



LIQUID COLOR SPECTROPHOTOMETER TORONSPEC™ TT-LC1

Liquid Color Spectrophotometer ToronSpec™ TT-LC1 is a high-precision spectrophotometer designed for accurate color measurement. It features a repeatability of $\Delta E_{ab} \leq 0.015$, ensuring consistent and reliable results. The inter-instrument agreement is excellent, with a $\Delta E_{ab} < 0.25$, making it suitable for environments where multiple instruments are used and consistency across devices is crucial. The TT-LC1 model does not include a heating function, focusing instead on delivering precise color measurements without the need for temperature control.

APPLICATIONS

The ToronSpec™ TT-LC1 is designed to provide objective, high-precision instrumental color analysis for a wide range of transparent liquids. It replaces subjective visual comparison methods with highly repeatable, numerical data, serving as a cornerstone for quality control, process monitoring, and ensuring products meet stringent industry-specific color standards.

This critical color measurement is essential for ensuring quality and consistency in:

- **Petroleum & Petrochemicals:** For the quality assurance and refining process control of fuels, lubricants, and solvents, ensuring products meet specifications like Saybolt (for jet fuel) and ASTM D1500 (for lubricating oils).
- **Chemical Manufacturing:** To control the purity and batch-to-batch consistency of resins, solvents, and polymers by precisely measuring color on scales such as Gardner and APHA/Pt-Co.
- **Pharmaceuticals:** As a vital QC tool to ensure the purity, stability, and consistency of liquid drug products, APIs, and excipients in compliance with global Pharmacopoeia standards.
- **Food & Beverage:** For monitoring and controlling the visual quality of products where color is a primary consumer indicator, such as in the sugar industry (ICUMSA) and brewing (EBC).

TECHNICAL SPECIFICATIONS

Product model	ToronSpec™ TT-LC1
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Measurement condition	d/0 (scattered light source, 0 degree observation angle) (comply with standards: CIE No.15, ISO 7724/1, ASTM E1164, DIN5033 Teil7, JISZ8722Condition c, ASTM D156, ASTM D1500, ASTMD1209, ASTMD5386, ASTMD6045, ASTM D6166, ASTM D1502)
Stand-alone operation	Support
Integrating sphere	Φ40mm Avian-D Fully diffuse surface coating
Lighting source	CLEDs(Full band balanced Led light source)
Inductor	Dual optical sensor array sensor
Wavelength range	360-780nm
Wavelength interval	10nm
Half-band width	5nm
Measuring range	0~200%
Resolution	0.0001
Observer Angle	2°/10°
Observation light source	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-V4
Display	Pharmacopoeia color number, transmission map/data, sample chromaticity value, color difference value/map, pass/fail result, color deviation, color simulation, historical data color simulation, manual input of standard sample, test report
Measuring time	≤1.5s
Measuring optical path	Standard: 10mm glass cuvette, 50mm glass cuvette (optional 33mm and 100mmglass cuvette)
Color space	CIE Lab, LCh, CIE Luv, XYZ, Yxy, Transmissivity, Hunter Lab Munsell, MI, CMYK

Color difference formula	$\Delta E^*ab, \Delta E^*CH, \Delta E^*uv, \Delta E^*cmc(2:1), \Delta E^*cmc(1:1), \Delta E^*94, \Delta E^*02$
Other indicators	Pharmacopoeia (European Pharmacopoeia, American Pharmacopoeia) □ WI (ASTM E313-20 □ ASTM E313-73 □ CIE, ISO2470/R457 □ Hunter □ Taube Berger Stensby) □ YI (ASTMD1925 □ ASTM E313-20 □ ASTM E313-73) □ Tint (ASTM E313-20) □ Allochromic index Milm □ APHA □ Hazen, Pt-Co □ Platinum-cobalt index □ Gardner □ Gardner index □ Iron cobalt index □ Saybolt □ Seibert index □ ASTM Color □ EBC □ Beer color □ ICUMSA Color (Sugar chroma)
Repeatability*	Transmittance: standard deviation $\leq 0.08\%$ Colorimetric value: $\Delta E^*ab \leq 0.015$ standard deviation, maximum ≤ 0.04
Inter instrument agreement	$\Delta E^*ab \leq 0.25$
Heating function	/
Heating temperature range	/
Audit trail	Yes (as required by FDA and CFDA)
Special function	Intelligent zero calibration
Screen size	7 inch touch screen
Store data	Over 100,000 pieces of data
Software support	ColorExpert, Color QC2
* After correction, the standard deviation and maximum value of air are measured 30 times at an interval of 5s	

Optional Accessories

Accessories	Photo
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Optional Accessories

100mmCuvette fixture	Liquid Color Spectrophotometer ToronSpec™ TT-LC1
100mmCuvette heat fixture	Liquid Color Spectrophotometer ToronSpec™ TT-LC1
100mmCuvette	Liquid Color Spectrophotometer ToronSpec™ TT-LC1
50mmCuvette	Liquid Color Spectrophotometer ToronSpec™ TT-LC1
33mmCuvette fixture	Liquid Color Spectrophotometer ToronSpec™ TT-LC1
33mmCuvette heat fixture	Liquid Color Spectrophotometer ToronSpec™ TT-LC1
33mmCuvette	Liquid Color Spectrophotometer ToronSpec™ TT-LC1
10mmCuvette	Liquid Color Spectrophotometer ToronSpec™ TT-LC1



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