Color Haze Meter

Model: LS155
User Manual V2.05

Please read this manual carefully before using and reserve it for reference.

I Product Introduction

The instrument is a multifunctional color haze meter. It adopts full spectrum LED light source and spectral sensor design, which is used for the measurement of haze, transmittance and color of various diffuse transmittance materials such as milky white, matte, frosted surface and various transparent and semi-transparent regular transmittance materials, and it can also display the spectral transmittance curve. The instrument is equipped with 7-inch color screen and capacitive touch screen, which provides excellent operation experience.

Standards for the product

JJF 1303-2011 Calibration Specification for Hazemeter

GBT 2410-2008 Determination of the luminous transmittance and haze of transparent plastics

GBT 36142-2018 Test methods of color and color difference for architectural glass

JJG 595-2002 Colorimeters and Color Difference Meters

GB/T 3978-2008 Standard illuminants and geometric conditions

GBT 7921-2008 Uniform color space and color difference formula

GB 3143-1982 Colour determination method of liquid chemicals (Hazen unit--platinum-cobalt scale)

JJF 1947-2021 Calibration Specification for Platinum-Cobalt Colorimeter

JJG 880-2006 Verification Regulation of Turbidimeters

ASTM D1003-21 Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics

ISO 13468-1:2019 Plastics - Determination of the total luminous transmittance of transparent materials - Part 1: Single-beam instrument

ISO 13468-2:2021 Plastics - Determination of the total luminous transmittance of transparent materials - Part 2: Double-beam instrument

II Parameters

Illumination geometry	D/0°
Illumination light source	Full spectrum LED light source
Spectral Range	400-700nm
Spectral Interval	10nm
Measuring aperture	5mm/14mm/25mm
Measurement conditions	Light source D65, field of view 10°; Light source A, field of view 2°; Light source C, field of view 2°

Measuring time	About 3s
Measuring parameter	Haze, Transmittance, CIE Lab, LCh, Yxy, Spectral transmittance, Clarity, Turbidity, Pt-Co(Hazen)
Transmittance resolution	0.01%
Transmittance accuracy	±2%, ±1% typical
Transmittance repeatability	≤0.03 (Standard deviation of 30 measurements at 3-second intervals on a standard haze plate with transmittance ~80% and haze ~30, after preheating calibration)
Haze/Clarity resolution	0.01%
Haze/Clarity accuracy	Better than ±2%
Haze/Clarity repeatability	≤0.03 (Standard deviation of 30 measurements at 3-second intervals on a standard haze plate with transmittance ~80% and haze ~30, after preheating calibration)
Color resolution	0.01
Color inter-instrument agreement	△E*ab<=0.4 (Standard haze plate with transmittance ~80% and haze ~30)
Color repeatability	Standard deviation ΔE*ab is within 0.03 (Standard deviation of 30 measurements at 3-second intervals on a standard haze plate with transmittance ~80% and haze ~30, after preheating calibration)
Turbidity resolution	0.1NTU
Turbidity range	0-1000NTU
Turbidity accuracy	≤±(5%H+1NTU) H is standard
Pt-Co resolution	0.1
Pt-Co range	0-1000
Pt-Co accuracy	≤±(5%H+1) H is standard
Display	7-inch 1024*600 dot matrix IPS color screen
Language	Simplified Chinese, English
Data transmission	USB (Type-C)
Operating temperature range	0~50℃，0~85%RH (no condensation)
Storage temperature range	-10~60℃，0~85%RH (no condensation)
Size	21.1cm×26.4cm×36.0cm(LWH)

Weight	5.3kg
Supply Voltage	AC100~277V 50/60HZ
Operating Current	0.4A
Operating Power Consumption	80W

III Features

1. The instrument is fashioned with a full-spectrum LED light source and spectral sensor, and it Is used for haze, transmittance, color difference multiple parameters measurement, and can display the spectral transmittance curve.
2. Adopt a 7-inch capacity touch panel with human-machine interaction interface for convenient operation.
3. The instrument has a built-in compensation optical path with stable values, allowing long-period calibration.
4. QC testing function: the threshold can be set.
5. Can store 1000 measurement records with large storage space.
6. A powerful function of color difference analysis as well as data import and export with PC software

IV Operation

1. Power on/off

Power on: Plug in the power supply, short press the right side button to turn on the instrument.

Power off: Long press the right side button to turn off or press “Power off” in the menu bar.

2. Calibration

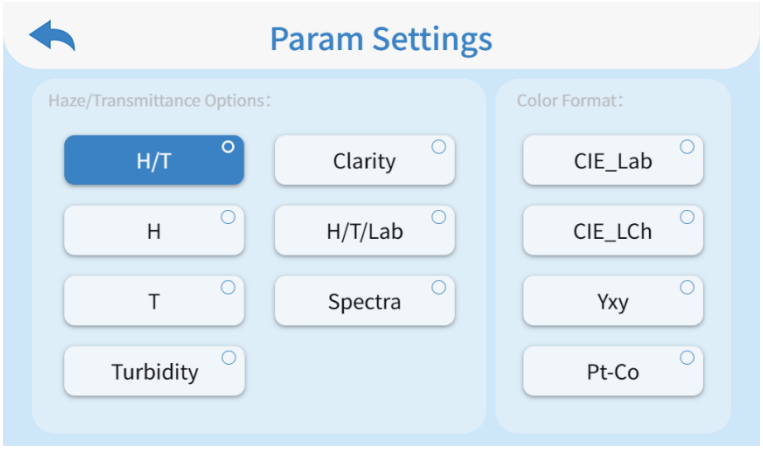
After entering "calibration" interface, you can perform calibration operation as the calibration animation, or skip the calibration. It is recommended to calibrate after a long time of no usage.



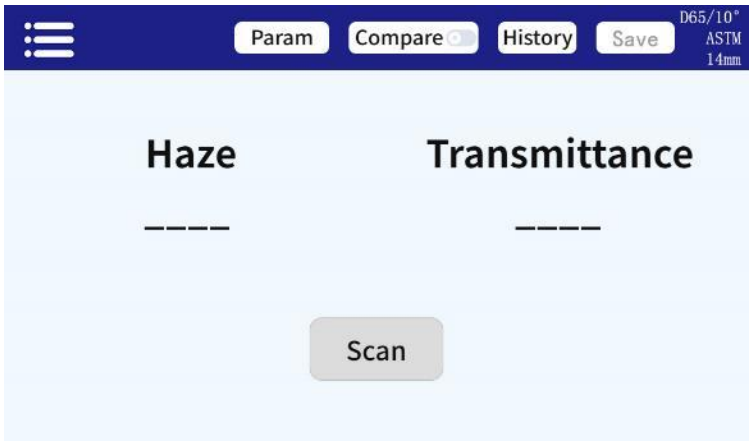
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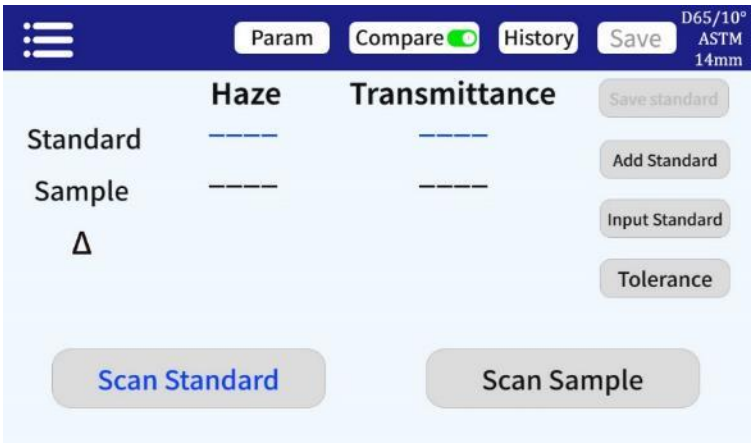
3. Measurement

The default measurement parameter of the instrument is "Haze/Transmittance". Users can click the "Param" at the top of the screen or the "Param Setting" in menu bar to enter the setting interface to select the parameters to be measured (H/T, H, T, CIE_Lab, CIE_LCh, Yxy, Spectra, Clarity, Turbidity, Pt-Co, H/T/Lab).



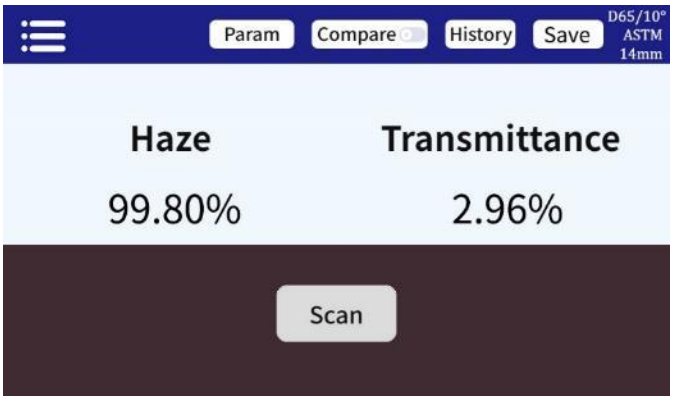
Entering the measurement interface, you can click the " Compare" on the top of the screen to switch the compare measurement mode.





3.1 Compare off

In the measurement interface, click on "Scan" or short press the button on the right side of the instrument to measure.



The following steps can be performed after completing measurement:

- **Save**

To save the comparison result, press "Save" on the upper right corner. You can choose default or name the record manually.

- **History**

If users need to view the saved results, click "History" to view the records, and records can be paged, deleted, renamed and searched.

3.2 Compare on



In the measurement interface, press the "Scan Standard" button to set current value as standard. Press the "Scan Sample" button to use current value as sample. If short press the button on the right side, another measurement will also be taken and the current value will replace the previous one. When measuring or adding a standard and measuring a sample, the difference or color difference between the two measured values will be calculated with the following results:

- **The difference value**

  The difference Δ is the sample data minus the standard data;

- **Color Bias**

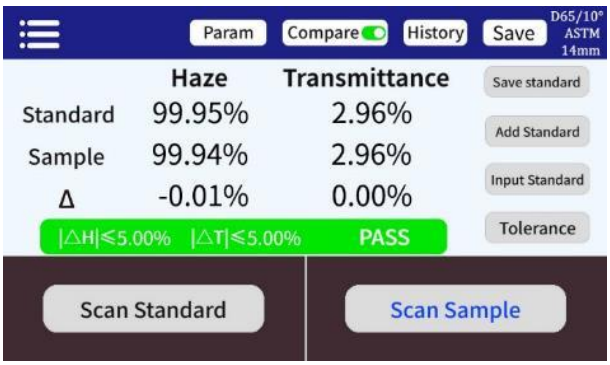
  When the measurement parameter is selected as Lab, the color bias will be judged by ΔL, Δa, and Δb;

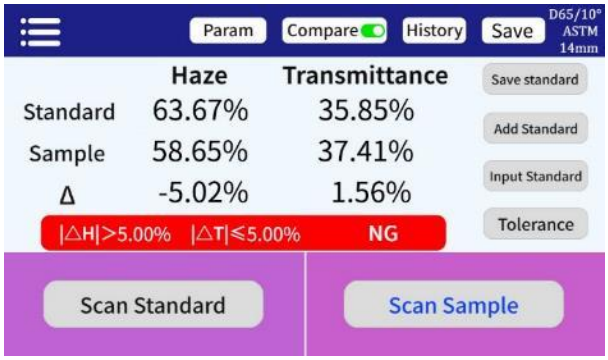
- **Δ E value**

  When the measurement parameter is selected as Lab, LCh, or Yxy, ΔE is calculated using the ΔE*ab color difference formula;

- **QC test**

  Suitable for difference inspection in production process. If ΔE is higher than the set threshold, it will read “NG” and sown in red; if ΔE is less than or equal to the set threshold, it will read “Pass” and display in green.





The following steps can be performed after completing compare measurement:

- **Save**

To save the comparison result, press "Save" on the upper right corner. You can choose default or name the record manually.

- **History**

If users need to view the saved results, click "History" to view the records, and records can be paged, deleted, renamed and searched.

- **Save standard**

After the user has finished measuring the standard value, if need to save it for later calling, click the " Save standard" to save it, and the saved value can be queried in the add standard interface.

- **Add standard**

After clicking "Add standard", the interface will jump to "Add standard", click the value you want to add, and the selected value will be used as the standard, and will automatically return to the measurement interface to compare with the current sample or the upcoming sample.

- **Input standard**

The user can manually input the Haze, Transmittance, Lab, LCh, Yxy, Clarity, Turbidity, Pt-Co value as standard.

- **Tolerance Setting**

Setting the threshold for QC inspection.

4. Menu bar

In the measurement interface, click the "" icon on the upper left corner to pop up the menu bar, with the following options: Language, Calibration, Standard, Param Settings, Device info, Reset to defaults and Power off.

4.1 Calibration

Can enter the calibration interface to perform calibration operation of the instrument.

4.2 Language

Support Simplified Chinese and English.

4.3 Standard

Selection of ASTM/ISO standards, switching of measurement aperture 25mm/14mm/5mm, and setting of light source and observer's field of view.

4.4 Param Settings

Select the parameter desired to be measured and displayed. Shortcut keys for the same functions are available at the top of the measurement interface.

4.5 Device Info

"Device Info" displays the basic information of the instrument, including: Device Model, Firmware Version, and Device Status.

4.6 Reset to defaults

To restore parameters to the factory settings and clear the data in the measurement interface.

4.7 Power Off

Press "Power off" to power off the instrument.

V PC Software

You can use the PC software to connect the computer via USB. The software has functions of compare measurement, reading compare record, export compare data to Excel, qualified number, unqualified number, total number statistics, report generation and printing, etc. For specific operation, please refer to the "Color Haze Meter Software Operation Manual".

VI Precaution

1. When the colorimeter has not been used for a long time, it is recommended to perform calibration before using.
2. Please ensure that the sample is evenly colored with a flat and clean surface, otherwise it will affect the measurement accuracy.
3. Avoid liquids entering the instrument through the measurement aperture, as this will damage the instrument and affect measurement accuracy and operational safety.
4. When the instrument is not in use, put on the dust cover to prevent dust from entering or prolonged humidity, which may affect the measurement accuracy.

5. It’s recommended to calibrate the instrument once each year. And we offer calibration service.
6. Due to color difference in the LCD display, the color displayed on the instrument screen is for reference only.
7. When measuring the haze, transmittance, color, clarity, turbidity, pt-co, in order to measure more accurately, it is necessary to fill pure water into the cuvette to calibrate it before measurement; at the end of the measurement, it is necessary to remove the test object to recalibrate again.
8. Modify the standard settings (standard, measurement aperture, measurement conditions) parameters of the instrument, need to recalibrate.
9. For failed calibration, the possible reasons are as below:
   - The dust cover has not been removed or the test holes are covered with samples;
   - Tested in a bright light environment;
   - The attenuation of the light source leads to failure of normal use and it needs to be returned to the factory for inspection and repair.

VII Packing List

No.	Description	Quantity	Unit
1	Color Haze Meter	1	Set
2	USB cable	1	pcs
3	Power cable	1	pcs
4	aperture cover	3	pcs
5	Screwdrivers	1	pcs
6	User manual	1	pcs

VIII Service

1. The colorimeter has one-year warranty. If the meter works abnormally, please send the whole instrument to our company for maintenance.
2. Provide users with spare parts and lifelong maintenance services.
3. Provide the users with the gauge calibration service.
4. Free technical support for long term.

Manufacturer: Shenzhen Linshang Technology Co., Ltd.

Website: www.linshangtech.com
Service hotline: +86-755-86263411
Email: sales21@linshangtech.com