Solutions for Automotive Interior Colors

Automotive interior consists of various components. Components are connected functionally and systematically. While putting an effort achieving such objectives, a car maker designs interior with putting utmost care for color harmony among components. At the same time, components suppliers are making efforts to achieve expectation of a car maker to achieve color quality demand.

Spectrophotometer CM-700d has granted its outstanding position in the industry serving to interior color measurement needs. The ergonomic design of the instrument is extremely suited to measurement of automotive components which varies in size and shape. The instrument has been serving in the field of color design, quality control, and incoming components inspection at global car makers across the world.

Why has CM-700d granted its outstanding position in automotive interior world?

Ergonomic - Perfect design to fit in your hand
Compact and lightweight (550g). Vertical format with small footprint is easy for positioning on various shape of samples

Measurement flexibility
The measurement aperture is selectable between 8mm and 3mm which makes measurement possible on small areas and curved surfaces

The standard target masks enable measurement of various shape and size of samples

High measurement repeatability
It gives the highest measurement repeatability in this grade of portable spectrophotometer

Other distinctive features

Automatic switching for SCI and SCE measurement
When comparing two samples, it is important to measure with both SCI and SCE conditions. By capturing Specular component element, we see the effect of surface condition of samples.

Wireless communication through Bluetooth
On top of regular USB communication, The CM-700d offers wireless communication through Bluetooth.

Target and sample comparison under multiple light sources
Color may look different under different light, i.e. ambient light or under room light. The screen of CM-700d can show color difference between target and sample under multiple light sources to help locate cause of differences

## How can PC software support your work?
SpectraMagic™ NX is an easy to use software.
Some of the main features related to color quality controls are:

Navigation function for total workflow control plus color measurement tutorial

With the exclusive Navigation function, you have total control of the flow of operations with online step-by-step instructions including picture illustrations. You can even customize this unique feature to match your individual measurement processes.

The Navigation window also includes a link to the HTML version of "Precise Color Communication", a color-measurement tutorial with numerous illustrations and explanations that contribute to a clearer understanding of the basics and technical terms related to color and color-measurement technology.
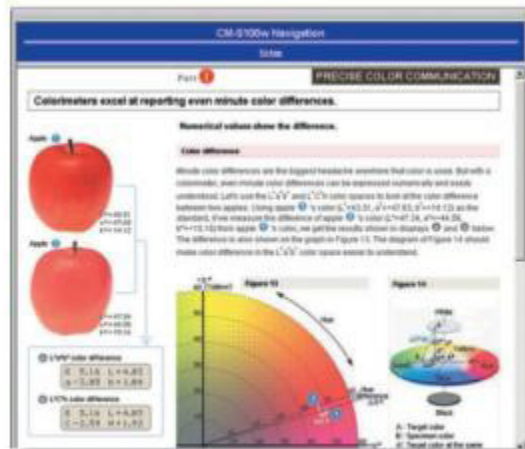

Navigation window

Precise Color Communication

### Comprehensive ease of use from various color-difference assessments to report creation

The software makes color quality control easy and comprehensive at the same time. You can choose from several types of graphs to display your measurement data and also select from among the latest color-difference formulas such as CIE DE1994 or CIE DE2000 for pass/fail assessments or various industry-related indices. And in addition to the user-definable printing layout, objects such as graphs, data lists, etc. on the display screen can be copied directly into Excel® to provide even more flexibility.
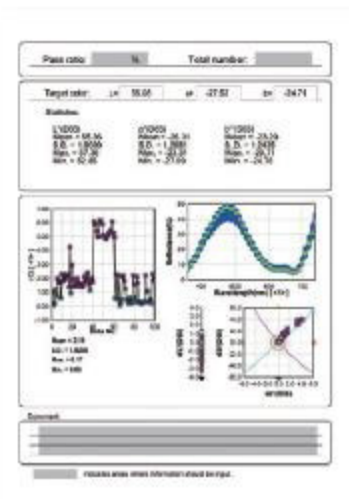

List window
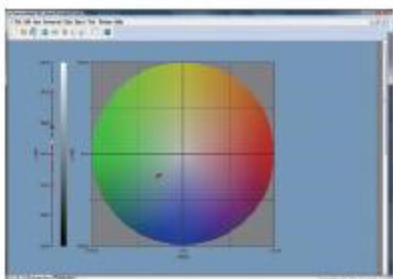
Color graph object
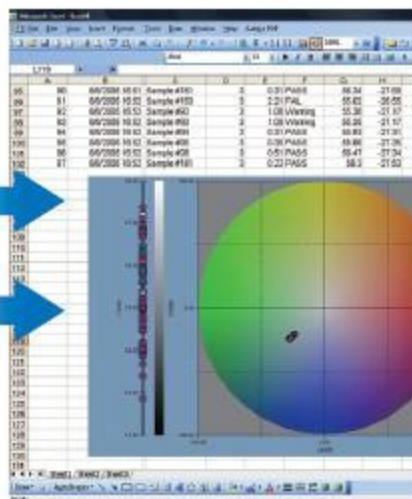
Pasted into Excel®

SpectraMagic™ NX print layout

Setting color tolerance

Below is an example of color quality evaluation. The color difference from the target color represented by dL*, da*, db*, and dE*94. The color tolerance set to dE*94 and shown as the elliptical tolerance in red. You evaluate your data by plotting it into the color space. Since the color space is 3dimentional, plotted data viewed in the direction of L*, a* and b*. The tolerance gives an indication of pass/fail of measured parts. There could be some data near the edge of tolerance. The software can set a margin for tolerance so that data close to the edge has a warning sign in the data list, and the marginal tolerance is a yellow ellipse. Later, an operator can visually inspect such parts.
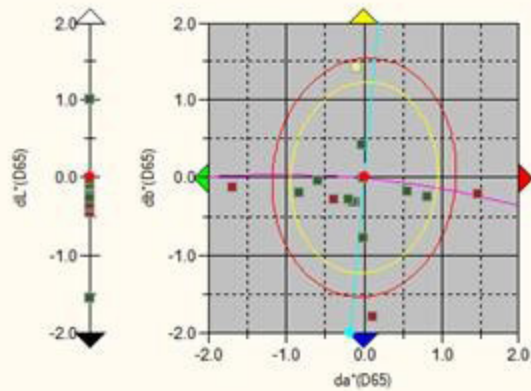
	Data Name	dL*(D65)	da*(D65)	db*(D65)	dE*94(D65)	Judgement
Target	tan100	—	—	—	—	—
1	tan sample#0001	-0.36	-0.09	1.41	0.94	Warning
2	tan sample#0002	-0.33	0.55	-0.18	0.50	PASS
3	tan sample#0003	-0.46	-0.14	-3.30	2.15	FAL
4	tan sample#0004	-0.39	0.12	-1.79	1.18	FAL
5	tan sample#0005	-0.44	-0.84	-0.20	0.73	PASS
6	tan sample#0006	-0.45	-1.69	-0.13	1.44	FAL
7	tan sample#0007	-0.36	-0.03	0.42	0.30	PASS
8	tan sample#0008	1.00	-0.12	-0.31	0.40	PASS
9	tan sample#0009	-0.39	0.82	-0.25	0.73	PASS
10	tan sample#0010	-0.22	-0.01	-0.78	0.51	PASS
11	tan sample#0011	-1.56	-0.15	-0.32	0.57	PASS
12	tan sample#0012	-0.35	1.47	-0.22	1.27	FAL
13	tan sample#0013	-2.86	-0.39	-0.29	1.02	FAL
14	tan sample#0014	-0.27	-0.20	3.33	2.18	FAL
15	tan sample#0015	2.14	-0.20	-0.27	0.75	PASS
16	tan sample#0016	-0.26	-0.59	-0.03	0.51	PASS
17	tan sample#0017	-0.10	-0.00	-0.01	0.04	PASS
18	tan sample#0018	-0.03	-0.00	-0.01	0.01	PASS

Tolerance can be set by taking various conditions into the account i.e. light sources, by nature of sample, by color of samples, by color equations commonly used in the industry, etc.

Below example shows QC inspection of a product against the target. Two light sources D65 and F11 are used. The product was evaluated by the tolerance of L*, a*, b* respectively.

Master Std.
< Surface D >
D65/10
L* 27.93
a*   4.74
b* -1.50

Product
L* 28.23
a*   4.53
b*   -1.57

Color Diff.
ΔL* 0.30   < Tolerance
Δa* -0.21   < Tolerance
Δb* -0.07   < Tolerance

PASS

Master Std.
< Surface D >
F11/10
L* 27.74
a*   4.91
b* -1.27

Product
L* 28.07
a*   4.64
b*   -1.24

Color Diff.
ΔL* 0.33   < Tolerance
Δa* -0.27   < Tolerance
Δb* 0.03   < Tolerance

PASS

	Instruments	Measurements	Comments
Spectrophotometers	**CM-700d**	Color	Vertical design is ideal for various shape of samples; curved surfaces and small samples
	CM-26d	Color	Horizontal design with low profile is ideal for measuring narrow areas such as edge of dashboard near the windshield and flat surfaces
	CM-26dG	Color & Gloss	Simultaneous measurement of color (d:8° geometry) and gloss of exact same spot, saving time in workflow
	CM-25cG	Color & Gloss	Simultaneous measurement of color (45°:0° geometry) and gloss of exact same spot, saving time in workflow
Complimentary Solutions	**Multi Gloss 268A**	Gloss	gloss meter consisting of three measuring angles (20°, 60°, 85°)
	Novo-Gloss Flex 60	Gloss	Ideal for measurement of curved surfaces
	GLE-M	Luminaire	Provides multiple lighting conditions (daylight, cool white fluorescent, incandescent, etc) for visual assessment of samples

Learn more by visiting us at:
https://sensing.konicaminolta.us/us/applications/color-measurement/
https://sensing.konicaminolta.us/us/industries/automotive-color-light-control/

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