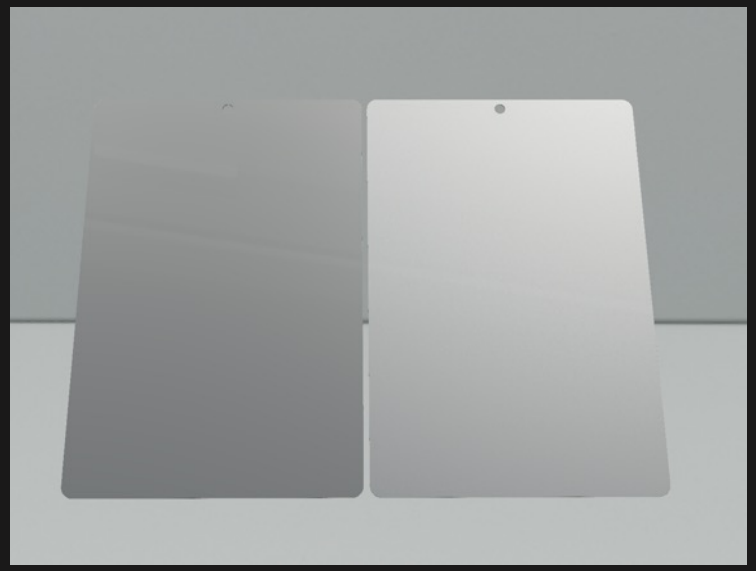

x-rite PANTONE® UL PROSPECTOR

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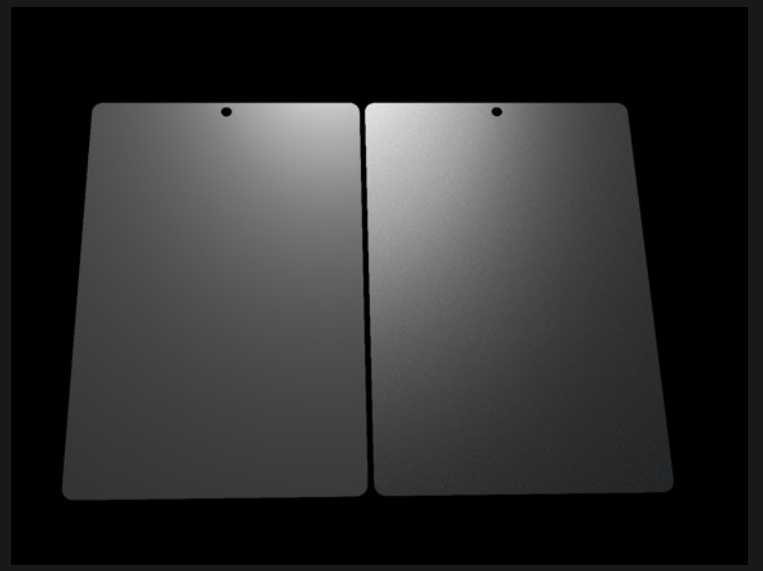
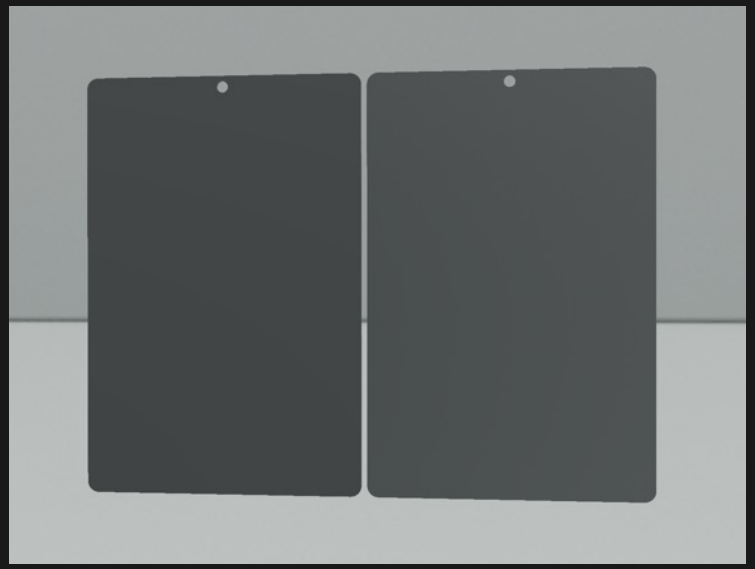
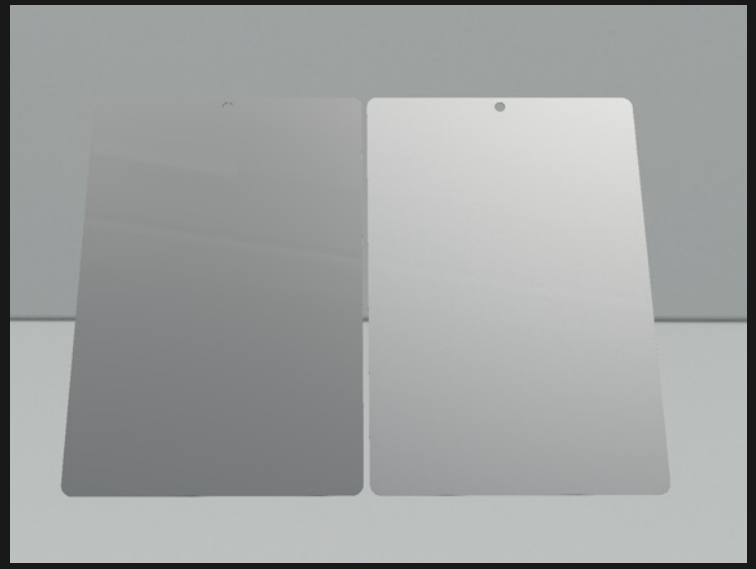


Gray or Silver?





Appearance even for gonio-Appearance like effect pigmented surfaces

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UL PROSPECTOR

PANTORA | CONNECT

Color from libraries

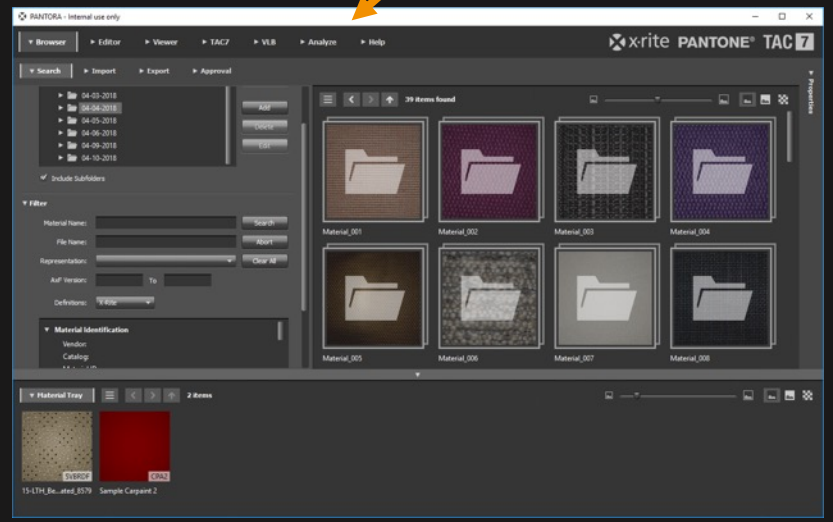
Extract dominant colors in AxFs

CxF constraint appearance fitting

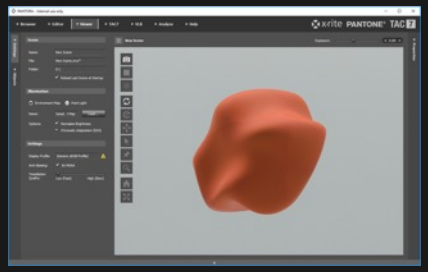
Attach QC information to AxFs

Color from files

Color and appearance from spectrophotometers



Visualize color



Compare colors / appearance, „QC light“

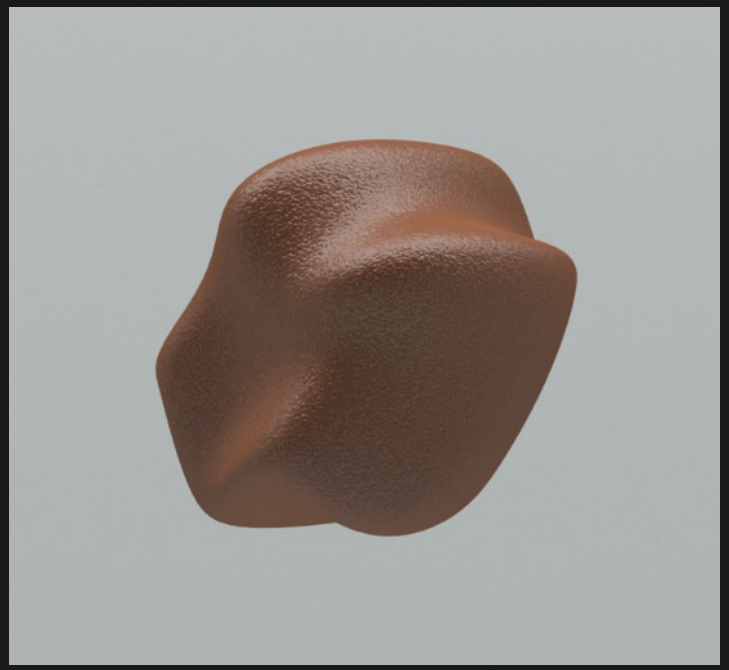
Search by colors

Browse colors

„Recolor“ AxFs

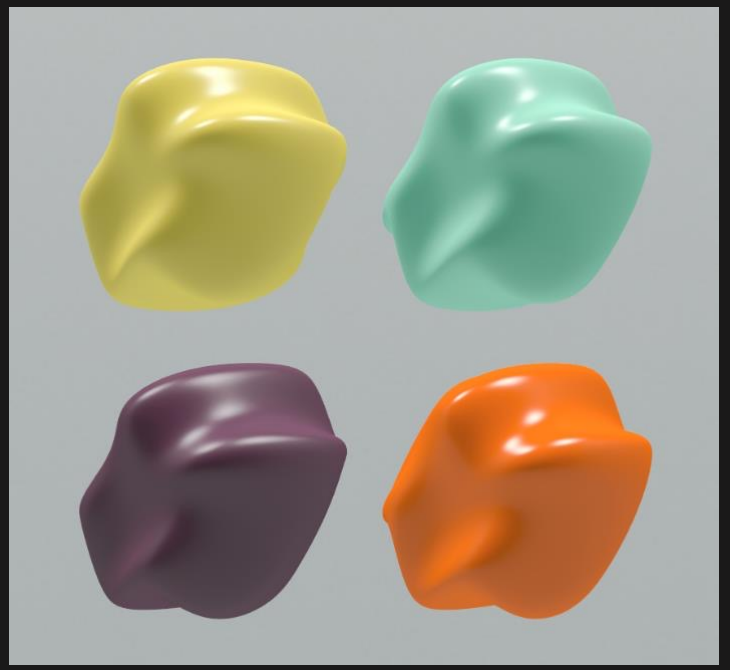
PANTORA VARIANT EDITOR

Combine surface texture and color into a new Material



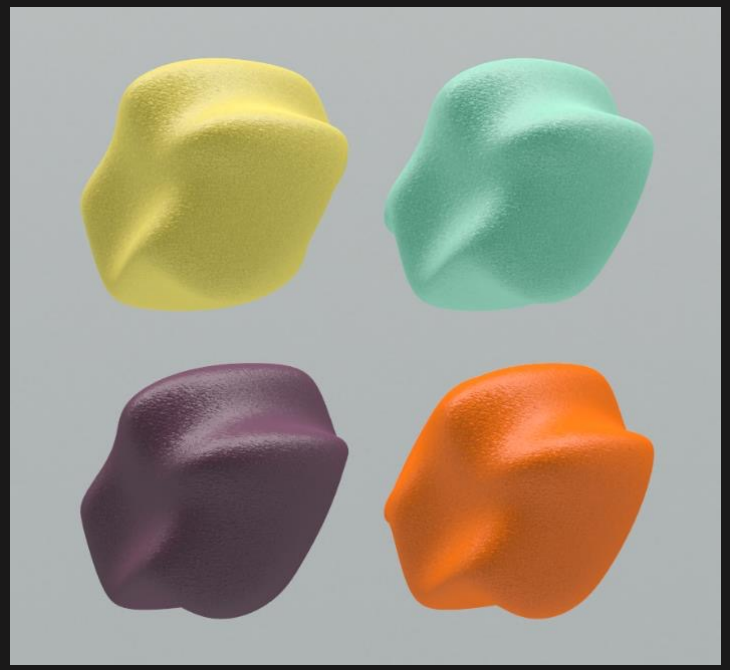
Leather Texture Measurement with the Meta Vue

+



Pantone Fan Deck Spot Color Measurement with the Meta Vue

=



Combined Color with the Pantora Variant Editor:
Recolored Leather Texture

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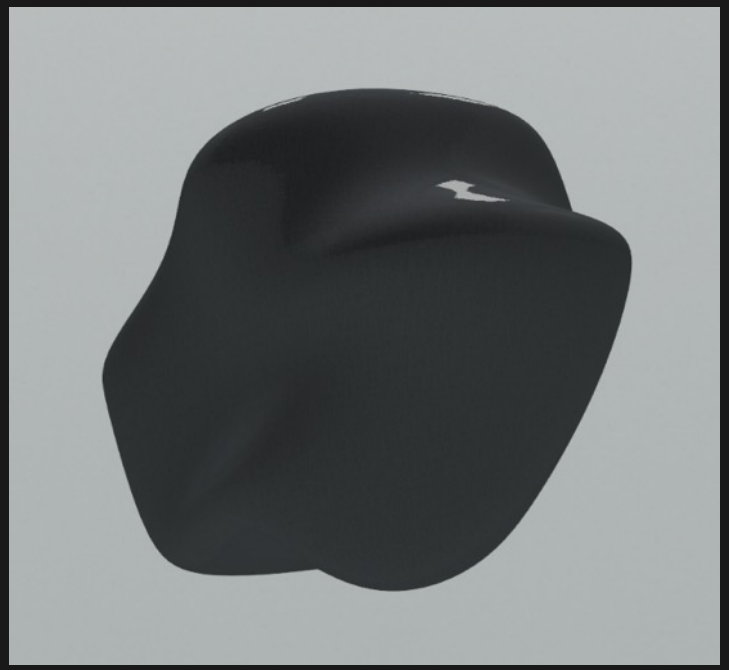
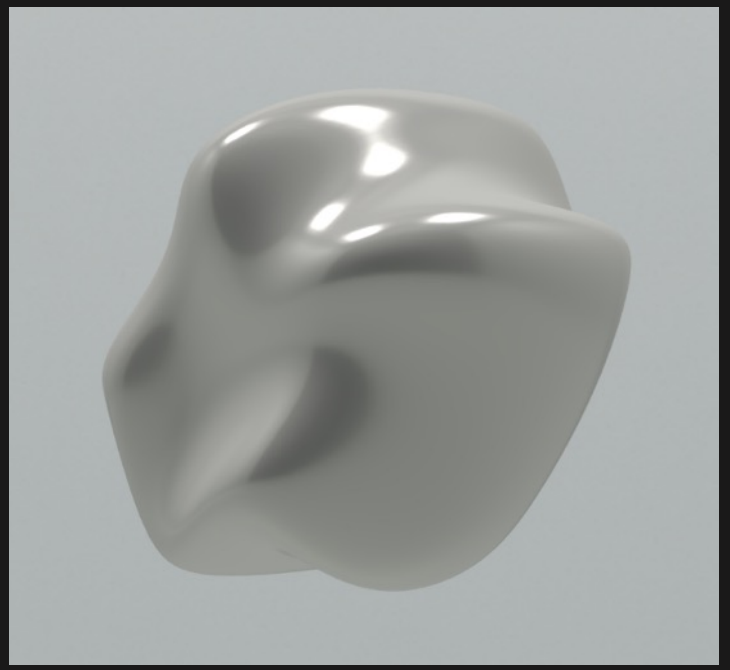
PANTORA VARIANT EDITOR

Combining MetaVue & Ci7800 into a Brushed Metal Material



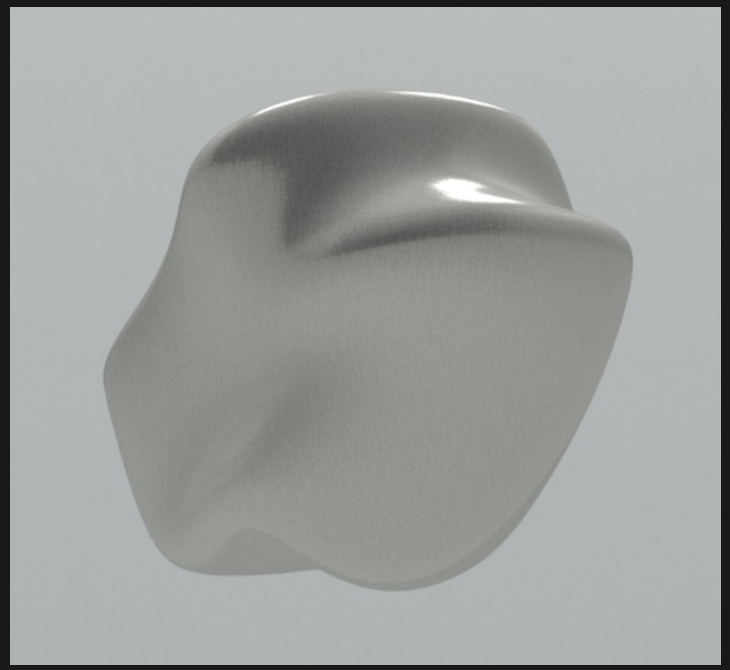
Metal Texture Measurement with the Meta Vue

+



Metal Spot Color Measurement with the Ci7800

=



Combined Attributes with the Pantora Variant Editor:
Brushed Metal Texture

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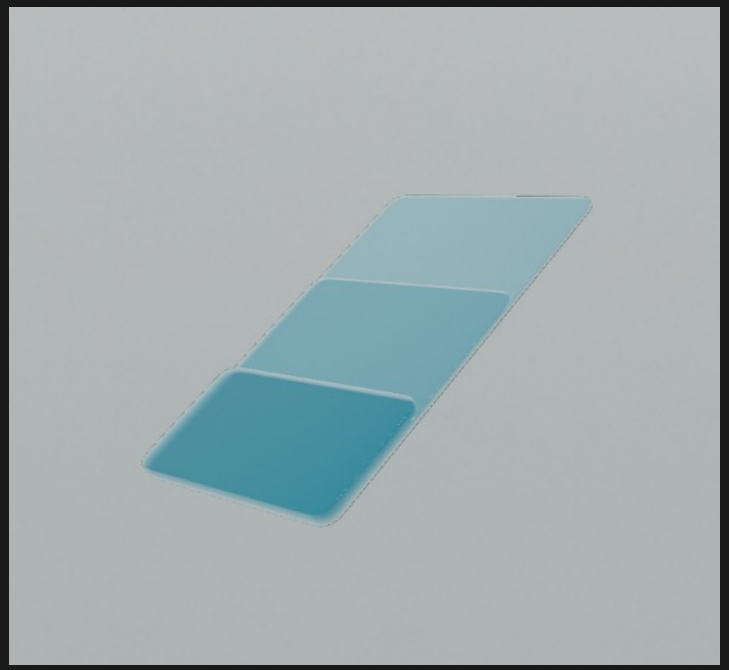
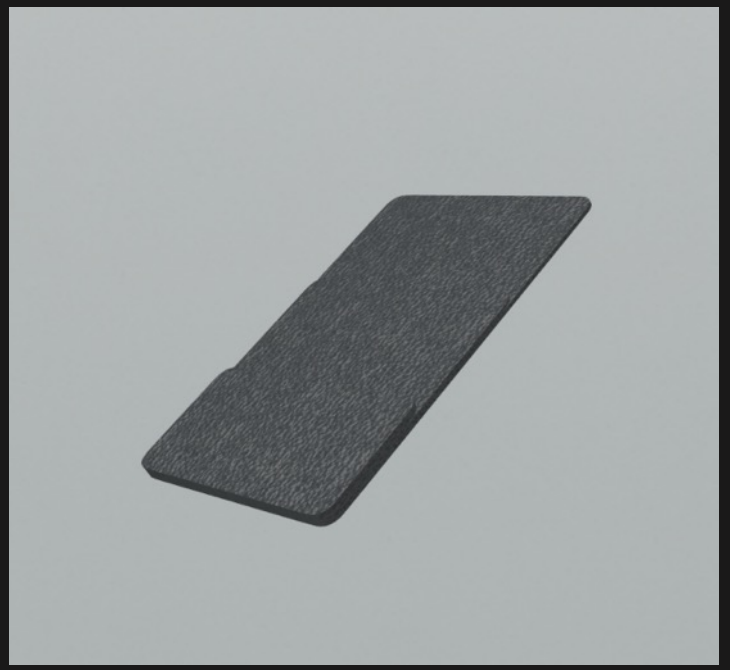
PANTORA VARIANT EDITOR

Combining Ci7800 Transparency with MetaVue Texture Scans into a Plastic Material



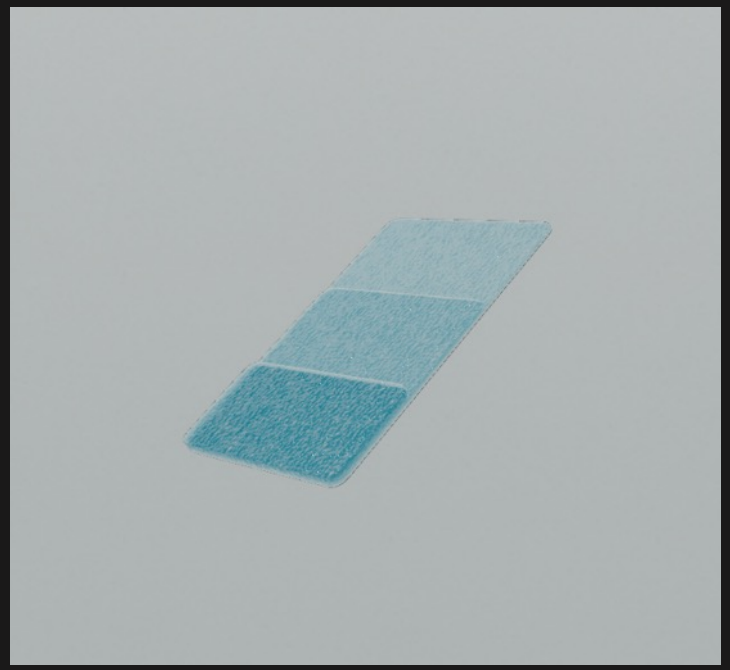
Volumetric Measurement with the Ci7800

+



Grain Measurement with the Meta Vue

=



Combined Attributes with the Pantora Variant Editor:
Volumetric Chip with Surface Structure

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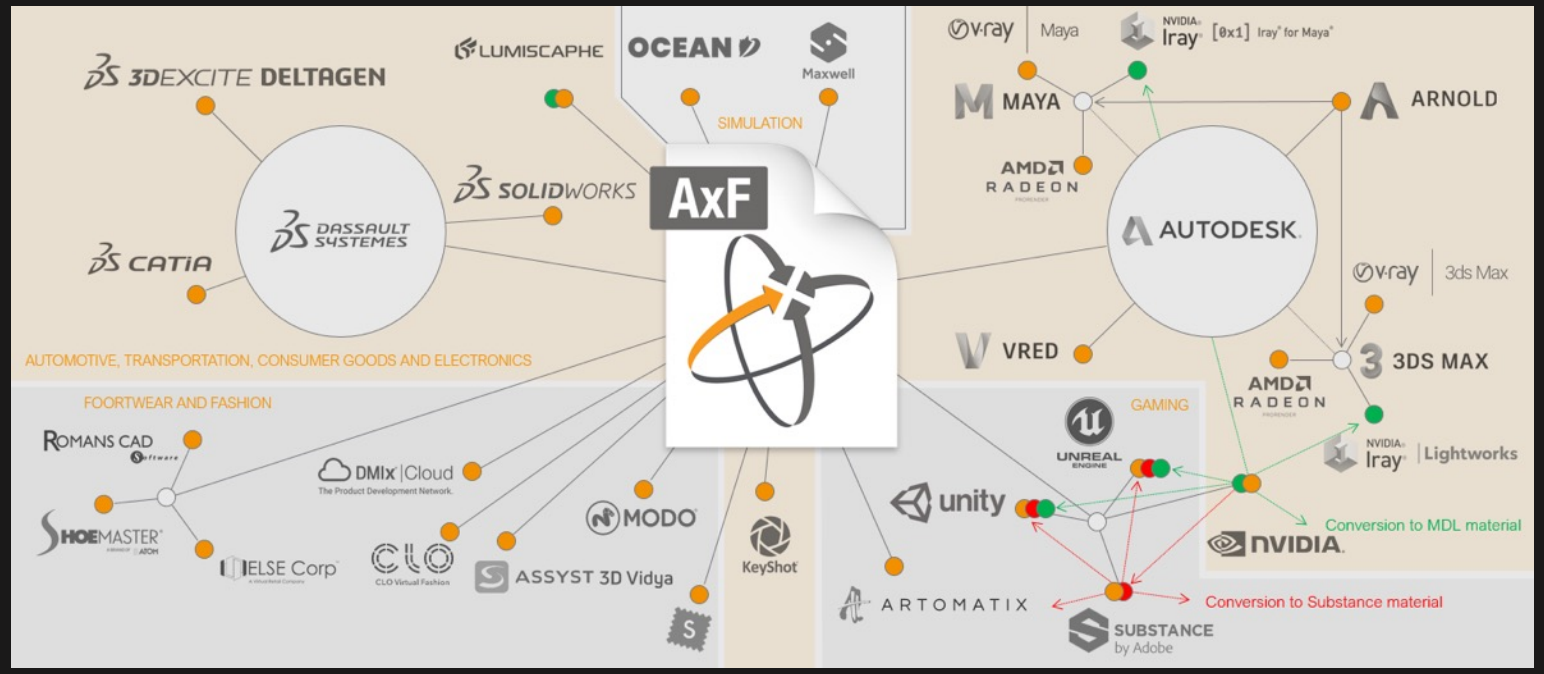
PARTNERS SUPPORTING AxF DIGITAL MATERIALS

The Digital Twin of a Physical Material

Design with Confidence and Communicate with Ease
AxF files provide a way to capture, store, edit, and communicate complex material characteristics using numerical data throughout the digital design workflow.

Applications with AxF Support



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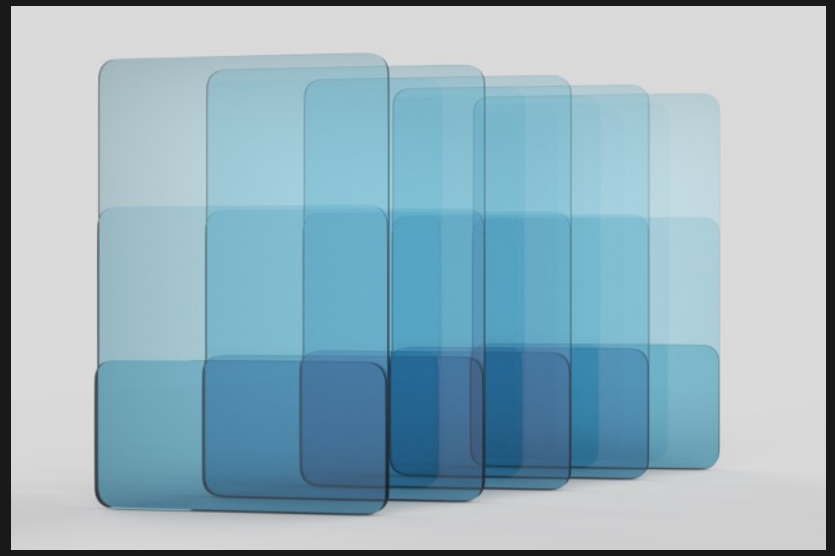


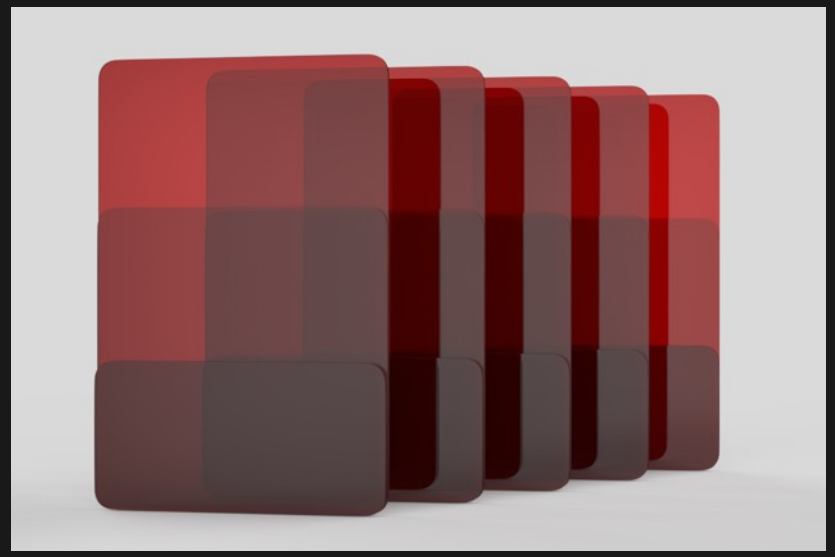

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How to Meet Quality and Sustainability Goals with Digital Color Management Tools

Poll question

How do you currently specify color (Design, R&D, Marketing) or receive color specification (material management, development & manufacturing)

1. Verbal description
2. Physical sample
3. A color reference code (PANTONE, Munsell, RAL, NCS, etc.)
4. L*a*b* Data
5. Spectral Data
6. Don’t know

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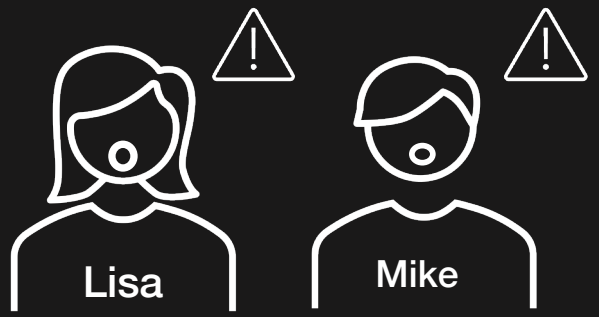
Lisa and Mike also got the challenge, to share their final proposal of a new material with the sourcing team for them to get serial production going.
Without a digital workflow they have to duplicate their physical samples to have enough master samples to share with suppliers.

This challenge is called …

x-rite PANTONE® PROSPECTOR

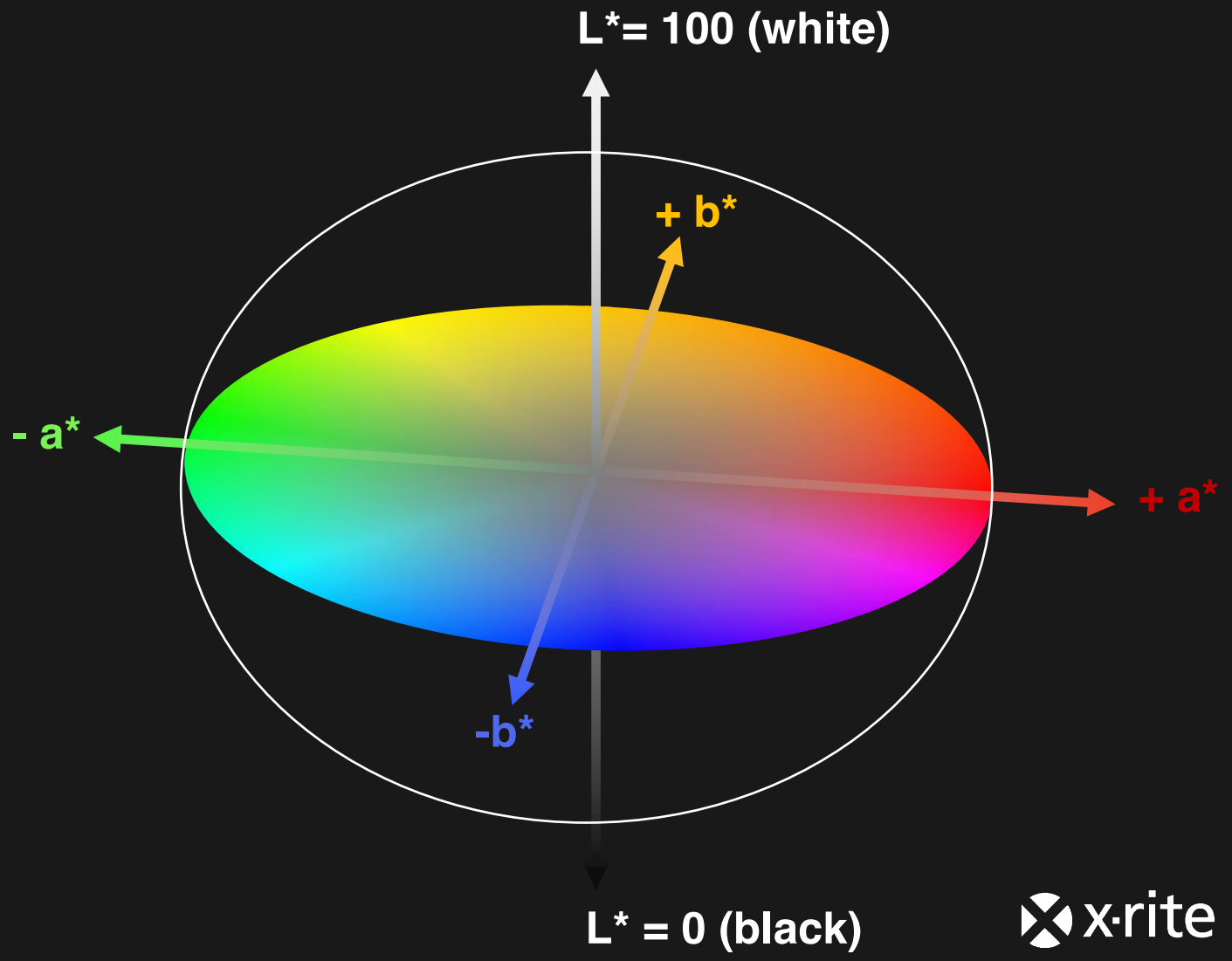


THE ERROR STACK

Master Physical Standard

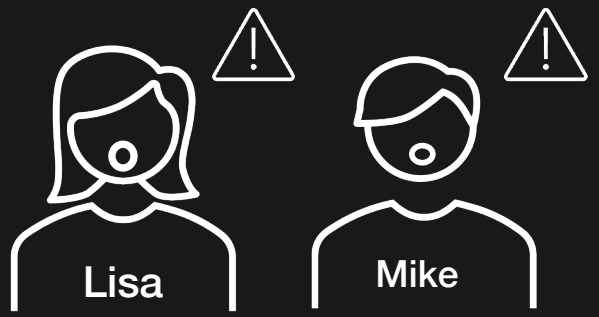
x-rite PANTONE® UL PROSPECTOR

Colorimetry is 3-dimensional

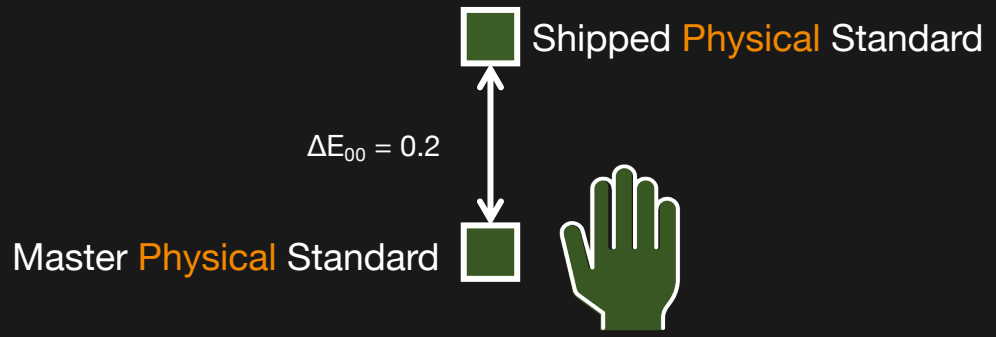


x-rite PANTONE®

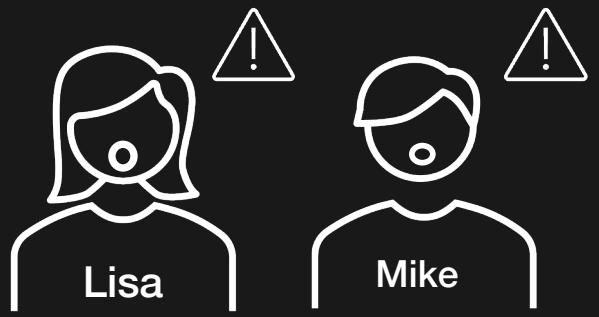
PROSPECTOR



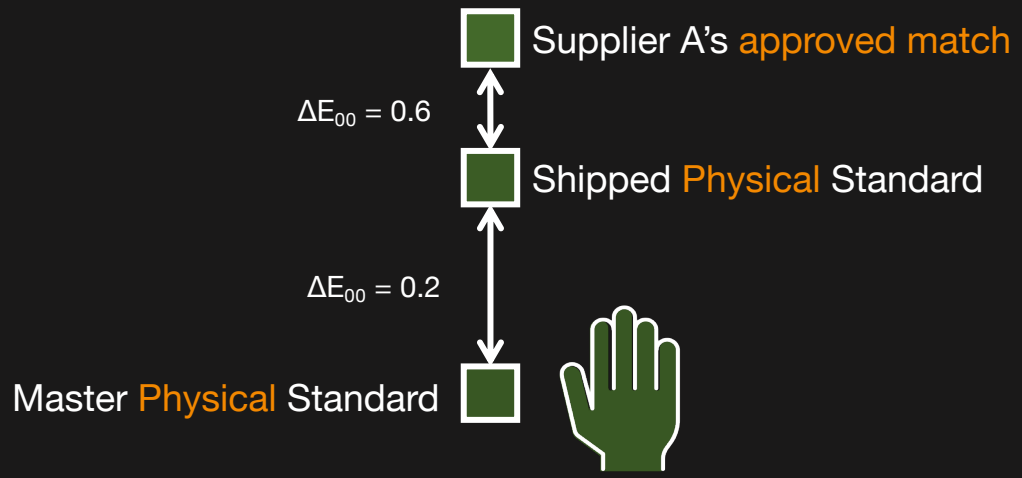
THE ERROR STACK



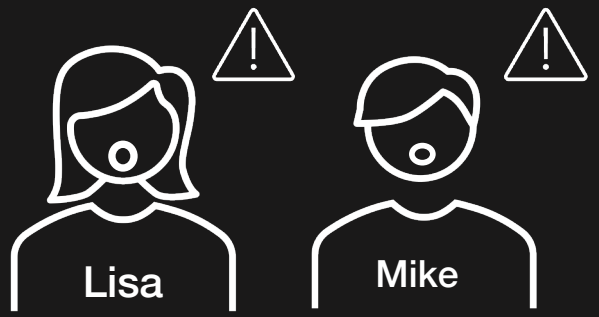
x-rite PANTONE® UL PROSPECTOR



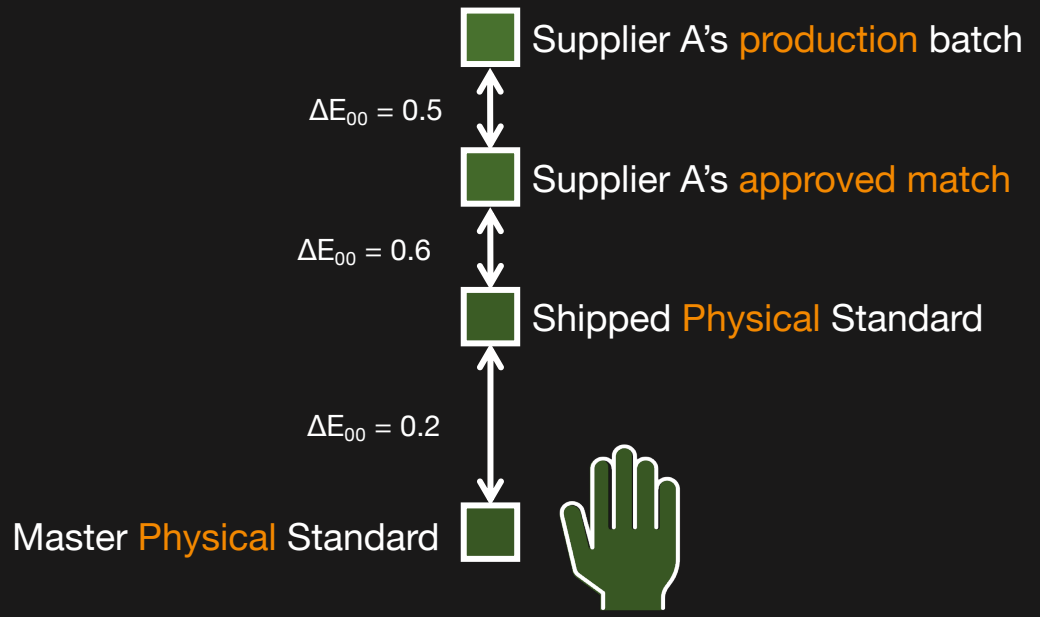
THE ERROR STACK



x-rite PANTONE® UL PROSPECTOR

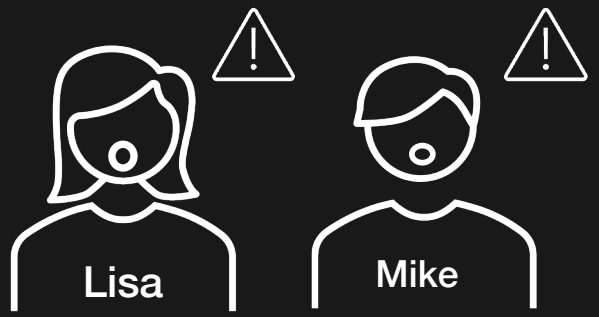


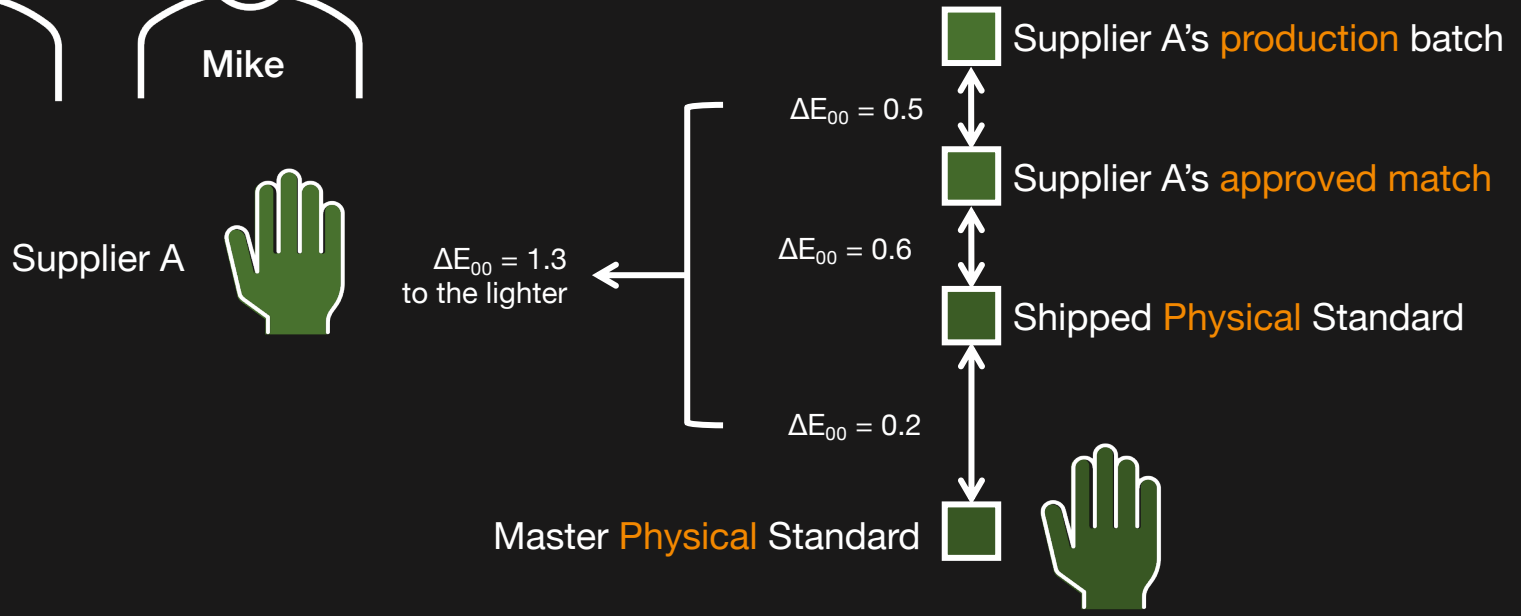
THE ERROR STACK



x-rite PANTONE® UL PROSPECTOR

THE ERROR STACK





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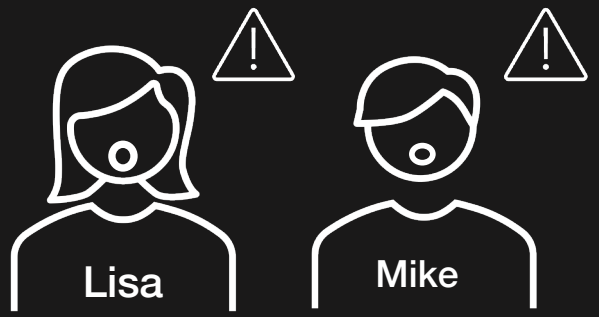
PROSPECTOR

THE ERROR STACK



Supplier A's production batch

ΔE_{00} = 0.5

Supplier A's approved match

ΔE_{00} = 0.6

Shipped Physical Standard

ΔE_{00} = 0.2

Supplier A

ΔE_{00} = 1.3
to the lighter

Master Physical Standard

ΔE_{00} = 0.3

Shipped Physical Standard

ΔE_{00} = 0.5

Supplier B's approved match

ΔE_{00} = 0.4

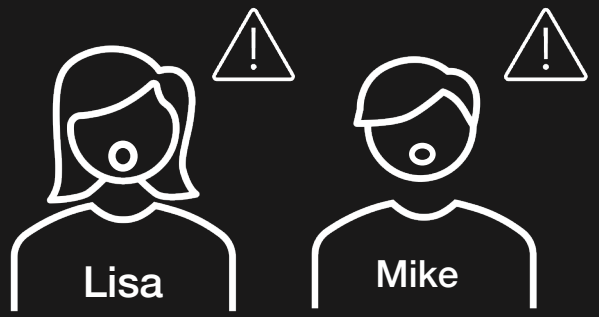
Supplier B's production batch

Supplier B

ΔE_{00} = 1.2
to the darker

x-rite PANTONE® UL PROSPECTOR

THE ERROR STACK



Supplier A's production batch

ΔE_{00} = 0.5

Supplier A's approved match

ΔE_{00} = 0.6

Shipped Physical Standard

ΔE_{00} = 0.2

Master Physical Standard

ΔE_{00} = 0.3

Shipped Physical Standard

ΔE_{00} = 0.5

Supplier B's approved match

ΔE_{00} = 0.4

Supplier B's production batch

Supplier A

ΔE_{00} = 1.3
to the lighter

Total Variation
ΔE_{00} = 2.5

Supplier B

ΔE_{00} = 1.2
to the darker

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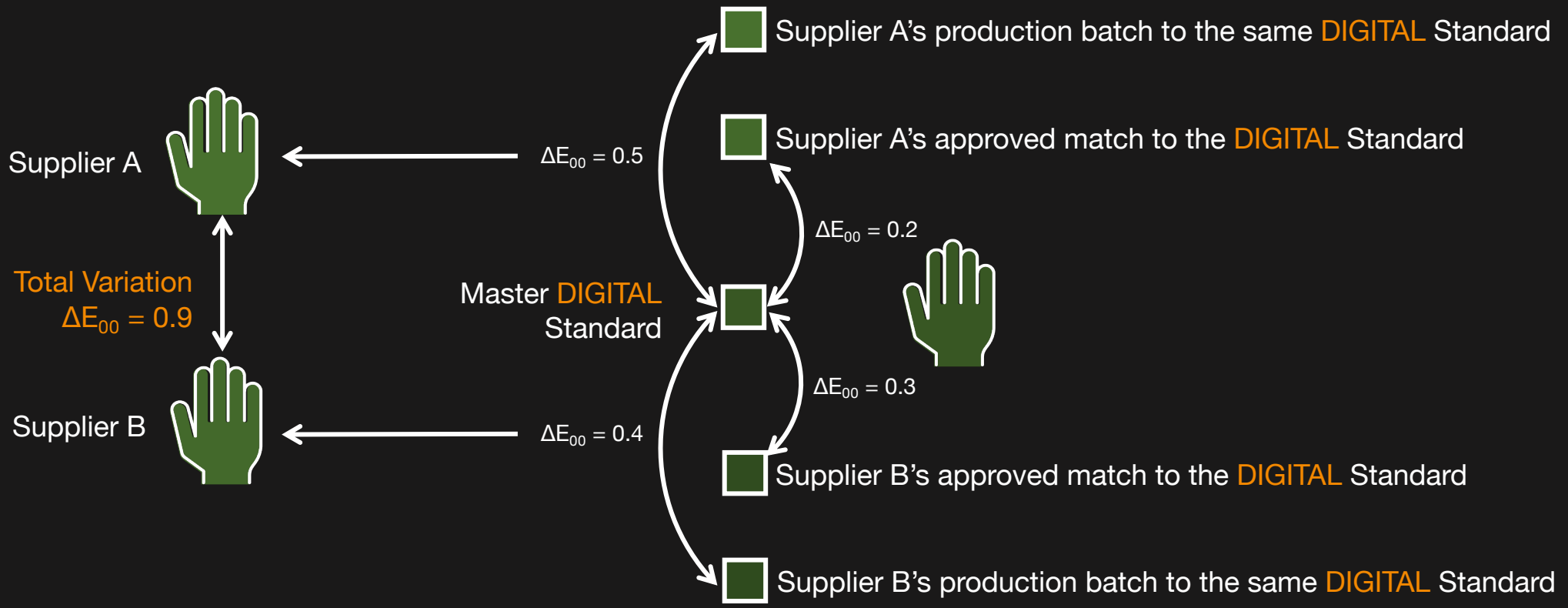
UL PROSPECTOR

REDUCE THE ERROR STACK



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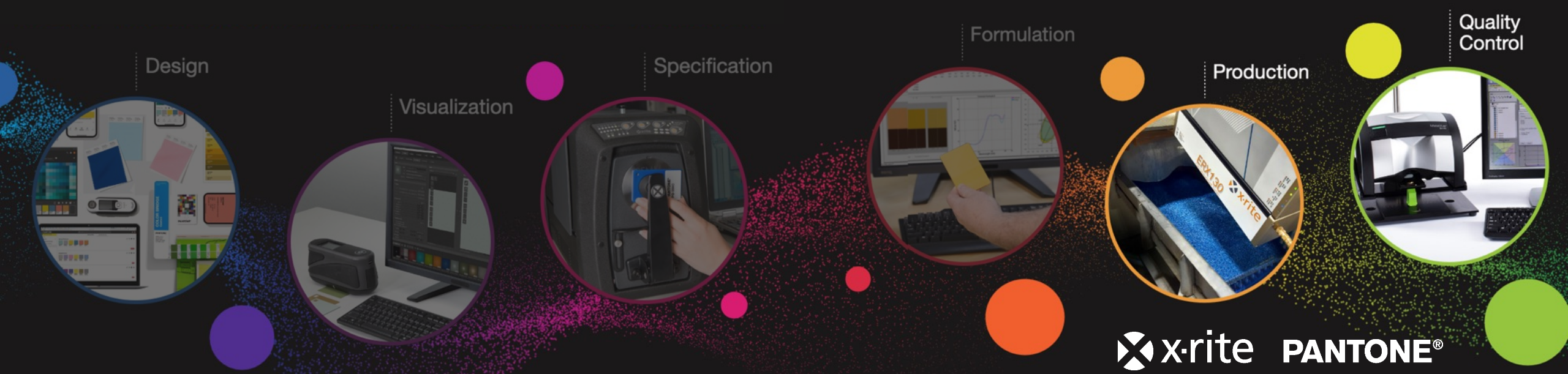
UL PROSPECTOR

How to Meet Quality and Sustainability Goals with Digital Color Management Tools



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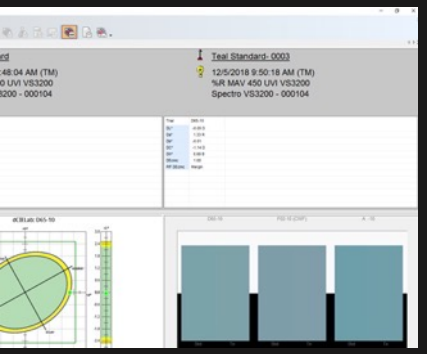
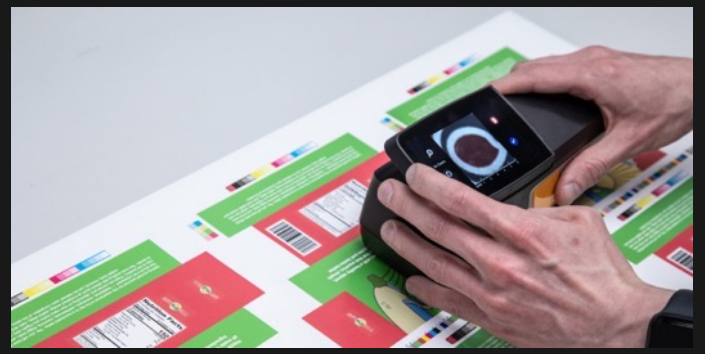
FROM HANDHELD TO NON-CONTACT

X-Rite has got a range of instruments in all measurement geometries from very reliable handheld devices, bechtop precision spectros, hyperspectral imaging devices, throug non- contact inline solutions to measure in the process





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UL PROSPECTOR

How to fit it all together?

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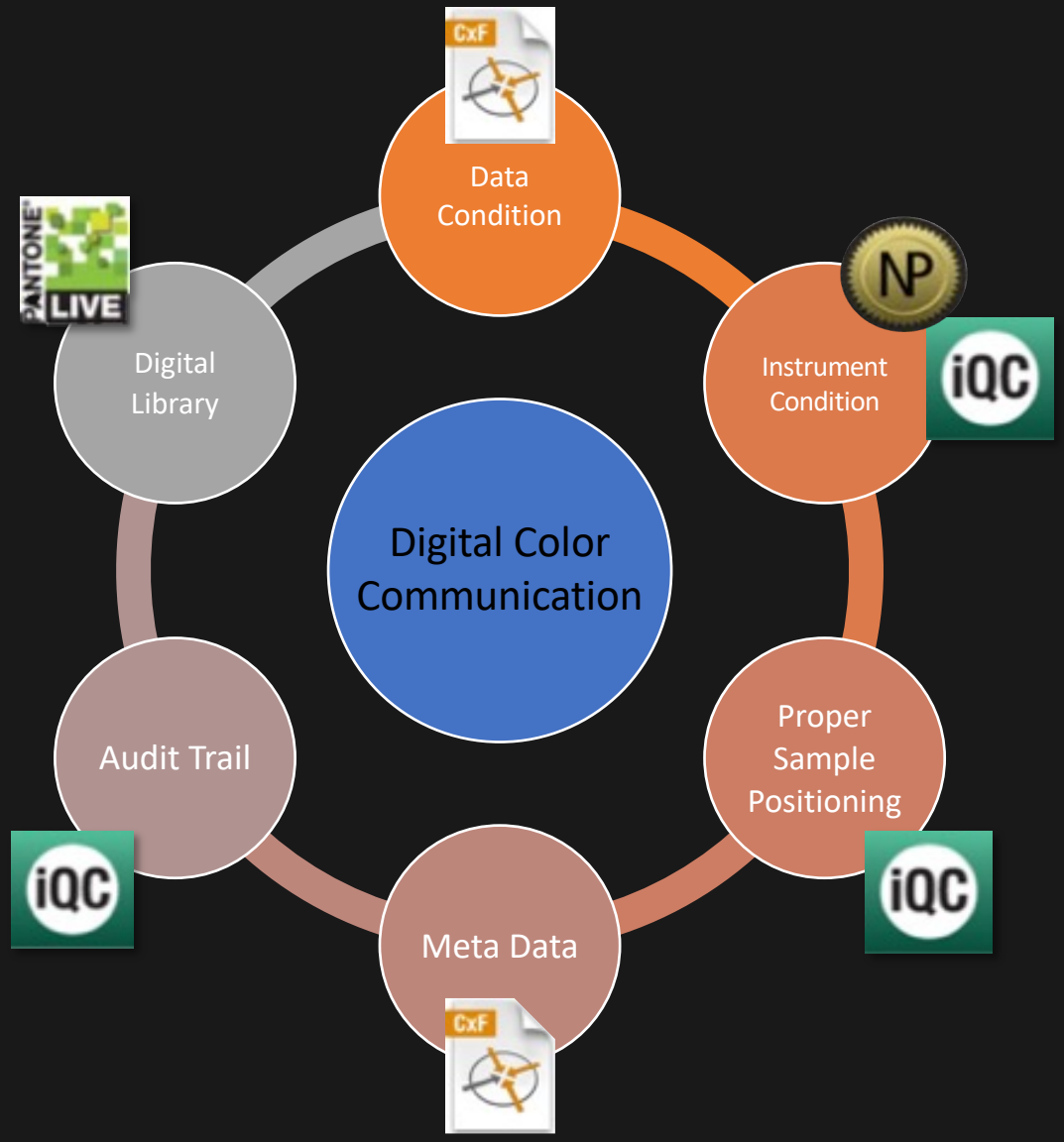
DIGITAL COLOR COMMUNICATION



In order to enable true digital color communication one needs to have an eco system of connected datasources, instruments, meta data and an Audit trail for being able to remove a multitude of physical samples moving around

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DIGITAL VS. PHYSICAL SAMPLES

Digital Samples

+ Don’t change, age, alter
+ Are available from a centralized source
+ Can be shared instantly over the internet
– Require a fleet of accurate, stable and controlled instruments

Physical Samples

+ Represent the current status quo
+ Are independent of instrument to instrument correlation
– Age and wear over time
– Require shipping across the globe
– Require duplication to be available in sufficient quantity
– Might be measured incorrectly from supplier to supplier

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NetProfiler

- NetProfiler is a professional tool to control a single instrument's performance compensating for user or environmentally caused drift
- NetProfiler helps to get multiple instruments across different production sites back into factory specifications
  → IMPROVES INTER-INSTRUMENT-AGEEMENT
  → ENABLES DIGITAL COLOR MANAGEMENT

x-rite PANTONE®

UL PROSPECTOR

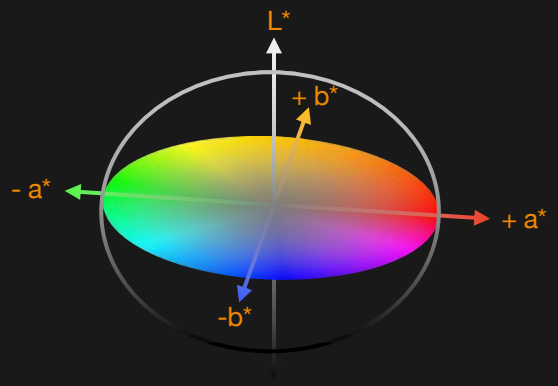
To net-Profile or not to Net-Profile …?

Instrument 1
used in laboratory in
the USA

22°C / 72°F
50% RH

Reference

Reads:
L* = 50.0
a* = 0.0
b* = 0.0



x-rite PANTONE® PROSPECTOR

To net-Profile or not to Net-Profile …?

Instrument 1
used in laboratory in
the USA

22°C / 72°F
50% RH

Reference

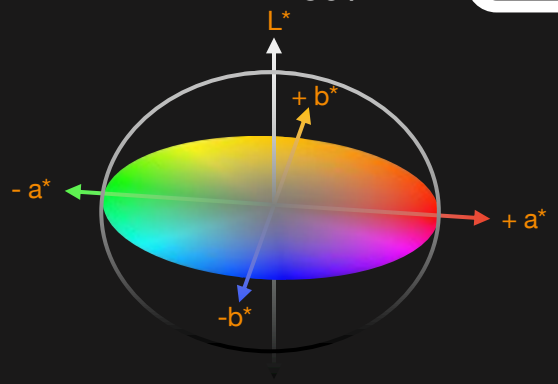
Reads:
L* = 50.0
a* = 0.0
b* = 0.0

Instrument 2
used in production
facility in Taiwan

31°C / 88°F
85% RH

Reference

Reads:
L* = 49.6
a* = 0.4
b* = -0.3



x-rite PANTONE® PROSPECTOR

To net-Profile or not to Net-Profile …?

Instrument 1
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22°C / 72°F
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Reads:
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b* = 0.0

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facility in Taiwan

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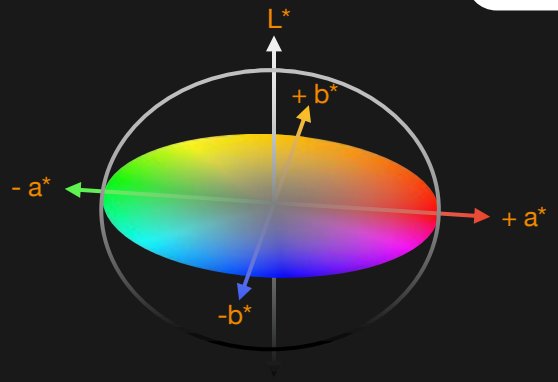
85% RH

Reference

Reads:
L* = 49.6
a* = 0.4
b* = -0.3



Instrument to
instrument
difference

ΔL* = -0.4
Δa* = -0.4
Δb* = 0.3

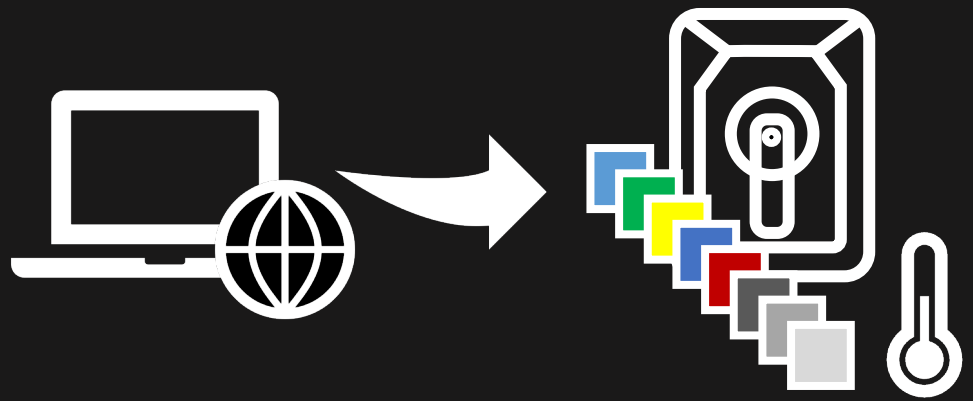
x-rite PANTONE® UL PROSPECTOR

NetProfiler

LOGON TO
NETPROFILER

x-rite PANTONE® UL PROSPECTOR

NetProfiler

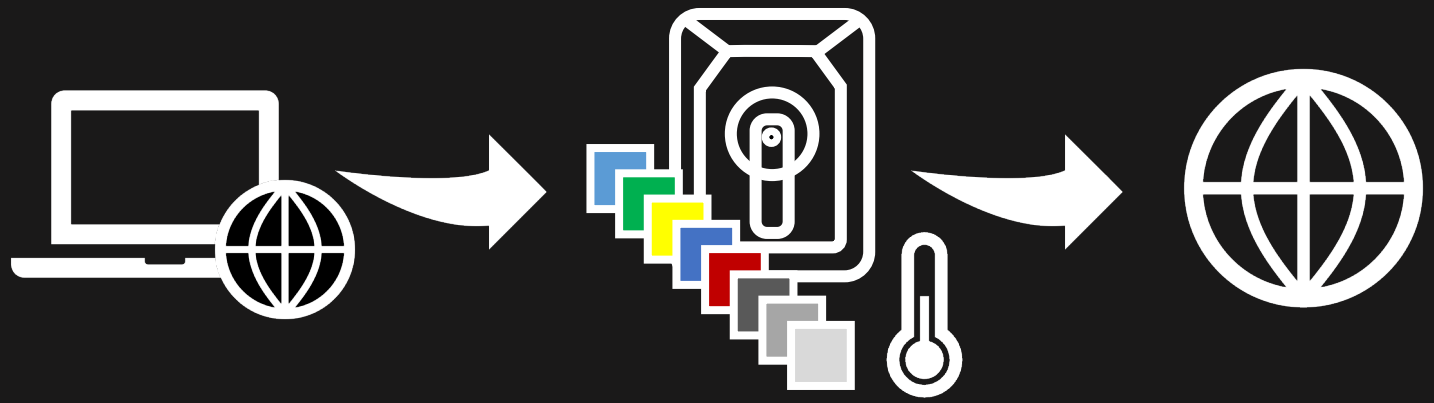


LOGON TO NETPROFILER

MEASURE TILES

x-rite PANTONE® UL PROSPECTOR

NetProfiler



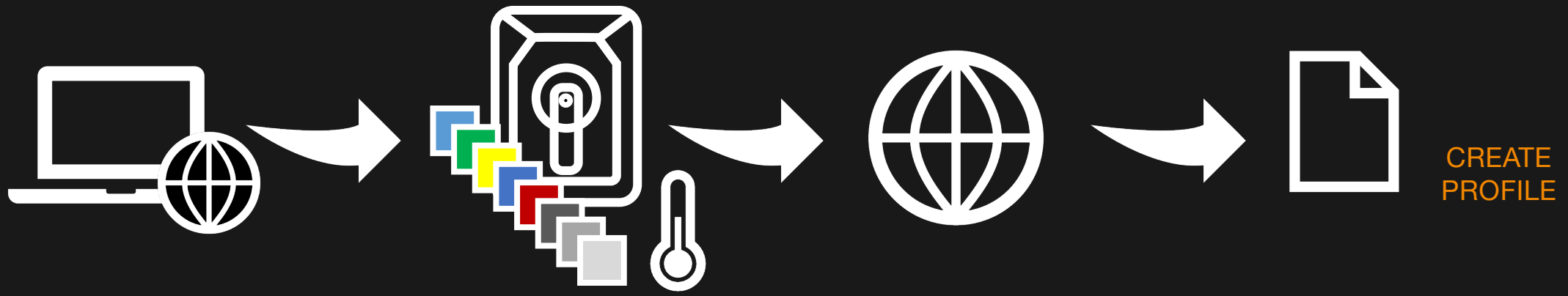
LOGON TO NETPROFILER

MEASURE TILES

COMPARE READINGS TO REFERENCES

x-rite PANTONE® UL PROSPECTOR

NetProfiler



LOGON TO NETPROFILER

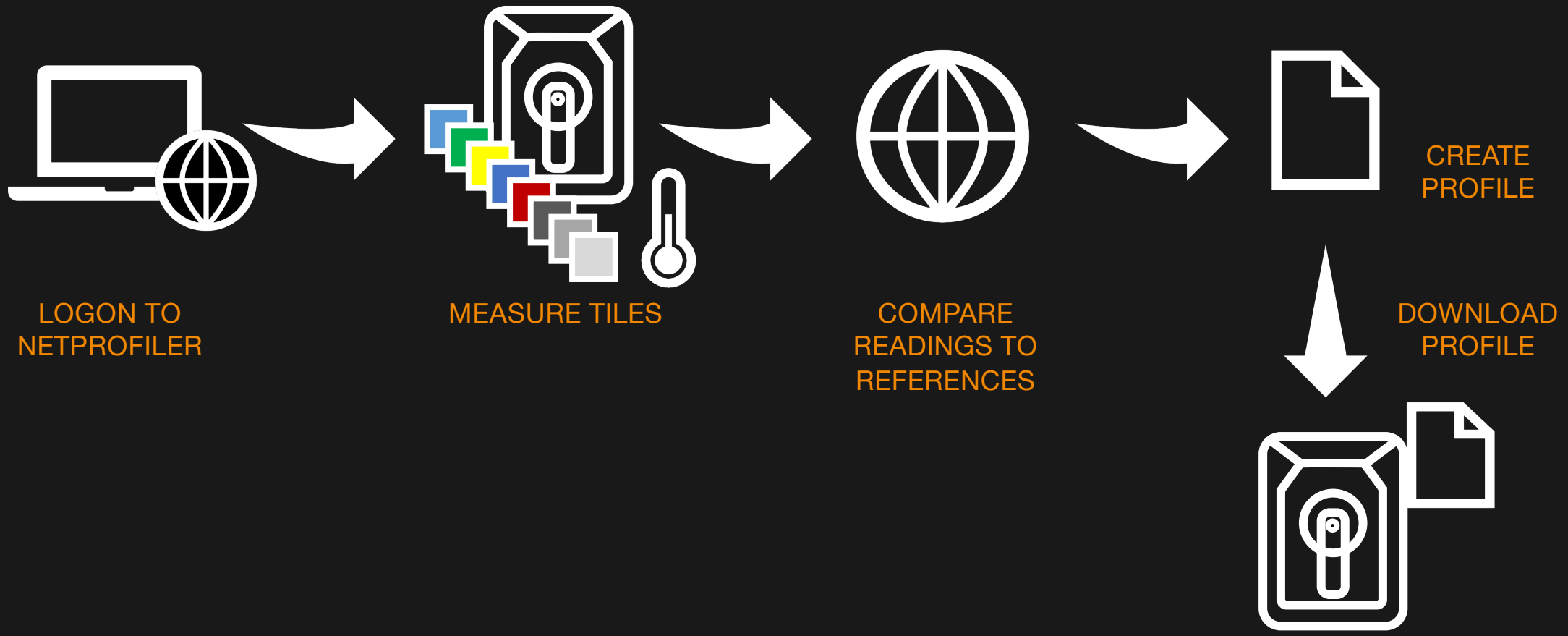
MEASURE TILES

COMPARE READINGS TO REFERENCES

CREATE PROFILE

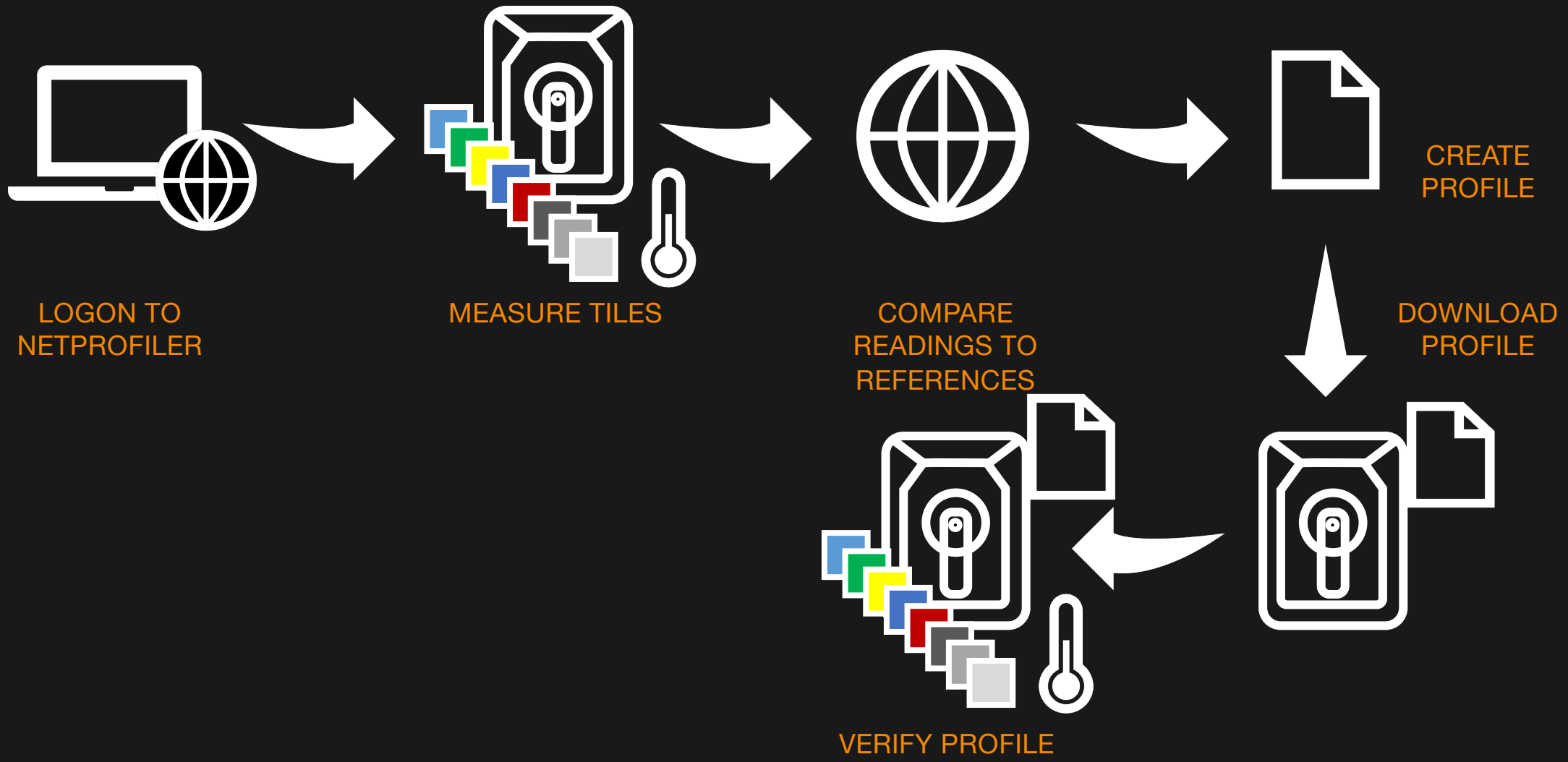
x-rite PANTONE® UL PROSPECTOR

NetProfiler



x-rite PANTONE® PROSPECTOR

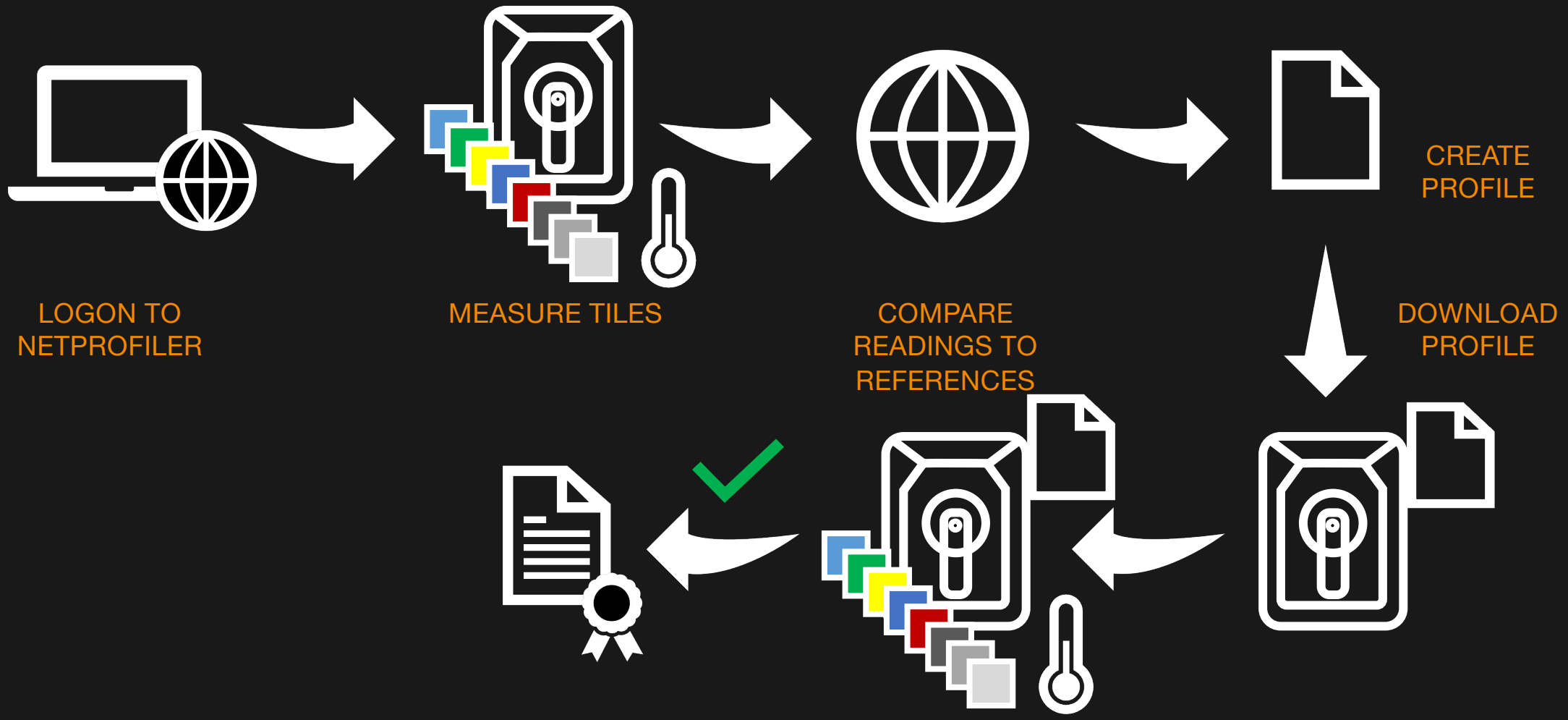
NetProfiler



x-rite PANTONE®

UL PROSPECTOR

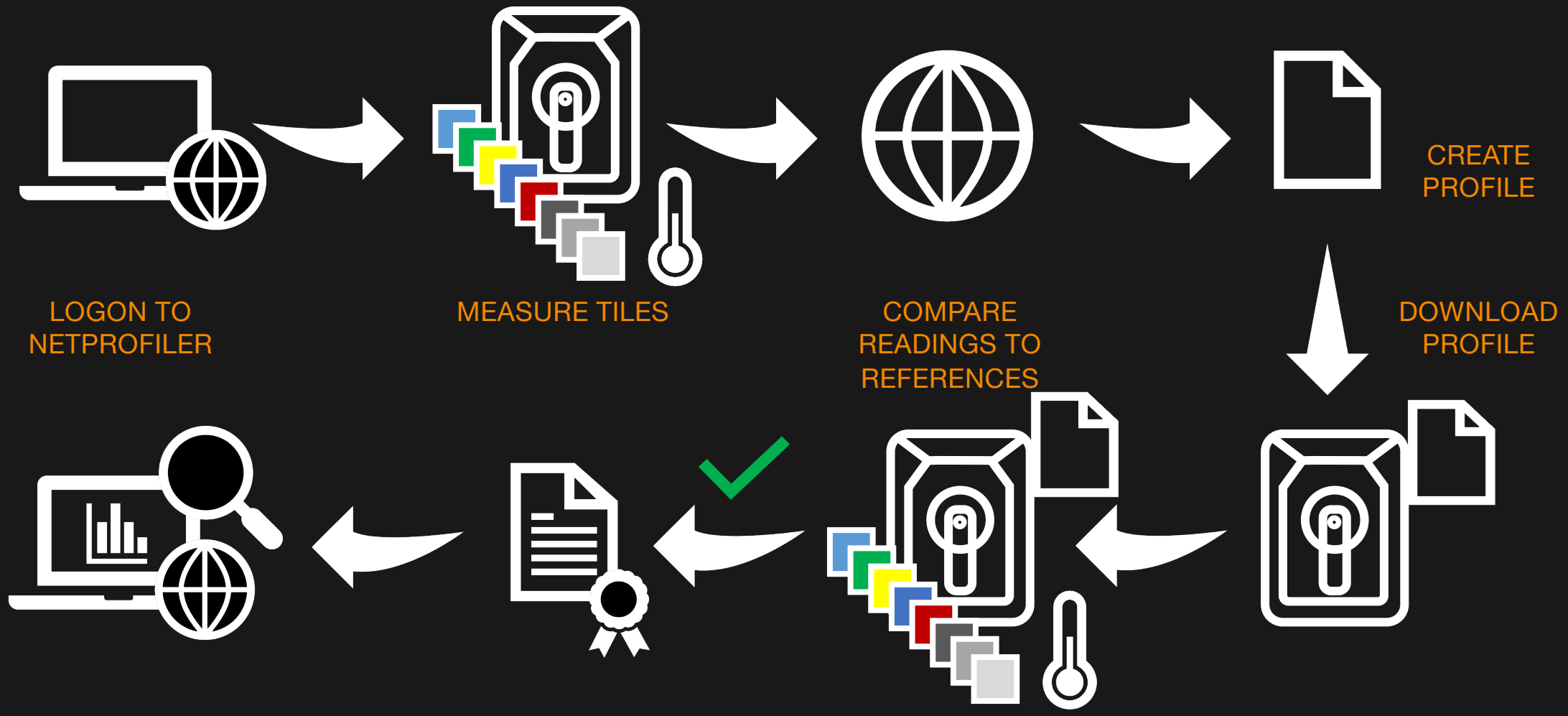
NetProfiler



x-rite PANTONE®

PROSPECTOR

NetProfiler



x-rite PANTONE®

PROSPECTOR

To net-Profile or not to Net-Profile …?

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50% RH

Digital

Reference

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b* = 0.0

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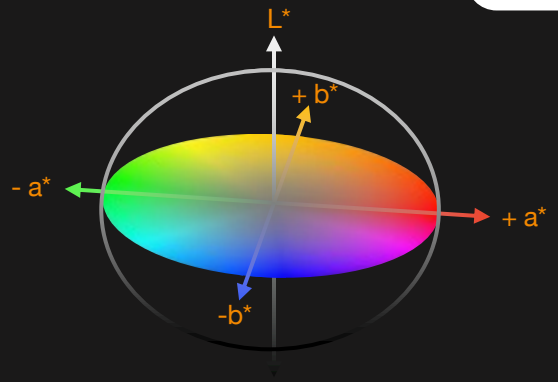
used in production
facility in Taiwan

31°C / 88°F
85% RH

Reference

Reads:
L* = 49.6
a* = 0.4
b* = -0.3



Instrument to
instrument
difference

ΔL* = -0.4
Δa* = -0.4
Δb* = 0.3

x-rite PANTONE® UL PROSPECTOR

To net-Profile or not to Net-Profile …?

Instrument 1
used in laboratory in
the USA

22°C / 72°F
50% RH

Digital

Reference

Reads:
L* = 50.0
a* = 0.0
b* = 0.0

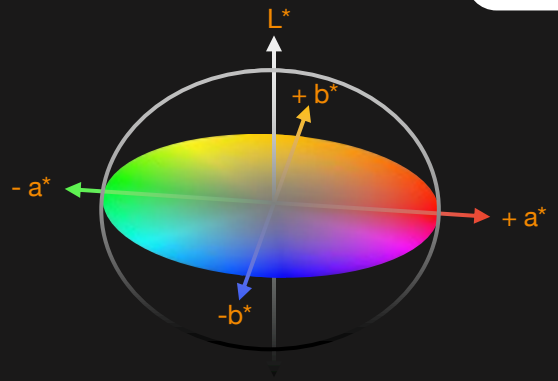
Reads:
L* = 50.03
a* = 0.12
b* = 0.07

Instrument 2
used in production
facility in Taiwan

31°C / 88°F
85% RH

Reference

Reads:
L* = 49.6
a* = 0.4
b* = -0.3



Instrument to
instrument
difference

ΔL* = -0.4
Δa* = -0.4
Δb* = 0.3

x-rite PANTONE®

UL PROSPECTOR

To net-Profile or not to Net-Profile …?

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Reference

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L* = 50.0
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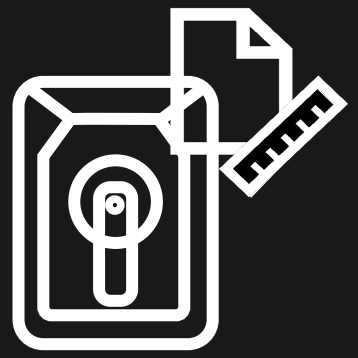
b* = 0.0



Reads:
L* = 50.03
a* = 0.12
b* = 0.07

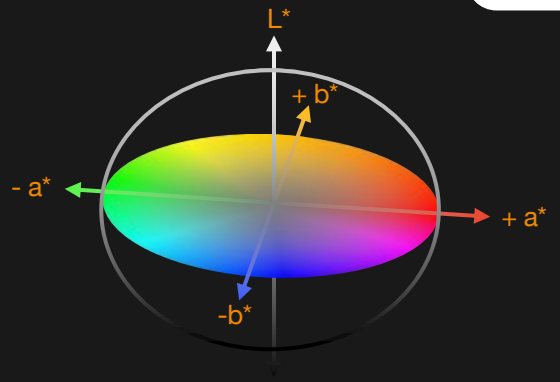
Instrument 2
used in production
facility in Taiwan

31°C / 88°F
85% RH

Reference

Reads:
L* = 49.6
a* = 0.4
b* = -0.3

Reads:
L* = 49.98
a* = 0.15
b* = 0.04



Instrument to
instrument
difference

ΔL* = -0.4
Δa* = -0.4
Δb* = 0.3

x-rite PANTONE®

UL PROSPECTOR

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Reads:
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b* = 0.0

Reads:
L* = 50.03
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L* = 49.6
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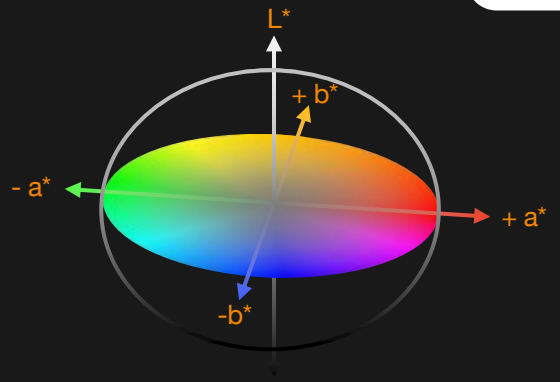
Reads:
L* = 49.98
a* = 0.15
b* = 0.04



Instrument to
instrument
difference

ΔL* = -0.4
Δa* = -0.4
Δb* = 0.3

ΔL* = -0.05
Δa* = 0.03
Δb* = -0.03

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UL PROSPECTOR

Poll question

Would you like to talk 1:1 with an X-Rite Color Expert?

1. Yes, I'm interested in upgrading my current device.
2. Yes, I would like to schedule a free product demo.
3. Yes, I would like to discuss my needs with an X-Rite expert.
4. No, I'm not ready to buy but would like more information.

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UL PROSPECTOR

THANK YOU!

Design

Visualization

Specification

Formulation

Production

Quality Control

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