



Catalogue TLC/HPTLC



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Short Overview TLC/HPTLC

Thin-Layer Chromatography (TLC) serves for the analytic separation of single substances of one mixture. It goes back to the discovery of the chromatography by the Russian botanic M. Tswett, who separated plant pigments (chlorophylls) in 1903 by filtering a solution in petroleum ether with a calcium carbonate column.

Starting 1938, the shifting of the chromatography from a column to a sorbents layer on a carrier plate took place. Due to works of Prof. E. Stahl (* 1924, † 1986), a standardization of the sorbents and the complete method was realized. In cooperation with the companies MERCK and DESAGA, the thin-layer chromatography was introduced as a procedure of the analytic chromatography.

At the TLC, a mobile phase flows by a stationary phase in which the mixture divides into its individual components. The physico-chemical processes of the adsorption and distribution are responsible for the separation.

The adsorptive chromatography distinguishes by the fact that the individual components of a mixture are tied to the surface of the stationary phase (sorbent) differently strong or are co-transported with the mobile phase (solvent).

In the partition chromatography, the separation takes place by the substances spreading out differently strong in two restricted mixable phases (liquid stationary and liquid mobile phase.)

Plates for TLC consist of a carrier foil or carrier plate and the coating with the sorbent. Glass, aluminium and polyester have been approved as carrier materials. The sorbent layer can be made of silica gel, cellulose, aluminium oxide or polyamide whereas silica gel is the one mostly used. Especially at the silica gel, there are special, chemically-modified versions for almost all sorts of requirements. For the optimal separation of the samples to be examined, it depends on the right combination of sorbent and mobile solvent.

A mobile solvent (mixture) is the solvent (mixture) and transports the sample through the sorbent.

At the adsorptive chromatography, the mobile solvent is also the mobile phase and the silica gel/aluminium etc. is the stationary phase.

At the partition chromatography, the mobile phase represents an organic solvent; water bound to the sorbent is the stationary phase.

Another influence on the separating result is the chamber saturation. Most separations are carried out with chamber saturation, i.e. the gas room is saturated in the TLC chamber with mobile solvent steams. The separation can take place in vertical or horizontal chambers. The last ones have the advantage that only very little solvent is needed which saves costs and respects the environment. Moreover, at transparent carrier materials like glass and polyester, the course of the separation and the solvent front can be seen.

After the separation, a drying and first consideration/documentation will follow. Visible and/or UV light (254 and 366 nm) are also commonly used. Ideally, the TLC plate is put into a darkhood which can be illuminated correspondingly and can take pictures using a high-quality colour camera. However, simple UV light boxes are also suitable for a fast judgement of the separation.

According to the examined sample, a derivatization can be carried out. This means that the sample substances on the TLC plate are chemically „converted“ and the detection via the mentioned light sources can be realized or eased. Moreover, indicators about the substance identity can be received due to the additionally won information.

For the application of the derivatization solutions, there are different methods such as spraying (manually or automatically), dipping (dipping chamber) or pressing (Derivapress). In most cases, heating for finishing the reaction is necessary. Appropriate stoves can be used, however, it is suggested to watch the course of a color reaction which can easily be made by using a hotplate. After the reaction, the TLC plate is observed and documented once more.

For the quantitative analysis, it is necessary to record and evaluate the plates with a densitometer. The sequence of a substance spot that was created by the sample application, is called „lane“. With the help of a light beam of a suitable wavelength, the densitometer scans the lanes and the absorption or fluorescence is measured. The signals are recorded and shown as peak curve along the measuring line. This curve is called chromatogram. A quantification is possible by the comparison of the peak intensities of unknown samples with known defaults. Chromatograms of one lane which were taken at different wavelengths are called multi-wavelength-scan. They serve for the determination of the optimum wavelength of an unknown sample. Furthermore, it is possible to create spectra (absorption or fluorescence) of single spots and so facilitate the identification of the substance.

Plate Preparation

The correct handling of TLC plates prior use is an important step for a successful chromatography.

Self-preparing TLC plates is a way to save money and to manufacture them in another manner than commercially available. Simply suspend your sorbent with an appropriate solvent, homogenize well to solve all clots and pour it into the spreading device. Move the lever and pull the device straight and continuously over the clean carrier plates. The TLC-spreading table ensures a flat and even surface for preparing five 20 x 20 cm or ten 20 x 10 cm plates. The coating thickness is adjustable from 0.1 up to 2.0 mm.

After self-preparing or pre-washing the plates, a drying rack is very helpful for space-saving storage during drying processes. For the storage over a certain period of time until use, it is recommended to protect the TLC plates from dirt and laboratory fumes, e.g. in a desiccator. Closed desiccators may be difficult to open and therefore, a special opener for all sizes is available. As desiccators are used in every lab, an opener is a benefit for everyone!

Sometimes pre-washing of the TLC plate is required to clean the sorbent layer from chemicals adsorbed from laboratory fumes. Usually these chemicals form a "dirt" zone near the solvent front and results are not reproducible. Therefore, a washing step with chloroform/methanol (1:1) or the required solvent mixture for separation is recommended.

If special formats of ready-to-use TLC glass plates are required, a plate cutter is the appropriate tool. It is easy to handle and the high quality carbide scriber ensures many cuts. Mark the TLC plate on the glass support, lay the plate with the sorbent layer down on the cutter, position the mark on the glass plate to the mark at the cutter, press the plastic head down and make one continuous scratch. Remove the plate and crack it on an edge of a table.

Spreading Device



The spreading device for quick and low-cost production of analytical and preparative layers is proven by many satisfied users.

The device can be set to produce layer thicknesses ranging from 100 to 2000 μm . The cost-effective spreading template permits simultaneous coating of 5 TLC plates with a format of 200 x 200 mm or 10 TLC plates of 200 x 100 mm.

The spreading table can be levelled and produces uniform layer thicknesses even if the working surface is not flat. Carrier plates can be found below.

Order Information

Order No.	Description
BS120.305	TLC spreading device
BS120.315	TLC spreading table with levelling device and spreading template (recommended to buy together with device)
BS120.140	Carrier plate 200 x 200 x 4 mm, 1 pack of 10 pieces
BS120.142	Carrier plate 200 x 100 x 4 mm, 1 pack of 20 pieces

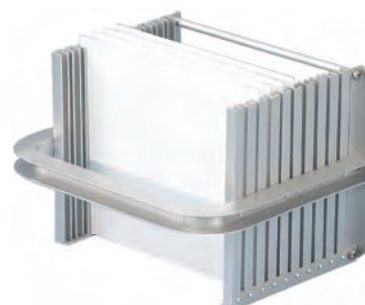
Drying Rack

This is a handy space-economizing light alloy rack for 10 TLC plates with the formats 200 x 200, 200 x 100 and 200 x 50 mm. After prewashing, the TLC plates are pushed into the horizontally standing drying rack. The TLC plates are dried in vertical orientation so that the moisture can easily escape upwards.

The drying rack fits into standard desiccators to protect the plates against environmental influences.

Order Information

Order No.	Description
BS120.180	Drying rack



Simultan Separating Chamber

This chamber is commonly used for washing TLC plates before use and then for storing them in protected manner. This procedure is used in particular for quantitative trace analysis.

The vertical grooves in the transverse walls will hold up to five plates of 200 x 200 mm. Specific features of this separating chamber are the plain ground flange edge and the flat chamber floor. The lid can be used as cover during prewashing.

Order Information

Order No.	Description
BS120.167	Simultan separating chamber 200 x 200 mm with knob lid



Desiccator Opener

Desiccator lids that have become stuck can be pulled off with this desiccator opener safely and without any need to exert force.

This opener is suitable for all sizes of desiccators.

Order Information

Order No.	Description
BS124.058	Desiccator opener



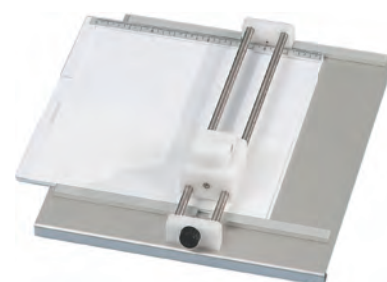
TLC/HPTLC Plate Cutter

The scoring and cutting of glass TLC/HPTLC plates is a routine in many chromatography laboratories either to economise on plate usage or to cut the plate following separation for further derivatization.

The cutter consists of a high-quality carbide scriber mounted into a movable plastic head. It is designed for cutting glass-backed TLC/HPTLC plates up to 200 x 200 mm.

Order Information

Order No.	Description
BS121.200	TLC/HPTLC plate cutter incl. carbide scriber
BS178.501	Carbide scriber



Sample Application

The step „Sample Application“ is highly important in the TLC/HPTLC workflow. The more accurate the application, the better and more reproducible the separation. We have different tools for all demands.

Manual sample application is very cost-effective. We offer different kinds and sizes of glass capillaries from 0.5 μ l up to 20 μ l volume. They are available with appropriate holders for comfortable working. Application templates make it very easy to apply spots in exact distances on a straight line. They can be used for TLC/HPTLC plates of 5 x 5 cm up to 20 x 20 cm. An application and evaluation template according to Stahl can be used for plates up to 20 x 20 cm. Markings show 19 application positions and horizontal lines help to determine spot migration distances and calculation of R_f-values.

The best and most professional way for sample application is the **semi-automatic** HPTLC-Applicator AS30. Samples are sprayed on the sorbent layer without touching and destroying it. Applications are highly accurate, reproducible and independent of the working person. Applications can be dot or line-shaped. A dosing syringe for application is fixed at a movable turret that is driven by stepping motors in the correct position according to the program. For routine analytical work, a 10 μ l dosing syringe and the corresponding 25 μ l filling syringe are recommended. For preparative purposes, a dosing syringe of 100 μ l can be installed and filled with a 250 μ l filling syringe. The dosing syringe is filled by the filling syringe and therefore, removing and new adjusting of the dosage syringe for every application is not necessary. It is easy to handle and reduces errors.

The dosing syringe cannot only be filled manually but also by an Autosampler BS35 - with this device, you can work **fully automatically**. After a few simple settings at the AS30 and connecting both instruments, the AS30 controls the autosampler via an interface box. The sample rack of the autosampler can be equipped with up to 80 sample vials with 1.5 ml volume. For rinsing after each sample, a bottle is filled with appropriate washing solution. Cleaning of the system occurs automatically. The sample solution is pumped through a capillary to the dosing syringe of the AS30. This perfect team works fine without observation. The AS30 can work as stand-alone by the manual input of program data using the keyboard. The memory can hold 10 methods. More comfortable is the use of the special PC software which enables the creation and storage of any numbers of programs. In such a program, you define all necessary parameters for the proper application (e.g. number of lanes, volume and size of application, sample or standard, names, plate layout) and transfer the data to the AS30. If requested, the methods can be transferred to and loaded by the HPTLC-densitometer CD60 for quantitative analysis.

Manual sample application

Micro Capillaries



These capillaries are intended for single use only. They automatically fill themselves right from one end to the other. Their accuracy is better than 1%.

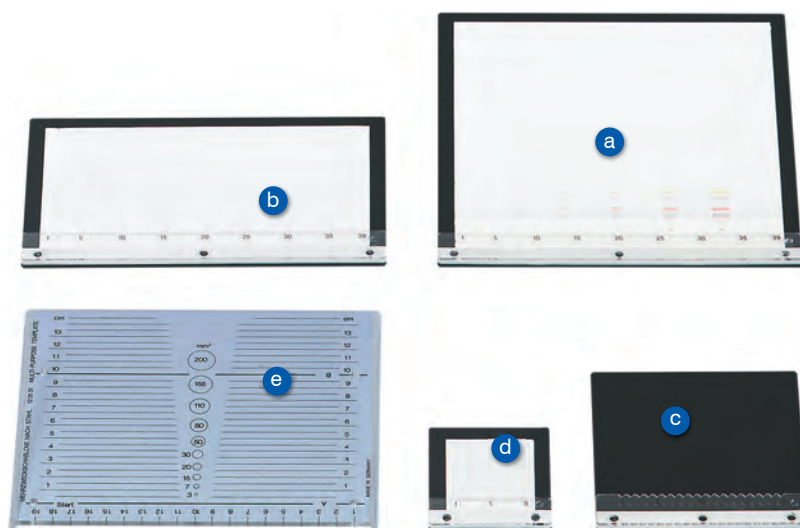
A capillary holder is provided with each pack of these capillaries. This holder consists of the guide for the capillary and a small bulb with an opening which must be mounted on the capillary. Pressing on this bulb is an effective means for assisting filling and emptying of the capillary.

Order Information

Order No.	Description
BS120.192	Micro capillaries, 1 pack of 100 pieces, 1 holder, 0.5 μ l
BS120.193	Micro capillaries, 1 pack of 100 pieces, 1 holder, 1 μ l
BS120.194	Micro capillaries, 1 pack of 100 pieces, 1 holder, 2 μ l
BS120.195	Micro capillaries, 1 pack of 100 pieces, 1 holder, 5 μ l
BS120.196	Micro capillaries, 1 pack of 100 pieces, 1 holder, 10 μ l

Spotting Templates

Spotting/Application templates ensure exact positioning of the samples on the TLC/HPTLC plate



Application Templates
for the following formats of plates

- a = for 200 x 200 mm
- b = for 200 x 100 mm
- c = for 100 x 100 mm
- d = for 50 x 50 mm

Application and Evaluation Template

- e = for 200 x 200 mm

Application Templates (a - d)

These templates are available for TLC plates having the formats 50 x 50, 100 x 100, 200 x 100 and 200 x 200 mm.

The numbered triangular cut-outs at 5 mm intervals provide exact guidance for the pipette. This gives 9, 19 or 39 spotting positions, depending on the size of the template. The non-slip underside prevents unintentional displacement on the table.

Application and Evaluation Template (e)

This template can be used with TLC plates up to 200 x 200 mm. It has 19 markings with 10 mm spacing. Holes are provided for marking the starting line and the standard separation distance of 100 mm. The good hand rest permits spotting, writing and line ruling with minimum effort required. The R_f-values can be read-off directly on the template.

The marked circular areas ranging from 3 to 200 mm² permit immediate comparison of spot sizes without further aids.

Order Information

Order No.	Description
BS120.135	Application template 50 x 50 mm
BS120.134	Application template 100 x 100 mm
BS120.136	Application template 200 x 100 mm
BS120.137	Application template 200 x 200 mm
BS120.131	Application and evaluation template 200 x 200 mm

Semi-Automatic Sample Application

HPTLC-Applicator AS30



The HPTLC-Applicator AS30 is a decisive contribution towards modern GxP-conform thin-layer chromatography and works according to the **spray-on-technique**. A stream of gas carries the sample from the cannula tip onto the TLC/HPTLC plate. Therefore, compressed air is needed. This proven principle prevents damage to the layer and allows the application tower to be moved during sample ejection. The samples can be applied on TLC plates, HPTLC plates or foils up to the size of 200 x 200 mm as dot or line.

During the filling process, the dosing syringe is positioned over the tray which collects rinsing and flushing solvent and excess sample. The sample is injected into the body of the syringe through a lateral opening. After the syringe has been filled, a stepping motor moves the piston downwards to close the fill port. A second stepping motor moves the tower sideways across the plate. The microprocessor controls the two stepping motors and the gas valve.

All parameters for the application of up to 30 samples are entered via the keyboard. The user is guided through the clearly structured menu by the 2-line LCD display. After entering all parameters, the data will be checked for plausibility such as compliance of limit, clear assignment of lane or clear assignment of name. One method contains the plate size, number, length and distance of the path, the volume applied as well as the rate of application. The sample number and volume factor can be indicated for each path. The battery-buffered memory holds 10 different methods which can be loaded, edited and printed out at any time. The parameters can be set manually or via the software where you can easily manage your programs by loading the actual needed to the AS30 and deleting older ones. Due to the data pool at the PC, you have always the possibility of loading every program once saved.

An outstanding advantage is that the analysis software ProQuant of the HPTLC Densitometer CD60 can load the methods of the AS30 software resulting in much less effort for manual data input and reducing sources of errors.

The standard scope of supply contains 10/25 μ l syringes. For higher volumes, 100/250 μ l syringes can be provided.

NEW: Special cover with active exhaustion of the aerosols available - for more safety and a better atmosphere in the laboratory!

Technical Data

Streak length: 0 - 100 mm in steps of 0.1 mm
Resolution: 2,000 steps / μ l
Turret movement: 40 mm/s, 13 steps/mm

Dimensions (W x D x H): 500 x 380 x 180 mm
Weight: 12 kg
Necessary air pressure: 2.5 - 10 bar



Autosampler BS35



Our newly integrated autosampler BS35 serves for an easy, automated workflow which is great especially when having a **high sample-throughput**. Up to 80 vials can be inserted into the rack. It allows you the opportunity of using your time more efficiently! It is accurate, silent and offers reproducible, validable and reliable results. Below, please find 2 graphs showing the linear correlation (value of 0.99602).

Technical Data

Rack: for 80 samples of 1.5 ml
Septum piercing: by dual needle design
Dimensions: 310 x 210 x 478 mm
Weight: 14 kg

Fully Automatic Sample Application

Coupling AS30 and BS35

The autosampler BS35 was especially designed for the coupling with the HPTLC applicator AS30. The autosampler is completely controlled by the AS30. This is very convenient and operating mistakes are led to a minimum. Particularly, at a high sample throughput, an autosampler is recommended. It allows the operator time to do other things.

Application and flushing is done autonomously due to the sample rack which holds up to 80 samples and a storage bottle with the appropriate washing solution.

An acrylic glass rack enables the space-saving arrangement of the instruments whereas the autosampler is situated below the rack and AS30 above. A PTFE capillary feeds the sample solution to the AS30 on a very short way.



Order Information

Order No.	Description
BS130.500	HPTLC-Applicator AS30, 230 V, with 10 µl dosing/25 µl filling syringe, PC-software
BS130.501	HPTLC-Applicator AS30, 110 V, with 10 µl dosing/25 µl filling syringe, PC-software
BS130.500.1	HPTLC-Applicator AS30, 230 V, with 100 µl dosing/250 µl filling syringe, PC-software
BS130.501.1	HPTLC-Applicator AS30, 110 V, with 100 µl dosing/250 µl filling syringe, PC-software
BS130.505	Cover for AS30 -> assembling can be made easily
BS130.510	Autosampler BS35 for AS30, 230 V, incl. PTFE hose, connecting cable to AS 30 and sample rack
BS130.511	Autosampler BS35 for AS30, 230 V, incl. PTFE hose, connecting cable to AS 30 and sample rack
BS130.525	IQ / OQ documents for HPTLC-Applicator AS30
BS130.535	Rack for Autosampler (already included when buying AS30 and BS35 together)
BS130.540	Compressor 230 V, max. 8 bar
BS130.541	Compressor 110 V, max. 8 bar
BS130.550	Dosing syringe 10 µl for AS30
BS130.555	Filling syringe 25 µl for AS30
BS130.560	Dosing syringe 100 µl for AS30
BS130.565	Filling syringe 250 µl for AS30
BS130.580	Filter cardboard 40 x 40 mm, 1 pack of 25 pieces
BS130.590	Exhaust hose, viton with connector, 2.5 m

Separation

After sample and/or standard application, the separation process takes place to uncover the components of the applied substance mixtures. For achieving this aim, the separation chambers have to fulfill several needs:

- They have to contain the mobile phase and bring it to the sorbent layer.
- They need a tight closing lid to ensure that the gas compartment can be saturated with solvent fumes if necessary (working with chamber saturation).
- The solvent front has to be observed and therefore, a transparent material is important.
- The material must be chemically resistant and easy-to-clean.

Obviously, glass is the best material meeting all needs and **most TLC/HPTLC chambers are made of glass**.

They have a flat bottom where to fill the mobile phase, a glass lid and some of the walls can be covered with filter paper to provide chamber saturation. Our **Standard separating chambers** fit for TLC/HPTLC plates of different sizes of up to 200 x 200 mm. A way for reducing the gas compartment volume and the consumption of solvents is the use of **round separating chambers**. They have a small base and are suitable for plates up to 100 mm width. Furthermore, the lower weight compared to the standard separating chambers is advantageous.

With the development of high resolution HPTLC-plates, the dimensions shrank. Mostly, plate formats of 50 x 50 mm or 100 x 100 mm are used. Separating chambers got smaller too and therefore, we offer the **Nano separating** chambers for the plate size 100 x 100 mm.

The newest and most elegant way for TLC/HPTLC separations is the use of **Horizontal separating chambers** (H-chambers) made of PTFE. They are very **solvent-saving** because 1.5 ml of mobile phase only is enough for one plate of 50 x 50 mm. The solvent is applied into a little trough and a frit rod conducts it to the plate laying with the sorbent side down. The gas compartment is very low ensuring easy chamber saturation with the mobile phase or another solvent. The glass lid allows the monitoring of the run. This system is very easy to handle and extremely space-saving, making it an ideal tool not only for analysis but also for schooling.

In combination with HPTLC plates, two different dye mixtures, microcapillaries and a practical book, we offer a Quicktest-Set for beginners in order to train the handling of TLC/HPTLC (see page 14).

Filter Paper

For gas space saturation, we offer special filter paper. In case a smaller size is needed, the paper can simply be cut by using a pair of scissors.

Order Information

Order No.	Description
BS120.178	Filter paper for gas space saturation, 180 x 75 mm, 1 pack of 25 sheet
BS120.179	Filter paper for gas space saturation, 460 x 190 mm, 1 pack of 25 sheet

Round Separating Chamber

These inexpensive cylindrical separating chambers with overhanging lid are available in two sizes. They are used for the plate formats of 200 x 100 and 200 x 50 mm.

These separating chambers are very easy to use. Complete gas space saturation is easily and quickly achieved by putting a rolled-up piece of filter paper in the chamber. Only a very small quantity of flow medium is required, by virtue of the plain floor. Another advantage is their limited weight compared to the Standard chambers.

Order Information

Order No.	Description
BS120.170	Round separating chamber with lid, 200 x 100 mm
BS120.171	Round separating chamber with lid, 200 x 50 mm



Standard Separating Chamber with Knob Lid

This is THE separating chamber which has accompanied thin-layer chromatography worldwide since its introduction, it has been proven a hundred thousand times. The standard separating chamber is used for TLC plates up to format 200 x 200 mm.

Specific features of this separating chamber are the plain ground flange edge and the flat chamber floor. The heavy knob lid made of glass with plain ground surface ensure a gastight seal of the separating space. As alternative, a plain glass lid is also available.

Order Information

Order No.	Description
BS120.160	Standard separating chamber 200 x 200 mm with knob lid



Standard Separating Chamber with Plain Glass Lid

The standard separating chamber is used for TLC plates up to format 200 x 200 mm.

There is a flat chamber floor with a small ridge in the middle so that less solvent is needed and the TLC plate can be placed comfortably. It is equipped with an even glass lid.

Order Information

Order No.	Description
BS120.173A	Standard separating chamber 200 x 200 mm with glass lid



Simultan Separating Chamber

The simultan separating chamber has all the advantages as well as dimensions of the standard separating chamber. The lids are interchangeable. The additional vertical grooves in the transverse walls will hold five 200 x 200 mm TLC plates.

This chamber is commonly used to wash TLC plates before use and then to store them in protected manner. This procedure is used in particular for quantitative trace analysis.

Order Information

Order No.	Description
BS120.167	Simultan separating chamber 200 x 200 mm with knob lid
BS120.174	Simultan separating chamber 200 x 200 mm with glass lid



Nano Separating Chamber

Nano and HPTLC layers are being used to an increasing extent for quantitative TLC. The nano separating chamber was developed for the preferred plate format of 100 x 100 mm. It has a small ridge in the middle and comes with an even glass lid.

Order Information

Order No.	Description
BS120.210A	Nano separating chamber 100 x 100 mm with glass lid



Horizontal Separating Chambers



The H-separating chamber exploits the advantages of the High Performance TLC layer (HPTLC) in optimum manner: small grain size of 5 μm , improved packing and greater number of theoretical plates. This separating chamber is price-worthy and intended for the time and cost-saving HPTLC-plate format of 50 x 50 mm and the common format of 100 x 100 mm. Optimum separation is obtained on shortest possible runs.

The H-separating chamber permits good control of developing conditions, optionally with flow medium vapour saturated atmosphere or without pre-expose vapour. It is ideal for all kinds of work, particularly where little time is available yet clear results must be obtained: in the laboratory, in the dispensing chemist shop, in tuition and student practicals. Experiments can be repeated within the time allowed for the practical session and each person obtains an evaluable result. Ambient atmospheric pollution with solvent vapours is minimized, even under congested working conditions. The chambers are made of solvent-resistant PTFE, precision milled to the required dimensions. It is closed with a 4 mm thick glass lid. An easily cleanable glass frit rod brings the flow medium to the layer. Frit rod and glass lid are already included in scope of supply.

Quick Test Set



The Quick Test Set has been designed not only for thin-layer chromatographic work in schools, but also for practicals, drug store laboratories, etc. The advantages of the H-separating chamber for time and cost saving work have been exploited for this set.

Scope of supply:

1x H-separating chamber 50 x 50, 1x application template 50 x 50, 100x micro capillaries 1.0 μm with 1 holder, 10 ml of lipophylic and hydrophylic test solution each, 20x HPTLC ready-to-use plates K60 F254 50 x 50 mm and 1x Concise Practical Book of Thin-Layer Chromatography (German or English)

Literature

The H-separating chamber was developed by **Prof. Dr. Kraus** of Hamburg University, who has also written a guide for practicals containing many working examples and suggestions. This book aims to introduce a time saving separating method which can be mastered very quickly even by beginners. The separating examples have been chosen in order to make this subject readily accessible even to inexperienced persons who are thereafter able to separate complicated mixtures of substances such as natural products, synthetic drugs, conservation agents and herbicide residues.

A further chapter deals with the techniques with which chemical reactions are performed with the substances on the layer or with which the course of the reaction (methylation, acetylation, etc.) can be monitored with the aid of chromatography. A series of coloured illustration documents the good reproducibility of the separation results.

Order Information

Order No.	Description
BS120.090	Quick Test Set with Concise Practical Book of Thin-Layer Chromatography in German
BS120.091	Quick Test Set with Concise Practical Book of Thin-Layer Chromatography in English
BS120.150	H-separating chamber 50 x 50 mm
BS120.151	H-separating chamber 100 x 100 mm
BS124.952	Concise Practical Book of Thin-layer Chromatography
BS120.155	Frit rod, 50 mm, 1 pack of 5 pieces
BS120.156	Glass lid for H-separating chamber 50 x 50 mm
BS120.157	Glass lid for H-separating chamber 100 x 100 mm
BS120.135	Application template 50 x 50 mm
BS120.134	Application template 100 x 100 mm

Derivatization

After separation, a derivatization is often necessary. Chemicals are applied to the TLC/HPTLC plate which lead to a chemical reaction making the substances visible or change their colour formerly seen under UV or white-light. This colour information helps to identify substances.

There are three different ways to apply the chemicals: pressing, dipping and spraying.

Pressing: In a plastic cassette, a foam material can be soaked with the reagent and the TLC/HPTLC plate is pressed against it. There is a homogeneous wetting without aerosols and therefore, it is very workplace-friendly. The foam can be cut to appropriate pieces according to the size of the TLC/HPTLC plates used. The soaked foam can be used several times.

A **dipping** chamber is a container made of glass with a small slit in which the reagent is filled and the TLC/HPTLC plate is dipped into. The main advantages are no air pollution by spraying dust as well as a homogenous wetting. Compared to a standard chamber, only little solvent is needed. The reagent should be used quickly; therefore, a dipping chamber is a good helper when many plates have to be treated one by one with the same reagent within short time.

Spraying techniques are usually more reagent-saving but producing a dust that has to be exhausted. Furthermore, the operator should have experience with the spraying tool used to minimize inhomogeneities on the plates. We offer **three different spraying instruments** for various demands.

The **atomizers** are the most cost-effective products. The test tube atomizer is suited for small volumes up to 12ml reagent whereas the special atomizer is perfect for up to 100ml due to its erlenmeyer flask. It works with a rubber ball as air pressure source. The atomizers work without electricity and can be used everywhere.

More elegant and of higher accuracy is the battery/accumulator-driven sprayer **SGe1**. It is equipped with a high performance pump producing a constant air flow that gives you a better homogeneity all over the plate. The reagent bottle holds 50ml, the nozzle is made of chemically-resistant PTFE and the accumulator version is delivered with a charging unit.

Both, atomizers and sprayer SGe 1 should be used in a spray box with ventilator to exhaust aerosols. It protects the operator as well as the laboratory environment. The ventilator directs the fumes by a tube to a fume cupboard.

The **ChromaJet DS20** is our top device for the application of derivatization reagents. It is PC-programmable and gives highly accurate and reproducible results independent of the operator. It has an included ventilator and hose to exhaust aerosols. Additionally, a transparent protective cover permits close inspection during the spraying process and prevents the escape of areosols. After loading up to four methods by PC, it can work as stand-alone instrument. It is equipped with five reagent containers and a rack with guide conducts for the hoses. It sprays with an extremely fine mist and therefore, it is very reagent-saving.

The final step in derivatization is mostly the heating of the TLC/HPTLC plate in order to accomplish the chemical reaction. Our **Thermoplate S plus** is very easy-to-use and programmable with nine methods. A coloured keypad allows you many settings such as a colour change when the surface becomes hot. It is located in the front for a comfortable use. The heating plate is made of aluminium and has a highly accurate temperature distribution ensuring best results all over the plate.

Derivapress

The TLC/HPTLC immersion derivatization system is available in 2 sizes: for 100 x 100 mm and 200 x 200 mm plates.

It is easy-to-use, just like opening and closing a book.

Take advantage of the following points:

- homogeneous and clear derivatization of all TLC/HPTLC plates
- complete treatment in 3 seconds
- clean and safe working environment, no dangerous discharges or leaks

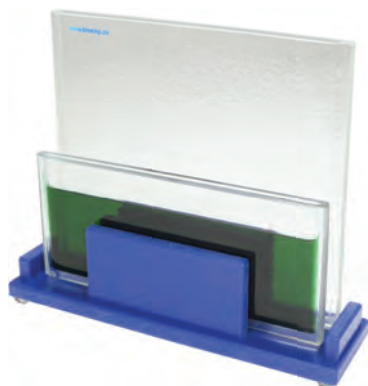
The transfer pads are meant for taking reagent solution. They can be used several times, depending on reagent use. One pad is 3 mm thick.



Order Information

Order No.	Description
DC07-T0010	Derivapress® Compact 100 x 100 mm (size: 220 x 190 x 35 mm)
DC07-T0020	Derivapress® Standard 200 x 200 mm (size: 290 x 250 x 35 mm)
DC08-T0115	Derivamouss® Transfer Pads 100 x 100 mm, 1 pack of 100 pieces
DC08-T0225	Derivamouss® Transfer Pads 200 x 200 mm, 1 pack of 25 pieces

Dipping Chamber



The dipping chamber is an alternative to spraying for avoiding environmental pollution. These chambers fulfil the established requirement: rapid and uniform implementation of a precise detection reaction. Special advantages of the dipping method are the improved uniformity of reagent distribution and the quick, reliable operation. The reagent is brought onto the plate - not into the air! All familiar spray reagents can also be used for dipping.

The chambers are made of high-inert glass. They have a clear width of only 5 mm. This allows manual immersion without difficulties and requires only small volumes of reagent: 100 ml for plate format of 200 x 200, 50 ml for 200 x 100 and 25 ml for 100 x 100 mm.

A rack made of polypropylene enables safe holding during dipping as well as easy storage. It is intended for 1 to 2 chambers of any size.

Order Information

Order No.	Description
BS124.160	Dipping chamber 100 x 100 mm
BS124.161	Dipping chamber 200 x 100 mm
BS124.162	Dipping chamber 200 x 200 mm
BS124.210	PP-Rack for 2 dipping chambers

Atomizers



Test tube atomizer - glass spraying device for spraying very small reagent quantities. The atomizer insert is fitted in a 12 ml test tube with standard taper and secured with springs.

Special atomizer - glass spraying device with rubber ball for producing reagent mists. When using this atomizer, the spray reagent comes into contact only with glass. The atomizer insert is fitted in a conical flask with ground joint and secured with clips. The capacity of the flask is 100 ml. If requested, the provided rubber ball can be replaced by other compressed air sources.

Order Information

Order No.	Description
BS123.990	Test tube atomizer, 12 ml
BS124.000	Special atomizer, 100 ml, with rubber ball

Sprayer SGe1



Spraying without CFC – an alternative for the environmental conscious laboratory

The Sprayer SGe1 works with a built in, quietly operating, high performance pump. Independent of mains, ultrafine spray mist is generated. Liquids with viscosities up to those of light oils are atomized simply by pressing a button. The droplet diameter is 5 - 10 μm . The closable container for the spray reagents is made of borosilicate glass and can hold 50 ml. It is screwed into the spray head which is made of high-quality PTFE and can be replaced within seconds. The handy and modern form of the Sprayer SGe1 was designed under ergonomical aspects.

Order Information

Order No.	Description
BS130.605	Sprayer SGe1, 230 V, incl. accumulator and charging unit
BS130.606	Sprayer SGe1, 110 V, incl. accumulator and charging unit
BS130.610	Reagent reservoir, 50 ml, 1 pack of 10 pieces

ChromaJet DS20

The ChromaJet DS20 presents a completely new derivatization concept. Reagents are sprayed on thin-layer plates or foils with the highest precision under microprocessor or computer control. The distinction from manual spraying lies in the great reduction in the quantity of reagent required, the almost complete absence of aerosol formation and the evenness of the spray pattern.

It is possible to create and store up to 4 spray methods specifically adapted to individual chromatography schemes and call them up as required. The integrated software works under Windows 10.

The individual working steps of the spraying procedure, including date and running number, are stored with the spray method.

That permits operation in conformity with GxP for the first time in the field of documentation, as a result of the exact reproducibility and documentation.

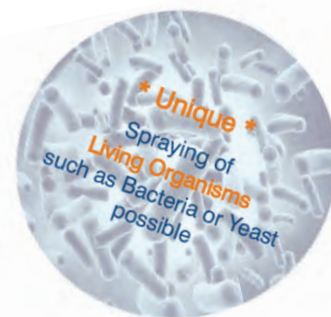
The spray methods define all important parameters, such as spray rate, volume to be sprayed and reagent selected. The free selection of X-Y coordinate direction means that it is possible to spray evenly, either individual tracks or areas of any size up to 200 x 200 mm.

The integrated reagent changer selects from 4 possible reservoirs of the desired spray medium depending on the spray program. An integrated rinsing process stops any carry-over. The transparent protective cover permits close inspection during the spray process and prevents the escape of aerosols. Excess spray mists are evacuated continuously and lead, for instance, into a fume cupboard, via an optional exhaust hose. The spray protocol includes all individual parameters of the spray program and is issued completely with date, time, user name, a plate designation assigned to the chromatogram and any comments that might have been entered.



Technical Data

Derivatisation area:	200 x 200 mm
Power supply:	100 - 240 V, 50 – 60 Hz, 500 W
Dimensions (W x H x D):	470 x 400 x 225 mm
Weight:	15 kg



Order Information

Order No.	Description
BS130.700	ChromaJet DS20, Reagent spraying device, 230 V
BS130.701	ChromaJet DS20, Reagent spraying device, 110 V
BS130.720	Filter for ChromaJet DS20, 1 pack of 20 pieces
BS130.725	IQ/OQ for ChromaJet DS20
BS130.732	Exhaust hose, viton with connector, 2.50 m

Thermoplate S plus



*** Great features ***

- Changing colours from green to red at increasing temperatures
- Timer function with acoustic signal
- Program control with saving up to 9 programs

The Thermoplate S plus is an electronically controlled **hotplate** for detection reactions in TLC/HPTLC and for precise heating and drying operations in the laboratory.

The set nominal temperature is held constantly within 2K. The operating range is between 25 and 200 °C. The lowest possible controlled temperature is 10 K above ambient temperature. The unit operates with a platinum resistance thermometer. Temperature readout is made on a coloured touchscreen which changes from green or blue to red at increasing temperatures. This means the user can visually see if it is safe to touch the plate or not. An acoustic signal informs the user as soon as a defined time or requested temperature is reached. Furthermore, up to 9 programs can be saved. The heating surface is made of high conductivity aluminium that - together with the ultralarge area of the heating element - ensures a uniform temperature distribution.

Technical Data

Temperature range:	25 – 200 °C
Heating area:	240 x 240 mm
Heating rate (at 50 °C):	10 K/min
Fluctuation range of temperature:	2 K
Power supply:	100 - 240 V, 50 – 60 Hz, 500 W
Dimensions (L x W x D):	447 x 240 x 105 mm
Weight:	6.5 kg

Order Information

Order No.	Description
BS121.845	Thermoplate S plus, 230 V
BS121.846	Thermoplate S plus, 110 V

Spray Box



The spray box serves as protective device when spraying TLC/HPTLC plates with aggressive solutions.

A built-in low noise ventilator leads the spray mist via the pipe connector on the rear into a fume cupboard. The pipe adapter of the ventilator leads upwards. It can be connected to standard installation tube NW 110. This converts the spray box into a small exhaust cupboard on the bench. The air feed is 400 m³/h. Any reagent run-off is collected into a separate trough. The spray box is made of acid-resistant PVC and can hold plates up to 200 x 200 mm.

If requested, a special, chemically-inert tube is also available. Length: 2 meters.

Technical Data

Air feed:	400 m³/h air
Dimensions (W x H x D):	620 x 580 x 610 mm
Pipe adapter:	NW 110
Weight:	7 kg

Order Information

Order No.	Description
BS124.105	Spray box with ventilator, 230 V
BS124.106	Spray box with ventilator, 110 V
BS124.110	Tube for spray box, 2.00 m

Documentation

Documentation and evaluation are the last steps in TLC/HPTLC-workflow. They give you the results or inspirations for new experiments.

You can **record images** reflecting the real optical impression **by your eyes** or **by a camera** or you generate chromatograms **by a densitometer** showing absorption or fluorescence curves of the separations.

Sometimes, it is sufficient to document the results by eyes only, independent on the light source. In most cases, UV light is required -> the UV detection methods belong to the most sensitive methods for the detection in thin-layer chromatography. At long-wavelength UV light 366 nm, substances fluoresce brightly on a dark background. This method becomes even more sensitive if the light intensity increases. In order to boost the contrast, it is important that the visible light is filtered out with a special filter. At 254 nm, when using TLC/HPTLC plates containing a fluorescent indicator, the substances reveal themselves as dark spots on a bright fluorescent background. The light intensity and the filtering of visible light are less critical for this form of detection. Our UV-Boxes, HP-UVIS and CabUVIS are very suitable devices for this purpose.

With **camera-based systems**, you have not only the opportunity of recording images under white light but also under UV light. Therefore, the fluorescent behavior of the substances can be documented and helps to identify the substances. It is advantageous to record the images of a TLC/HPTLC-plate under white light, UV 254 nm and 366 nm without changing the position of the plate for observing the spectral properties of a given spot precisely. For this reason, it is important that the darkhood is equipped with light sources for white light, UV 254 and 366 nm which can be switched on/and off optionally. Another point is the necessity of a high resolution camera with high colour fidelity. Images recorded in this way can be quantified by an appropriate software similar to the process with electrophoretic gels. On page 24, you will find specific data about our system ProViDoc® DD70.

For an accurate quantitative analysis of TLC/HPTLC separations, **densitometers** are used which produce chromatograms of the lanes measured at suitable wavelengths. This can be done in absorption or fluorescence mode. Calibration is feasible by defined standard substances and therefore, quantification of unknown samples is possible. Such instruments offer the opportunity of recording adsorption spectra of desired spots to assist substance identification. Measurements with reference wavelength (two-wavelengths measurements) serve for background reduction. With multi-wavelength scans, it is possible to detect the best measurement wavelengths for chromatograms of unknown samples. Our HPTLC densitometer CD60 will be the perfect instrument for the generation of reliable quantitative data.

UV-Box



*** For safety reasons ***
With automatic UV cut-off & preparative switch!

The UV-Box combines two UV-tubes for 254/366 nm in one unit and allows inspecting thin-layer chromatograms in an undarkened room. Visible light compounds are held back by a selected filter. The viewing window is made of polyacrylate glass and provides adequate protection from reflected short-wavelength UV-light. Nevertheless, safety glasses can be worn additionally as one pair is always included in scope of supply. If requested, you can work preparatively and cut your samples under UV-light. Please protect yourself against the harmful UV radiation! For safety reasons, there is an automatic UV cut-off when opening the door. The UV light goes off without delay - this is useful when only inspecting the samples is required. **Clever:** there is a preparative switch for those who still want to cut their samples under UV light.

Technical Data

Detection area:	200 x 200 mm
Dimensions (W x H x D):	380 x 167 x 290 mm
Weight:	5 kg

Order Information

Order No.	Description
BS131.215	UV-Box, 230 V, incl. UV safety glasses, with automatic UV cut-off and preparative switch
BS131.216	UV-Box, 110 V, incl. UV safety glasses, with automatic UV cut-off and preparative switch
BS131.121	Hg low pressure tube 366 nm, 8 W
BS131.122	Hg low pressure tube 254 nm, 8 W
BS178.515	UV filter 254 nm for UV-Box

HP-UVIS



The HP-UVIS combines two UV-tubes for 254/366 nm in one unit.

Two inclined plate tables with non-slip surface are positioned one above the other. Incident stray light is minimized by the cabinet which is closed on 3 sides so that an observation is possible without the need of a darkroom. Due to the use of a high pressure mercury vapour discharge lamp, the HP-UVIS provides a **very high radiation intensity at 366 nm** for fluorescence evaluation of thin-layer chromatograms. In this respect, it is superior to all analyzing lamps with cold light tubes. Fluorescent substances can still be detected in nanogram quantities. One 8 W low pressure tube together with a selected filter guarantee an optimum contrast at 254 nm.

The HP-UVIS is equipped with a UV protection shield.

Technical Data

Detection area:	200 x 200 mm
Dimensions (W x H x D):	325 x 480 x 290 mm
Weight:	11.5 kg

Order Information

Order No.	Description
BS131.221	HP-UVIS UV-Cabinet, 230 V, incl. UV safety glasses and UV protection shield
BS131.222	HP-UVIS UV-Cabinet, 110 V, incl. UV safety glasses and UV protection shield
BS131.020	Hg high pressure tube 366 nm, 125 W
BS131.122	Hg low pressure tube 254 nm, 8 W
BS178.515	UV filter 254 nm for HP-UVIS

A modern PC-controlled camera-based documentation system must fulfil the following needs

- An image-recording model with the best possible resolution, high replay quality and adequate speed, which can operate on all types of subjects.
- Easily operated and rapidly mastered software which is adapted to scientific requirements but avoids all unnecessary programmatic embellishments.
- A uniform illumination with visible and UV-light at 254 and 366 nm.
- A documentation module that reproduces even the finest nuances correctly, without loss of detail and in true colour.

The work station consists of:

- A dark hood with different illumination sources
- A camera which takes great images of the sample
- A camera holder for guaranteeing the perfect distance between camera and sample
- A software that can document the results very well



Our ProViDoc system DD70 fulfils all these requirements!

ProViDoc® System DD70

Dark hood with different illumination sources: CabUVIS

2x white light tubes, 2x 8W tubes of 254 nm and 4x 8W of 366 nm are arranged symmetrically in the CabUVIS for incident light applications and guarantee the uniform illumination which is very important for documentation. The visible light component of the low pressure tubes is kept back by means of selected UV filters. A special 8 W white light tube is fitted in the base for transmitting light applications. It is covered by means of an acrylic sheet and, thus, allows the observation of objects up to 200 x 200 mm.

NEW: When opening the door, there is an automatic UV cut-off for safety reasons. However, if you want to work under UV light at open door, please protect yourself and then use the preparative switch!

Technical Data

Detection area:	200 x 200 mm
Dimensions (W x H x D):	395 x 390 x 290 mm
Weight:	11.3 kg

Digital reflex camera: With high resolution

The core of the image collection system consists of a high resolution digital reflex camera equipped with a high-performance objective, motor zoom and auto-focus over the whole focal range for razor-sharp images.

This camera with a resolution of min. 24 Mpixels produces accurately detailed images of real evidential value in excellent colour brilliance. The high light sensitivity makes it possible to record weak fluorescence. Once the desired detail of the object has been selected, the camera settings follow with stored standardized parameters.

A high quality objective glass filter, specially selected for the requirements of digital image processing, yields stable colour results with the highest resolution. The image is either taken by the software argusX2.

For the perfect distance: Documentation top

Our digital camera can be attached to the CabUVIS without difficulties. The special documentation top serves as interface. It consists of a cover plate with camera mounting and completely protects the system from stray light. The special filter for 420 nm is included in the scope of supply and can be mounted in the integrated filter magazine if requested. This special filter of high quality optical glass suited to digital imaging yields stable colour results with high resolving power.



*** Safe ***
With automatic UV cut-off & preparative switch!

ProViDoc System DD70

Software: argusX2

The **acquisition and documentation software** supports the GxP editing and problem-free archiving of the taken images. This extraordinarily high performance software operating under MS Windows 10 can easily be operated - even by users who have no computer experience, and, hence it is easy to learn to use in a short time. The image displayed on the monitor can be edited, labelled and marked. There is a free choice of type size and font. A zoom function is available to increase the image format. Any desired number of windows with images can be opened at the same time. The arrangement of the images is a matter of choice.

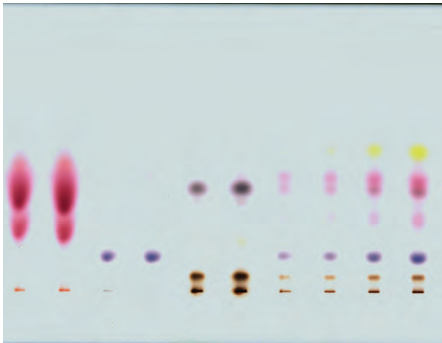
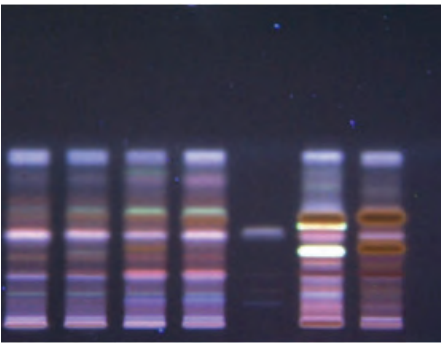
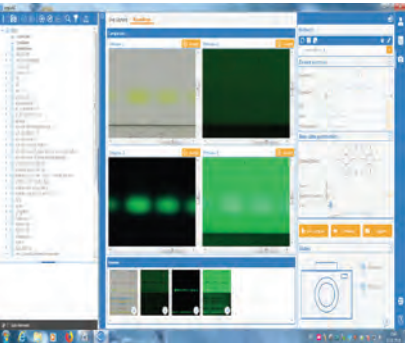
For comparison purposes, the images can be displayed next to each other. Each image is automatically labelled with the date, user name and an unequivocal identification number and thus it is stored in conformity with GxP guidelines – it can even be protected by means of a password if desired. The user can add comments of any desired length to each image. This is stored directly with the image and can be printed out with every laser or inkjet printer that is supported by Windows. The integrated file manager allows the assignment of meaningful file names, the search function makes it possible to find the stored images rapidly in the data base.

NEW: Module 21 CFR part 11

Nowadays, more and more companies must comply with the FDA regulations. Using our new module 21CFR part 11, you can work compliant to these rules. Please feel free to contact us for detailed information.

Printer

Any printer can be used for printing of the results taken by scanner or camera.



Order Information

Order No.	Description
BS140.061	ProViDoc System DD70, incl. CabUVIS 230 V, documentation top with UV filter, digital reflex camera, software
BS140.062	ProViDoc System DD70, incl. CabUVIS 110 V, documentation top with UV filter, digital reflex camera, software
BS140.066	IQ/OQ documents for ProViDoc system, incl. validation plate
BS140.066C	IQ/OQ documents for ProViDoc system, incl. validation plate in combination with module 21 CFR part 11
BS140.085	Colour and validation plate for documentation system
BS150.030	NEW: Module 21 CFR part 11

HPTLC Densitometer CD60

The HPTLC Densitometer CD60 includes the know-how of more than 20 years experience and the current state of the art. A PC serves as interface between the user and the CD60 and controls all functions of the densitometer. It is equipped for absorbency and fluorescence measurements in reflectance and transmittance on objects with dimensions up to 265 x 200 x 4 mm.

Three light sources are provided: a deuterium lamp (190 - 340 nm), a halogen lamp (340 - 900 nm) as well as a mercury lamp. The usable spectral range extends from **190 to 900 nm** whereby the monochromator, the lamps and the filters are automatically switched over. The size of the scanning light beam can also be adjusted by the PC. Slit widths from 0.4 to 10 mm and slit heights from 20 µm to 2 mm are possible.

There are many application possibilities in conjunction with the software ProQuant. This extraordinary software operating under Windows 10 is also easy to use by those without computer experience, so that its use can be learned in very short time. Process chromatograms and compile result and peak lists in a simple, reliable manner that conforms with GxP! You rapidly acquire reproducible results and data of real evidential worth.



Recording modes

- Remission and transmission
- Extinction or fluorescence
- Two-wavelength measurement
- Multi-wavelength measurement

Technical Data

Dimensions (W x H x D): 300 x 730 x 550 mm
 Weight: 30 kg
 Filters: 370, 420, 450, 550, Orange, UV

Max. scan length: 5 mm to 195 mm
 Max. scan width: 5 mm to 260 mm
 Spectral range: 190 - 900 nm

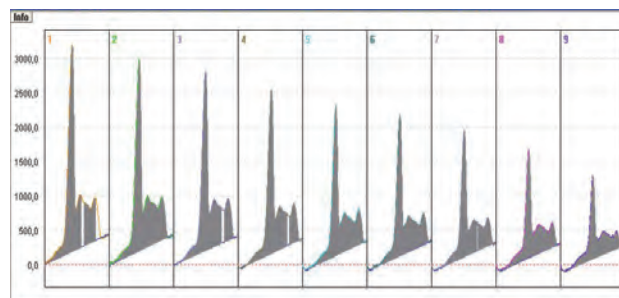
Additional software packages

Provalid® - Software for Automatic Validation

The scanner validation program provides an automatic check on and if necessary re-adjustment of the mechanical, optical and electronic systems of the densitometer. The following points are individually checked.

- The accuracy of the wavelength adjustment of the monochromator
- Tests on the slit module
- The positioning of the plate table
- The condition and adjustment of the electronic system
- The condition and adjustment of the lamps and lamp mirror

The results are evaluated, printed and stored.



Spectra Calc® - Software for Compilation of Spectral Libraries

A special working library is easily compiled. It is possible to identify the spectra unequivocally, even when the intensity is very low and the noise level high. This software with user-created libraries can be used to compare spectra that have been measured on different plates. The results are issued in form of a hitlist. Each hit is listed with its hit rank number, quality, library name, library ID number, spectral thumbnail preview as well as text information.

Order Information

Order No.	Description
BS131.800	HPTLC Densitometer CD60, Transmission/Remission, 230 V, incl. interface, control/evaluation software ProQuant
BS131.801	HPTLC Densitometer CD60, Transmission/Remission, 110 V, incl. interface, control/evaluation software ProQuant
BS131.816	Software Provalid, Program for automatic validation
BS131.830	Software Spectra Calc, Program for compilation of spectral libraries
BS131.825	IQ/OQ documents for HPTLC Densitometer CD60

biostep - made in Germany

Your partner for Thin-Layer Chromatography

biostep GmbH was founded in 1997 and is situated in Burkhardtsdorf/Ergebirge in Saxony. At the beginning, biostep mainly dealt with devices for Radioanalytics and Bio-Imaging. Later on, articles for PCR and electrophoresis enriched the range. With the broadening of the product portfolio, own devices were increasingly developed and manufactured.

In 2012, biostep took over the worldwide known product line of thin-layer chromatography (TLC/HPTLC) of the company Desaga GmbH/SARSTEDT AG & Co. KG. The existing expertise and product range from the fields of Bio-Imaging and TLC complemented each other very successfully.

biostep expanded very quickly within few years. Thus, development and trade as well as production and service had to be carried out at different locations. These locations could be merged in 2015 by moving to the new company headquarter in the Burkhardtsdorf industrial estate.

In the following years, biostep successfully established as a laboratory specialist and system provider.

In 2017, the previous managing partner Heiko Mixtacki withdrew from the company and SARSTEDT AG & Co. KG became the complete owner.

Today, biostep GmbH is a member of the SARSTEDT-Group. As a system provider, it is dedicated to the development and worldwide sale of products for Thin-Layer Chromatography.



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