

Spectrophotometer

ColorLite sph900 and sph860



Innovative spectral Colour Metrology
Made in Germany



ColorLite offers you the perfect solution for
controlling the quality of your product colours

- Description
- Features
- Probe Head Versions
- Accessories
- Technical Data

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ColorLite how can we help you...?

Reasons for choosing ColorLite as your partner for ensuring the quality of your product colours:

- ColorLite designs and produces a wide range of high quality products for colour measurement, mainly for quality control applications.
- Our equipment is designed, so that using it is as simple as possible to use greatly aiding the reliability of results.
- Our spectrophotometers offer our customers a perfect solution for measuring colours of all types of materials. Made possible through our unique wide range of accessories.
- **Customer support:** We understand that many companies have reservations about implementing colour measuring equipment in their quality control system. We aim to help by offering:

ColorLite offers your company the perfect solution for the reliable control and communication of your product colours. Our spectral colour measuring equipment developed and produced by us in Germany is exemplary easy to use and through our wide range of accessories, very flexible.

The ColorLite GmbH was founded over 10 years ago, applying the results of 5 years of research work in the field of colour metrology gained at the University of Applied Sciences, Hannover.

Our products have been based on the technological advantages gained from these beginnings. All products carry on with this tradition of innovation, making them by far the most advanced spectrophotometers on the market.

To maintain this advantage ColorLite spends an over proportional amount of its resources in research and development.

Research projects in co-operation with renowned institutes and companies help us to develop the products that future industry needs.

Colour Measurement Principles



How and why?

When we measure colours we are measuring a sensorial perception, its like measuring taste or odour.

By measuring colours the subjectivity of the perceived colour, or more importantly colour difference, is replaced by objective values. As the human colour visual system is based on three receptors, each with a different spectral sensitivity, colours can always be described by three values. The perceived colour is also dependent on the ambient light, which is a further variable affecting the colour. Another variable is the field of view, when looking at a larger surface a larger area of the retina is used which has a slightly different spectral response. Colour science differentiates between 10° and 2° viewing angles. In other words the colour changes slightly, depending on the size of the area viewed.

A spectrophotometer measures colours by illuminating the sample and analysing the light that is diffusely reflected. The resulting spectrum is compared to the spectrum of a known (normally white) surface and the spectral characteristics of the measured surface are calculated. This sample spectrum is then weighted with a standardised illuminant, for example for daylight (D65), and with the three spectra (colour matching functions 10° or 2°) derived from the human perception. This results in three values X, Y and Z which are not only dependent on the used illuminant (D65) but on the colour matching functions, 10° or 2°.

This sounds complicated but it is not; most industries use the same basics settings D65 illumination and 10° standard observer, which are setup and left. Colour differences are normally described by adding the differences of the three colour values (mainly ΔL^* , Δa^* and Δb^*) together, resulting in a single value delta E (ΔE).

The main application area for colour measurement is as a quality control tool. Colour is a quality feature that you and your customers can see. Spectrophotometers ensure that colours can be compared to a reference standard independent of user, ambient light conditions and time. Standards can be a release sample, RAL colour scale (or any other colour scale) or any other reference which are digitised and stored indefinitely. Spectrophotometers measure a colour difference well in advance of the human eye on an ideal surface. This is defined by the repeatability, which is dependent on the sample, and should be factor ten better than the required smallest delta E.

The big advantage of colour measurement, apart from being 100% objective, is that these standards can be assigned specified limits. This ensures that customers can be sure of deliveries with the correct colour and suppliers know that their products are within specs. Colour measurement enables producers to save resources by optimising the amount of colourants. On the other hand controlling colours specifications at the start and during production, reduces one of main reasons for reclamation and helps towards reducing waste and saving resources.

ColorLite sph860 + sph900

Spectrophotometers

Overview ColorLite sph860 + sph900

We offer you a complete solution

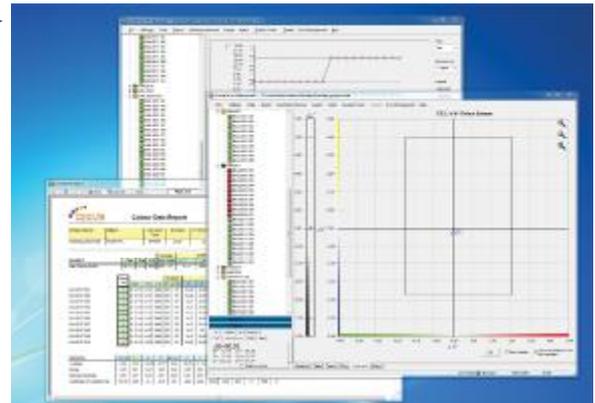
One of the key features of the ColorLite sph860/900 spectrophotometers is the ability to extend applications through the use of a wide range of available accessories.

The ColorLite sph860 and sph900 spectrophotometers are available with different types of probe head for different applications. Our accessory range is used to extend the application fields of your device and with the d/8° probe head adapter, ensure that results are compatible to all your customers or suppliers.



Our unique small external standard 45°/0° probe head

USB V2.0 or
Bluetooth



ColorDaTra Basic + Professional
PC Software

Universal accessories socket

here are some accessory and probe head examples...



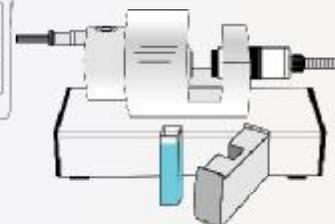
MA35-UK Stand



MA35-UK
Probe head



MA38-SET



CA10-UK Stand



MA38
Probe head

Description ColorLite sph860 + sph900

User friendly and flexible

The Spectrophotometers ColorLite sph900 and sph860 are a colour measuring instrument suitable for a wide range of applications, especially through the package of accessories on offer. The sph900 has all of the user friendly qualities and advantages of the sph860 but with up to date features such as Bluetooth interface and a high resolution O-LED display. Not only does this high resolution display offer brilliant full colour contrast, but makes operating much easier as more information is displayed. The sph900 has high speed electronics enabling measuring time of less than one second.



Smallest probe head and highest specifications

Using a grating spectrometer with high specifications and ideal reproducibility makes the device perfect for customers with high quality demands typical in industries such as automobile. Ideal handling as the probe head is only 25 mm in diameter and just over 80 mm in length, weighing only 110 grams! Scans are simply triggered by pressing the sprung probe head downwards, against even the smallest of samples which can be held in the other hand.

Special probe heads are optional with a smaller aperture or with a V-block fitting for cables cylindrical probes such as cables and rods.



Wide range of accessories and probe head options

A comprehensive range of accessories permits use for a wide range of samples. For example it is possible to measure different powders, liquids, and inhomogeneous products such as granules. In addition to this a version with stainless steel waterproof (IP67) probe head is ideal for working in harsh, wet conditions typical for example in the food industry.



ColorLite sph860 + sph900

Spectrophotometers

Description ColorLite sph860 + sph900

One device with all main geometries

Using supplementary accessories the sph860 and sph900 offers you the unique option of implementing different measurement geometries with one device.

Apart from the two main probe head standards $45^\circ/0^\circ$ and $d/8^\circ$ the equipment can be used for transmission measurements in $0^\circ/0^\circ$ or $d/0^\circ$ mode. To measure inhomogeneous surfaces like granules or wood a adapter is available to expand the scanning to 38 mm or 80 mm.

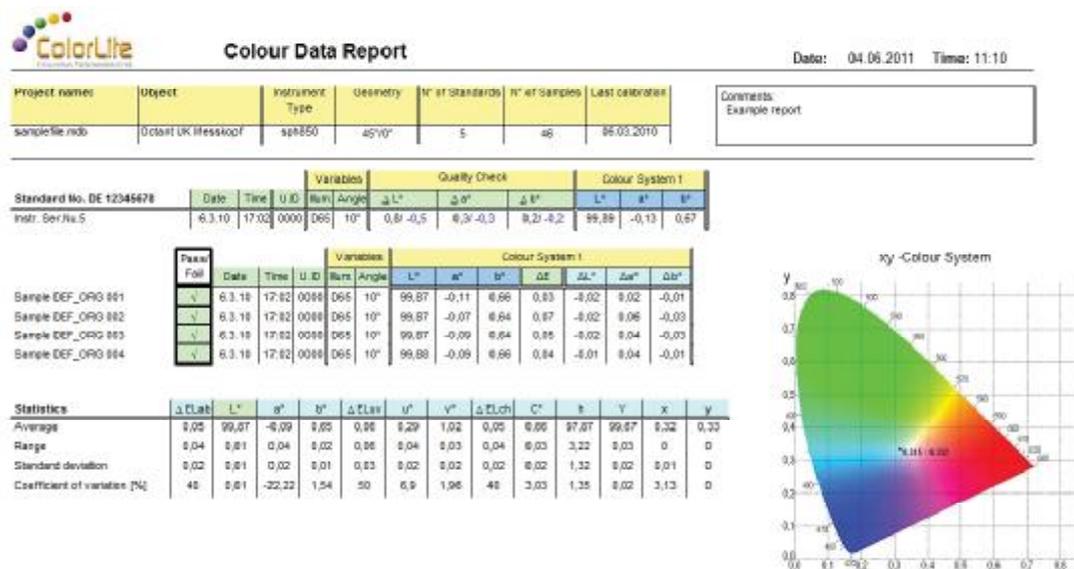


State of the art technology

All the sph900 adapters using an auxiliary light source are controlled from the main unit over a smart interface. This recognises the accessory automatically and programs the settings accordingly.

Professional quality control PC software

Our quality control database software ColorDaTra Professional with an online mode, is simple to use. It enables an easy operation and management of your colour data directly from the PC.



Features ColorLite sph860 + sph900

External stainless steel probe head

The unique stainless steel probe head, only 25 mm in diameter, provides the perfect interface between the sample and instrument ensuring the most reliable results possible. Hold your sample in one hand and simply press the sprung probe head onto the surface to trigger the scan.



The ideal interface
between your samples
and device

High contrast colour O-LED display

Super high contrast O-LED full colour display, provides the perfect interface between the instrument and user ensuring very simple handling, reducing training time and increasing reliability. The 180° viewing angle of the O-LED display works without back lighting thus saving battery life.



The ideal interface
between the device
and user

User friendly

Only 4 Main levels:

Measure - Calibrate - Settings - Memory

Simple 4 button control.

Real photos explaining things step-by-step, for example the calibration routine.



Software programmed
to keep it simple

The perfect light source – LED's

"The light source of the future" LED's (Light Emitting Diodes) ensure an excellent long and short-term stability of results and low maintenance costs. The pulse mode ensures that brightness levels stay high for a guaranteed 20 years.



AAD - automatic accessory detection

The external probe head can be attached to a variety of accessories for measuring different types of samples. The sph860 and sph900 AAD automatically changes internal settings depending on what accessory is attached.

AAD

ColorLite sph860 + sph900

Spectrophotometers

Features ColorLite sph860 + sph900

Two main geometries in one device - 45°/0° AND d/8°

The two main geometries in use today are the 45°/0° and the d/8° geometry described in DIN 5033. The normal 45°/0° geometry of the ColorLite sph900/sph860 can be easily converted to a d/8°, using our optional accessory MA35-UK.



High optical resolution of 3.5 nm steps

One hundred and fifteen (115) 16-Bit spectral values are measured for each scan, using a highly robust optical grating and Hamamatsu line sensor. This ensures a good correlation, even with elaborate desktop spectrophotometers. Many spectrophotometers on the market measure only 30 or 40 points or less.



1000 standard colours in 5 folders and 3 ways of finding them

Store up to 1000 standard colours in 5 folders – each with an individual CIE dE or dL*, da*, db* tolerance. To find the correct colour use one of three methods, including a best match function. Sort the standards by list or use our intelligent name recognition tool.



User mode and user management

User Mode – restricted functionality - prevents adjustment of settings or standards being deleted. User simply selects the standard colour and measures.

User management - When activated a four-digit user ID is stored with all colour data.



Super Fast - 32-Bit ARM RISC processor

The central processing unit of the ColorLite sph900 is a high performance 32-Bit RISC (Reduced Instruction Set Computer) processor. This enables a single scanning time of about 0.5 seconds. Which means the overall time needed for measuring samples is less than with any other spectral device on the market.



Features ColorLite sph860 + sph900

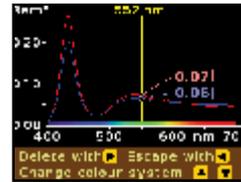
FRAM memory chips – no batteries needed

The high performance „Ferroelectric Random Access Memory“ chips have an operating life of at least 100 000 billion write operations and a data retention of 10 years. This ensures that no data or standards are lost. With no backup battery needed. Possible by using one of the most advanced memory chips technologies available.



Spectrometer mode - Optional

In this mode the unit can be used as a normal mobile spectrometer i.e. measure the spectral radiation (in 3.5 nm steps) and chromaticity values of any light source for example such as LED's. To do this we determine a calibration file by measuring against a special spectral lamp which is stored on the device.



Bluetooth® wireless communication or USB V2.0 (RS232 optional)

With wireless communication data is instantaneously transferred to the PC during measurements. Alternatively stored data can be downloaded, or colour standards (references) uploaded, without cables, optimising handling. Or use the supplied fast USB V2.0 cable.



Communication tool ActiveX - Optional

A list of commands in an ActiveX DLL library enables you to communicate with the spectrophotometer from your software.



Black soft touch coating

Means that the ColorLite sph900 /sph860 feels good in the hand. The rubber like surface offers an ideal grip on the instrument and at the same time simply looks great!



Features sph860 + sph900

Further features include:

- storage for 1000 colour samples
- storage for 300 spectra 400 nm to 700 nm in 3.5 nm steps
- different probe head versions available
- multiple scanning with automatic averaging of 1 to 20 scans

Warning messages:



- when the standard deviation threshold (0.01 to 2) is exceeded by multiple scans
- when the Metameric Index higher is as a variable limit
- for time dependent calibration warning 1 h to 24 hours
- for temperature dependent calibration warning 0 to 9
- when a high colour difference between the standard and the sample is measured
- when the samples are measured in a different mode to the standard
- when the self-diagnoses after calibration is not 100% okay.
- when the battery charge is low
- when the memory full is

Colour Data Output

Spectrophotometers are mainly used to compare a sample colour to standard colour. The ColorLite sph860 and sph900 spectrophotometers will display these differences and absolute values in all commonly used colour scales. Exactly which data is displayed after measuring a standard or sample can be programmed in the settings, according to the individual needs. Hereby it is possible to activate a number of different outputs and toggle between screens with the up and down buttons. Following are some of the colour data outputs available on the ColorLite spectrophotometers.

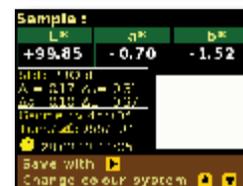
PASS / FAIL

A data output displaying the difference between the standard and a sample is Pass/ Fail. The CIE L^* , a^* , b^* differences are translated into simple text „lighter“ or „darker“ etc. The PASS / FAIL output is dependent on the standard limits set as delta L^* , delta a^* and delta b^* OR a



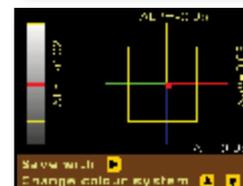
Absolute CIE $L^*a^*b^*$

Sample or standard colours are displayed as absolute values together with time stamp and settings etc. Also the colour is displayed on the screen in a rectangular field.



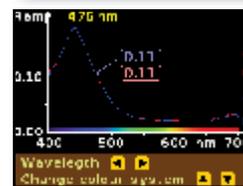
CIE $L^*a^*b^*$ Diagram

Samples are displayed relative to the standard. Also visible are the limits of the standard.



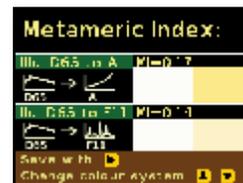
Spectral Data - Remission + Transmission Diagram

The ColorLite sph860 & sph900 spectrophotometers scan the remitted or transmitted spectrum in an interval of 3.5 nm. This results in a sample of over 100 spectral values in the visible range.



Metameric Index

The perceived colour difference between two colours is always dependent on the spectral distribution of the illumination. The Metameric Index value describes to what extent the colour difference between a standard and sample varies when the standard illuminant is changed.



Best Match

Simplified output for use with the best match function. This tool automatically looks for the standard which is closest to the sample colour. The user can select from which internal folder the standard is selected.





Colour Data Output

White and Yellow Index

The absolute values describing the whiteness and yellowness of the sample are displayed.



Y, x, y Values

The absolute values for Y which is often used as a brightness value and the chromaticity values x and y.



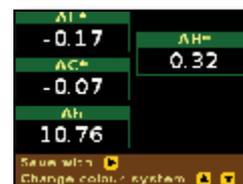
X, Y, Z Values

The absolute tristimulus values X, Y, Z are the main colour values. From these values most other colour values can be calculated.



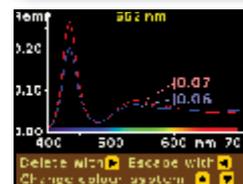
Delta L*, C*, h*, H* Values

After the CIE L*a*b* colour scale the L*,C*h* colour scale describes the lightness L*, saturation or chroma C* and hue h*.



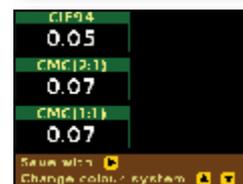
Spectrometer function

An additional optional function for measuring the emission spectrum of a light source. The exposure time can be manually or automatically set.



Delta-E cmc und Delta-E CIE94

Modified colour difference equations that better match the perceived colour difference.

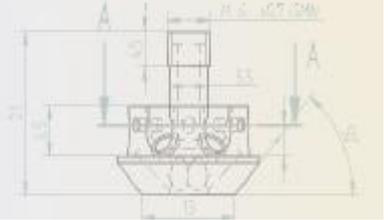


Contrast Value LRV

The contrast value is calculated between the standard and sample readings as specified in the BS 8493:2008



Probe head versions 45°/0°



The ColorLite sph860 and sph900 spectrophotometers are available with a wide range of probe heads. The probe heads are not interchangeable, so the probe head version has to be ordered according to the application.

The standard 45°/0° probe head

The 45°/0° probe head is optimal for most applications and can be used with a variety of adapters to expand the application field (see accessories). The name „45°/0°“ describes the standardised measurement geometry described in the DIN 5033. Hereby the samples are illuminated at an angle of 45° with a direct light source and the diffuse remitted light measured at 0°.

The probe head weighing only 170 grams is sprung and measurements are triggered by simply pressing downwards on the sample surface. As the illumination is direct the measurement is gloss dependent, which means results correlate to the visual perception.

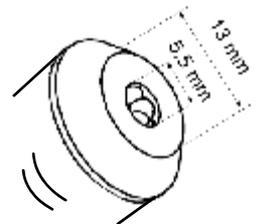


The 45°/0° probe head - s-version

The 45°/0° probe head in the s-version is the same size as the standard probe head above, but has a smaller aperture (5.5 mm) and a footprint of only 13 mm. The measuring spot is about 3 mm.

The probe is ideal for measuring extremely small or curved parts.

Typical applications for this probe head are measuring automobile interior parts, pharmaceutical products, curved moulded plastics parts.



Ordering Information

| Article No. | E11241* | E11141* | E11242 | E11142 |
|------------------------|--|---|--|--|
| Model | sph860 | sph900 | sph860-s | sph900-s |
| Probe head | Standard 45°/0° geometry - according to DIN 5033 | | | |
| Description | ColorLite sph860 with a standard probe head | ColorLite sph900 with a standard probe head | ColorLite sph860 with a s-version probe head | ColorLite sph900 with a s-version probe head |
| Scanning Area | 3.5 mm | | 3.0 mm | |
| Aperture | 8 mm | | 5.5 mm | |
| Dimensions: Probe Head | 25 mm diameter; 60 mm length | | | |

Illustration



* Both probe head types above can be ordered with a v-block opening for measuring cylindrical samples

Probe head versions special 45°/0°

The standard 45°/0° probe head - IP62 - version

The 45°/0° probe head is available with a protection window. This mainly is to prevent dust or powders soiling the opening of the optical fibre. The probe head will remain sprung, which can be used to trigger the scans.



The standard 45°/0° probe head - IP67 - version

The 45°/0° probe head is also available in completely water and dust proof version according to the IP67 standard. This probe head is for highly rugged applications and can be cleaned with running water. The solid stainless steel head can be ideally be used in the food industry as it can be disinfected.



The 45°/0° probe head - with a 9 mm measuring spot

The ColorLite sph860 is available with a 9 mm measuring spot and 45°/0° geometry. This can be used to measure samples that have a stronger structure. Equipment ordered with this probe head can not be used with the probe adapters.



Ordering Information + Specifications

| Article No. | E11243 | E11143 | E11246 | E11146 | E11260 | E11160 |
|------------------------|---|---|--|--|---|---|
| Model | sph860-IP62 | sph900-IP62 | sph860-IP67 | sph900-IP67 | sph860-9 | sph900-9 |
| Probe head | Standard 45°/0° geometry - according to DIN 5033 | | | | | |
| Description | ColorLite sph860 with a standard probe head with IP-62 protection | ColorLite sph900 with a standard probe head with IP-62 protection | ColorLite sph860 fully water and dust proof. | ColorLite sph900 fully water and dust proof. | ColorLite sph860 with a 9 mm measuring area | ColorLite sph900 with a 9 mm measuring area |
| Scanning Area | 3.5 mm | | 3.5 mm | | 9.0 mm | |
| Aperture | 8 mm | | 8 mm | | 13.5 mm | |
| Dimensions: Probe Head | 25 mm diameter; 60 mm length | | 25 mm diameter; 60 mm length | | 37 mm diameter; 70 mm length | |

Probe head $d/8^\circ$



The $d/8^\circ$ probe head

For applications where only a $d/8^\circ$ probe head is required the ColorLite sph860 and the ColorLite sph900 are available with a directly connected sphere geometry. The $d/8^\circ$ describes the standardised measurement geometry according to DIN 5033. Hereby, the sample is illuminated with a diffuse light source and measured at an angle of 8° . The diffuse light is generated in an integrating (Ulbricht) sphere.

The probe head is made of a light weight POM (Polyoxmethalene) and has a button to trigger the measurements.

As the light source is diffuse i.e. the sample is illuminated from all directions (also opposite the measuring angle of 8°), the gloss reflected off the surface is measured together with diffuse remitted light. This means the results are independent of the gloss and measurements. This is ideal for measuring the colour of surfaces with uneven glossiness, as results will be more stable than with a $45^\circ/0^\circ$ probe head.

ColorLite offer stands for supporting the probe for different applications (see accessories).

The ColorLite spectrophotometers sph900 and sph860 are available with $d/8^\circ$ probe heads with 6 mm, 3 mm and 10 mm measuring areas. All versions can be supplied with a permanently installed gloss trap*.

For technical specifications see pages 31-32.

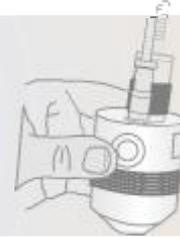


Ordering Information + Specifications

| Article No. | E11249 | E11752 | E11248 | E11751 | E11250 | E11753 |
|------------------------|---|---|---|---|--|--|
| Model * | sph860-3-UK | sph900-3-UK | sph860-6-UK | sph900-6-UK | sph860-10-UK | sph900-10-UK |
| Probe head | d/8° geometry - according to DIN 5033 | | | | | |
| Description | ColorLite sph860 with a d/8° probe head and 3 mm spot | ColorLite sph900 with a d/8° probe head and 3 mm spot | ColorLite sph860 with a d/8° probe head and 6 mm spot | ColorLite sph900 with a d/8° probe head and 6 mm spot | ColorLite sph860 with a d/8° probe head and 10 mm spot | ColorLite sph900 with a d/8° probe head and 10 mm spot |
| Scanning Area | 3 mm | | 6 mm | | 10 mm | |
| Aperture | 8 mm | | 8 mm | | 13.5 mm | |
| Dimensions: Probe Head | 55 mm diameter; 102 mm length | | | | | |
| Weight: Probe Head | 250 g | | | | | |

* All devices with a $d/8^\circ$ probe head can be ordered with a gloss trap denoted by „-GT“ ending of the model no.

Adapter for the 45°/0° probe head

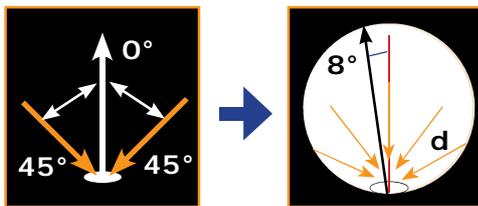
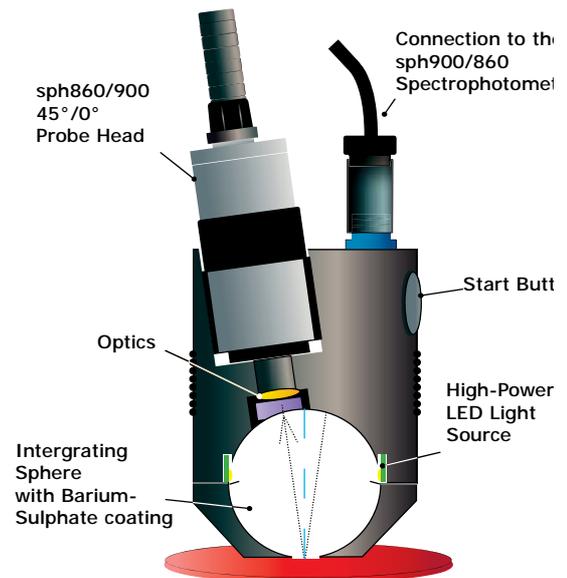


The MA35-UK probe head adapter - d/8° geometry

This unique adapter converts the 45°/0° probe head of the sph860 and sph900 spectrophotometer into a d/8° probe head in accordance to the DIN 5033 norm.

Nearly all colour measuring devices on the market are sold with one of two standard geometries. These are distinguished mainly by the type of illumination; direct or diffuse. A probe head with a 45°/0° geometry illuminates the sample with a direct light source at 45° and measures the diffuse remitted light at zero degrees (0°). A probe head with a d/8° geometry illuminates the samples with a diffuse light source and measures the remitted light at an angle of eight degrees (8°).

The 45°/0° probe head is sensitive to gloss, which means glossy surfaces which look darker are measured darker. The d/8° probe head measures the gloss reflected at the 8° measuring angle together with the diffuse reflected „surface colour“, which makes the d/8° probe head much less sensitive to gloss. A gloss trap opposite the 8° viewing angle can be used to compensate this error, but this is also dependent on glossiness of the surface as only the gloss from this 8° angle is suppressed. Because of this fundamental difference the two main geometries are not compatible.



Delivery includes:

- Probe head adapter MA35-UK
- White BAM calibration standard and black reference
- Certificate from the BAM (Bundesanstalt für Materialforschung) Berlin

Available accessories:

- V-Block for measuring cylindrical samples
- Set for measuring liquids and powders with device holder, optical cuvette and stand
- Horizontal holder for transmission measurements of liquids, plastics etc.

Adapter for the 45°/0° probe head

The MA35-UK probe head adapter - d/8° geometry (con't)

The adapter is available with different measuring areas. For most applications the 6 mm adapter is ideal, but for special applications 3 mm or 10 mm measuring spots are available. An ideal diffuse light source is created in the integrating sphere (Ulbricht Kugel - UK) through a special coating, with the upper layers being made of barium sulphate. All settings of spectrophotometer are automatically altered by connecting the adapter, using a very simple push-pull plug.

Only with a ColorLite sph860 or sph900 spectrophotometer will your measurements be 100% compatible to ALL your customers and suppliers - Now and in the future !



Ordering Information + Specifications

| Article No. | E13341 | E13343G | E13342 | E13342G | E13345 | E13345G |
|----------------------|--|------------|-----------|------------|------------|-------------|
| Model | MA35-UK-6 | MA35-UK-6G | MA35-UK-3 | MA35-UK-3G | MA35-UK-10 | MA35-UK-10G |
| Gloss Trap | No | Yes | No | Yes | No | Yes |
| Scanning Area | 6 mm | 6 mm | 3 mm | 3 mm | 9 mm | 9 mm |
| Aperture | 8 mm | 8 mm | 4.5 mm | 4.5 mm | 10.5 mm | 10.5 mm |
| Measurement Geometry | d/8° without gloss trap - Specular included or optional with gloss trap - Specular excluded | | | | | |
| Light Source | High powered LEDs - with a life span of over 20 Years | | | | | |
| Power Supply | 1 WATT - supplied direct from the sph860/sph900 | | | | | |
| Material | Lightweight Polyoxymethylene (POM) | | | | | |
| Weight | 210 grams | | | | | |
| Dimensions | 55 mm diameter x 78 mm length | | | | | |
| Coating: | Barium Sulphate | | | | | |
| Calibration | With certified white BAM* standard and black reference standard | | | | | |

* BAM (Bundesanstalt für Materialforschung) Federal Institute for Materials Research

Stand for the d/8° probe head



MA35-UK-UP - Upright stand for d/8° probe head

Accessory for holding the d/8° probe head or probe head adapter in an upright position. This is needed for measuring various samples that can be placed on the opening of the probe head and measured using the d/8° geometry. Samples measured this way include:

- powders in a 25 mm glass cuvette (optional)
- cylindrical parts - additional using a v-block accessory (optional)
- very small objects that can be positioned with a spacer*
- relative small profiles that can be positioned with a spacer*
- highly glossy samples such as caps**

The set includes a stand for the sph860 and sph900 spectrophotometer which is easily clipped on to the holder and the viewing angle adjusted as needed. It has an integrated connection to the power supply (100-240 VAC).

The support for the d/8° probe head is made of black Polyoxymethylene (POM), easy to open with a clamp lever and supported by 2 steel rods. A light proof cover can be used to reduce the affects of ambient light.



Ordering Information + Specifications

Stand - MA35-UK-UP

Article No. E13474

Support for the d/8° probe head including holder for the sph860 or sph900 (device not included in the delivery)

Light proof cap

Article No. E13494

Prevents ambient light affecting results

Glass cuvette

Article No. E15331

Cylindrical cuvette made of optical glass
Dimensions: 25 x 34 mm (h x d)

See also positioning aids on page 28



*Spacer can be made customer specific by ColorLite

** For special applications ColorLite offers a modified version of the MA35-UK-UP



Probe head $d/0^\circ$ - 38 mm



The $d/0^\circ$ probe head - 38mm measuring area

The probe head illuminates the sample with a diffuse LED light source over an area of 38 mm. This version is used to measure inhomogeneous samples such as granules, foods or wood colours. The probe head is made of a light weight POM (Polyoxmethalene) and has an optional button to trigger the measurements for hand held applications.

A stand is available to support the probe, for measuring samples in a cuvette (see accessories).



Ordering Information + Specifications

| Article No. | E11245 | E11145 | E11245T | E11145T |
|------------------------|--|--|---|---|
| Model * | sph860-38 | sph900-38 | sph860-38-T | sph900-38-T |
| Probe head | $d/8^\circ$ geometry - according to DIN 5033 | | | |
| Description | ColorLite sph860 with a 38 mm measuring spot | ColorLite sph900 with a 38 mm measuring spot | ColorLite sph860 with a 38 mm measuring spot and trigger button | ColorLite sph900 with a 38 mm measuring spot and trigger button |
| Scanning Area | 38 mm | | | |
| Aperture | 45 mm | | | |
| Dimensions: Probe Head | 63 mm diameter; 135 mm length | | | |
| Weight: Probe Head | 360 g | | | |

ColorLite sph860 + sph900

Spectrophotometers



ColorLite
Innovative Farbmesstechnik

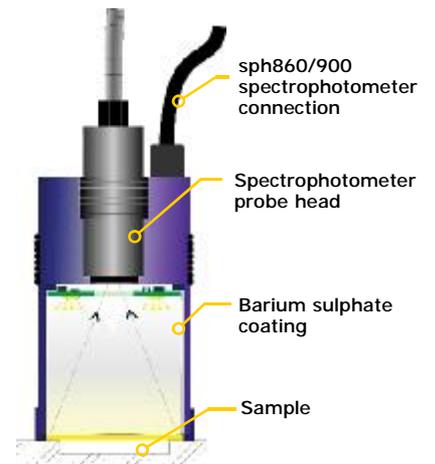
Adapter $d/0^\circ$ - 38 mm/ 80 mm



The MA38 and MA80 probe head adapter with 38 mm and 80 mm measuring area

Converts the sph860 or sph900 device with a $45^\circ/0^\circ$ probe head into a device with a measuring area of 38 mm/80 mm. This enables a reproducible colour measurement of extremely inhomogeneous samples such as wood surfaces, foods or granules.

The probe head adapter illuminates the sample over a large area with a diffuse LED light source. The probe is made of a light weight POM (Polyoxmethalene) and has an optional button to trigger the measurements for hand held applications. A stand is available to support the probe, for measuring samples in a cuvette (see accessories).



Ordering Information + Specifications

| Article No. | E13331 | E13331T | E13336 |
|---------------------|---|---|--|
| Model | MA38 | MA38-T | MA80 |
| Trigger Button | No | Yes | No |
| Measurement area | 38 mm | 38 mm | 80 mm |
| Illustration |  |  |  |
| Probe Head Geometry | $d/0^\circ$ | $d/0^\circ$ | $d/0^\circ$ |
| Dimensions | 55 x 78 mm | 55 x 78 mm | |
| Weight in grams | 300 | 300 | 700 |
| Light Source | High powered LEDs - with a life span of over 20 Years | | |
| Power Supply | 1 WATT - supplied direct from the sph860/sph900 | | |
| Material | Polyoxymethylene (POM) | | |
| Coating: | Barium Sulphate | | |
| Calibration | With certified white BAM* standard and black reference standard | | |

* BAM (Bundesanstalt für Materialforschung) Federal Institute for Materials Research

Accessories for the MA38 Probe Head



MA38-Set/MA80-Set for measuring inhomogeneous

This set extends the small measuring spot of the normal 45°/0° probe head to a measuring area of 38 mm/80mm. The set is for measuring inhomogeneous samples such as pellets, plastic granules and liquids. Comprising of a MA38/MA80 probe head adapter. Casing made of Polyoxymethylen (POM) and light source from high powered LEDs. The unit is operated and powered from the spectrophotometer, which is attached by a holder. The spectrophotometer can easily be clipped on to the same holder with the viewing angle adjusted as needed. An integrated connection is used to connect the spectrophotometer to a power supply (100-240 VAC).

Included in the delivery:

- Probe head adapter with a white BAM tile used for calibrating
- Stand for supporting the MA38/80 adapter and spectrophotometer
- Optical cuvette
- Light proof cover used as a black reference



Ordering Information

MA38-Set

Article No. E13332

Set for measuring inhomogeneous samples including the MA38 adapter with stand and holder for the sph860 or sph900 spectrophotometer (device not included in the delivery)

MA80-Set

Article No. E13337

Set for measuring inhomogeneous samples including the MA80 adapter with stand and holder for the sph860 or sph900 spectrophotometer (device not included in the delivery)

MA38-Stand

Article No. E13338

Only the stand for the probe head adapter

Reflector with spacer

Article No. E13493

Used to measure translucent liquids. Fits into the glass cuvette

Replacement glass cuvette

Article No. E15332

Glass optical cuvette 30 x 50 mm

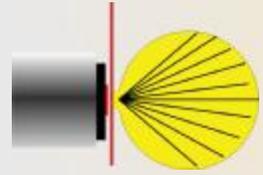
Metal cuvette

Article No. E15337

Replacement metal cuvettes with glass floor



Transmission accessory - d/0° mode



MA35-UK-CA10 - for transmission measurements

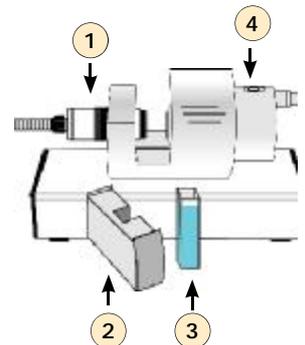
Accessory for measuring samples in transmission mode. On the one side of the device supports an integrating sphere, which is used as a diffuse light source, and on the other side of the sample the normal 45°/0° probe head is fixed to measure the transmitted light. This setup is used mainly for measuring transmission of translucent samples, such as:

- translucent liquids
- transparent liquids
- plastic sheeting of different thicknesses
- various plastic parts

The results transmission spectrum in the range between 400 to 700 nm, opacity, CIE L*a*b*-values, density or yellowness. The integrating sphere can be MA35-6-UK adapter or a single purpose light source: For measuring liquids in disposable plastic cuvettes we offer a holder which slots in between the light source and probe head.

Delivery includes:

- Holder for the MA35-UK adapter or light source (MA35-UK included)
- Stand for supporting the spectrophotometer
- Adapter for the use of 10mm disposable cuvettes, incl. 100 cuvettes



- 1) Probe head
- 2) Cuvette holder
- 3) Disposable cuvette
- 4) Diffuse light source

Ordering Information + Specifications

Holder

Article No.

E13351

MA35 *not included in the delivery*

MA35-UK-LS

Article No.

E13352

Integrating sphere *MA35-UK-LS* with same specifications as the MA35 adapter but simplified to be used as a light source only for the CA10-UK

Transmission $0^\circ/0^\circ$ for the $45^\circ/0^\circ$ probe head

CA10 and CA10-LS sets for measurements of liquids

The CA10 and CA10-LS sets with integrated light source are used for measuring different types of liquids which are measured in standard sized 10 mm cells made of glass or disposable plastic.

The CA10 set is used for measuring opaque liquids in disposable cuvettes. As the CA10-LS has an integrated light source it is used for measuring transparent liquids in a $0^\circ/0^\circ$ transmission mode.

The light source is a high powered white LED, with the casing made of Polyoxymethylen (POM). Operation and power supply come from the spectrophotometer which can be easily clipped on to the holder and the viewing angle adjusted as needed. The stand has an integrated junction to the power supply (100-240 VAC).

The delivery includes 100 disposable plastic cuvettes made of polymethylmethacrylat PMMA



Ordering Information + Specifications

CA10-Set

Article No.

E13452

Set for measuring opaque liquids in disposable cuvettes with holder for the sph860 or sph900 spectrophotometer (device not included in the delivery)

CA10-LS Set

Article No.

E13462

Set for measuring transparent liquids in disposable or glass cuvettes with an integrated LED light source and holder for the sph860 or sph900 spectrophotometer (device not included in the delivery)

Disposable 10 mm cuvettes

Article No.

E15334

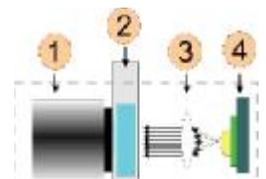
Plastic cuvettes 12.5 x 12.5 x 45 mm with a 10 mm optical path - 100 pieces

Working white standard

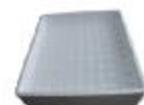
Article No.

E13522

Used to calibrate the CA10 with the probe head in the unit



- 1) Probe head
- 2) Disposable cuvette
- 3) Collimator
- 4) Direct light source



Accessories for measuring powders



Powders can be measured mainly by different methods; either the powder is measured directly in a powder form or it is pressed into a tablet form.

To measure the powder in its original form, an interface is needed to prevent the powder from soiling the probe head. Normally the powder is filled into a glass cuvette which is tapped on a solid surface, so that an even film of powder can be observed through the glass. ColorLite offers you this solution as a powder measurement set. But as we have a fully water and powder proof probe head (IP67 Version) on offer this can be used to measure powders directly without having to take a sample. The ColorLite probe head can be easily cleaned with a brush and/or under running water after use.

A more complicated method is to press the powder before measuring into a tablet. The surface of the tablet can then be measured directly as if it is a solid. Again we advise using our IP67 probe head to measure the tablet also to prevent soiling. For measuring powder tablets we also offer a complete set with every thing needed.

Set 1 for measuring powders in glass cuvettes

The set includes a device holder for the spectrophotometer (not included) which is easily clipped on, with the viewing angle adjusted as needed. The holder has an integrated connection to the external power supply included. The probe head is supported in an upright position in a probe head holder. To calibrated the device in this position a working white standard is supplied. The working standard has to be calibrated against the BAM white standard first.

Included in the delivery:

- Probe head and device holder
- White ceramic tile 38 mm diameter used as a working standard
- Optical cuvette, cylindrical made of special glass. Dimensions: 30 x 50 mm (h x d)
- Mains power supply 100 - 240 VAC
- Light proof cover



Accessories for measuring powders

Set 2 for measuring powders in in tablet form

For measuring fine grained powders ColorLite offers a complete set, as an accessory for the sph860 and sph900 (not included). The set includes the same probe head and spectrophotometer holder as in the set for measuring powders in cuvettes. But also includes a hand press and a powder form and piston.

The tablets are pressed against a glass which creates a perfect smooth surface. This surface can be measured direct by the spectrophotometer. To prevent the probe head from being soiled a shp860 or sph900 with IP-67 probe head can be used. As the colour values measured are dependent on the density of the powder, measuring powders in tablet form is the method with the best reproducibility.

To calibrated the device in this position a working white standard is supplied. The working standard has to be calibrated against the BAM white standard first.



Included in the delivery:

- Probe head and device holder
- White ceramic tile 38 mm diameter used as a working standard
- Powder press: Force = 1.5 kN, 110 x 360 x 160 mm (w x h x d), Weight = 7.5 kg
- Powder form + piston
- Mains power supply 100 - 240 VAC

Ordering Information + Specifications

PWD-Set 1

Article No.

E13483

Set for measuring powders in glass cuvettes with holder for the sph860 or sph900 spectrophotometer (device not included in the delivery)

PWD-Set 2

Article No.

E13481

Set for measuring powders as tablets with holder for the sph860 or sph900 spectrophotometer (device not included in the delivery).

Glass cuvette - replacement

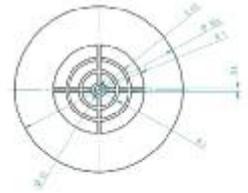
Article No.

E15331

Cylindrical cuvette made of optical glass
Dimensions: 25 x 34 mm (h x d)



Accessories Probe head positioning aids



Positioning tools for the 45°/0° probe head

The target device is made of black anodised aluminium with the crosshair made of stainless steel. A inner plastic sleeve on the 45°/0° probe head version prevents jamming.

Positioning tools for the d/8° probe head

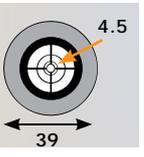
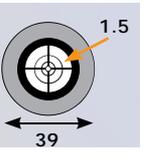
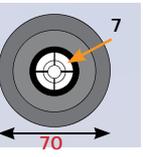
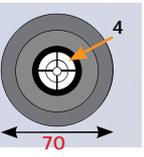
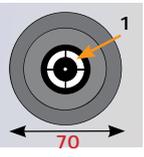
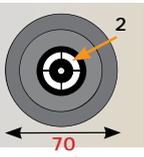
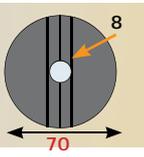
The target accessories are available for 3 mm and 6 mm probe heads.

The aperture accessories have a 1 mm or 2 mm opening used for minimising the measurement area accordingly. They are supplied with a auxiliary white standard so it is possible to calibrate together with aperture tool, so that absolute values still match.

The V-block accessory can be fitted to the MA35-UK probe head and enables cylindrical samples to be positioned exactly in the center of the probe head opening. The v-block can be best used together with the MA35-UK-UP stand which supports the probe in an upright position.



Ordering Information + Specifications

| Article No. | E13511 | E13513 | E13512 | | | | E13346 |
|----------------------------|---|---|---|--|---|---|---|
| Model | TD-4 | TD-1.5 | TD-7-UK | TD-4-UK | AP-1-UK | AP-2-UK | V-6-UK |
| Measurement area | 3 mm | 1 mm | 6 mm | 3 mm | 1 mm | 2 mm | 6 mm |
| Aperture | 4 mm | 1.5 mm | 7 mm | 4 mm | 1 mm | 2 mm | 8 mm |
| Illustration |  |  |  |  |  |  |  |
| Used with Probe Head | 45°/0° | 45°/0° | d/8° | d/8° | d/8° | d/8° | d/8° |
| Diagram (dimensions in mm) |  |  |  |  |  |  |  |
| Dimensions | 39 x 13 mm | 39 x 13 mm | | | | | |
| Weight | 10 g | 10 g | | | | | |
| Description | Target device for positioning the standard 45°/0° probe head | Target device for positioning the XS probe head | Target device for the d/8° probe head 6 mm scan area | Target device for the d/8° probe head 3 mm scan area | Aperture for measuring 1 mm area with the d/8° probe head | Aperture for measuring 2 mm area with the d/8° probe head | V-block cap for positioning the samples on the d/8° probe head |

Accessories supplement aids and spare parts

Battery pack

| | |
|-------------|--------|
| Article No. | E13411 |
|-------------|--------|

Rechargeable battery made of 5 cells in NiMH (Nickel-metal hydride) technology. By using a low self-discharge version our equipment is always ready to use, even after a longer storage period. The battery simply clips on and off.



Power supply and device holder

| | | |
|-------------|---------|--------|
| Article No. | E13471 | E13474 |
| Model | HT-45-0 | HT-D-8 |
| Probe head | 45°/0° | d/0° |

For using the colorLite sph860 or sph900 as a desktop device we offer a stand which has a support also for the probe head. When using this accessory the spectrophotometer is supplied with power from a mains power supply (110V-240V, 50/60 Hz) which is included in the delivery. Available in two versions



Padded carrying case

| | |
|-------------|--------|
| Article No. | E13501 |
|-------------|--------|

The protection casing has an adjustable strap, a transparent front and a velcro fastener. The side has an extra strap for holding the probe head. Can be used for hands free applications.



Working Standard - Small

| | |
|-------------|--------|
| Article No. | E13521 |
|-------------|--------|

White ceramic tile 10 mm in diameter, has a polished surface and is edged in a black pastic. The tile is delivered in a padded case. The standard can be used to protect the original 45°/0° BAM standard.



Working Standard - Large

| | |
|-------------|--------|
| Article No. | E13531 |
|-------------|--------|

White robust ceramic tile 38 mm in diameter, has a polished surface and is edged in black plastic. The tile is delivered in a padded case. The standard can be used to protect the original 45°/0° BAM standard or can be used when a defined white back ground is needed.



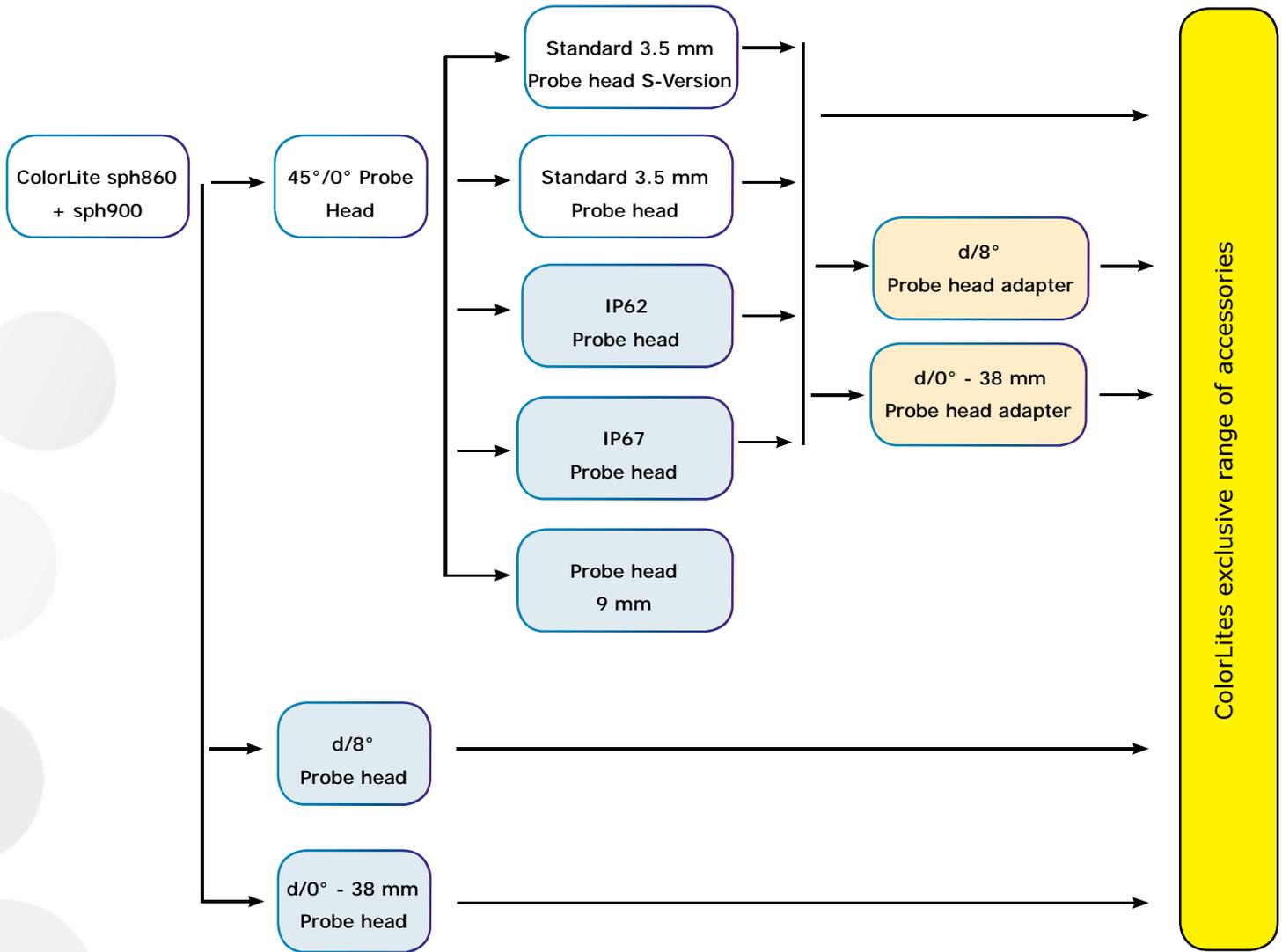
Green Tile

| | |
|-------------|--------|
| Article No. | E13591 |
|-------------|--------|

The equipment is calibrated with a white BAM standard (d/8° probe heads also with a black reference), but to check if the spectrophotometer is working 100% correctly a independent green tile can be measured. The tiles that we supply for this task, are from a company (CERAM) that produces tiles with a guaranteed stability over time and designed for colour metrological applications. Dimensions 50 x 50 mm



Probe Head Overview



| | |
|--|---------------------|
| | Standard Version |
| | Special Versions |
| | Probe Head Adapters |
| | Accessories |

Technical Data

Below the technical data typical for all models. For model dependent data please see text in the pages above.

| Function | ColorLite sph900 | ColorLite sph860 |
|---|---|--|
| Measurement Geometry | 45°/0° - or d/8° - according to DIN5033 Optional 45°/0° AND d/8° with MA35-UK adapter | 45°/0° - or d/8° - according to DIN5033 Optional 45°/0° AND d/8° with MA35-UK Adapter |
| Illuminants | D65, D55, D50, A, C, F11 | D65, D55, D50, A, C, F11 |
| Standard Observer | 2° and 10° | 2° and 10° |
| Data Output/ Colour Scales | XYZ, Yxy, ΔE CIE L*a*b*, L*u*v*, L*C*h, Hunter Lab Remissions Spectrum with cursor displaying wavelength and %, CIE-L*a*b* Diagram incl. tolerance limits | XYZ, Yxy, ΔE CIE L*a*b*, L* u* v*, L*C*h, Hunter Lab CIE-L*a*b* Diagram incl. tolerance limits |
| Quality Control Tolerance Limits and Colour Differences | ΔE CIELab; ΔL , Δa , Δb ; ΔL , Δu , Δv ; ΔL , ΔC , Δh ; Min/Max, PASS/FAIL ΔE_{CMC} (1:1 and 1:2), CIE ΔE_{94} Metameric-Index for D65/A and D65/F11 according to DIN 6172 | ΔE CIELab; ΔL , Δa , Δb ; ΔL , Δu , Δv ; ΔL , ΔC , Δh ; Min/Max, PASS/FAIL |
| Other Values | Contrast: LRV (Light Reflectance Value) accord- ing to - BS 8493:2008 Various White-Index values Various Yellowness-Index values Grey-Index Hazen/APHA; JOD (CA10-LS Adapter needed) | not available |
| Spectral Light Source Measurement | Spectra and chromaticity measurement of light sources such as LED's - Optional | Spectra and chromaticity measurement of light sources such as LED's - Optional |
| Sample photos | 350 Colour photos to visualise scanning area Dimension: 160 x 120 Pixel " | not available |
| Displayed Spectral Range | 400 to 700 nm | 400 to 700 nm |
| Spectral Resolution | Holographic grating-Spectrometer FWHM** @ 500 nm < 10 nm Scanning in 3.5 nm steps 115 x 16-Bit values per scan | Holographic grating-Spectrometer FWHM** @ 500 nm < 10 nm Scanning in 3.5 nm steps 115 x 16-Bit values per scan |
| Display | High resolution O-LED colour display: High contrast and low-power 1/4-VGA, 320 x 240 Pixel | High resolution O-LED colour display: High contrast and low-power 1/4-VGA, 320 x 240 Pixel |
| Repeatability | < 0.03 ΔE CIELab | < 0.05 ΔE CIELab |
| Light Source | White and blue LED's Life span > 20 years | White and blue LED's Life span > 20 years |
| Scanning Time | Complete measurement cycle with calculation and readout time: 0.5 sec | Complete measurement cycle with calculation and readout time: 0.5 sec |

**Full width at half maximum

Technical Data continued

| Function | ColorLite sph900 | ColorLite sph860 |
|---------------------------------|--|--|
| Multiple Scanning | Mean calculation of 1 to 20 individual measurements with colour values and standard deviation statistics displayed | Mean calculation of 1 to 20 individual measurements with colour values and standard deviation statistics displayed |
| Power Supply | "Rechargeable battery NiMH 6-Volt /1100 mAh Operating time > 15 hours Charging time 1.5 hours Optional - operation with power supply | Rechargeable battery NiMH 6-Volt /1100 mAh Operating time > 15 hours Charging time 1.5 hours Optional - operation with power supply |
| Automatic Accessory Recognition | An accessory is detected and device settings automatically modified accordingly | An accessory is detected and device settings automatically modified accordingly |
| Calibration | With white standard certified by the Federal Institute for Materials Research (Bundesanstalt for Materialforschung -BAM), Optional - 2-stage calibration with working standard | With white standard certified by the Federal Institute for Materials Research (Bundesanstalt for Materialforschung -BAM), Optional - 2-stage calibration with working standard |
| User-Mode | Limited user rights - Password protected | Limited user rights - Password protected |
| Upload Standards from PC | Yes | Yes |
| Memory | Memory for 1000 standard colours Memory for 1000 colour values Memory for 300 spektra (400-700nm / 3.5nm) Memory for 350 sample-photos (160 x 120 Pixel) | Memory for 1000 standard colours Memory for 1000 colour values Memory for 300 spektra (400-700nm / 3.5nm) |
| Standard Colour Management | Standards loaded by list with Best-Match tool Standards loaded by index-no. Standards loaded by entering name | Standards loaded by list with Best-Match tool Standards loaded by index-no. Standards loaded by entering name |
| PC-Interface | USB 2.0 Bluetooth® RS232 - Optional | USB 2.0 Bluetooth® - Optional RS232 - Optional |
| Accessories | For the measurement of inhomogeneous samples, transparent, translucent and opaque liquids, powders in cuvettes or tablet form. Holder/stand with power supply: 110-240V, 50/60 Hz | For the measurement of inhomogeneous samples, transparent, translucent and opaque liquids, powders in cuvettes or tablet form. Holder/stand with power supply: 110-240V, 50/60 Hz |
| Dimensions | Device with battery: 180mm x 82mm x 40mm - 370g Probe head 45°/0°: 60mm x 25mm Ø - 170g Probe head d/0°: 78 mm x 56 mm Ø - 250g | Device with battery: 180mm x 82mm x 40mm - 370g Probe head 45°/0°: 60mm x 25mm Ø - 170g Probe head d/0°: 78 mm x 56 mm Ø - 250g |
| Climatic Conditions | Ambient temperature: 15°C to 45°C Relative humidity: max. 85% non-condensing | Ambient temperature: 15°C to 45°C Relative humidity: max. 85% non-condensing |

Included in the delivery of all our spectrophotometers are:

- BAM Certificate
- Aluminium carrying case with foam padding
- Battery charger
- USB cable



ColorLite sph860 + sph900

Spectrophotometers



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