



# TABLE TOP SPECTROPHOTOMETER

## LTS-A1 SERIES

## Table top Spectrophotometer LTS-A10

Table top spectrophotometer LTS-A10 is a high performance spectrophotometer with test caliber (top port) upward. The solid samples (paper sheets, cloth) can be placed directly on the measurement port & particles like pellets, tablets, powder (dye, food powder, chemical powder), paste (thick paste, opaque samples can be placed in a round shape plates & then in the mouth of the measurement unit. It is adopted with every test calibration ETC technology, where the standard white boards is included in the optical system for reliable, accuracy of every measurement.

### Features

- Top port caliber
- 5 inch TFT touch screen
- Quartz plates of round shape used for measurement
- Adopted with SCS system for best measurement repeatability
- Can measure SCE & SCI simultaneously
- Adopted with 8°/diffused illumination geometric design of lightning
- Can connect to mini printers for printing
- Use of high capacity rechargeable lithium-ion battery
- PC software to manage data
- UDB for data transmission

### Applications

The top port table top spectrophotometer can measure color of solid samples such as particles, powder, paste, pellets, opaque liquids used in textile, medicine, chemical, food, paper & other industries.

## Specifications

Model no.	LTS-A10
Illumination system	d/8 (Diffused lighting, 8° observation angle), SCS optical engine (light splitting and integration system), ETC (real time calibration technology ), SCI (specular reflection included) & SCE(specular reflection excluded) simultaneous measurement
Size of integrated sphere	40 mm, alvan diffused reflection surface coating
Illumination light source	CLED
Sensor	Dual light path sensor array
Light source	A, C, D50, D65, D75, F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, DLF, TL183, TL184, NBF, U30, CWF
Wavelength range	400-700 nm
Wavelength interval	10 nm
Half spectral width	5 nm
Reflectivity range & resolution	0-200%, 0.01%
Observation Angle	2°/10°
Measurement time interval	0.5 s
Measurement time	1 s
Measuring aperture	11 mm
Color space	CIE-L*a*b, L*C*h, L*u*v, XYZ, Yxy, Reflectance, hunterlab, munsell Mi, CMYK
Color difference formula	$\Delta E^*ab$ , $\Delta E^*CH$ , $\Delta E^*uv$ , $\Delta E^*cmc(2:1)$ , $\Delta E^*cmc(1:1)$ , $\Delta E^*94$ , $\Delta E^*00$ , $\Delta Eab$ (Hunter), 555, color classification
Color difference formula	<b>WI (whiteness)</b> (ASTM E313-10, ASTM E313-73, CIE/ISO, AATCC, Hunter, Taube Berger, Ganz, Stensby), <b>YI (yellowness)</b> (ASTM D1925, ASTM E313-00, ASTM E313-73), Tint(ASTM E313, CIE, Ganz), Metamerism index Milm, adhesive/changing Color fastness, ISO illuminance, 8 gloss, A density, T density

Repeatability	light splitting reflectivity: standard deviation within 0.08% color values: $\Delta E^*_{ab} \leq 0.015$ (After calibration, standard deviation of 30 measurements on test white board, 5 second intervals), Maximum: 0.03
Battery capacity	Rechargeable. 4V/6000 mAh
Data being displayed	SPD distribution/data, sample's color values color difference values/graph, pass/fail results, color error tendency, color simulation display measurement area, history data color simulation manual input standard sample generate measurement report
Interface	USB
Display	5.5 inch TFT touch screen
Data storage	20000 test results
Light source longevity	10 years, 3 million tests
Dimension (L*W*H)	350×300×200 mm
Weight	4.5kg
Work temperature range	0 to 45°C, relative humidity 80% or below( at 35°C ), no condensation
Storage temperature range	-25°C to 55°C, relative humidity 80% or below (at 35°C ), no condensation
Color matching system	Matches
UV light source	Not included

### Standard accessories

AC power line, Lithium battery, color management software, drive software, electronic manual, color management guide, USB Cable, black/white calibration tube protective cover, spire lamella, portable bag, electronic color charts

### Optional accessories:

Powder molding device, Micro printer, Measurement & test report

## Table top Spectrophotometer LTS-A11

Table top spectrophotometer LTS-A11 is a high performance spectrophotometer with test caliber side ward for different aperture direction. Equipped with ETC technology solves the problem of long-term stability. The solid samples (paper sheets, cloth) can be placed directly on the measurement port & particles like pellets, tablets, powder (dye, food powder, chemical powder), paste (thick paste, opaque samples) can be placed in cube shape cells & then in the mouth of the measurement test.

### Features

- Side ward caliber
- 5 inch TFT touch screen
- Double beam optical path system
- Adopted with 8°/diffused illumination geometric design of lightning
- Quartz cells of cube shaped are used for measurement
- Spectral reflectance standard deviation within 0.08 value
- SCS system for measurement repeatability & ETC for stability
- Can measure SCE & SCI simultaneously
- PC software to manage color matching data
- Can connect to mini printers for printing
- Use of high capacity rechargeable lithium-ion battery

### Applications

The top port table top spectrophotometer can measure color of solid samples such as particles, powder, paste, pellets, opaque liquids used in textile, medicine, chemical, food, paper & other industries.

## Specifications

Model no.	LTS-A11
Illumination system	d/8 (Diffused lighting, 8° observation angle) SCS optical engine (light splitting and integration system), ETC (real time calibration technology ), SCI (specular reflection included) & SCE (specular reflection excluded) simultaneous measurement
Size of integrated sphere	40 mm, alvan diffused reflection surface coating
Illumination light source	CLED
Sensor	Dual light path sensor array
Light source	A, C, D50, D65, D75, F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, DLF, TL183, TL184, NBF, U30, CWF
Wavelength range	400-700 nm
Wavelength interval	10 nm
Half spectral width	5 nm
Reflectivity range & resolution	0 to 200%, 0.01%
Observation Angle	2°/10°
Measurement time interval	0.5 s
Measurement time	1 s
Measuring aperture	11 mm
Color space	CIE-L*a*b, L*C*h, L*u*v, XYZ, Yxy, Reflectance, hunterlab, munsell Mi, CMYK
Color difference formula	$\Delta E^*ab$ , $\Delta E^*CH$ , $\Delta E^*uv$ , $\Delta E^*cmc(2:1)$ , $\Delta E^*cmc(1:1)$ , $\Delta E^*94$ , $\Delta E^*00$ , $\Delta Eab$ (Hunter), 555, color classification
Other colorimetric indices	<b>WI (whiteness)</b> (ASTM E313-10, ASTM E313-73, CIE/ISO, AATCC, Hunter, Taube Berger, Ganz, Stensby), <b>YI (yellowness)</b> (ASTM D1925, ASTM E313-00, ASTM E313-73), Tint(ASTM E313, CIE, Ganz), Metamerism index Milm, adhesive/changing Color fastness, ISO illuminance, 8 gloss, A density, T density

Repeatability	<b>light splitting reflectivity:</b> standard deviation within 0.08% color values: $\Delta E^*ab \leq 0.015$ (After calibration, standard deviation of 30 measurements on test white board, 5 second intervals), Maximum : 0.03
Battery capacity	Rechargeable, 7.4V/6000 mAh
Data being displayed	Sample's color values, color difference values/graph, pass/fail results, color error tendency, color value simulation, display measurement area, history data color simulation, manual input standard sample generate measurement report
Interface	USB
Display	5.5 inch TFT touch screen
Data storage	20000 test results
Light source longevity	10 years, 3 million tests
Dimension (L*W*H)	350×300×200 mm
Weight	4.5 kg
Work temperature range	0 to 45°C, relative humidity 80% or below ( at 35°C ), no condensation
Storage temperature range	-25°C to 55°C, relative humidity 80% or below (at 35°C ), no condensation
Color matching system	Matches
UV light source	Not included

### Standard accessories

AC power line, Lithium battery, color management software, drive software, electronic manual, color management guide, USB Cable, black/white calibration tube protective cover, spire lamella, portable bag, electronic color charts

### Optional accessories:

Powder molding device, micro printer, measurement & test report

## Table top Spectrophotometer LTS-A12

Table top spectrophotometer LTS-A12 has multiple measuring calibers with largest caliber of 25.4 mm, satisfies the measurement needs of samples of different size. It is possible to measure the color data of opaque samples and transmission and opacity of transparent or semi-transparent samples. Equipped with dual light path spectral analysis technology ensures precision and long-term stability of the instrument. The 8°/diffused illumination geometric design of lighting, provides full insight of the color data.

### Features

- Equipped with Dual light path spectral analysis technology
- Manual fitting of white calibration board on measurement port for accuracy
- Four measurement calibers, maximum is 25.4 mm
- Equipped with large display screen for easier measurement and settings
- Flexible measurement fixtures to eliminate the effects of stray light on measurement results
- Measurement of SCI and SCE mode simultaneously
- Supporting color management software via PC
- Equipped with reflection and transmission measurement
- Can adjust the percentage of the UV components of the light source

### Applications

Table top spectrophotometer with multiple measuring calibers has applications in measurement of solid as well as liquid materials using multiple calibration points.



## Specifications

Model no.	LTS-A12
Illumination system	d/8 (Diffused lighting, 8° observation angle) SCS optical engine (light splitting and integration system), ETC (real time calibration technology ), SCI (specular reflection included) & SCE(specular reflection excluded) simultaneous measurement
Size of integrated sphere	15.2 cm, alvan diffused reflection surface coating
Illumination light source	CLED
Sensor	Dual optical sensor array
Light source	A, C, D50, D65, D75, F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, DLF, TL183, TL184, NBF, U30, CWF
Wavelength range	400-700 nm
Wavelength interval	10 nm
Half spectral width	5 nm
Reflectivity range & resolution	0-200%, 0.01%
Measurement caliber	LAV: large aperture: 2.54cm (1 inch) MAV: middle aperture: 1.5cm (0.6 inch) SAV: small aperture: 0.75cm× 1.0cm (0.3 inch×0.4 inch) VSAV: very small aperture: 0.3cm× 0.8cm (0.12 inch× 0.31 inch)
Repeatability	<b>light splitting reflectivity:</b> Standard deviation within 0.08% color values: $\Delta E^*_{ab} \leq 0.015$ (After calibration, standard deviation of 30 measurements on test white board, 5 second intervals), Maximum: 0.03
Transmission	Total transmission and direct transmission
Measurement time interval	2 s
Measurement time	2 s
Color space	CIE-L*a*b, L*C*h, L*u*v, XYZ, Yxy, Reflectance, hunterlab, munsell Mi, CMYK
Color difference formula	$\Delta E^*_{ab}$ , $\Delta E^*_{CH}$ , $\Delta E^*_{uv}$ , $\Delta E^*_{cmc}(2:1)$ , $\Delta E^*_{cmc}(1:1)$ , $\Delta E^*_{94}$ , $\Delta E^*_{00}$ , $\Delta E_{ab}$ (Hunter), 555, color classification

Other colorimetric indices	<b>WI (whiteness)</b> (ASTM E313-10, ASTM E313-73, CIE/ISO, AATCC, Hunter, Taube Berger, Ganz, Stensby), <b>YI (yellowness)</b> (ASTM D1925, ASTM E313-00, ASTM E313-73), Tint(ASTM E313, CIE, Ganz), Metamerism index Milm, adhesive/changing Color fastness, ISO illuminance, 8 gloss, A/T/E density
Data being displayed	Sample's color values, color difference values/graph, pass/fail results, color error tendency, color value simulation, display measurement area, history data color simulation, manual input standard sample generate measurement report
Interface	USB
Display	5 inch TFT touch screen
Data storage	20000 test results
Light source longevity	10 years, 3 million tests
Dimension (L*W*H)	583×330×304 mm
Weight	18 kg
Work temperature range	0-45°C, relative humidity 80% or below (at 35°C), no condensation
Power source	AC117V, 50/60Hz or AC230V,50/60Hz

## Transmitted Spectrophotometer LTS-A13

Transmitted spectrophotometer LTS-A13 with table top design is used to measure the transmittance, absorbency, concentration as well as reflectance of the material. Equipped with SCS system for best measurement repeatability & accurate measurement of surface color of material. The double grating & double optical path splitting system & ETC (every test calibration technology) produces 0.01% resolution, color balance intensity across visible spectrum & highly accurate measurements.

### Features

- Use of D/O Diffused lighting illumination system
- CLED light source to guarantee the measurement speed & test accuracy
- Double grating & double optical path splitting system
- SCI & SCE both includes lightening & observation conditions
- Can be connected to PC to work on software
- Use of UV enhanced silicon photodiode for improved transmittance range up to 200%
- Use of ETC to ensure reliability & accuracy in every test measurement
- Performs glass and liquid color measurement

### Applications

Transmittance spectrophotometer is used in the measurement of range of liquids and solvents like resins, solvents, oils etc. to be used in food, chemical, textile, life science industries.

## Specifications

Model no.	LTS-A13
Illumination system	d/0 (Diffused lighting, 0° observation viewing), SCS optical engine (light splitting and integration system), ETC (every time calibration technology), SCI (specular reflection included)/ SCE (specular reflection excluded) simultaneous measurement
Size of integrated sphere	40 mm, alvan diffused reflection surface coating
Illumination light source	CLED
Repeatability	<b>Transmittance:</b> standard deviation within 0.08% color values: $\Delta E^*_{ab} \leq 0.015$ (After calibration, standard deviation of 30 measurements on test white board, 5 second intervals), Maximum: 0.03
Sensor	Dual light path sensor array
Light source	A, C, D50, D65, D75, F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, DLF, TL183, TL184, NBF, U30, CWF
Wavelength range	400-700 nm
Wavelength interval	10 nm
Half spectral width	5 nm
Reflectivity range & resolution	0 to 200%, 0.01%
Observation Angle	2°/10°
Measurement time interval	0.5 s
Measurement time	2 s
Measuring aperture/ caliber	25.5*10 mm (cuvette support)
Color space	CIE-L*a*b, L*C*h, L*u*v, XYZ, Yxy, Transmittance, Hunterlab, Munsell Mi, CMYK
Color difference formula	$\Delta E^*_{ab}$ , $\Delta E^*_{CH}$ , $\Delta E^*_{uv}$ , $\Delta E^*_{cmc}(2:1)$ , $\Delta E^*_{cmc}(1:1)$ , $\Delta E^*_{94}$ , $\Delta E^*_{00}$ , $\Delta E_{ab}$ (Hunter), 555, color classification

Other colorimetric indices	<p><b>WI (whiteness)</b> (ASTM E313-10, ASTM E313-73, CIE/ISO, AATCC, Hunter, Taube Berger, Ganz, Stensby)</p> <p><b>YI (yellowness)</b> (ASTM D1925, ASTM E313-00, ASTM E313-73), Tint (ASTM E313, CIE, Ganz), Metamerism index Milm, staining fastness, color fastness, APHA, Astm color, ISO illuminance, saybolt</p>
Data being displayed	<p>Sample's color values, color difference values/graph, pass/fail results, color error tendency, color value simulation, color difference values, display measurement area, history data color simulation, manual input standard sample, generate measurement report</p>
Interface	USB
Data storage	Mass storage (on PC)
Light source longevity	5 years, 1.5 million tests
Dimension (L*W*H)	475×340×150 mm
Weight	7 kg
Work temperature range	0 to 45°C, relative humidity 80% or below( at 35°C), no condensation
Storage temperature range	-25°C to 55°C, relative humidity 80% or below(at 35°C), no condensation