Spectrophotometer

ColorLite
Innovative Colour Measurement
made in Germany

ColorLite sph900 & sph870

ColorLite – the perfect solution for reliably controlling the colour quality of your products.

sph900 | Probehead-Versions | sph870

Descriptions – Features – Probehead-Versions – Accessories – Technical Data

Innovative spectral colour measurement technology
made in Germany

ColorLite sph900 & sph870
Spectrophotometers

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Spectrophotometers

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Why choose ColorLite as your partner for ensuring the quality of your product colours?

- ColorLite develops and manufactures a wide range of high-quality products for colour measurement, primarily used in quality assurance.
- Our instruments are designed to be as easy to operate as possible, helping to minimise measurement errors.
- With ColorLite spectrophotometers, our customers have the perfect solution for measuring colour across a wide variety of material types. This is made possible through our extensive range of specialised accessories.
- We are happy to support you in finding the best solution for your company.

ColorLite offers your company the perfect solution for the reliable control and communication of your product colours. Our spectral colour measurement technology, developed and manufactured in Germany, is characterised by outstanding ease of use and exceptional flexibility.

ColorLite GmbH was founded in 2003, based on the knowledge gained from many years of research in the field of colour measurement technology.

From the very beginning, our products have represented technical innovation. The ColorLite sph900 continues this tradition of pioneering instruments and is currently the most advanced and versatile mobile spectrophotometer on the market.

To ensure that we maintain this high standard in the future, ColorLite GmbH invests significantly above average in research and development.

Research projects, including collaborations with Europe’s largest plastics institute, the SKZ in Würzburg, further support us in developing products that will continue to optimally meet the future needs of industry.

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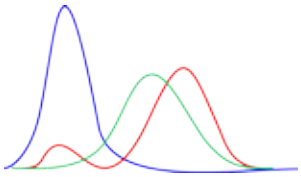
The Colour Measurement Principle



How and Why?

Measuring colour means making a sensory perception measurable — much like attempting to measure taste or smell.

By measuring colour, the subjectivity of the perceived colour, or any perceived colour difference, is replaced by objective values. Since the human visual colour system is based on three receptors, each responding with different spectral sensitivity, colours can always be described using three values. The colour perceived is dependent on the surrounding light. An additional variable is the field of view. When viewing a larger area, a larger part of the retina is used, which has a slightly different spectral sensitivity. Science distinguishes between a 10° and a 2° viewing angle. In other words, colour perception changes depending on the size and viewing angle of the observed area.

A spectrophotometer measures colour by illuminating the sample and analysing the light that is diffusely reflected. The resulting spectrum is compared with that of a known (usually white) reference surface, and the spectral properties of the measured surface are calculated. This sample spectrum is then weighted with a standardised illuminant, for example daylight (D65), and a colour matching function (10° or 2°). This produces the three values X, Y and Z, which depend not only on the chosen illuminant (e.g. D65), but also on the selected observer angle (10° or 2°). It may sound complicated, but it is not: most industries use the same basic settings, such as D65 illumination and the 10° standard observer.
Colour differences are usually described by the deviation of the three colour values (mainly ΔL*, Δa* and Δb*), or summarised into a single value (Delta E).

The main field of application for colour measurement is quality control. Colour is a quality characteristic that both you and your customers can see. Spectrophotometers make it possible to compare colours with a reference standard independent of the user, ambient light or time. Standards may be defined samples such as the RAL colour scale (or another colour scale). Other references can also be used, which have been digitised and stored indefinitely. Spectrophotometers detect colour differences more precisely than the human eye. This precision is defined by repeatability, which depends on the sample and should ideally be a factor of ten better than the smallest required Delta E.

The major advantage of colour measurement — in addition to 100% objectivity — is that colour standards can be assigned defined tolerance limits. This ensures that customers can rely on receiving products in the correct colour, and suppliers know that their products lie within the specified tolerances. Colour measurement also enables manufacturers to save resources by optimising the amount of colourant used. In addition, checking colour specifications at the beginning and during production significantly reduces reworking and complaint costs.

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Spectrophotometers

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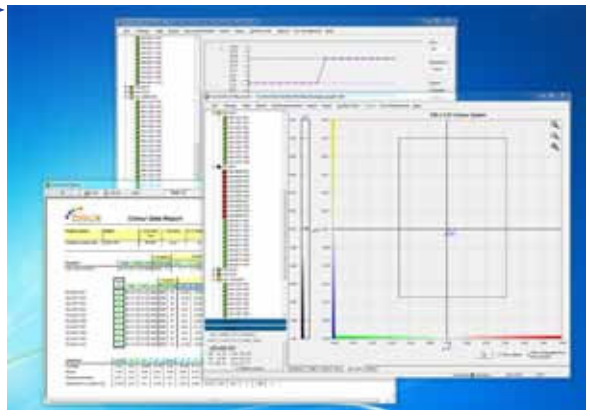
One device for many measurement requirements

One of the most important features of the ColorLite sph870 and sph900 spectrophotometers is the ability to meet new measurement requirements at a later stage by using our accessories.

the ColorLite sph870 and sph900 spectrophotometers are available with different probe heads depending on the application. Our extensive range of accessories allows you to expand the device's fields of application as required. With the appropriate probe head adapter, you can ensure that your measurement results are comparable with those of your customers and suppliers.

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

USB V2.0



ColorDaTra Basic and Professional PC Software

Universal accessory socket

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ColorLite sph900 & sph870
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Description – ColorLite sph870 and sph900

User-friendly and flexible

The ColorLite sph900 and sph870 spectrophotometers are colour measurement instruments that are ideally suited to a wide range of applications, primarily due to their extensive accessory options.
The sph900 incorporates all the user-friendly features and advantages of the sph870, while additionally offering modern enhancements such as a high-resolution O-LED display. This high-resolution display not only provides brilliant colour contrast but also simplifies operation by allowing more information to be displayed simultaneously. State-of-the-art electronics enable a measurement time of less than one second.

Smallest probe head and highest specifications

The use of a high-specification grating spectrometer with excellent reproducibility makes the instrument ideal for customers with demanding quality requirements, for example in the automotive industry. The probe head dimensions—just 25 mm in diameter, 60 mm in length, and a weight of only 110 grams—ensure easy and ergonomic handling. Measurements are triggered by pressing down the spring-loaded probe head. This allows the sample to be held in one hand while the measurement is initiated with the other. Special probe heads with a smaller aperture or with a V-block fixture for cylindrical shapes such as cables and rods are available as optional accessories.

Wide range of accessories and probe head options

A comprehensive accessory programme allows the measurement of a wide variety of samples, including powders, liquids, and inhomogeneous products such as granulates. In addition, a waterproof (IP67) stainless-steel probe head is available for use in harsh and wet environmental conditions, for example in the food industry.

Universal holder for
standard probe head

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Description – ColorLite sph870 and sph900

Probe Head (adapter) MA35-UK
with optional push button

One device – all major geometries

With the complementary accessories for the sph870 and sph900, you have the unique possibility to realise different measurement geometries using a single device.

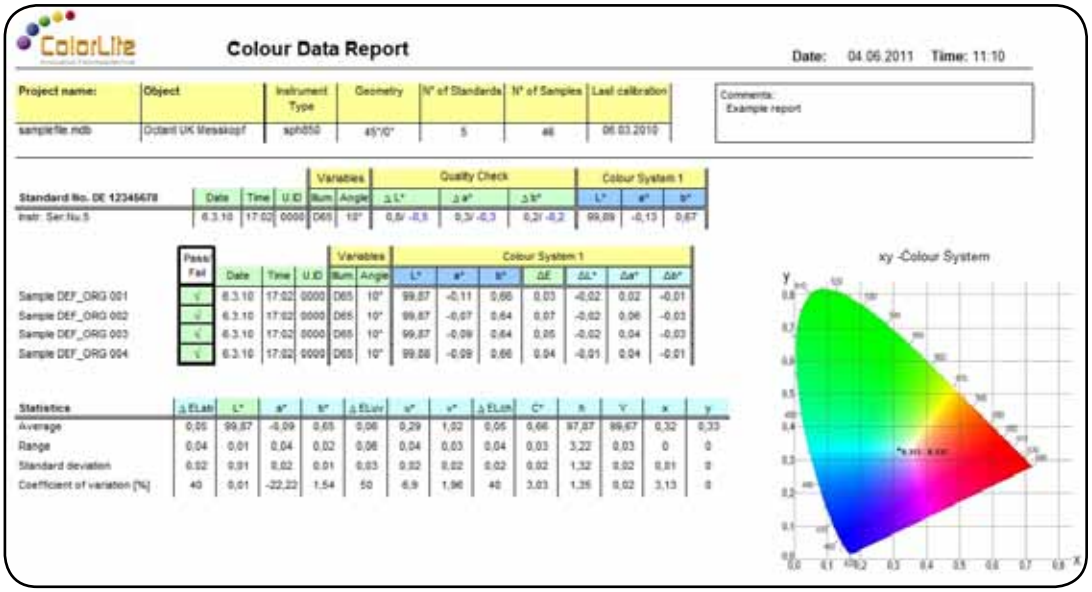
In addition to the two main probe heads with 45°/0° and d/8° geometries, transmission measurements can also be performed in 0°/0° or d/0° mode. For the measurement of inhomogeneous surfaces such as granulates or wood, an adapter is available to extend the measurement area to 38 mm or 80 mm.

Technically up to date

All sph870 and sph900 adapters use an auxiliary light source that is controlled by the main unit via an intelligent interface.
The system automatically recognises the connected accessory and adjusts the instrument settings accordingly.

Professional quality control using PC software

Our quality control database software ColorDaTra is easy to use. It enables clear operation and efficient management of your colour data directly from a PC.



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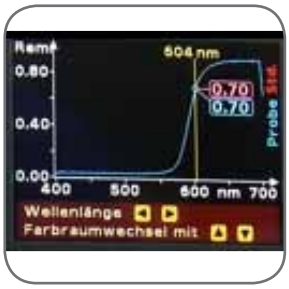
Features – ColorLite sph870 and sph900

External stainless-steel probe head

The stainless-steel probe head measures just 25 mm in diameter and provides the perfect interface between the sample and the instrument. Hold the sample in one hand and press the spring-loaded probe head onto the surface with the other to trigger the measurement.

High-contrast O-LED display (sph900)

The O-LED display of the sph900 impresses with brilliant colour contrast and extremely high resolution. It operates without backlighting, thereby extending the instrument's battery life.
A 180° viewing angle guarantees excellent readability from virtually any position.



User-friendly operation

- The menu is structured into just four main levels:
  Measure – Calibrate – Settings – Memory
- Simple four-button operation
- Real photographs explain all procedures step by step

The perfect light source – LEDs

LEDs (light-emitting diodes) are regarded as the light source of the future. They ensure excellent short- and long-term stability of measurement results while keeping maintenance costs low.
The pulse mode ensures that the brightness of the LEDs remains consistently stable for more than 20 years.

AAD – Automatic Accessory Detection

A wide range of accessories can be attached to the external probe head for measuring many different types of samples. The AAD system of the sph870 and sph900 automatically adjusts the internal settings depending on which adapter is connected.

AAD

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Features – ColorLite sph870 and sph900

Two main geometries in one device: 45°/0° and d/8°

The two most important measurement geometries are 45°/0° and d/8°, both of which are defined in DIN 5033.
The standard 45°/0° geometry of the ColorLite sph870 and sph900 can be converted into a d/8° geometry using the optional MA35-UK accessory. The d/0° measurement geometry is achieved by using the MA80 and/or MA38 probe head adapters.

High optical resolution in 3.5 nm increments

A total of one hundred and fifteen (115) 16-bit spectral values are measured during each measurement using a highly robust optical grating and a Hamamatsu linear sensor.
The measurement results are fully comparable with those of sophisticated desktop spectrophotometers. Many competing instruments measure using only 30 to 40 values, or even fewer.

1,000 standard colours in five folders

Store up to 1,000 standard colours in five folders, each with its own individual CIE ΔE or ΔL*, Δa*, Δb* tolerances.
Use one of three search methods, including a Best Match function, to find the correct colour. Standards can be sorted in a list or located using our intelligent word recognition tool.

User mode and user management

User mode (restricted functionality) prevents unintentional changes to settings or the deletion of standards. The user simply selects the required standard colour and carries out the measurement. User management: When enabled, a four-digit user ID is saved together with all colour data.

Super-fast – the 32-bit ARM RISC processor

The central processing unit is a high-performance 32-bit ARM RISC (Reduced Instruction Set Computer) processor. It enables a measurement time of approximately 0.5 seconds, making the measurement speed faster than that of any other spectral measuring instrument on the market.

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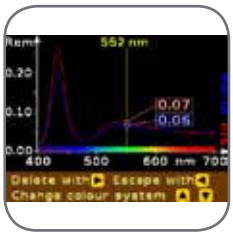
Features – ColorLite sph870 and sph900

FRAM memory – no batteries required

The high-performance ferroelectric random access memory (FRAM) chips offer a lifetime of at least 100,000 billion write cycles and a data retention period of 10 years. This ensures that no data or standards are lost.
No additional battery is required, as this is made possible by the use of FRAM memory technology.

Spectrometer mode – optional

In this mode, the instrument can be used as a portable spectrometer. For example, the spectral radiation (in 3.5 nm increments) and the colour values of any light source, such as LEDs, can be measured. For this purpose, a special spectral lamp is measured and stored on the instrument as a calibration file.



Communication: USB 2.0 (Wi-Fi or RS232 optional)

To optimise handling, data can be transferred directly to a PC via USB 2.0 during measurement.
Stored data can also be downloaded, or colour standards (references) can be uploaded. Alternatively, Wi-Fi or RS232 can be used for this purpose as optional interfaces.

ActiveX communication tool – optional

A list of commands within an ActiveX DLL library enables communication with the spectrophotometer via your own software.

Soft-touch surface

The soft-touch finish ensures that the ColorLite sph870 and sph900 feel comfortable in the hand. The rubber-like surface provides a secure and reliable grip in any situation. In addition, it simply looks great.

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Features – ColorLite sph870 and sph900

…additional features

- Memory for up to 1,000 colour samples
- Storage for 300 spectra in the range from 400 nm to 700 nm in 3.5 nm increments
- Multiple measurements with automatic averaging of 1 to 20 values

Error messages are displayed

… when the standard deviation (0.01 to 2) is exceeded during multiple measurements.
… when the metamerism index exceeds the variable limit value.
… for time-based calibration warnings from 1 to 24 hours.
… for temperature-based calibration warnings from 0 to 9.
… when a large colour difference between the sample and the standard is measured.
… when the sample is measured using settings different from those of the standard.
… when the self-test after calibration is not passed at 100%
… when the battery charge is low.
… when the memory is full.

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Color DaTra Firmware

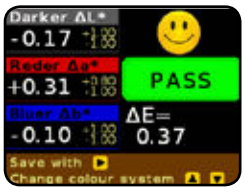
Spectrophotometers are primarily used to compare a colour sample with a standard colour. The ColorLite sph870 and sph900 spectrophotometers display these differences as well as absolute values in all commonly used colour spaces. Which data are shown after measuring a standard or a sample can be defined in the settings according to individual requirements. This makes it possible to activate different displays and switch between the screens using the up and down buttons.

Below, we present some of the available display options:

Pass / Fail

The difference between the standard and the sample is evaluated using a Pass / Fail indication. The CIE L*, a* and b* differences are explained using simple text messages such as “lighter” or “darker”.

The Pass / Fail result depends on the predefined tolerance limits.

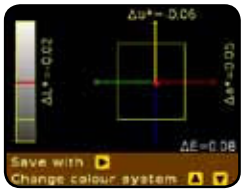


Absolute CIE L*a*b*

Samples or standard colours are displayed as absolute values, together with a timestamp, settings and other relevant information.
In addition, the colour itself is shown on the display in a rectangular field.

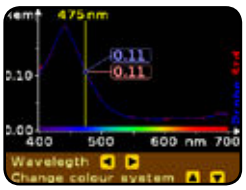
CIE L*a*b* Diagramm

Samples are displayed relative to the standard. The tolerance limits defined for the standard are also shown.



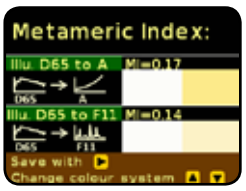
Spectral data – reflectance and transmission diagram

The ColorLite sph870 and sph900 spectrophotometers measure the reflected or transmitted spectrum at 3.5 nm intervals. This results in the measurement of more than 100 spectral values within the visible range.



Metamerism index

The perceived colour difference between two colours always depends on the spectral characteristics of the illumination. The metamerism index describes the colour difference between a standard and a sample when the standard illuminant is changed from D65 to A and from D65 to F11.



Best result

A simplified display for use with the Best Match function. This tool automatically searches for the standard that is closest to the sample colour. The user can specify which of the five internal standard folders is searched.

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Color DaTra Firmware

Whiteness and yellowness index

Displays absolute values describing the whiteness and yellowness of the sample. Among others, the following indices can be displayed: DIN 6167, ASTM E313, and the CIE index.

Y, x, y values

The absolute Y value, which is often used as a measure of luminance, along with the normalised spectral components x and y, are displayed.

X, Y, Z values

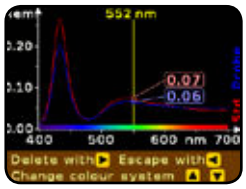
The absolute normalised tristimulus values X, Y and Z are the most important colour values. Most other colour values are calculated from these values.

ΔL*, ΔC*, Δh* and ΔH* values (Δ = Delta)

In addition to the CIE L*a*b* colour space, the L*C*h* colour space describes the lightness (L*), the saturation or chroma (C*), and the hue (h*).

Spectrometer function

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



Δ-E cmc and Δ-E CIE94

Modified colour difference equations that correspond to perceived colour differences.

Contrast values (LRV)

The contrast value, or LRV (Light Reflectance Value), is calculated between the standard and the sample measurement, as described in BS 8493:2008.

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Spectrophotometers

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45°/0° Probe Head Version

The ColorLite sph870 and sph900 spectrophotometers can be equipped with a wide range of probe heads. The choice of probe head depends on the intended application.

The standard 45°/0° Probe Head

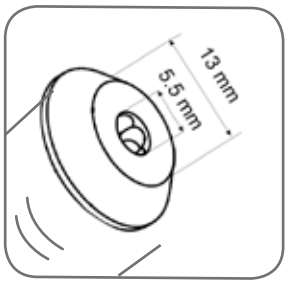
The 45°/0° probe head is suitable for most applications and can be used with a range of adapters, extending its scope accordingly (see accessories). The term "45°/0°" describes the standardised measurement geometry specified in DIN 5033: the sample is illuminated at an angle of 45° with a directional light source, and the diffusely reflected light is measured at 0°.

Measurement is triggered simply by pressing down the spring-loaded probe head onto the sample surface. Because the illumination is directional, 45°/0° geometry is sensitive to gloss. This means the results correlate well with visual perception.

45°/0° Probe Head – s Version

The 45°/0° probe head in the s version has the same dimensions as the standard probe head. It features a smaller measuring spot (5.5 mm) and a contact surface of only 13 mm. The measuring area is 3.0 mm.

This s-version probe head is ideal for measuring extremely small or curved parts. Typical applications include automotive interior components, pharmaceutical products, and curved plastic mouldings.



Ordering Information and Specifications

Art. No.	E11341	E11141	E11342	E11142
Model	sph870	sph900	sph870-s	sph900-s
Probe Head	Standard 45°/0° geometry in accordance with DIN 5033			
Description	ColorLite sph870 with a standard probe head	ColorLite sph900 with a standard probe head	ColorLite sph870 with an s-version probe head	ColorLite sph900 with an s-version probe head
Measuring Area	3.5 mm		3.0 mm	
Measuring Spot	8 mm		5.5 mm	
Dimensions: Probe Head	Diameter: 25 mm; length: 60 mm			

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Special probe head versions for harsh environments and liquids

45°/0° Probe Head – IP62 Hersion

The 45°/0° probe head is fitted with a protective window. Its primary purpose is to prevent contamination of the optical fibre by dust, powder, or similar particles. The IP62-rated probe head is spring-loaded. A measurement can be triggered simply by pressing down the probe head.

45°/0° Probe Head – IP67 Version

The 45°/0° probe head is also available in an IP67 version. This probe head is protected against water and dust, making it ideal for use in harsh industrial environments. The solid stainless steel probe head can, for example, be used in the food industry, as it can be cleaned and disinfected under running water.

45°/0° Probe Head – IP68 TS R Version

The 45°/0° probe head in this version is suitable for reflection measurements in liquids (TS R). The stainless steel probe head is dust-tight and waterproof (protection class IP68), has a diameter of 25 mm and a length of 150 mm. The probe head is non-spring-loaded. It is suitable for opaque, non-transparent liquids.

0°/0° Probe Head – IP68 TS T Version

This probe head is suitable for transmission measurements of transparent and translucent liquids. The stainless steel probe head is dust-tight and waterproof (protection class IP68), has a diameter of 25 mm and a length of 180 mm. The probe head is non-spring-loaded.

Ordering Information and Specifications

Art. No.	E11343	E11143	E11344	E11146	E11346	E11149	E11356	E11148
Model	sph870-IP62	sph900-IP62	sph870-IP67	sph900-IP67	sph870-IP68 TS R	sph900-IP68 TS R	sph870-IP68 TS T	sph900-IP68 TS T
Probe Head	Standard 45°/0° geometry – in accordance with DIN 5033						0°/0° geometry – not standardised	
Description	sph870 with IP62 probe head	sph900 with IP62 probe head	sph870 with IP67 probe head	sph900 with IP67 probe head	sph870 with IP68 TS R probe head	sph900 with IP68 TS R probe head	sph870 with IP68 TS T probe head	sph900 with IP68 TS T probe head
Meas. Area	3.5 mm							
Meas. Spot	8 mm							
Dimensions: Probe Head	Diameter: 25 mm Lenght: 60 mm		Diameter: 25 mm Lenght: 60 mm		Diameter: 25 mm Lenght: 150 mm		Diameter: 25 mm Lenght: 180 mm	

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Probe head version d°/8°

d/8° Probe Head

Probe Head (adapter)
MA35-UK

For applications where d/8° geometry is required, the ColorLite systems sph870 and sph900 are also available with a directly connected sphere geometry.

The d/8° measurement geometry describes the standardised measurement geometry in accordance with DIN 5033. In this setup, the sample is illuminated by a diffuse light source and measured at an angle of 8°. The diffuse light is generated inside an integrated (Ulbricht) sphere.

The probe head is made of lightweight POM (polyoxymethylene) and is optionally equipped with a push button for triggering measurements. As the light source is diffuse, the sample is illuminated from all directions (including opposite the 8° measurement angle). The surface gloss is measured together with the diffuse light, meaning that the measurement results are independent of the surface gloss. This makes the geometry ideal for measuring coloured surfaces with uneven gloss.

The reproducibility is more stable than when using a 45°/0° probe head.

Spectrophotometer
sph900

ColorLite offers various stands to facilitate handling (see accessories).

The d/8° probe heads are available with measuring apertures of 3 mm, 6 mm and 10 mm. All versions can be supplied with a permanently installed gloss trap*.

For technical data, see pages 27–28.

* The corresponding article numbers for the individual probe head versions are available on request.

Ordering Information and Specifications

Art. No.	E11349	E11752	E11348	E11751	E11350	E11753
Model	sph870-3-UK	sph900-3-UK	sph870-6-UK	sph900-6-UK	sph870-10-UK	sph900-10-UK
Probe Head	d/8 ° geometry - in accordance with DIN 5033					
Descriptions	ColorLite sph870 with a d/8° probe head and 3 mm spot	ColorLite sph900 with a d/8° Probe Head and 3 mm spot	ColorLite sph870 with a d/8° Probe Head and 6 mm spot	ColorLite sph900 with a d/8° Probe Head and 6 mm spot	ColorLite sph870 with a d/8° Probe Head and 10 mm spot	ColorLite sph900 with a d/8° Probe Head and 10 mm spot
Meas. Area	3 mm		6 mm		10 mm	
Meas. Spot	8 mm		8 mm		13.5 mm	
Dim.: Probe Head	Diameter: 55 mm Length: 102 mm					
Weight Probe Head	250 g					

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Probe Head d/0° – 38 mm

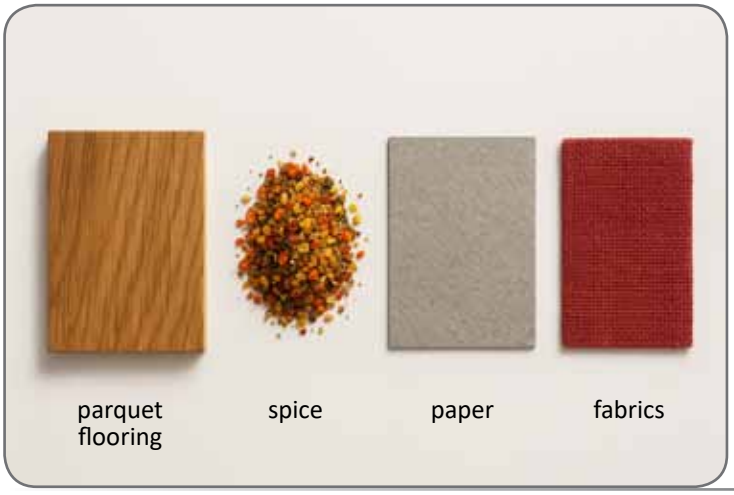
d/0° Probe Head – 38 mm Scanning Area

The d/0° 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 parquet flooring, paper, textiles or food products. The probe head is made of lightweight POM (polyoxymethylene) and is optionally equipped with a button for triggering the measurement.

A stand for measuring samples in a cuvette is optionally available (see page 21: universal holder).

Fig. 1: Probe Head d/0°, Scanning Area: 38 mm for inhomogeneous samples

Fig. 2: Examples of inhomogeneous samples



Ordering Information and Specifications

Art. No.	E11345	E11145	E11345T	E11145T
Model*	sph870-38	sph900-38	sph870-38-T	sph900-38-T
Probe Head	d/0°			
Description	ColorLite sph870 with a 38 mm measauring spot	ColorLite sph900 with a 38 mm measuring spot	ColorLite sph870 with a 38 mm measuring spot and trigger button	ColorLite sph900 with a 38 mm measuring spot and trigger button
Meas. Area	38 mm			
Meas. Spot	45 mm			
Dimensions: Probe Head	Diameter: 63 mm Länge: 135 mm			
Weight: Probe Head	360 g			

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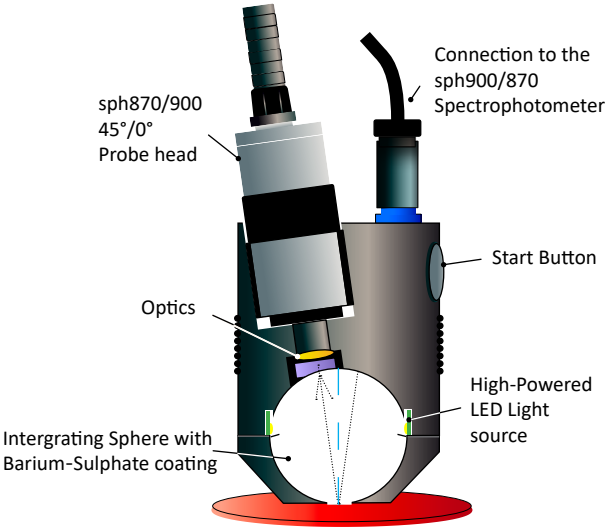
Adapter for the 45°/0° probe head

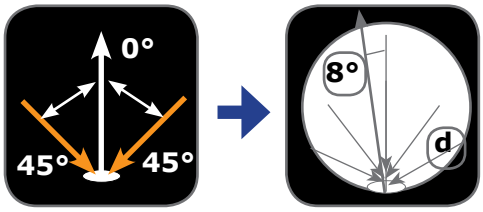
MA35-UK probe head adapter – d/8° geometry

This unique adapter converts the 45°/0° probe head of the sph870 and sph900 spectrophotometers into a d/8° probe head in accordance with DIN 5033.

Almost all colour measurement instruments on the market are offered with one of these two standard geometries. They differ mainly in the type of illumination: direct or diffuse. A 45°/0° probe head illuminates the sample with a direct light source at 45° and measures the reflected light at 0°. A d/8° probe head illuminates the sample with a diffuse light source and measures the remitted light at an angle of 8°.

The 45°/0° probe head is more sensitive to gloss, meaning that glossy surfaces that appear darker are also measured as darker. The d/8° probe head measures the gloss at a measurement angle of 8°, together with the diffusely reflected “surface colour”. This makes the d/8° probe head significantly less sensitive to differences in gloss. A gloss trap opposite the viewing angle can be used to compensate for this effect. Due to this fundamental difference, the measurement results obtained with these two main geometries are not comparable.





Scope of delivery:

- Probe Head MA35-UK
- White PTB calibration standard and black reference standard
- PTB certificate

Available accessories:

- Adjustable prism for measuring cylindrical samples
- Universal holder
- Optical cuvette 25 × 34 mm
- Light protection cap
- Targeting device / aperture

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Adapter for the 45°/0° probe head

The adapter is available with different measuring apertures. For most applications, the probe head adapter with a 6 mm measuring aperture is ideal. For special applications, measuring adapters with 3 mm or 10 mm apertures are available.

The ideal diffuse light source is an Ulbricht sphere (US) with a special barium sulphate coating. The adapter is connected to the instrument via a simple push-pull connector. All device settings are automatically configured by the spectrophotometer.

With a ColorLite sph870 or sph900 spectrophotometer, your measurements are 100% comparable with the measurement data of your customers and suppliers!

Ordering Information and Specifications

Art. No.	E13341	E13343G	E13342	E13344G	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
Measuring Area	6 mm	6 mm	3 mm	3 mm	10 mm	10 mm
Measuring Spot	8 mm	8 mm	4.5 mm	4.5 mm	10.5 mm	10.5 mm

Probehead	d/8° without Gloss Trap or optional with Gloss Trap
Light Source	High-performance LEDs – with a service life of over 20 years
Power supply	1 W – powered directly via the sph870/sph900
Material	Material: lightweight polyoxymethylene (POM)
Weight	210 g
Dimensions	55 mm Diameter x 78 mm Length
Coating	Barium Sulphate
Calibration	with certified white PTB standard and black reference standard

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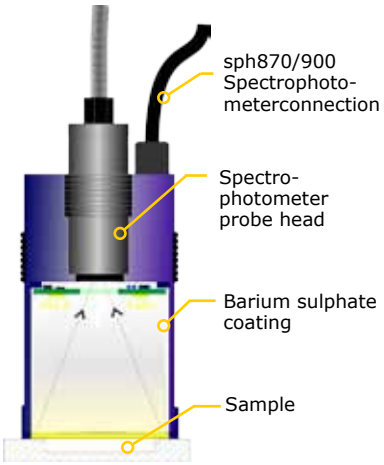
d/0° Adapter – 38 mm / 80 mm

Der MA38 und MA80 Probe Head Adapter with 38 mm und 80 mm Measuring Area

These probe head adapters convert the sph870 and sph900 instruments equipped with a 45°/0° probe head into a system with d/0° measurement geometry and a measuring area of 38 mm / 80 mm. This enables reproducible colour measurement of extremely inhomogeneous samples such as wood surfaces, food products or granulates.

The MA38 and MA80 probe head adapters illuminate the sample over a large area using a diffuse LED light source. The probe head is made of lightweight POM (polyoxymethylene). The MA38 is optionally equipped with a trigger button for one-handed operation. For measuring samples in a cuvette, an optional stand is available (see page 19).

For details on the MA80 set, please refer to page 22.



Ordering Information and Specifications

Art. No.	E13331	E13331T	E13336
Model	MA38	MA38-T	MA80
Trigger Button	Nein	Ja	Nein
Measuring Area	38 mm	38 mm	80 mm
Probe Head	d/0°	d/0°	d/0°
Illustration			
Dimensions	63 x 110 mm	63 x 110 mm	108 x 120 mm
Weight in grams	300	300	700
Light Source	High powered LEDs - with a life span of over 20 Years		
Power Supply	1 W – powered directly via the sph870/sph900		
Material	Polyoxymethylene (POM)		
Coating	Barium Sulphate		
Calibration	with certified white PTB standard and black reference standard		

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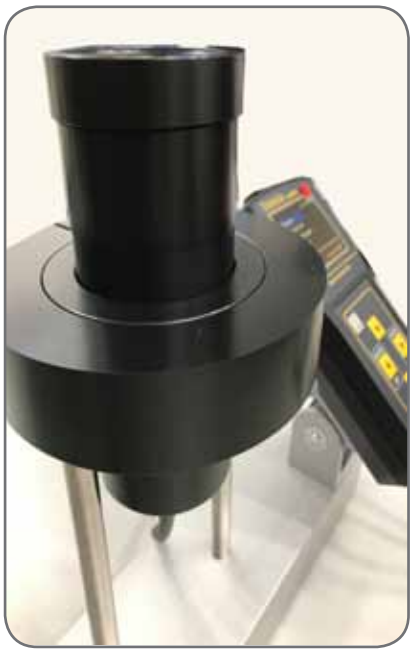
Universal holder for all probe heads and probe head adapters (except MA80)

Accessory for holding the probe head or probe head adapter in an upright position. This is required for measuring various samples. The samples are positioned on the probe head aperture and measured.



Which samples are suitable for measurement in an upright position?
- **Powders,** e.g. in a (30 × 50 mm) MA38 glass cuvette (optional).
- **Cylindrical parts** with an additional V-block attachment (optional) – MA35.
- **Very small objects** positioned using a spacer.
- **Small profiles** positioned using a spacer*.
- **High-gloss samples** such as caps**.

The device is mounted on the holder, and the viewing angle can be adjusted as required. The stand has an integrated connection for the plug-in power supply (100–240 V AC).

The holder is made of black polyoxymethylene (POM). It can be easily opened using a clamping lever and is supported by two steel rods. A light-shielding cover can be used to exclude ambient light.

Ordering Information and Specifications		
Universal Holder Stand with holder for the sph870 or sph900 (device not included in delivery)	Art. No. E13474	
light proof cap Prevents ambient light from influencing the measurement results	Art. No. E13494	
Cuvettes: cylindrical cuvettes made of optical glass in two sizes Dimenions: 30 x 50 mm (h x d) Dimensions: 25 x 34 mm (h x d)	Art. No. E15332 E15331	

Further accessories: page 28

* *Spacers are custom-made for you.*
** *For special applications, ColorLite offers a modified version of the holder.*

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MA80-Set

The MA80 set for inhomogeneous samples

This set extends the measuring spot of the standard 45°/0° probe head to a measuring area of 80 mm. It is suitable for measuring inhomogeneous samples such as pellets or plastic granulates. The housing is made of lightweight polyoxymethylene (POM). High-performance LEDs are used as the light source.

The adapter is controlled and powered directly by the spectrophotometer. The spectrophotometer is clipped onto the stand, and the viewing angle can be adjusted as required. The stand features an integrated power connection.

IIncluded in delivery:

- MA80 probe head adapter
- Aluminium stand for the MA80 adapter and the spectrophotometer
- Cuvette for reflectance measurement, 30 × 80 mm
- Light proof cap as black reference
- White calibration standard (PTB certified)

Ordering Information and Specifications

MA80-Set Set for measuring inhomogeneous samples – MA80 adapter with stand and holder for the sph870 or sph900 spectrophotometer (Device not included in delivery)	Art. No. E13337

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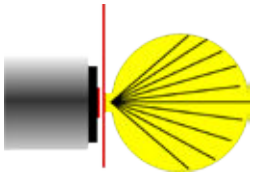
Accessories for transmission measurement – d/0°



TA35-UK

Accessory set for measuring samples in transmission mode.

The sample is positioned between a diffuse light source and the standard probe head of the spectrophotometer. The transmitted light is measured.

Fig. 1: Transmission measurement with the TA35-UK

This setup is particularly suitable for transmission measurement of transparent and translucent samples, such as:

- transparent and translucent liquids
- plastic films of varying thickness
- various plastic components

The transmission spectrum ranges from 400 to 700 nm. The measured parameters include opacity, CIE L*a*b* values, density values, as well as whiteness or yellowness indices.

Alternatively, the MA35 probe head adapter can be used as the light source. Option: For measuring liquids in disposable plastic cuvettes, a holder positioned between the light source and the probe head is available.

Fig. 2: Lightsource

The setup is also suitable for measuring opaque liquids. In this case, a white tile is installed as the background instead of the light source.

Included in delivery:

- Holder for the light source
- Holder for the spectrophotometer

Fig. 3: Cuvette holder and cuvette

Ordering Information and Specifications	
TA35-UK	Art. No. E13356
Light source for transmission mode	Art. No. E15062
Disposable cuvettes 12.5 × 12.5 × 45 mm (100 pcs)	Art. No. E15334
Cuvette holder	Art. No. E13516

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Accessories for powder measurement

Powder can be measured in different ways:

1. Measurement in a cuvette using our MA35-UK accessory.

2. Measurement in the form of a tablet using a powder press and the IP67 probe head.

3. Direct immersion of the probe head into the sample using the IP67 probe head.

1. If powder is to be measured in a cuvette, fill the cuvette and compact the powder by tapping it several times on a solid surface. This creates a “homogeneous layer” at the bottom of the cuvette, which is then measured.

The required accessories are the MA35-UK probe head adapter, a universal stand, and a cuvette.

2. With our special accessories, powder can also be measured in tablet form. For this purpose, the powder is compressed using a powder press and a mould (Fig. 2). The powder is pressed against the glass base of the powder press, creating a perfectly flat surface, which is then measured directly with the spectrophotometer.

To prevent contamination of the probe head, we recommend using our IP67-protected probe head. As colour measurement of powder strongly depends on density, measuring powder in tablet form is the best method for obtaining reproducible results.

A detailed description of the IP67 probe head can be found on page 15.

3. When measuring by direct immersion into the powder, our water- and dust-protected IP67 probe head is used. The probe head can then be cleaned using a brush or under running water (Fig. 3)

A detailed description of the IP67 probe head can be found on page 15.

Fig. 1: MA35-UK with stand and glass cuvette 25 × 34 mm

Fig. 2: Powder press with sleeve and plunger

Fig. 3: Probe Head IP67

Ordering Information and Specifications of Probe head adapter MA35-UK	
Glasscuvette 25 x 34 mm	Art. No. E15331
Universalholder	Art. No. E13475
Powder press, powder mould and plunger (incl. sleeve and glass plate)	Art. No. E13481

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Accessory: probe head positioning aid

Positioning aid for the 45°/0° probe head

The positioning aid is made of black anodised aluminium and features a stainless steel crosshair. A plastic inner sleeve on the 45°/0° probe head prevents jamming.

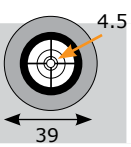
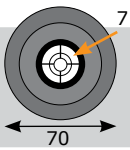
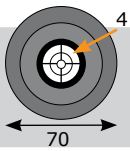
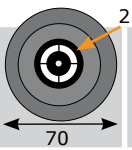
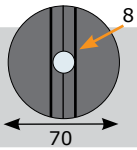
Positioning aid for the d/8° probe head

The targeting accessory is available for the 3 mm and 6 mm probe heads.

The prism accessory is mounted on the MA35-UK probe head and allows cylindrical samples to be positioned precisely in the centre of the measuring spot. The prism adapter is best used in combination with the universal holder (Art. No. E13474), which keeps the probe head in an upright position.

Positionierungshilfe für MA35-UK

Ordering Information and Specifications

Art. No.	E13511	E13512	E13511-UK	E13510	E13346
Model	TD-4	TD-7-UK	TD-4-UK	AP-2-UK	V-6-UK
Measuring Area	3 mm	6 mm	3 mm	2 mm	6 mm
Measuring Spot	4 mm	7 mm	4 mm	2 mm	8 mm
Illustration					
Used with Probe Head	45°/0°	d/8°	d/8°	d/8°	d/8°
Diagram (dimensions in mm)					
Dimensions	39 x 13 mm	70 x 26 mm	70 x 26 mm	70 x var.	70 x var.
Weight	10 g	65 g	65 g	65 g	80 g
Description	Targeting device for positioning the standard 45°/0° probe head	Targeting device for the d/8° probe head with a 6 mm measuring area	Targeting device for the d/8° probe head with a 3 mm measuring area	Aperture for a 2 mm measuring area with d/8° geometry	V-block attachment for positioning the sample on the d/8° probe head

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Accessories – additional aids and spare parts

Akku-Pack

Art. No.	E13411

Rechargeable NiMH battery with 5 cells. Nickel–metal hydride batteries feature low self-discharge, ensuring that our instruments remain ready for use even after extended storage periods. The battery can be easily connected to and disconnected from the instrument.

Power supply unit and instrument holder

Art. No.	E13471
Model	HT-45-0
Probe Head	45°/0°

For using the ColorLite sph870 or sph900 as a bench-top instrument, we additionally offer a stand that includes a holder for the probe head and the spectrophotometer. When this accessory is used, the spectrophotometer is powered via an external power supply (110–240 V, 50/60 Hz). The power supply unit is included in delivery.

Working standard – small

Art. No.	E13521

White ceramic tile with a diameter of 10 mm. Featuring a polished surface, enclosed in black plastic. The tile is supplied in a padded storage box.

This working standard can be used to protect the original 45°/0° BAM standard. It can also be used as a white background for measurements.

Working standard – large

Art. No.	E13531

Robust white ceramic tile with a diameter of 38 mm. It features a polished surface and is enclosed in black plastic. The tile is supplied in a padded storage box.

This working standard can be used to protect the original 45°/0° BAM standard. It can also be used as a white background for measurements.

Colour reference: green tile

Art. No.	E13591

The instrument is calibrated using a white PTB standard. To additionally verify that the spectrophotometer is operating with 100 % accuracy, an independent green tile can be measured.

The tiles supplied by us are manufactured by CERAM, a company that produces tiles with guaranteed long-term stability specifically for colour measurement applications. Dimensions: 50 × 50 mm.

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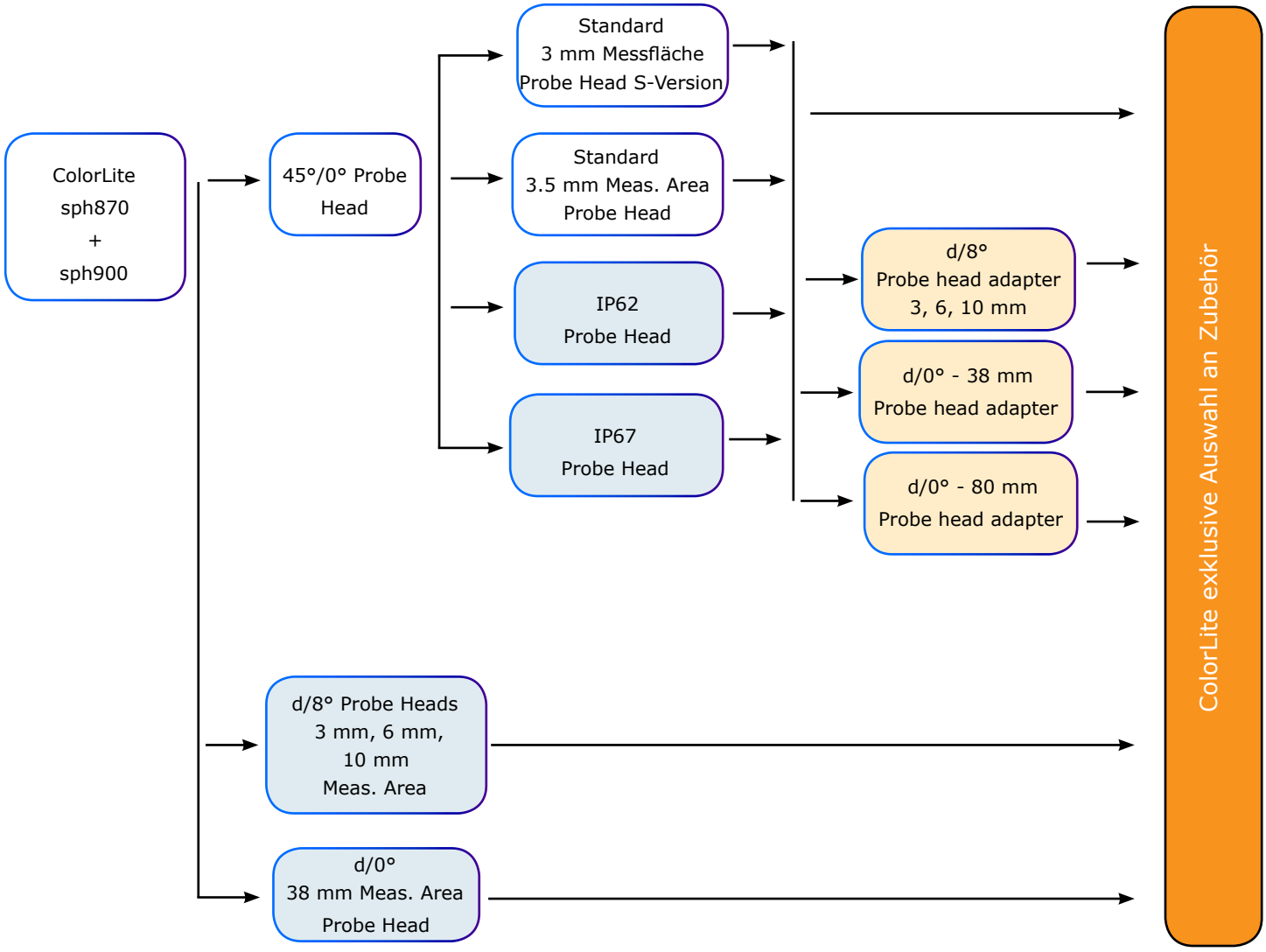
Overview: Probe Heads



	Standard Version
	Special Version
	Probe Head Adapter
	Accessories

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Technical data

The technical data are typical for all models. Additional information on the different device types can be found in the respective chapters of the brochure.

Function	ColorLite sph900	ColorLite sph870
Measurement Geometry	45°/0° - or d/8° - according to DIN 5033 optional 45°/0° AND d/8° with MA35-UK Adapter d/0° not standardized	45°/0° - or d/8° - according to DIN 5033 optional 45°/0° and d/8° with MA35-UK Adapter d/0° not standardized
Standard illuminants	D65, D55, D50, A, C1, C2, C3, F11, C, S, B1, B3, B5. All other illuminants are available on request.	D65, D55, D50, A, C1, C2, C3, F11, C, S, B1, B3, B5
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 RemissionsspektHunter 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 ΔECMC (1:1 und 1:2), CIE ΔE94 Metamerism 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) according to BS 8493:2008 Different whiteness index values Various White-Index values Grau-Index Hazen/APHA; JOD (mit TA35-UK Adapter)	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	Holografic grating-Spectrometer FWHM** @ 500 nm < 10 nm scanning in 3.5 nm Intervals 115 x 16-Bit steps per scan	Holografic grating-Spectrometer FWHM** @ 500 nm < 10 nm Scanning in 3.5 nm intervals 115 x 16-Bit steps per scan
Display	High resolution O-LED colour display: High contrast and low-power 1/4-VGA, 320 x 240 Pixel	Hochauflösendes TFT Farbdisplay: 1/4-VGA, 320 x 240 Pixel
Repeatability	< 0.03 ΔE CIELab	< 0.05 ΔE CIELab
Light Source	Weiße and blaue LED's Lebenserwartung > 20 Jahre	Weiße and blaue LED's Lebenserwartung > 20 Jahre
Scanning Time	Complete measurement cycle with calculation and readout time: 0.5 s	Complete measurement cycle with calculation and readout time: 0.5 s

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Technical Data continued

Function	ColorLite sph900	ColorLite sph870
Multiple Scanning	Mean calculati on of 1 to 20 individual measurements with colour values and standard deviati on stati sti cs displayed	Mean calculation of 1 to 20 individual measurements with colour values and standard deviation statistics displayed
Power Supply	Rechargable battery NiMH 6-Volt /1100 mAh Operating time > 15 hours Charging time 1.5 hours Optional - operation with power supply	Rechargable battery NiMH 6-Volt /1100 mAh Operati ng time > 15 hours Charging time 1.5 hours Optional - operation with power supply
Automatic Accessory Recognition	An accessory is detected and device settings automati cally modfi ed accordingly.	An accessory is detected and device setti ngs automati cally modfi ed accordingly.
Calibration	With white standard, certified by the Physikalisch-Technische Bundesanstalt (PTB) Optional two-step calibration using a working standard.	With white standard, certified by the Physikalisch-Technische Bundesanstalt (PTB) Optional two-step calibration using a 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 RS232 - optional	USB 2.0 RS232 - optional
Accessories	For measuring inhomogeneous samples, transparent, translucent and opaque liquids, as well as powders in cuvettes or tablet form. Holder incl. power supply: 110–240 V, 50/60 Hz	For measuring inhomogeneous samples, transparent, translucent and opaque liquids, as well as powders in cuvettes or tablet form. Holder incl. power supply: 110–240 V, 50/60 Hz
Dimensions	Device with battery: 180 mm × 82 mm × 40 mm – weight 370 g Probe head 45°/0°: 60 mm × 25 mm Ø – 170 g Probe head d/0°: 78 mm × 56 mm Ø – 250 g	Device with battery: 180 mm × 82 mm × 40 mm – weight 370 g Probe head 45°/0°: 60 mm × 25 mm Ø – 170 g Probe head d/0°: 78 mm × 56 mm Ø – 250 g
Climatic Conditions	Ambient temperature: 15°C to 45°C Relati ve humidity: max. 85 % non-condensing	Ambient temperature: 15°C to 45°C Relati ve humidity: max. 85 % non-condensing

- Included in the delivery of all our spectrophotometers are:
- PTB-Certificate
- Aluminium carrying case with foam padding
- Battery-Charger
- USB cable

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