COLOR MANAGEMENT

Color Management Equipment and Solutions

Shenzhen ThreeNH Technology Co., Ltd.

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COLOR MANAGEMENT

Color Management Equipment and Solutions

3nh® TILO®

COLORIMETER SPECTROPHOTOMETER

COLOR MATCHING SYSTEM

COLOR LIGHT BOX TUBES

RESOLUTION TEST CHART COLOR CHART

DIGITAL CAMERA TEST LIGHT BOX

DIGITAL COLOR MEASUREMENT SYSTEM

GLOSS METER PRINTING DENSITY METER

Shenzhen ThreeNH Technology Co., Ltd.

ABOUT US

Shenzhen ThreeNH Technology Co.,Ltd. is a high-tech enterprise. we research,develop,produce and market photoelectric detection products in photoelectric detection technology field and color management field after years of intensive research,3nh has launched ns series spechtrophotometer and nh,nr series colorimeter,NHG intelligent gloss instrument, HG automatic calibration type gloss meter,ISO1233 resolution test chart, optical image test solution and specific standard illuminant which are widely used in plastic ,electronic, paint, inktextile, garment, printing and dyeing, food, medical cosmetic, optical image lest industries and the field of scientific research, school and laboratory. Our products are exported around the world. We can provide customization service which has been well received by customers.

SERVICE CONCEPT

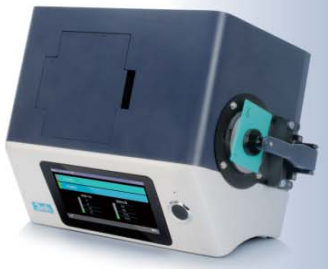
Focus on color for 20 years to make it better
Integrity wins the world

Continuous research and development innovation for excellence

Constantly create value for customers

YS6060 Benchtop Grating Spectrophotometer

YS6060 is a benchtop grating spectrophotometer which is developed by 3nh independently with propietary intellectual property. YS6060 has many features, like 7 inches TFT capacitive touch screen display, full illuminants, reflective d/8 and transmissive d/0 geometry(including or excluding UV). With very stable and precise color measurement, large storage and powerful PC software all makes YS6060 ideal for color analysis within R&D and laboratory environments.



7 inches TFT Capacitive Touch-screen

USB/Bluetooth 2.1

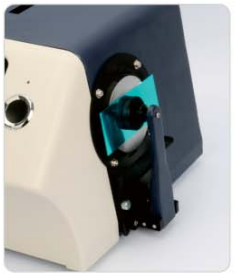
Wavelength range 360nm – 780nm

Built-in camera locating

PRODUCT FEATURES

1. Double Array 256 Image Element CMOS Sensor; Long life-span stable LED, UV LED and xenon lamp.
2. With reflectance and transmittance spectrum, accurate L*a*b value, good to calculate color formula and do precise color transmission.
3. Auto-identify measuring aperture. Freely switchable between 4 measuring apertures:φ25.4mm/15mm 8mm/4mm. Users can also customize apertures.
4. Built-in temperature sensor to monitor and compensate the measuring temperature to ensure the measurement more precision.
5. Wavelength range 360nm – 780nm. Built-in 400nm cut off/420nm cut off/460nm cut off (only xenon lamp edition), more professional in UV measurement.
6. Independent light source detector, continuously monitor the change of light sources to ensure the light source reliable.
7. Multiple accessories, sample holders, fixation frame, suitable to more working condition.
8. More powerful extended functions with the PC software.

PRODUCT HIGHIGHTS



Plastic Sample

Reflectance Measurement: Adopt D/8° Geometry, conform to ISO7724/1, CIE, ASTM, DIN and JIS standard.

Transmissive Sample

Transmittance Measurement: Adopt D/0° Geometry, conform to ISO, CIE, ASTM and DIN standard.

Liquid, Powder, Solid Sample Measurement

360-780nm wide wavelength range measurement, professional UV sample measurement.

Measuring Apertures

Auto-indentify the apertures, 25.4/15/8/4mm four apertures freely switch. Special aperture can be customised.

APPLICATION INDUSTRY

YS6060 benchtop spectrophotometer is used to do precise color analysis and transmission in laboratories. It can be widely applied in different industries, such as plastics, electronics, paint and ink, printing, garments, leather, paper, auto, medical, cosmetics, food, science institutes, laboratories.

Automobibe

Leather

Plastics

Paint

Foodstuff

Laboratory

Others

SPECIFICATION PARAMETER

YS6060Specification			YS6010 Specification
Optical Geometry:Reflectance: d/8 (SCI&SCE; Include UV/Exclude UV) Transmittance: d/0 (SCI&SCE; Include UV/Exclude UV) Conforms to CIE No.15, GB/T 3978, GB 2893, GB/T 18833, ISO7724/1, ASTM E1164, DIN5033 Teil7			
Integrating Sphere Size:Φ154mm			
Light Source Device:360nm-780nm Combined LED Lamp, 400nm cut-off, 420nm cut-off, UV Lamp			360nm-780nm Combined LED Lamp, 400nm cut-off
Sensor:256 Image Element Double Array CMOS Image Sensor			
Light Source Device:360nm-780nm Combined LED Lamp, 400nm cut-off, 420nm cut-off, UV Lamp			
Wavelength Pitch:10nm			
Semiband Width:10nm			
Reflectance Range:0~200%			
Measuring Aperture:Reflective: Φ30mm/Φ25.4mm, Φ18mm/Φ15mm, Φ10mm/Φ8mm, Φ6mm/Φ4mm;Transmissive: Φ30mm/Φ25.4mm;			
Specular Component:Reflectance: SCI&SCE Transmittance: SCI&SCE			
Color Space:CIE LAB,XYZ,Yxy,LCh,CIE LUV,Musell,s-RGB,HunterLab,βxy,DIN			
Color Difference Formula:ΔE ab,ΔE uv,ΔE 94,ΔE cmc(2:1),ΔE cmc(1:1),ΔE 00, DINΔE99,ΔE(Hunter)			
Colorimetric Index:WI (ASTM E313, CIE/ISO, AATCC, Hunter),YI (ASTM D1925, ASTM 313),TI (ASTM E313, CIE/ISO),MI (Metamerism Index), Staining Fastness, Color Fastness, Color Strength, Opacity,Gardner Index, Pt-Co Index, 555 Index,			
Observer Angle:2°&10°			
Illuminants:D65A,C,D50,D55,D75,F1,F2,F3,F4,F5,F6,F7,F8,F9,F10,F11,F12			
Displayed Data:Spectrogram/Values, Chromaticity Values, Color Difference Values/Graph, Pass/Fail Result, Color Offset			
Measurement time: About 3 s (simultaneous measurement SCI / SCE about 6 s)			
Repeatability	Spectral reflectance:Φ25.4mm/SCI	Standard deviation within 0.04% (400 nm to 700 nm: within 0.04%)	Standard deviation within 0.05%
	Chromaticity value:Φ25.4mm/SCI	Standard deviation within ΔE*ab 0.01	Standard deviation within ΔE*ab 0.02
	Spectral Transmittance:Φ25.4mm/SCI	Standard deviation within 0.05% (400 nm to 700 nm: within 0.04%)	
	Chromaticity value:Φ25.4mm/SCI	Standard deviation within ΔE*ab 0.02	Standard deviation within ΔE*ab 0.03
Inter-instrument Error:Φ25.4mm/SCI Within ΔE*ab 0.15(Average for 12 BCRA Series II color tiles)			Φ25.4mm/SCI, Within ΔE*ab 0.12
Size:370X300X200mm			
Weight:9.6kg			
Power Supply:DC 24V, 2A Power Adapter			
Light Source Device Life:5 years, more than 3 million times measurements.			
Screen:7" TFT Capacitive Screen-touch Display			
Data Port:USB & Bluetooth			USB
Data Storage Capacity:Standard: 5000 Pcs; Sample: 40000 Pcs.(One PCS can include both SCI and SCE)			Standard: 2000 Pcs; Sample: 20000 Pcs.
Language:English & Chinese			
Working Environment:Temperature: 0~40°C; Humidity: 0~85% (No Condensation)			
Storage Environment:Temperature: -20~50°C; Humidity: 0~85% (No Condensation)			
Standard Accessory:White and Black Calibration Board, Checking Green Board, Sample Holder, Φ4mm, Φ8mm, Φ15mm, Φ25.4mm Aperture,Power Adapter, USB Cable, User Guide, PC Software			
Optional Accessory:Micro-printer, Transmissive Test Clamp Component			

Perfect partner for color measurement

YS3010、YS3020、YS3060 Grating spectrophotometer are developed by 3nh independently, features with stable performance, precise measurement and powerful functions in leading position of same industry.

YS3060 UV Grating Spectrophotometer

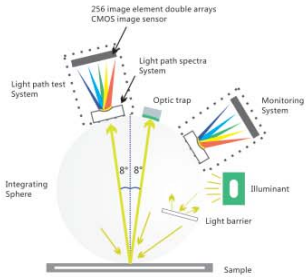
Full Illuminants + UV, 8mm&4mm Apertures, SCI&SCE,Bluetooth Comm, High Precision.

YS3020 Grating Spectrophotometer

Multi-illuminants, Customizable Aperture, SCI&SCE, Bluetooth Comm, High Precision.

YS3010 Grating Spectrophotometer

4 Illuminants, 8mm Aperture, SCI&SCE, Good Precision.



Grating spectrophotometer light path system

PRODUCT CHARACTERISTICS

1.D/8 geometrical optics, conforms with CIE No.15,GB/T 3978,GB2893, GB/T 18833, ISO7724/1, ASTM E1164, DIN5033 Teil;

2.Combined long life LED light source, including/excluding UV;

3.Switchable Φ8/4mm aperture, adapt to more samples;

4.USB/Bluetooth 2.1, dual modes, widely useful;

5.Support both SCI and SCE modes measurement;

6.Camera Locating Function, better position;

7.Super stain-resistant and stable white calibration plate;

8.Large capacity storage space, over 20,000 measurement data;

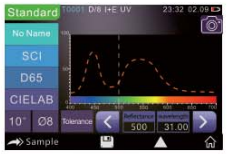
9.With full illuminants and many color indexes for color measurement;

I0.PC software has a powerful function extension.

PRODUCT HIGHLIGHTS

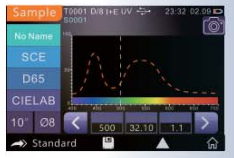
YS30 Series grating spectrophotometer adopts bluetooth and USB dual modes for wider use, and with SCI & SCE measurement data, it is compatible with many famous brands. 8mm, 4mm or customized aperture is optional. Speical UV light makes YS3060 easy to measure sample with UV more accurate. And extended PC software let it be good partner for colorist and color quality contral management.

Standard Measurement



Standard Reflectance

Sample Measurement



Sample Reflectance

APPLICATION INDUSTRY

Grating spectrophotometer can easily implement accurate color transmission, also can be used as a precision color testing Equipment. It's widely used in plastics, electronics, painting, ink, textile and garment, printing and dyeing, printing paper, Automotive, medical, cosmetics and food industries, scientific research institutes, schools and laboratories.

Automobibe

Leather

Plastics

Paint

Foodstuff

Laboratory

Others

GRATING SPECTROPHOTOMETER

SPECIFICATION PARAMETER

Specification			
Model	YS3060	YS3020	YS3010
Illumination/ observation system	reflect: di:8°, de:8°(diffused illumination, 8-degree viewing angle) ; UV Included/UV Excluded	reflect: di:8°, de:8°(diffused illumination, 8-degree viewing angle)	
Integrating Sphere Size	Φ48mm		
Light Source	Combined LED sources,UV sources	Combined LED sources	
Spectral Mode	Concave-Grating		
Sensor	256 Iimage Element Double Arrays CMOS Image Sensor		
Wavelength range	400~700nm		
Wavelength pitch	10nm		
Half bandwidth	10nm		
Reflectance range	0~200%		
Measurement Aperture	MAV: Φ8mm/Φ10mm;SAV:Φ4mm/Φ5mm	Customizable: Φ4mm/Φ8mm/1*3mm	MAV: Φ8mm/Φ10mm
Light-included Mode	both SCI&SCE modes		
Color Spaces	CIE LAB,XYZ,Yxy,LCh,CIE LUV,HunterLAB		
Color Difference Formulas	ΔE*ab,ΔE*uv,ΔE*94,ΔE*cmc(2:1),ΔE*cmc(1:1),ΔE*00v,ΔE(Hunter)		
Other Colorimetric Data	WI(ASTM E313, CIE/ISO,AATCC,Hunter)		
	YI(ASTM D1925,ASTM 313)		
	TI(ASTM E313,CIE/ISO)		
	MI,Strength,Staining fastnes,Cover Ratio, 8°gloss value		
Observer	2°/10°		
Illuminant	A,C,D50,D55,D65,D75,F1,F2,F3,F4,F5,F6,F7,F8,F9,F10,F11,F12,CWF,U30,TL83,TL84,U35		
Display Data	Spectrogram/Values,Chromaticity Values, Color Difference Values/Graph, PASS/FAIL Result, Color Assessment		
Measurement Time	Approx. 1 second(Approx. 2.6 second in SCI&SCE)		
Repeatability	Spectral reflectance: MAV/SCI, Standard deviation within 0.08%(400~700nm::within0.18%)	Spectral reflectance: MAV/SCI, Standard deviation within 0.1%(400~700nm::within0.2%)	
	Chromaticity value: Standard deviation withinΔE*ab 0.03	Chromaticity value: Standard deviation withinΔE*ab 0.04	Chromaticity value: Standard deviation withinΔE*ab 0.05
Inter-instrument agreement	WithinΔE*ab 0.15 (MAV/SCI)(Average for 12 BCRA Series II color tiles)	WithinΔE*ab 0.2	
Measurement Mode	Single Measurement,Average Measurement(2~99times)		
Locate Mode	Camera Locating		
Size	(L*W*H)184*77*105mm		
Weight	Approx. 600 g		
Battery Performance	Li-ion battery. 5000 measurements within 8 hours		
Lamp Life	5 years, more than 1.6 million measurements		
Screen	3.5-inch TFT color LCD,Capacitive Touch Screen		
Interface	USB/RS-232,Bluetooth 4.0 dual mode		
Storage	Standard\1000, Sample\28000 (SCI&SCE can be included in one data)	Standard\1000, Sample \20000 (SCI&SCE can be included in one data)	
Languages	Chinese, English		
Standard Accessories	Power Adaptor,Built-In Li-ion Battery,User manual,CD-ROM (containing management software), White and Black Calibration Cavity,Dust Cover		
Optional Accessories	Micro Printer, Powder Test Box		

STABLE PERFORMANCE
HIGH PRECISION

NHG SERIES TOUCH SCREEN GLOSS METER

Large Touch Screen Operation

HG SERISE ECONOMIC GLOSS METER

Fully Automatic Calibration

SCM TUV CE ISO9001 RoHS FC

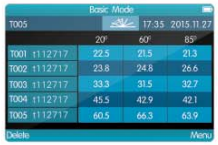
NHG series intelligent touch screen gloss meter and HG series economic gloss meter is independently developed by 3nh, with independent intellectual property. Manufactured according to International standard ISO2813 and Chinese standard GB/T 9754, it is the world's first full large touch screen gloss meter. Tri-angle and 60 degree model meet most customers' requirment.
With GQC6 PC software, gloss measurement is more convenient use. Stable performance and high accuracy measurement makes it very popular all over the world.

- Color capacitive touchscreen, the world' s first full touch operation
- Simultaneous display multiple sets of measurement data, good for comparison
- Manually input gloss value, convenient to use
- PC software have powerful extended functions

PRODUCT CHARACTERISTICS

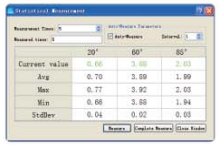
1.3.5 inch high resolution 480*320 large touch screen
2.Comply to ISO 2813, ASTM D523, GB/T 9754, ASTM D2457
3.Beauty appearance, good man-machine communication interface
4.One button for all angles measurement at the same location
5.Display 5 sets of measurement data, good for comparison
6.Basic measurement, statistical measurement, continuous measurement for different requirement
7.Built-in lithium ion rechargeable battery with long lifespan
8.Connect to PC, more extend functions
9.Input gloss value manually, convenient to use
10.Large storage to save over 5000 data

Large Touch Screen



Tri-angle for different use

Multi sets of data for better comparison



GQC6 PC software

SPECIFICATION PARAMETER

Model	NHG268 Tri-Angle Intelligent Gloss Meter	NHG60 Single Angle Intelligent Gloss Meter	NHG60M Small Aperture Gloss Meter
Measuring Angle	20° 60° 85°	60°	
Standard	ISO 2813, GB/T 9754, ASTM D 523, ASTMD 2457Display 5 sets of test data.		
Characteristics	Input glossiness value manually.		
Measuring Area (mm)	20°:10x10, 60°:9x15, 85°: 5x36	9x15	1.5x2
Measuring Range	20°:0-2000GU 60°:0-1000GU 85°:0-160GU	0-1000GU	
Division Value	0.1GU		
Range	0-10GU 10-100GU 100-2000GU	0-10GU 10-100GU 100-1000GU	
Repeatability	±0.1GU, ±0.2GU, ±0.2%GU		
Reproducibility	±0.2GU, ±0.5GU, ±0.5%GU		
Deviation	±1.2, ±1.2%		±1.5, ±1.5%
Measurement Standard	Conform with JJG696 first class gloss meter working requirement		
Chromaticity Corresponding	Corresponding with CIE 1931(2°) under CIE C light source		
Measuring Time	0.5S		
Weight	350g		
Dimension	L*W*H=160x75x90mm		
Battery	3200mAh Li-ion Battery , >10000 times (within 8 hours)		
Display	TFT 3.5 inch, touch screen		
Interface	USB/RS-232		
Storage	Basic Mode: 1000, Statistic Mode: 5000, Continuous Mode: 5000		
Software	GQC6 Quality Control Software with QC report printing function and more extended functions		
Standard Accessories	Power Adapter, USB Cable, User Manual, GQC6 software CD, Calibration Plate		
Optional Accessories	Miniature Printer		

YG Series Gloss Meter

YG series gloss meter is independently developed by Shenzhen ThreeNH Technology Co.,Ltd with independent intellectual property, manufactured according to international standard ISO2813 and China standard GB/T 9754. With auto-calibration and high-end QC software, it can meet the first grade requirements of JJG696.

Tri-angle(Accurate)

USB/Bluetooth 2.1 Version

QC Data Printing

QC Software

PRODUCT FEATURES

1.Elegant design combined with aesthetics and ergonomics;
2.With auto-calibration function;
3.Meet the first grade requirements of JJG696;
4.Large storage to save over 35000 data;
5.Can realize auto power on & off automatically within 30s-120s;
6.Comply to ISO2813,ASTM523, GB/T9754;
7.With PC software for quality report and more extend functions;
8.With multi working modes and multi-functions meeting most customers' requirements.

APPLICATION INDUSTRY

Widely used in the filed of paints,coating,plastics,ink,rubber,printing,paper,glass,handware,ceramic,marble etc.

SPECIFICATION PARAMETER

YG Series Specification Parameter		
Model: YG268 Tri-angle Gloss Meter	YG60 60°Accurate Gloss Meter	YG60S 60°Economic Gloss Meter
Measuring Angle: 20°/60°/85°	60°	
Measuring Area (mm): 20°:9X10 60°:9X15 85°:5X38	60°:9X15	
Measuring Range : 20°: 0~2000GU 60°: 0~1000GU 85°: 0~160GU	60°:0~1000GU	60°:0~200GU
Division Value: 0.1GU		1GU
Measuring Time: 0.5s		
Repeatability: 0~100GU:±0.2GU ; 100~2000GU:±0.2%GU	0~100GU:±0.2GU 100~1000GU:±0.2GU%	0~100GU:±0.5GU 100~200GU:±0.5GU%
Accurate: Conform with JJG696 first grade requirements of gloss meter		second grade requirements of gloss meter
Auto Power-off Time: Within 30s-120s		30s
Long-time Calibration: Automatically finished calibration		/
Language: Chinese & English		
Storage: 35000(Basic mode &Statistic mode : 1500; Continuous mode : 10000; QC mode: 10000)		/
Display: 2.3 inch black and white screen		
Size: 160X52X84mm		
Weight: About 300g		
Power Supply: 1pc dry-cell battery(can measure 10000 times) or use USB Charge		
Interface: USB & Bluetooth 2.1 version	USB	
PC Software: GQC6 QC software for quality report and more extended functions		/
Operation Temperature Range: 0~40°C(32~104°F)		
Storage Temperature Range: -20~50°C(-4~122°F)		
Humidity Range: < 85% RH, without condensation		
Standard Accessories: User manual, calibration plate,USB cable, user manual, QC software		
Optional Accessories: Miniature printer		

ECONOMIC GLOSS METER

GQC6 PC SOFTWARE

GQC6 software is designed for 3nh brand gloss meter for PC connection, gloss measurement, manually gloss value input, data management, data export, print reports, etc.

1. Data management: measure, rename, record, delete, export, print, hide or display one angle data.
2. Set auto-save or not and set time / language etc.
3. Manually input gloss value.

APPLICATION INDUSTRY

Gloss meter is wildly used to test glossiness in industries of automobile, paint, ink, coating, paper, printing, leather, plastic, electronic, furniture, ceramic, electroplate, hardware, marble, etc.


Automobile


Leather


Plastics


Marble


Metal

Others

SPECIFICATION PARAMETER

Model	HG268 Tri-angle Gloss Meter	HG60 Economic Gloss Meter	HG60S Economic Gloss Meter
Measuring Angle	20° 60° 85°	60°	
Standard	ISO 2813, GB/T 9754, ASTM D 523, ASTMD 2457		
Measuring Area (mm)	20°: 10x10, 60°: 9x5, 85°: 5x36	9x15	
Measuring Range	20°: 0-1000GU,60°: 0-1000GU 85°:0-160GU	0-300GU	0-200GU
Division Value	0.1GU		1GU
Range	0-10GU 10-100GU 100-1000GU	0-10GU 10-100GU 100-300GU	0-200GU
Repeatability	±0.1GU, ±0.2GU, ±0.2%GU		±1GU
Reproducibility	±0.2GU, ±0.5GU, ±0.5%GU		±1GU
Deviation	±1.5, ±1.5%		
Measurement Standard	Conform with JJG696 first class gloss meter working requirement		
Chromaticity Corresponding	Corresponding with CIE 1931(2°) under CIE C light source		
Measuring Time	1S		
Dimension	L*W*H=160x75x90mm		
Weight	350g		
Language	Chinese/English		
Battery	3200mAh Li-ion Battery , >10000 times(within 8 hours)		
Display	TFT 3.5 inch		
Interface	USB/RS-232		
Storage	Basic Mode: 1000		
Software	Power Adapter, USB Cable, User Manual, GQC6 software CD (except HG60S), Calibration Plate		
Standard Accessories	GQC6 Quality Control Software with QC report printing function and more extended functions		
Optional Accessories	Miniature Printer		

TRANSMISSION LIGHT BOX
NO FLASH FREQUENCY
CRI> 90

1. Unique LED light or DNP original light, life up to more than 25000 hours.
2. Uniformity Illumination over 92%, CRI (Color Rendering Index) > 90.
3. Adjustable illuminance range from 0-11000lx, with 2 dimmer knobs.
4. Fits for many kinds of 4:3 transmission test charts use, like 3nh, DNP, etc.
5. Through Image test software, camera analysis result more professional and much easier.

APPLICATION

Transmission light box is widely used for digital camera, HD camera,phone camera, video camera, Security cameras, car camera, etc lens camera test quality control.


Digital Cameras


HD camera


Security camera


Car Camera


Video camera


Phone Camera

Others

SPECIFICATION

Model	CC5100/CC3100 with DNP original light	HC5100/HC3100 with LED light
Light source	5100K(5100K±200k) *4,3100K(3100K±200k) *4	HC3100 ± 100k / HC5100 ± 100k Duv ± 0.002
Uniformity	>90%	>92%, CRI >90
Luminous Source	100 ~ 4400cd/m2 adjustable	100 ~ 5000cd/m2 adjustable
Illuminance	250 ~ 10000Lux adjustable	0 ~ 27000Lux adjustable
Power supply	AC230V 50/60HZ	AC100-240V 50/60HZ
Lighting method	High Frequency lighting method 20KHzHigh	Constant current source
Operating temperature	10 ~ 40℃	10 ~ 40℃
Operating humidity	Below 80%(avoid dew)	Below 80%(avoid dew)
Major diameter dimension	38.5W*34H*15Dcm	37W*32.5H*16.5Dcm
Luminance plane dimension	25W*19Hcm	25W*19Hcm

YOUR CHIEF COLOR EXPERTS

SPECTROPHOTOMETER NS810/NS800

NS800 series spectrophotometer is developed by 3nh with numbers of innovative technology and many patents. NS800 series has high configuration and powerful functions in the leading position of the same industry.

SPECTROPHOTOMETER NS810

D/8 structure(diffuse illumination,8° viewing)

SPECTROPHOTOMETER NS800

45/0 method (45 ring-shaped illumination,vertical viewing)

15 Degree screen to display upside-down and up

Large Storage Space with High hardware configuration

3. 5 inch large capacitive touch screen, fully functional touch control.

58mm large integrating sphere, more accurate measurement

PRODUCT FEATURES

1. Display complete reflectance rate and input LAB value manually.
2. NS810:D/8 structure (diffuse illumination, 8° viewing)
   NS800:45/0 method (45 ring-shaped illumination, vertical viewing)
3. 3.5 inch large capacitive touch screen, fully functional touch control.
4. 2°/10° degree observe, multiple lights, many color systems.
5. The repeatability ΔE*ab is within 0.04, errors is less than 0.2
6. Large capacity storage, more than 15000 data.
7. PC software with powerful extension functions.
8. 15° oblique angle screen, in line with the human eye observation.
9. Oversized integrating sphere, more effective homogenization ray of lights.
10. High hardware configuration with a number of innovative technologies.

APPLICATION INDUSTRY

NS810/NS800 spectrophotometer is widely used in plastic, electronic, paint, ink, textile, garment, printing and dyeing, foodmedical cosmetic industries, scientific research institutes, schools and laboratories. It can measure reflectance spectrum and other color index precisely. NS810/NS800 spectrophotometer not only can help to perform color matching and color management studies, but also can control product quality management Accurately. The instrument is equipped with high-end color management software which can connect PC to achieve more extension functions.


Plastics


Paints


Printing


Automobile


Textile


Medicine

Others

SPECIFICATION PARAMETER

SPECTROPHOTOMETER NS810

Illumination/Observation System: D/8 structure
Wavelength Range: 400~700nm
Wavelength Interval: 10nm
Reflectance Range: 0~200%
Color Space: CIE LAB,XYZ,Yxy,LCh,CIE LUV
Color Difference Formula: ΔE*ab,ΔE*uv,ΔE*94,ΔE*cmc(2:1) ΔE*cmc(1:1),ΔE*cmc(l:c),CIE2000ΔE*00, Δ E (h)
Chromaticity Data: WI(ASTM E313,CIE/ISO,AATCC,Hunter) YI(ASTM D1925,ASTM 313),Metamerism Index (Mt), color strength Color Stain, Color Fastness ,Opacity
Illuminant: D65,A,C,D50,D55,D75,F1,F2,F3,F4,F5F6,F7,F8,F9 F10,F11,F12
Measuring Aperture: Φ8mm
Observer: 2°/10°
Repeatability: within Delta E*ab 0. 04
Errors between Each instrument: Within Delta E*ab 0.2
Storage: 1000 Standards, 15000 Samples
Optional Accessory: Universal Test Components for liquid, powder particle, Micro Printer, Powder Test Box

SPECTROPHOTOMETER NS800

Illumination/Observation System: 45°/0° structure
Wavelength Range: 400~700nm
Wavelength Interval: 10nm
Reflectance Range: 0~100%
Color Space: CIE LAB, XYZ, Yxy, LCh, CIE LUV
Color Difference Formula: ΔE*ab, ΔE*uv, ΔE*94, ΔE*cmc(2:1) ΔE*cmc(1:1), ΔE*00
Chromaticity Data: WI(ASTM E313, CIE/ISO, AATCC, Hunter) YI(ASTM D1925, ASTM 313), TI(ASTM E313, CIE/ISO), Opacity Metamerism Index (Mt),Color strength , Color Stain, Color Fastness
Illuminant: D65, A, C, D50, D55, D75, F2, F6, F7, F8, F10, F11, F12
Measuring Aperture: Φ8mm
Observer: 2°/10°
Repeatability: within Delta E*ab 0. 04
Errors between Each instrument: Within Delta E*ab 0.2
Storage: 1000 Standards, 15000 Samples
Optional Accessory: Universal Test Components for liquid, powder particle, Micro Printer, Powder Test Box

MODEL: NH310

NH310 is a mainstream brand colorimeter introduced by 3nh which has synthesized the advantages of ten more traditional imported colorimeters. Accurate, Stable Exquisite and Affordable!

MODEL: NH300

Nh300 is the highest cost-effective portable colorimeter with high precise in NH series.

INNOVATION TECHNOLOGY AND PATENTED

Camera Locating Illumination Locating

Built-in white plate Automatic Calibration at Startup

Extended Aperture(Optional) Available for Measuring Concave

Configure with 8mm/4mm Dual Measurement Aperture

PRODUCT FEATURES

1. Leading Humanity Design and Convenient Operation

Auto White and Black Calibration at Startup
Structure Design in line with Ergonomics
Easy-to-use Operation Interface。

2. Stable Measurement Performance

The average fluctuation of △E is less than 0.06, actually more in 0.03~0.06.
Portable structure design which is more conductive to keeping the instrument stable when using.

3. More Measurement Modes

Three measuring apertures for more circumstances.
Five color spaces for more color schemes selection.
Three light sources for more circumstances.

4. Flexible and Accurate Locating

Camera locating can solve the problem of locating a small area. The minimum width of locating is 4mm.
Illumination locating is a fast, simple and convenient locating function which is the original function by 3nh.

5. PC Software and Li-ion Battery

PC software can perform color difference analysis, color difference cumulative analysis chromaticity index, color sample database management, simulating object color, etc.
Advanced Li-ion battery can measure over 3000 times on one charge.

6.Optional Accessories

Powder Test Box (For Powder)

8mm Extended Aperture (For Concave, circular arc surface)

Universal Test Component (For Liquid, Particle and Paste)

SPECIFICATION PARAMETER

Model	Locating	Calibration	ΔE	Aperture	Light Source	Color Space	SCI/SCE	Whiteness	Formula	Yellowness	CQCS3 software
NH310	Camera Illumination Locating	Automatic Manual	<0.06	8mm/4mm	D65 D50 A	Lab XYZ CIE-RGB LCH Luv	✓	✓	✓	✓	✓
NH300	Illumination Locating	Manual	<0.07	8mm	D65	Lab XYZ	–	–	–	–	✓

MAKE THE MEASUREMENT EASIER

NR60CP

High cost-effective precise colorimeter features with powerful functions and excellent innovation technology.

PRODUCT FEATURES

1. 8mm and 4mm double aperture for switch, easy to measure concave sample in large plane
2. More stable and accurate, ΔE* ab<0.03
3. Many color spaces, many color indexes, extensive applicability
4. Double locating: illuminating locating and cross locating
5. Equipped with rechargeable high-capacity li-ion battery
6. Built-in white plate parameters, and configuration of physical whiteboard, easy to operate;
7. New integrating sphere optical path design, more stable to measure;
8. Double apertures measurement data can pass SCM metrological certification;

Φ8mm aperture

Φ4mm aperture

SPECIFICATION PARAMETER

Illuminating/Viewing Geometry: 8°/ d
Light Source: LED Light
Sensor: silicon photodiode array
Measuring Aperture: Φ8mm flat aperture; Φ4mm tip aperture
Color Space： CIE LAB, XYZ, LCH, CIE RGB, CIE LUV
Color Difference Formula: ΔE* ab, ΔE(h) , ΔE* uv,ΔE* 94 ΔE*cmc (2: 1) , ΔE*cmc (1: 1) , ΔE* 00
Other Chromaticity Data: WI , Color Fastness, Staining Fastness J PC79,BFD(1. 5: 1), FMCI I
Observer: CI E 10°
Illuminant: D65, A, C, D50, F2, F6, F7, F8, F10, F11, F12
Display Data: Colorimetric Value, Color Difference Value/Graph PASS/FAIL Result, Color Offset,
Measuring Time: 0. 4s

Repeatability: ΔE* ab 0. 03 (Average of 30 measurements of standard white plate within 5s)
Errors between Each instrument: within Delta E*ab 0.2
Dimension: 205*67*80mm
Weight: 500g
Battery: rechargeable lithium-ion battery 3. 7V @ 3200mAh
Lamp Life: 5 years, more than 1.6 million measurements
Screen: TFT 2.8 inch（16: 9）
Interface: USB/ RS- 232
Storage: 100 Standards, 20000 Samples
Operating Temperature: 0~40℃（32~104°F）
Storage Temperature: -20~50℃（-4~122°F）
PC Software: CQCS3 software
Optional Accessory: miniature thermal printer, powder test box

NR110 High cost-effective precise colorimeter features with powerful functions and excellent innovation technology.

1. Built-in white plate parameters. No need to calibrate each time which realize rapid measurement.
2. Double Locating: Illuminating locating and precise cross locating.
3. New Integrating Sphere Optical Path Design: Possessing the highest measurement stability and precision.
4. 4mm Measuring Aperture.
5. Equipped with rechargeable high-capacity Li-ion battery. No need to purchase battery repeatedly.
6. Exquisite appearance: a dopts traditional and fashionable aesthetic designs.

SPECIFICATION PARAMETER

Illuminating/Viewing Geometry :8°/d	Errors between Each Equipment :≤0.80ΔE*ab
Measuring:Φ4mm	Storage:100pcs standards 20000pcs samples
Detector:Silicon photoelectric diode	Repeatability: ΔE* ab 0. 08
Locating:Illuminating Locating/Cross Locating	Average of 30 measurements of standard white plate
Measurement End Face:Large stable end-face and small	Language:English/Chinese
concave-convex end-face	Dimension:205×67×80mm
Color Space:CIEL*a*b*c*h* CIEL*a*b* CIEXYZ	Power Source:Lithium battery 3.7V@3200mAh
Color Difference Formula:△E*ab △L*a*b* △E*C*h*	Lamp Life:5 years, more than 1.6 million measurements
Light Source:D65	PC Software:CQCS3 Software
Light Source Device:LED blue light excitation	Printer (optional):Miniature thermal printer

High stability and high accuracy

Model	Locating	Calibration	ΔE	Aperture	Light Source	Color Space	SCI/SCE
NR200	Illumination Locating	Manual	<0.08	8mm	D65	CIE-Lab CIE-XYZ CIE-LabCH	SCI

20mm diameter aperture

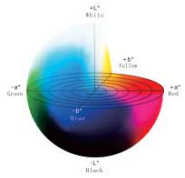
Model	Locating	Calibration	ΔE	Aperture	Light Source	Color Space	SCI/SCE
NR20XE	Cross Locating Illumination Locating	Manual	<0.08	20mm	D65	CIE-Lab CIE-XYZ CIE-LabCH	SCE

Different innovation technologies

Model	Locating	Calibration	ΔE	Aperture	Light Source	Color Space	SCI/SCE
NR145	Cross Locating Illumination Locating	Manual	<0.08	8mm	D65	CIE-Lab CIE-XYZ CIE-LabCH	SCE

The cheapest colorimeter

Model	Locating	Calibration	ΔE	Aperture	Light Source	Color Space	SCI/SCE
NR10QC	Cross Locating Illumination Locating	Manual	<0.03	4mm	D65	CIE-Lab CIE-XYZ CIE-LabCH	SCI



COLORIMETER SPECIAL CUSTOMIZATION SERVICES

Special function customized service is to meet customers' kinds of requirements.

Include: Display Mode/Color Formula/Special Light Source/Whiteness Brightness etc full functions

COLOR MATCHING SYSTEM

MatchColor is a full software with 6 modules. As far as it is very complete, it is mainly dedicated to big factory which have a color laboratory with colorist using it all day long. The 6 modules are:

1-Color Quality Control with different indexes (WI, YI, Opacity, Color strength) and graphics.

Color inspection and quality control

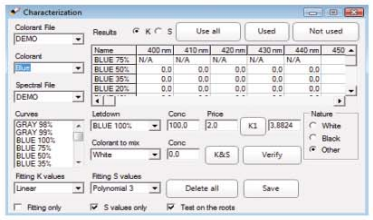
2-Approach Search

which allows to classify all colors in
a file (spectral or formulas files) from a standard.

Search close colorimetric method

3-Colorant Characterization

This module uses a spectral file of all colorants letdowns (some mixtures with white and one with black) and measurements (made in general with quality control module). It allows calculating and displaying the fitting curves of K (light absorption) and S (light diffusion) versus concentration. It allows building up what we call a colorant file.



4-Formulation by Combination

This formulation module combines all the colorant of a colorant file to calculate thousands of formula and display the best regarding DE, price or metamerism.

New amethod recipe

5-Manual/Automatic Formulation

With this module, the user selects manually the colorants he wants to use in the formula. Then formulation can be calculated automatically by curve fitting or by color coordinate. This mode can be very useful in a research laboratory to do simulations

6 - Correction Module

2 correction modes are available:
-Correction by reformulation. The software calculates a new formula which give the correction to match the standard.

-Correction by adding. The software calculates the minimum quantity of each colorant you need to add in a given basic quantity. This mode is also used to recycle work off products.

Recipe correction

MatchColor can support 3nh spectrophotometer, Konica Minolta Spectrophotometer and Datacolor spectrophotometer.

IMATEST ANALYSIS SOFTWARE

Imatest Master

Imatest Master is a GUIbased application that can be used to set camera product requirements in R&D.
Measure device sharpness (MTF), perceptual sharpness (SQF), color response, noise, dynamic range, tonal response, lens flare (veiling glare), lens distortion, lens vignetting, and sensor nonuniformity with SFR, Colorcheck, Multicharts, Stepchart, Distortion, and Light Falloff.

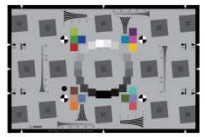
Imatest Image Sensor (IS)

In addition to the features of Imatest Master, the Imatest Image Sensor (IS) edition also offers the ability to dynamically load images from a variety of camera and image sensor sources.

Imatest Industrial Testing (IT)

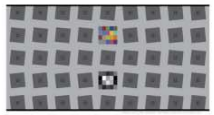
Imatest Industrial Testing (IT) software allows for the integration of key Imatest Master and Imatest Image Sensor (IS) module functionality into your custom testing programs. Quickly test products on the production line while maintaining quality standards. Manage multiple suppliers using one unbiased testing algorithm and catch issues earlier in your supply chain.

ISO 12233:2014 ESFR



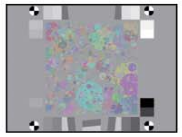
All Imatest ISO 12233:2014 ESFR charts are fully compliant with the ISO Low Contrast EdgeSFR test chart standard.
Standard: basic, no extra measurement features, inkjet prints.
Enhanced: extra squares, wedges and color patterns when printed with technologies that allow color. Inkjet and photographic print options.
Extended: similar to Enhanced, but with a 16:9 aspect ratio, suitable for HDTV and cinema, inkjet prints.

SFRplus Charts



Imatest’ s ISOcompliant SFRplus charts are designed to work with all Imatest software to provide automated, comprehensive image quality analysis. SFRplus charts test for MTF, noise, lateral chromatic aberration, dynamic range, among many other image quality factors.

Texture Charts



Imatest texture charts measure texture sharpness and come in color and black and white. The “Dead Leaves” chart was the first chart to test a camera’ s ability to reproduce texture.

TILO®

One-stop color management

Color Matching Light Box No.1

TILO was founded in 1998
Global Sales No.1

T60+ P60+

1. Composite engineering plastics, Processing in all mould mode
2. Be able to add the elastic mats and light barrier
3. Display each light source using time, name and off and on times
4. Light source automatic switch
5. No warm and flashing, low energy consumption, no fever
6. More complete Britain-American general light source

T60(4) Color Light Box

D65/TL84/UV/F
Size: 71 x 40.5 x 57 cm

T60(5) Color Light Box

D65/TL84/CWF/UV/F
Size: 71 x 40.5 x 57 cm

P60(6) Color Light Box

D65/TL84/CWF/UV/F/TL83
Size: 71 x 53 x 57 cm

P120 Large Size

D65/TL84/CWF/UV/F/TL83
Size: 131 x 60 x 80 cm

P60˚S Upgraded light box

D65/TL84/ F/CWF/TL83/ UV
Size: 69 * 55 * 50 cm

M60（American Style）

D65,TL84/U30,CWF,UV,F
Size: 71 x 53x 57 cm

T60B (British Style)

D65/TL84/UV/F
Size: 71 x 40.5 x 57 cm

CC120 Common Color Viewer

multiple tubes selectable
higher illumination evenness

STANDARD LIGHT SOURCE

VeriVide (British)

CAC60 CAC120 CAC150Models
D65,TL84/U30,CWF,UV,F
N5 standard grey environment
Widely used in Europe

X-rite Judge QC light box

D65,TL84/U30,CWF,UV,F
N7 standard grey environment
Widely used in all over the world
Made in China

X-rite SpectraLight QC

Size: 950*940*1270（mm）
D65 or D50, D50/ CWF/ U30/ T
L84/ HOR/ A/ UV 7 tubes
Made in China

TUBES AND LAMPS

Provide a full range of standard lamps and tubes:

D65、D50、D75、D35、TL84、CWF、UV
U30、TL83、U35、F、A、INCA、HOR

SYLVANIA D65 Tube
MOdel : F20T12/65 6500K 20W
Size : 60cm
Brand : SYLVANIA
Origin : GERMANY

PHILIPS D65Tube

Model: TLD18W/965
Size: 60cm
Brand: PHILIPS
Origin: Netherlands

VeriVide D65Tube

Model: F20T12/D65
Size: 60cm
Brand: VeriVide
Origin: E.E.C.

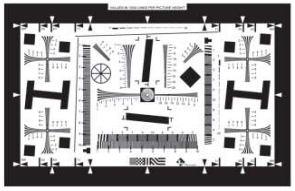
Ecolux U35Tube

Model: F17T8 SPX35 ECO
Size: 60cm
Brand: GE
Origin: USA

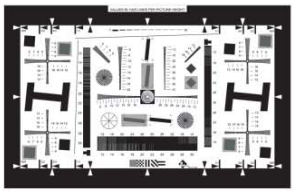
PHILIPS UV Tube

Model: TLD18W BLB
Size: 60cm
Brand: PHILIPS
Origin: Netherlands

OPTICAL IMAGE TEST SOLUTION



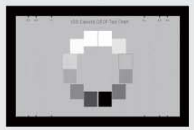
ISO12233 Resolution Test Chart



ISO12233 Enhanced Resolution Test Chart

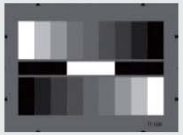
Resolution Test Chart	
(Product No.)	(Active Area)
NQ-10-100A (1X)	200 x 356mm (7.87 x 14in)
NQ-10-200A (2X)	400 x 712mm (15.75 x 28in)
NQ-10-400A (4X)	800 x 1424mm (31.5 x 56in)
NQ-10-800A (8X)	1600 x 2848mm (63 x 112in)
NQ-10-50A (0.5X)	100 x 178mm (3.94 x 7in)
NQ-10-10A (0.1X)	20 x 35.6mm (0.79 x 1.4in)

Enhanced Resolution Test Chart	
(Product No.)	(Active Area)
NE-10-100A (1X)	200 x 356mm (7.87 x 14in)
NE-10-200A (2X)	400 x 712mm (15.75 x 28in)
NE-10-400A (4X)	800 x 1424mm (31.5 x 56in)
NE-10-800A (8X)	1600 x 2848mm (63 x 112in)
NE-10-50A (0.5X)	100 x 178mm (3.94 x 7in)

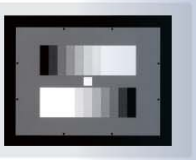


Iso14524 Dynamic Range Test Chart

DNP Color-bar Chart



DNP 9 Steps Grayscale Chart



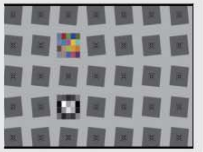
DNP 11 Steps Grayscale Chart

X-rite 24 Color Card

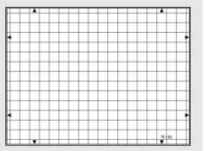
X-rite Digital Color Checker SG140

ESSER Skin Color Card

DNP Skin Color Card



SFR Chart



3NH Distortion Test Chart

Kodak Q-14

Gray Card

STANDARD LIGHT SOURCE

NEW: T90-7 Color Light Box (Adjustable Illumination Light)

Size: 1008*716*898mm(W*D*H)
Light source: D65, A, D50, UV, U30, TL84, U35
4 sets of LED light (Life up to 25000 times)
3 sets of fluorescent light source
Adjustable illumination light with metamerism function

Camera Viewing Station Color Cabinet (Desktop)

Size: 98*60*85cm
Standard: D65 TL84 A and three fixtures for test chart
Optional Light Source: 10000K、D75、D50、CWF、U35、TL83
Illuminance: 0.1-2800 lux adjustable
Illumination uniformity: 85%-90%

Camera Viewing Station Color Cabinet (Horizontal)

Size: 98*150*150cm
Standard: D65 TL84 A and three fixtures for test chart
Optional Light Source: 10000K、D75、D50、CWF、U35、TL83
Illuminance: 0.1-2800 lux adjustable
Illumination uniformity: 85%-90%

3nh Color Viewer / Transmission Light Box

Size: 38.5W*34H*15Dcm
Color temperature: 3100K±200K. 5100K±200K
Uniformity: >90%
Illuminance: 10000lux
Compatible with 4:3 transmission test chart

Color Light Box/Color Assessment Cabinet

Size: 71*53*57 cm
Display the using time and total time of each light
With Light source automatic switch
Without preheating, low energy consumption
Without heat dissipation

KONICA MINOLTA

Japan Konica Minolta

Authorized agent in China (authorization date: 2006. 10. 10)

CR-10 Plus Colorimeter

CM-3600a
Spectrophotometer

CM-5
Spectrophotometer

CM-2300d/2500d/2600d
Spectrophotometer

CR-410/CR-400
Colorimeter

CM-512m3a
Spectrophotometer

CL-200A
Chroma Meter

LS-150/CS-150
Color luminance meter

Chlorophyll Meter

C-7000
Spectral Color Light Meter

UG60/MG268 Gloss Meter

FD-5/FD-7 Spectrodensitometer

x-rite

AMERICA
COLOR MANAGEMENT

Ci6x Series Ci64 Portable Spectrophotometer

The Ci6x family of handheld spectrophotometers— Ci60, Ci62,Ci64 &Ci64UV is a performance-driven solution for managing color at any stage of production, and gives manufacturers a whole new level of confidence in their color data, regardless of where or when the measurements are collected.

RM200QC
Portable Colorimeter

Ci7800/Ci7600
Desktop Spectrophotometer

Exact Spectrodensitometers

Ci4200/Ci4200uv
Desktop Spectrophotometer

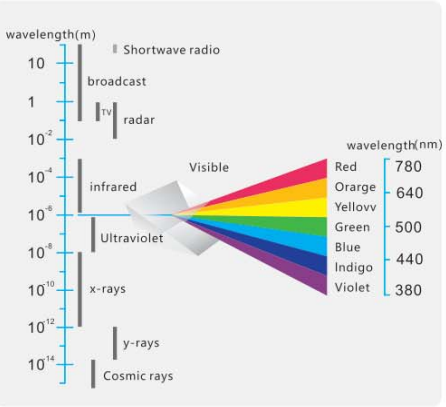
341CX
Transmission Densitometer

EYEONECOLOR MANAGEMENT SYSTEM

You can quickly and easily create custom monitor and projector profiles that ensure the colors you view are true, verify soft proofs and print quality with built-in Quality Assurance (QA) tools, and easily capture and manage spot colors. Plus, with X-Rite ColorTRUE free mobile app you can even calibrate your Apple® iOS phone and tablet.

1. Visible Range

From a science point of views, electromagnetic wave is a kind of energy. All objects above absolute zero will release electromagnetic wave. When the temperature is higher, the wavelength is more short. Just like the air in people's life, we live in it, but we can not see it. Electromagnetic wave is human's "friend" we have never meet.



The reason why our eye can see chromatograph is that certain wavelength will stimulate our retina. According to difference wavelength, the order for chromatograph is red, orange, yellow, blue, indigo, violet. Of all visible lights, red is the longest while violet is the shortest wavelength. Visible range is the area which visible to the human eyes.

Light is only a part of wavelength across the universal. The width for electromagnetic spectrum is extremely board which ranges from thousands of miles waves and radio waves to wavelength 10-13m or gamma Y rays. Visible range is only a small part of electromagnetic spectrum : from 380-780nm*2. The light reflected from an object is the color we see. Actually, it is a mixture of difference wavelength lights in the visible region (except the synthetic monochromatic lights).

3. To what extent can words express colours?

There have been already several persons who came up many methods to express color. Normally it is by complex formula to show the number of colors. It is to ensure the color information exchange more easy and accuracy. Those methods are trying to propose a way to show the color by using certain number , just like the way we indicates length and weight. For example, in 1905, an American painter named A.H Munsell developed a way to express color. That is to use large amount of color paper compared with sample color by visualization (color hue (Munsell hue), lightness (Munsell lightness), saturation(Munsell saturation).

Two of most famous color systems are Yxy system and L*a*b system. The former was originally developed based on the tristimulus theory of color perception under CIE regulation. The latter was developed in 1976, in order to give more even color difference which is relative to parallax. Both are wildly applied in the color communication.

2. Elements of color

Elements of color includes Hue, Lightness, Saturation

All the colors we see is a general effect of the three elements. There is a direct relationship between Hue and the wavelength of light, and lightness and Saturation is related to the level of the lights.

Hue	Different color

Hue is the face of color. It is the color when propagation of light rays reflected from an abject or through the object. It is the term used in the word of color for the classification of red, yellow, blue, etc.

Lightness	Bright colors, dark colors

Colors can be separated into bright and dark colors when their lightnesses (how bright they are) are compared. Lightness is general measured in percent from 0%(black) - 100%(white).

Saturation	Vivid colors, dull colors

Saturation, sometimes called chrominance, is meaning of the strength and purity of a color. Vivid colors, dull colors. Saturation changes outward from the center.

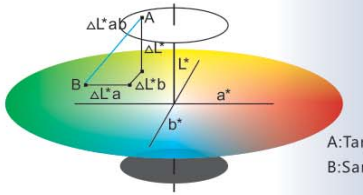
Saturation means the strength and purity of the color.

Gray component: range from 0% to 100%

4.Common Color Formula

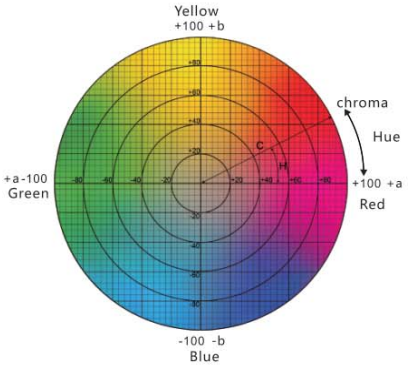
In the L*a*b color space, color difference can be expressed as single numerical value, which indicates the size of the color difference but not in that way the colors are different. It is defined by the follow formula :

$$\Delta E^*ab=[(\Delta L^*)2]+(\Delta a^*)2+(\Delta b^*)2]^{½}$$



A:Target color
B:Sample color

5. Color Value ΔE, CIE LCH, CIELAB



CIE LAB is a color space specified by the international commission on illumination. CIE LAB is based on the theory that one color can't be both red and green, or blue and yellow. In that way, a single value can be used to describe red or green, yellow or blue. In the CIE LAB color space, L means lightness, a for (red-green), b for (blue-Yellow).

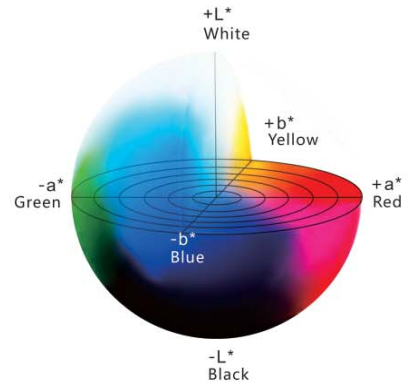
CIE LCH is a similar color space as L*a*b. L means brightness, C means saturation's value, H means cylindrical coordinates' hue value. ΔE Total Color difference.

The total size of the color difference ΔE

ΔL represents large whitish, ΔL represents small blackish; Δa large expressed reddish, Δa represents small greenish;

Δb represents large yellow, Δb represent small bluish.

Color difference Δ E * ab	Meaning
0 - 0.5 ΔE	A normal invisible difference
0.5 -1.0 ΔE	Very small difference, only obvious to a trained eye
1.0 -2.0 ΔE	Medium difference, also obvious to an untrained eye
2.0 - 4.0 ΔE	An obvious difference
4.0 ΔE	A very obvious difference



6.Temperature will effect Colors

Sometimes, when the temperature changes, the color will change. This phenomenon is called thermochromism. In order to make the colorimeter measurement more accuracy, it is better to do in a certain temperature room and measure it after the measured sample reach room temperance. BCRA standard board temperature characteristic when the room temperature changed 10℃.

Colour	(ΔE*ab)
White	0.01
Light gray	0.02
Medium grey	0.05
Dark gray	0.05
Deep gray	0.05
Deep pink	0.60
Orange	1.52

Colour	(ΔE*ab)
Red	1.32
Yellow	0.92
Green	0.92
Dark Green	0.91
Green	0.46
Deep Blue	0.17
Black	0.02

7.The relative between colors and glossiness. (SCI&SCE)

SCI&SCE are two method in the color measurement. SCI means Specular Component Include, SCE means Specular Component Exclude.

Under the method of SCE, only test diffuse refection and exclude specular reflection. In that way, the test result is similar to object color was observed by human eyes.

Under the method SCI, both the diffuse refection and specular reflection will be included. In that way, the value about the color is more objective. It will not effect by the environment condition.

When we choose the instrument, those elements should be taking into consideration.

8.An example of quality control with a colorimeter

Company A manufacturers exterior plastic parts ordered by company B. Company B also orders similar parts from companies other than company A. At company A, a full-time staff of inspectors is in charge of controlling color on the production line and visually evaluates products in comparison to color samples. Visual inspection depends on the eyes of skilled inspectors to determine whether a product is within the acceptable range or not as defined by the color samples. This work can not be performed by anyone. It requires years of experience to develop an ability for visual inspection. As a result, the number of people who can do this work is limited. Also, the process can be performed only for a limited period time per day or week, and the evaluation will vary according to the inspection's age and physical condition.

Sometimes,company B complained that the color of parts from company A did not match those of other suppliers and so company B returned the parts to company A. Company A decided to use colorimeter for color quality contrl. Then colorimeter is very popular due to its function of handheld, fast measurement, even any time used in every production line. Plus, they are very easy for anyone to use, and they can print a test result as proof of the company's color quality control.