

# DS-200 series

Stable and reliable instrument for color difference detection

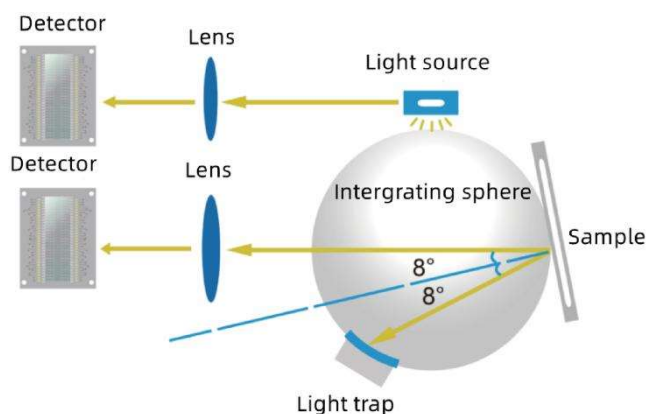
Repeatability accuracy is up to:  $dE^*ab < 0.03$



## I 、 Key technology

(1) Dual optical path design improves repeatability accuracy  $dE^*ab \leq 0.03$

The dual optical path design monitors light source energy fluctuations while measuring the sample signal, reducing interference during measurement, obtaining higher measurement stability and improving the instrument's measurement repeatability index to  $dE^*ab \leq 0.03$ , which guaranteed the measuring speed, accuracy and stability of the instrument. Related technologies are protected by Chinese invention patents and US invention patents.



## (2) Innovative 5 micron thick nano-integrated optics

After intensive research, using nano-integrated optical devices as light splitters, only 5 micron thick optical devices can achieve nano-level light splitting ability, once again leading the direction of industry innovation, greatly improving the technical performance of products. Relevant technologies are protected by Chinese invention patents.



## II、Product features

### (1) Over 30 Measurement Indicators

- RGB, Lab, Reflectance, LCh, Hunter Lab, CIE-Luv, XYZ, Yxy
- Difference ( $\Delta E^*ab$ ,  $\Delta E^*cmc$ ,  $\Delta E^*94$ ,  $\Delta E^*00$ )
- WI (ASTM E313-00, ASTM E313-73, CIE/ISO, AATCC, Hunter, Taube Berger Stensby)
- YI (ASTM D1925, ASTM E313-00, ASTM E313-73)
- Blackness (My, dM), Color Fastness, Tint (ASTM E313-00)
- Color Density CMYK (A, T, E, M), Milm, Munsell, Opacity, Color strength

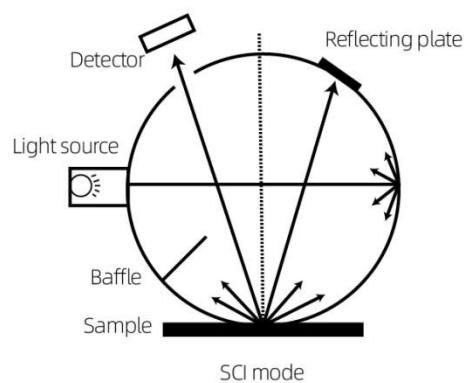
(2) Evaluate whether the color is jumping light, and provide nearly 40 evaluation light sources

A, B, C, D50, D55, D65 and nearly 40 evaluation light sources can be selected, covering almost all the color measurement indicators and light source types in the industry.



(3) Contains SCI measurement mode

SCI refers to specular reflections that are generally used to study the properties of a color itself without regard to the surface gloss of the sample to which it is attached.



(4) Contains UV for fluorescent color measurement

DS-200 series spectrophotometer, still provide stable and objective reflectivity data for color measurement on surfaces containing fluorescent materials.



Shirts with fluorescent dyes added



Paper with fluorescent dye added

(5) Calibration base and zirconium reference with a Mohs hardness of 9 to calibrate the instrument, ensuring long-term stability

Compared to existing products, the DS-200 series spectrophotometer, does not require frequent manual calibration when in use. Simply place it on the calibration base and the instrument will automatically calibrate the overall instrument function and accuracy according to its own state and environmental factors, ensuring that the instrument is always in a stable state and ready for use.

The white plate in the calibration base is the basis of the instrument's work. Through long-term investment and research, CHNSpec has integrated zirconium material as the calibration white plate, with a Mohs hardness of 9. As the material itself has the hardness and stability comparable to diamond, the surface of the calibration white plate will not be scratched and will not change colour with changes in temperature and humidity. This is a further improvement in the stability and durability of the calibration whiteboard compared to similar foreign and domestic products that use common industrial ceramics or even plastic as calibration whiteboards, ensuring the performance of the instrument.

Calibrated white plate  
(artificial diamond zirconium material)

- Mohs hardness: 9
- Spectral reflectance >90%
- No discolouration due to changes in temperature and humidity
- No discolouration by oxidation
- Ultra-high strength without scratching



(6) The DS-200 series supports 3 measuring apertures for selection (11mm, 6mm, 3mm)

Rotate to switch the caliber. Say goodbye to the tedious manual screw fixing method.

Large caliber (  $\Phi$  11mm) Dial to "M".

Small caliber (  $\Phi$  6mm,  $\Phi$  3mm) Dial to the "S".



Caliber rotation switch

Caliber switching dial

(7) Built-in HD camera for clear observation of the measured area

DS-200 series spectrophotometer can obtain an image of the measured area through the camera when measuring, which can clearly locate the measured area of the sample and avoid inaccurate measurement due to wrong area.

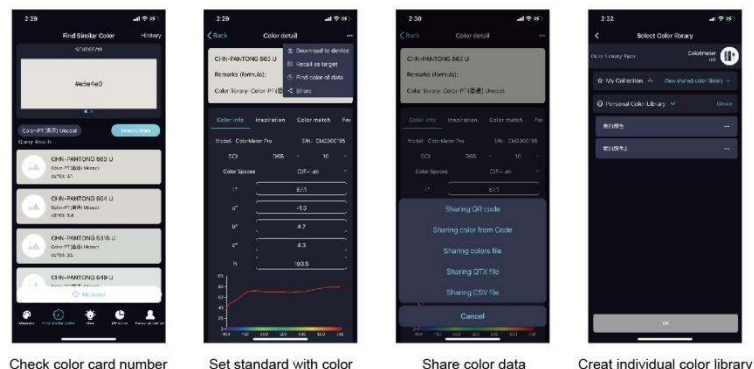


(8) Support WeChat applet, Android, Apple, Hongmeng mobile APP

- The DS-200 series spectrophotometer, can be connected to a variety of mobile phones via a rich mobile app.
- Users no longer have to pass on the colour values of samples and physical objects, they can easily pass on colour data via WeChat.
- Users can find the most similar colours in multiple sets of colour cards.
- Users can create personal colour databases and enter information on colour cards for printing, paint and textiles. The colour libraries created can be uploaded to

the cloud for easy colour processing with data sharing across multiple devices.

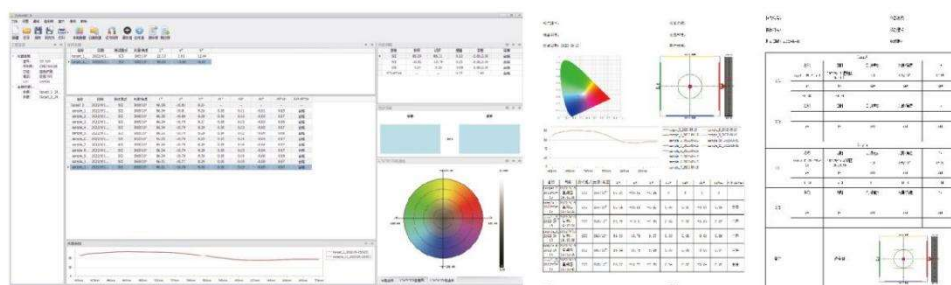
- Business users can create and manage their own colour card information library and colour recipes in the cloud, and share the information library and colour recipes to their own users through a unique invitation code.



### (9) Use the powerful PC-based colour management system ColorExpert

The Windows color management system ColorExpert is included in the DS-200 series colorimeter package, which can be connected to the colorimeter through Bluetooth or USB cable.

ColorExpert is a full-featured colour management software with four functional modules: My Colours, Colour Check, Colour Matching System and Personal Centre.



## III、Introduction to Appearance Structure



#### IV、 Function difference

Model	DS-200	DS-210	DS-220
Test condition	SCI	SCI	SCI
Repeatability	$\leq 0.03$	$\leq 0.03$	$\leq 0.03$
Aperture	1	2	3
UV light source	×	×	√
Camera function	×	√	√
Mobile App	√	√	√
PC software	√	√	√

#### V、 Technical Parameter

Product model	DS-200	DS-210	DS-220
Measuring structure*	D/8, SCI		
Measurement repeatability**	$\Delta E^*ab \leq 0.03$		
Display accuracy	0.01		
Measuring aperture	Φ6mm	Φ11mm, Φ6mm	Φ11mm, Φ6mm, Φ3mm
Color Spaces and Indices	Reflectance, CIE-Lab, CIE-LCh, HunterLab, CIE Luv, XYZ, Yxy, RGB, Color difference( $\Delta E^*ab$ , $\Delta E^*cmc$ , $\Delta E^*94$ , $\Delta E^*00$ ),WI(ASTM E313-00,ASTM E313-73,CIE/ISO, AATCC, Hunter, Taube Berger Stensby), YI(ASTM D1925,ASTM E313-00, ASTM E313-73), Blackness(My,dM),Color Fastness		
Source condition	A,B,C,D50,D55,D65,D75,F1,F2,F3,F4,F5,F6,F7,F8,F9,F10,F11,F12,CWF,U30,U35,DLF,NBF,TL83, TL84,ID50,ID65,LED-B1,LED-B2,LED-B3,LED-B4,LED-B5,LED-BH1,LED-RGB1,LED-V1,LED-V2		
Light source	LED		LED+UV
Measurement observation method	Visual	Camera	
Calibration	Manual calibration	Auto calibration	
Software support	Andriod,iOS,Windows, Wechat app		
Guaranteed accuracy	Guaranteed measurement	Guaranteed first class measurement	
Observer	2°, 10°		
Integrating sphere diameter	40mm		
Standards	CIE No.15,GB/T 3978,GB 2893,GB/T 18833,ISO7724-1,ASTM E1164,DIN5033 Teil7		
Ways of spectral	Nano-integrated spectral devices		
Sensor	Silicon photodiode array Dual 16-group		
Wavelength interval	10nm		
Wavelength range	400-700nm		
Reflectance determination range	0-200%		
Reflectance resolution	0.01%		
Measurement method	Single measurement, average measurement (2 to 99 measurements)		
Measurement time	Approx. 1 second		
Interface	USB, Bluetooth		
Screen	Screen Full colour screen, 2.4		
Battery capacity	8000 continuous measurements on a single charge, 3.7V/3000mAh		
Life of light	10 years and 1 million cycles		
Language	Simplified Chinese, English		
Storage	Instrument :10,000 data ; APP: mass storage		

\* Diffuse illumination / 8° directional reception with specular reflected light included / specular reflected light removed

\*\*White plate calibration with 30 standard deviations measured at 5 second intervals after white plate calibration