

# Fast and precise Thin Layer Chromatography by EMD Millipore



EMD Millipore is a division of  
Merck KGaA, Darmstadt, Germany

# Traditionally innovative. Unique quality from the pioneer in thin layer chromatography

**Ahead of the times** EMD Millipore and thin layer chromatography go back a long way. Several decades ago, we revolutionized the industry by introducing the first ready-to-use, pre-coated plates to the market. Today, our TLC portfolio comprises over 60 high-quality products – each setting new standards in quality, efficiency and utility. And our journey of innovation continues year after year. What drives us? First and foremost, it is our dedication to our customers. Because when our shared challenges are turned into mutual achievements, we both stay ahead of our fields.

**Quality makes all the difference** Thin layer chromatography is one of the most versatile methods of chromatographic analysis for the separation and identification of chemical substances. Fast and inexpensive, the technique enables both qualitative and quantitative analysis. As the world leader in TLC, EMD Millipore offers plates of unparalleled robustness and surface homogeneity, thus ensuring the highest reliability. Our comprehensive range includes various chemistries, sizes and backings to suit even the most demanding applications. And when it comes to quality, our TLC plates are second to none – as documented by countless published studies.



- Disposable plates ensure simplified sample preparation
- Direct visualization of results by UV or derivatization
- Analysis of many samples under identical conditions simultaneously
- Easy two-dimensional separations
- Thin layer chromatography is suitable for many applications, such as screening, rapid identity tests in drug synthesis, as pilot method for flash and preparative chromatography and for quantitative analysis.

## Thin layer chromatography – numerous fields of application

### Pharma and herbal medicine

#### **R&D / Synthesis labs:**

- Stability testing
- Uniformity testing
- Sub-component evaluation

#### **Quality control / Analytical labs:**

- In-process control
- Identity testing

### Food

#### **Quality control:**

- Stability testing
- Drug residue testing
- Testing for additives
- Mycotoxins (including aflatoxins)

### Environmental analysis

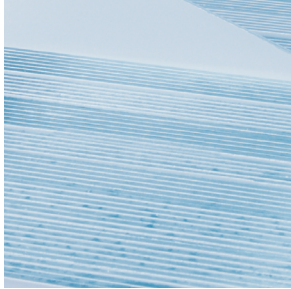
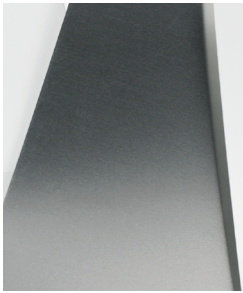
- Water and soil analysis
- Residue analysis

### Clinical labs

- Drug monitoring
- Metabolism studies

### Forensic

- Drug abuse
- Poisons
- Alkaloids



[www.emdmillipore.com/thin-layer-chromatography](http://www.emdmillipore.com/thin-layer-chromatography)

# Choose the best plate for your separation

Technologies	Sorbents Type				
	Silica (unmodified)	Spherical silica LiChrospher®	Aluminum oxide	Modified silica	Cellulose
Thin layer chromatography <b>TLC</b>	page 04		page 12	page 13	page 16
High performance plates <b>HPTLC</b>	page 06	page 08		page 13	page 16
Preparative layer plates <b>PLC</b>	page 10		page 10	page 10	
<b>Special plates</b>					
Concentrating zone plates					page 18
Kieselguhr and mixed layer plates					page 20
GLP plates					page 21
Multiformat plates					page 22
ProteoChrom® HPTLC plates for peptide analysis					page 23
TLC silica gel 60G plates					page 26
Loose sorbents for the preparation of TLC plates					page 29
Accessories					page 31

**Information:** These products are not intended for use as medical devices for in vitro diagnostic testing of human specimens within the meaning of European Directive 98/79/EC. They are for research purposes only, for investigating in vitro samples without any medical objective.

# Classical silica plates (TLC)

## Reliable routine analysis of a broad range of substances

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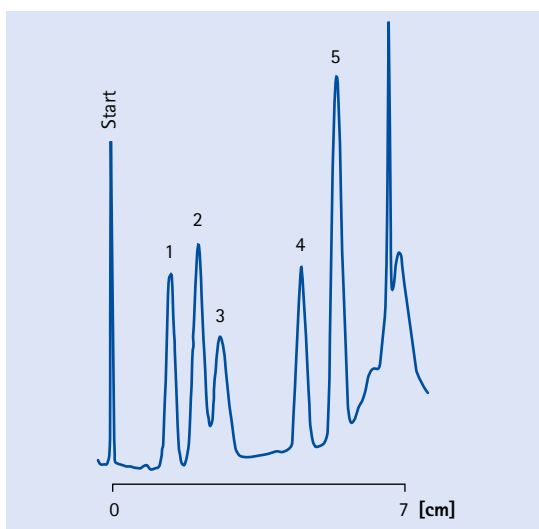
**Trust your test** Unmodified silica is the most widely used sorbent in TLC. There's a good reason for this: when combined with a suitable mobile phase, it allows you to analyze almost any substance. The smooth and extremely dense plate coating ensures narrow bands and maximum separation efficiency with lowest background noise. Our silica plates offer all these advantages and more. They utilize the well-established EMD Millipore silica gel 60 together with a unique polymeric binder, which results in a uniform, hard surface that will not crack or blister.

**Pick your plate** Glass, aluminum or plastic? You have the choice with our classical silica TLC plates. Each is available in a broad range of sizes from 20 x 20 cm down to 2.5 x 7.5 cm. They offer a layer thickness of 250 µm for glass plates and 200 µm for aluminum or plastic, with a mean particle size of 10 - 12 µm. What's more, our flexible aluminum or plastic plates can easily be cut with scissors to match your individual separation requirements. We also provide two kinds of inorganic fluorescent indicators for UV detection of colorless substances: the green fluorescing  $F_{254}$  or the blue fluorescing, acid-stable  $F_{254s}$ , both of which fluoresce in UV light at an excitation wavelength of 254 nm. Samples which absorb shortwave UV at 254 nm are detected due to fluorescence quenching. For superior identification of separated substances, our exceptional high-fluorescent LuxPlates® contain a higher amount of fluorescent indicator.

- Your benefits**
- Highest quality
  - Most reliable batch-to-batch consistency
  - Unsurpassed robustness

**Applications** Unmodified silica gel covers nearly 80% of both adsorption and partition TLC applications. It enables separation of a large range of diverse substances, such as alkaloids, anabolics, carbohydrates, fatty acids, glycosides, lipids, mycotoxins, nucleotides, peptides, pesticides, steroids, sulfonamides, surfactants, tetracyclines and many others. This makes it suitable for:

- In-process control in drug synthesis
- Identity and stability testing of drugs
- Quality control of pharmaceuticals, food and environmental samples
- Residue analysis in food and environmental samples



### Analysis of a sulfonamide mixture

<b>Sample</b>	1. Sulfadiazine 2. Sulfamerazine 3. Sulfisoxalazole 4. Sulfapyridine 5. Sulfanilamide (all 0.1%)
<b>Sample volume</b>	0.75 µl
<b>Mobile phase</b>	Ethyl acetate / methanol / ammonia solution 25% (60/20/2 (v/v/v))
<b>Detection</b>	UV 254 nm (TLC/HPTLC Scanner 2/ CAMAG)

*Analysis of a sulfonamide mixture on a classical TLC silica gel 60  $F_{254}$  reveals clear separation of five different isomers.*

## TLC unmodified silica gel 60

Coating Material	Format [cm]	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Silica gel 60	20 x 20	25 plates	glass	M1057210001	5721-7
	10 x 20	50 plates	glass	M1056260001	5626-6
	5 x 20	100 plates	glass	M1057240001	5724-3
	2.5 x 7.5	100 plates	glass	M1153260001	15326-1
Silica gel 60 F <sub>254</sub>	20 x 20	25 plates	glass	M1057150001	5715-7
	10 x 20	50 plates	glass	M1057290001	5729-6
	5 x 20	100 plates	glass	M1057140001	5714-3
	5 x 20	25 plates	glass	M1058080001	5808-3
	5 x 10	200 plates	glass	M1057190001	5719-2
	5 x 10	25 plates	glass	M1057890001	5789-2
	2.5 x 7.5	100 plates	glass**	M1057940001	15341-1
	2.5 x 7.5	100 plates	glass***	M1153270001	15327-1
	2.5 x 7.5	500 plates	glass	M1153410001	15341-5
Silica gel 60 W F <sub>254s</sub>	20 x 20	25 plates	glass	M1164850001	16485-1
LuxPlate® silica gel 60 F <sub>254</sub>	20 x 20	25 plates	glass	M1058050001	5805-1
	10 x 20	50 plates	glass	M1058040001	5804-1
	5 x 10	25 plates	glass	M1058020001	5802-1
	2.5 x 7.5	100 plates	glass	M1058010001	5801-1
Silica gel 60*	20 x 20	25 sheets	aluminum	M1055530001	5553-7
	5 x 10	50 sheets	aluminum	M1168350001	16835-2
Silica gel 60 W*	20 x 20	25 sheets	aluminum	M1164870001	16487-1
Silica gel 60 F <sub>254</sub> *	20 x 20	25 sheets	aluminum	M1055540001	5554-7
	10 x 20	25 sheets	aluminum	M1055700001	-
	5 x 20	100 sheets	aluminum	M1055340001	5534-3
	5 x 10	50 sheets	aluminum	M1168340001	16834-2
	5 x 7.5	20 sheets	aluminum	M1055490001	5549-4
	500 x 20	1 roll	aluminum	M1055620001	5562-7
Silica gel 60 W F <sub>254s</sub> *	20 x 20	25 sheets	aluminum	M1164840001	16484-1
Silica gel 60*	20 x 20	25 sheets	plastic	M1057480001	5748-7
Silica gel 60 F <sub>254</sub> *	20 x 20	25 sheets	plastic	M1057350001	5735-7
	4 x 8	50 sheets	plastic	M1057500001	-
	500 x 20	1 roll	plastic	M1057490001	5749-7

Layer thickness: 250 µm | \* = 200 µm | W: water resistant | F<sub>254</sub>: fluorescent indicator | F<sub>254s</sub>: acid stable fluorescent indicator

\*\* paper box

\*\*\* plastic box

For our wide range of loose sorbents and bulk materials, please have a look on page 29.

For our wide range of loose sorbents and bulk materials,  
please refer to the Chrombook or visit our web page under:

[www.emdmillipore.com/chromatography](http://www.emdmillipore.com/chromatography)

Aluminum and plastic backed plates can  
be cut to smaller sizes to reduce the cost of analysis.



# High performance silica plates (HPTLC)

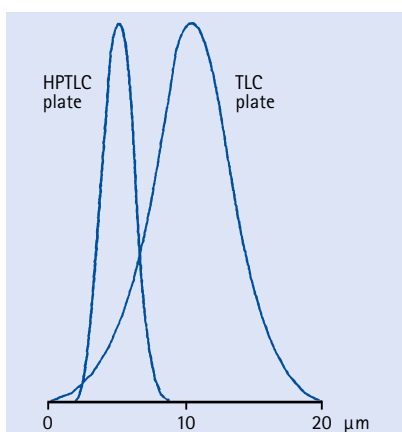
## Fast and quantitative analysis of complex samples for both manual and automated use

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**Greater efficiency** Need higher efficiency and sensitivity? EMD Millipore HPTLC plates are the answer. They use an optimized silica 60 sorbent with a significantly smaller particle size: just 5 – 6  $\mu\text{m}$  compared to 10 – 12  $\mu\text{m}$  used for classical TLC. This enables a higher packing density and hence a smoother surface. Band diffusion is also reduced, producing very compact sample bands or spots. These features and the thinner layer (200  $\mu\text{m}$  or 100  $\mu\text{m}$ ) ultimately lead to highly increased sensitivity and faster analysis.

**Greater choice for greater efficiency** Just as for classical TLC, EMD Millipore HPTLC silica plates are available with either glass or aluminum backing in a variety of formats to suit many separation needs. The fluorescent indicators offered are green fluorescent  $F_{254}$  or the blue fluorescent acid-stable  $F_{254s}$ . Both indicators fluoresce in UV light at an excitation wavelength of 254 nm.

- Your benefits**
- Faster analysis, only 3 – 20 min for optimal separations
  - 5 to 10-fold increased sensitivity compared to classical TLC
  - Highly reproducible, sharp bands for quantitative analysis
  - Gold standard for automated use



Comparison of the particle size distribution of TLC and HPTLC plates

Features of HPTLC versus classical TLC	HPTLC	Classical TLC
Mean particle size	5 – 6 $\mu\text{m}$	10 – 12 $\mu\text{m}$
Particle size distribution	4 – 8 $\mu\text{m}$	5 – 20 $\mu\text{m}$
Layer thickness	200 $\mu\text{m}$ (100 $\mu\text{m}$ )	250 $\mu\text{m}$
Plate height	12 $\mu\text{m}$	30 $\mu\text{m}$
Typical migration distance	3 – 6 cm	10 – 15 cm
Typical separation time	3 – 20 min	20 – 200 min
Number of samples per plate	< 36 (72)	< 10
Sample volume	0.1 – 0.5 $\mu\text{l}$	1 – 5 $\mu\text{l}$
Detection limits: absorption	100 – 500 pg	1 – 5 ng
Detection limits: fluorescence	5 – 10 pg	50 – 100 pg

**HPTLC AMD Plates** **HPTLC AMD Plates** with extra thin layers of 100  $\mu\text{m}$  are intended for automated multiple development and best suited for qualitative and quantitative detection of pesticides.

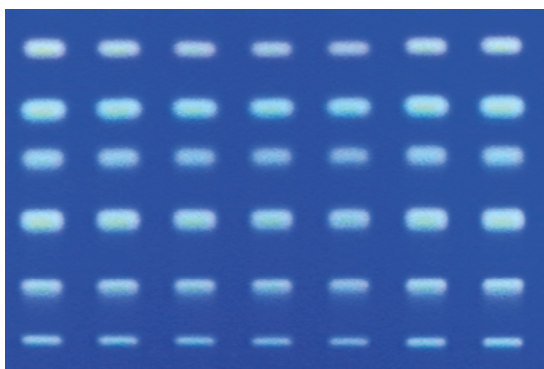
**HPTLC Premium Purity Plate** The new **HPTLC Premium Purity Plate** is especially designed for demanding pharmacopoeia applications. It is carefully wrapped in a special aluminum foil. This prevents any deposition of plasticizers from the wrapping material that could appear as an unknown extra zone when using middle-polar solvent systems such as toluene / ethyl acetate (95/5).

- Applications** HPTLC plates offer unsurpassed separation performance and are therefore ideal for quantitative thin layer analysis including:
- Automated applications for quantitative separations
  - Quality control of drugs
  - Medicinal plant and herbal analysis



Comparison of classical TLC versus HPTLC plates		A. TLC	B. HPTLC
Sample	1. N-alpha-dansyl-L-asparagine	Mobile phase Ethyl acetate/methanol/propionic acid (20/10/3)	
	2. alpha-dansyl-L-arginine		
	3. Dansyl-L-cysteic acid	Detection UV 366	
	4. N-Dansyl-L-serine	Sample volume 4 µm	0.3 µm
	5. Dansyl-glycine	Migration distance 10 cm	5 cm
	6. N-N-Didansyl-L-tyrosine	Analysis time 42 min	13 min 45 sec

Comparison of the separation of dansyl amino acids under identical conditions. The comparison clearly demonstrates that the HPTLC plate delivers sharper zones with shorter migration distances and faster analysis times. In addition the HPTLC plate allows the separation of twice the number of samples simultaneously.



A. Classical TLC silica gel 60 plate



B. HPTLC silica gel 60 plate

### HPTLC unmodified silica gel 60

Coating Material	Format [cm]	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
HPTLC silica gel 60	20 x 10	50 plates	glass	M1056410001	5641-6
	10 x 10	25 plates	glass	M1056310001	5631-5
	10 x 10	100 plates	glass	M1056330001	5633-5
HPTLC silica gel 60 F <sub>254s</sub>	20 x 10	25 plates	glass	M1156960001	15696-6
HPTLC silica gel 60 F <sub>254</sub>	20 x 10	50 plates	glass	M1056420001	5642-6
	10 x 10	25 plates	glass	M1056280001	5628-5
	10 x 10	100 plates	glass	M1056290001	5629-5
	5 x 10	25 plates	glass	M1056160001	105616-2
HPTLC silica gel 60	20 x 20	25 sheets	aluminum	M1055470001	5547-7
HPTLC silica gel 60 F <sub>254</sub>	20 x 20	25 sheets	aluminum	M1055480001	5548-7
	5 x 7.5	20 sheets	aluminum	M1055560001	5556-4
HPTLC silica gel 60 WR F <sub>254s</sub>	20 x 10	25 plates	glass	M1155520001	15552-6
HPTLC silica gel 60 F <sub>254</sub> AMD, extra thin*	20 x 10	25 plates	glass	M1117640001	11764-6
HPTLC silica gel 60 WR F <sub>254s</sub> AMD, extra thin*	20 x 10	25 plates	glass	M1123630001	-
HPTLC silica gel 60 F <sub>254</sub> premium purity plate	20 x 10	25 plates	glass	M1056480001	-

Layer thickness: 200 µm | \* Layer thickness: 100 µm | WR: water resistant and higher purity

F<sub>254</sub>: fluorescent indicator | F<sub>254s</sub>: acid stable fluorescent indicator

# LiChrospher® HPTLC plates with spherical particles

## For high-throughput separations with optimal performance

### Race through running times

To help you save precious laboratory time, we created the world's first thin layer chromatography plates based on spherical silica particles: HPTLC LiChrospher® plates. Compared to standard HPTLC, these unique plates offer the ultimate in performance and speed, enabling high-throughput analyses of complex samples.

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### Step up performance

HPTLC LiChrospher® plates are based on spherical shaped silica 60 with a particle size of 7 µm and narrow particle size distribution similar to what is generally used in HPLC. LiChrospher® HPTLC plates possess selectivity that is comparable to the respective HPTLC plates, however plate height and separation numbers are further improved – resulting in shorter analysis times and improved detection limits.

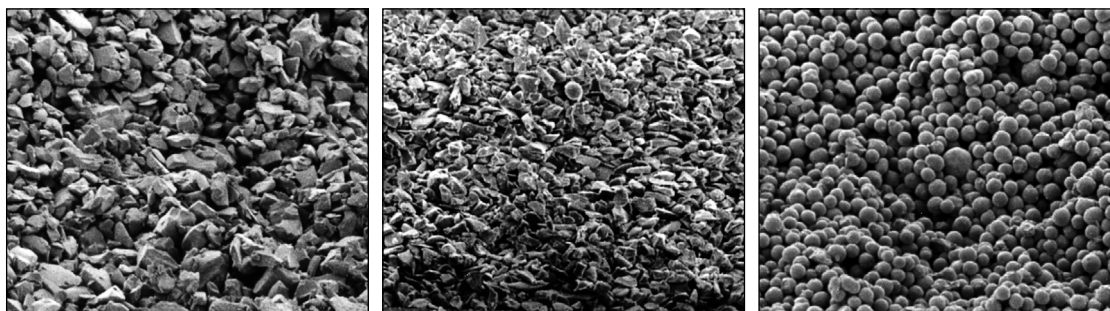
### Your benefits

- 20% reduced running times comparing with normal HPTLC plates
- Highly compact spots or zones
- Low detection limits

Comparison of detection limits on HPTLC LiChrospher® Si 60 F<sub>254s</sub> plates and normal HPTLC Si 60 F<sub>254</sub> plates (Detection Limits, UV 254 nm, ng/spot)

Substance	Visually		Spectrophotometrically	
	Silica gel 60 F <sub>254</sub>	LiChrospher® Si 60 F <sub>254s</sub>	Silica gel 60 F <sub>254</sub>	LiChrospher® Si 60 F <sub>254s</sub>
Ascorbic acid	100	100	100	25
Cortisone	50	25	25	10
Atrazine	50	25	10	5
Prometryne	25	10	10	5
Theophylline	50	25	25	10
o-Aminophenol	50	25	25	5
m-Aminophenol	10	5	10	5
p-Aminophenol	> 100	50	50	25

### Scanning electron pictures of the cross-section



(A) classical silica TLC plate

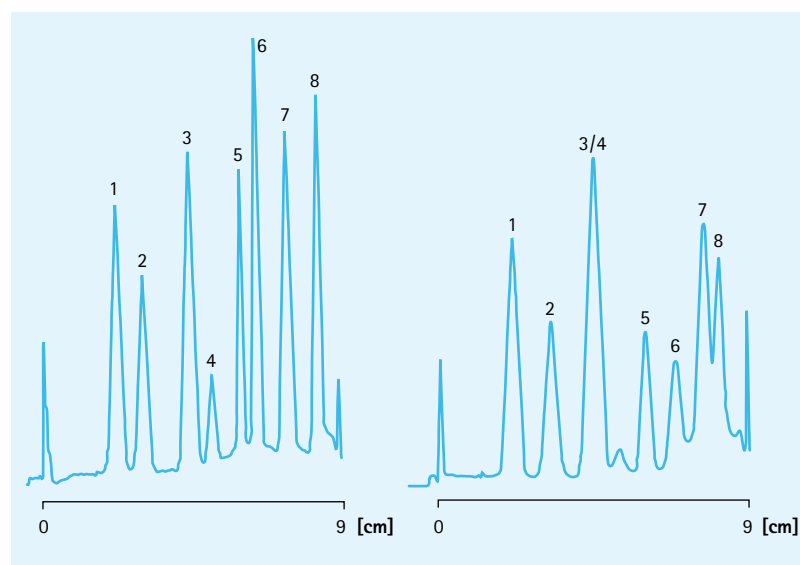
(B) high performance silica HPTLC plate

(C) HPTLC LiChrospher® plate

LiChrospher® HPTLC plates are especially suitable for the analysis of highly complex low concentration samples for example:

- Analysis of pesticide mixtures
- Assaying pharmaceutical compounds

## Applications



A. HPTLC LiChrospher® Si 60 plate

B. Conventional HPTLC Si 60 plate

### Pesticide separation

<b>Sample</b>	1. Hexazinone 2. Metoxuron 3. Monuron 4. Aldicarb 5. Azinphos-methyl 6. Prometryn 7. Pyridate 8. Trifluralin
<b>Sample volume</b>	50 nl
<b>Mobile phase</b>	Petroleum benzine 40 - 60°C / acetone 70/80
<b>Detection</b>	5 - 10 pg

### HPTLC LiChrospher® unmodified silica gel 60

Coating Material	Format [cm]	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
HPTLC LiChrospher® silica gel 60 F <sub>254s</sub>	20 x 10	25 plates	glass	M1154450001	115445-1
HPTLC LiChrospher® silica gel 60 F <sub>254s</sub>	20 x 20	25 sheets	aluminum	M1055860001	-
HPTLC LiChrospher® silica gel 60 WR F <sub>254s</sub> AMD extra thin*	20 x 10	25 plates	glass	M1056470001	-

Layer thickness: 200 µm | \* Layer thickness: 100 µm | WR: water resistant and higher purity  
F<sub>254s</sub>: acid stable fluorescent indicator

### HPTLC LiChrospher® RP-modified silica gel 60

Coating Material	Format [cm]	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
HPTLC LiChrospher® silica gel 60 RP-18 W F <sub>254s</sub>	20 x 10	25 plates	glass	M1056460001	M10564610001

Layer thickness: 200 µm | W: fully water resistant  
F<sub>254s</sub>: acid stable fluorescent indicator

# Preparative layer plates (PLC)

## For enrichment and purification of analytes in mg quantities

### Heavier loads, lighter analyses

When your application involves higher sample quantities, our PLC plates are the optimal solution. They are based on the same proven EMD Millipore silica-binder technology as analytical TLC plates, however they allow loads of up to gram amounts. Samples are typically applied as a band across the whole width of the plate, and substances are detected almost exclusively by UV detection. The substances can be isolated by extraction after the spot has been scraped from the layer.

### Further flexibility

Depending on your application, you can choose between preparative layer plates with layers of unmodified silica gel, RP18-modified silica gel or aluminum oxide, in several layer thicknesses ranging from 0.5 mm up to 2 mm, with or without fluorescent indicator.

### Your benefits

- Separation and purification of mg up to g samples
- Enables high sample loading
- Purification up to g quantities

### Applications

PLC plates are perfectly suited for cleaning up synthetic reaction mixtures, natural products, plant extracts and biotech products.

#### PLC silica gel 60

Coating Material	Format [cm]	Layer thickness	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
PLC silica gel 60	20 x 20	0.5 mm	20 plates	glass	M1138940001	13894-7
	20 x 20	2 mm	12 plates	glass	M1057450001	5745-7
PLC silica gel 60 F <sub>254</sub>	20 x 20	0.5 mm	20 plates	glass	M1057440001	5744-7
	20 x 20	1 mm	15 plates	glass	M1138950001	13895-7
	20 x 20	2 mm	12 plates	glass	M1057170001	5717-7
PLC silica gel 60 F <sub>254 + 366</sub>	20 x 20	2 mm	12 plates	glass	M1056370001	5637-7
PLC silica RP-18 F <sub>254s</sub>	20 x 20	1 mm	15 plates	glass	M1054340001	5434-7

#### PLC aluminum oxide 60 and 150

Coating Material	Format [cm]	Layer thickness	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
PLC aluminum oxide 60 F <sub>254</sub>	20 x 20	1.5 mm	12 plates	glass	M1057880001	5788-7
PLC aluminum oxide 150 F <sub>254</sub>	20 x 20	1.5 mm	12 plates	glass	M1057260001	5726-7

F<sub>254</sub>: fluorescent indicator | F<sub>254s</sub>: acid stable fluorescent indicator

## PLC concentrating zone plates

Coating Material	Format [cm]	Layer thickness	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Silica gel 60 F <sub>254</sub> concentrating zone 4 x 20 cm	20 x 20	0.5 mm	20 plates	glass	M1137940001	13794-7
	20 x 20	1 mm	15 plates	glass	M1137920001	13792-7
	20 x 20	2 mm	12 plates	glass	M1137930001	13793-7

F<sub>254</sub>: fluorescent indicator

- For our wide range of loose sorbents and bulk materials, please have a look on page 29.

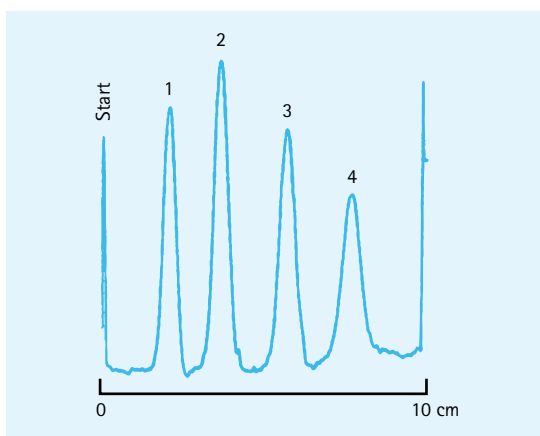


# Aluminum oxide plates (TLC)

## For basic and neutral compounds using different pH conditions

### Plate and pH: the perfect match

EMD Millipore TLC aluminum oxide plates are designed to optimally complement the pH value of your compounds. This provides you with distinct separation advantages: under aqueous conditions, basic compounds can be best separated on basic aluminum oxide plates, while neutral compounds are best separated on neutral plates. To suit different application needs, the plates utilize neutral or basic aluminum oxide with 60 Å or 150 Å pore size, with or without fluorescent indicator.



### Separation of m-oligophenylenes on a TLC aluminum oxide plate

<b>Sample</b>	1. m-Quinquephenyl 2. m-Quarterphenyl 3. m-Terphenyl 4. Biphenyl
<b>Sample volume</b>	200 nl
<b>Mobile phase</b>	n-heptane
<b>Migration distance</b>	10 cm
<b>Detection</b>	UV 254 nm, TLC/HPTLC Scanner, Camag

### TLC aluminum oxide 60

Coating Material	Format [cm]	Layer thickness	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Aluminum oxide 60 F <sub>254</sub> basic	20 x 20	250 µm	25 plates	glass	M1057130001	5713-7
Aluminum oxide 60 F <sub>254</sub> basic	5 x 20	250 µm	100 plates	glass	M1057310001	5731-3
Aluminum oxide 60 F <sub>254</sub> neutral	20 x 20	200 µm	25 sheets	aluminum	M1055500001	5550-7
Aluminum oxide 60 F <sub>254</sub> neutral	20 x 20	200 µm	25 sheets	plastic	M1055810001	5581-7

### TLC aluminum oxide 150

Coating Material	Format [cm]	Layer thickness	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Aluminum oxide 150 F <sub>254</sub> neutral	20 x 20	200 µm	25 sheets	aluminum	M1055510001	5551-7

F<sub>254</sub>: fluorescent indicator

# Modified silica plates (TLC and HPTLC)

## Free choice of solvent system for special separations and as pilot method for HPLC

When separation challenges cannot be adequately resolved with standard silica, you can count on our modified silica plates to facilitate your application. The system offers a free choice of solvents, so you can be sure that they meet your particular separation requirements.

RP-2, RP-8 and RP-18 are based on silica gel 60 modified with aliphatic hydrocarbons. The chain length in combination with the degree of modification defines the ability to tolerate the water of the solvent system and strongly affects retention. Migration time increases in the order RP-2, RP-8, RP-18 using the same solvent composition. The HPTLC RP-2 sorbent exhibits higher polarity and high affinity of aqueous solutions, tolerating up to 80% water, while the longer carbon chains RP-8 and R-18 can be run with up to 60% water in the solvent system. The specially developed HPTLC RP-18 W plate, with a defined lower degree of surface modification, can even be used with pure water.

The CN and Diol modified silica plates are moderately polar and suited for both normal phase and reversed phase systems. The amino modified  $\text{NH}_2$  plate provides weak basic ion exchange characteristics with special selectivity for charged compounds. For many applications, it offers an alternative to PEI cellulose. Since most substances separated on modified plates are colorless, the majority of EMD Millipore's modified silica plates contain the blue fluorescent, acid-stable UV indicator  $\text{F}_{254s}$ . Samples which absorb shortwave UV at 254 nm are detected due to fluorescence quenching.

- Results less dependent on atmospheric humidity
- Allows use of aqueous solvent systems
- RP-modified silica provides ready correlation with HPLC
- No catalytic activity for unstable substances (e.g. oxidative degradation)

Modified silica plates (TLC and HPTLC) provide additional selectivities and significantly broaden TLC applications.

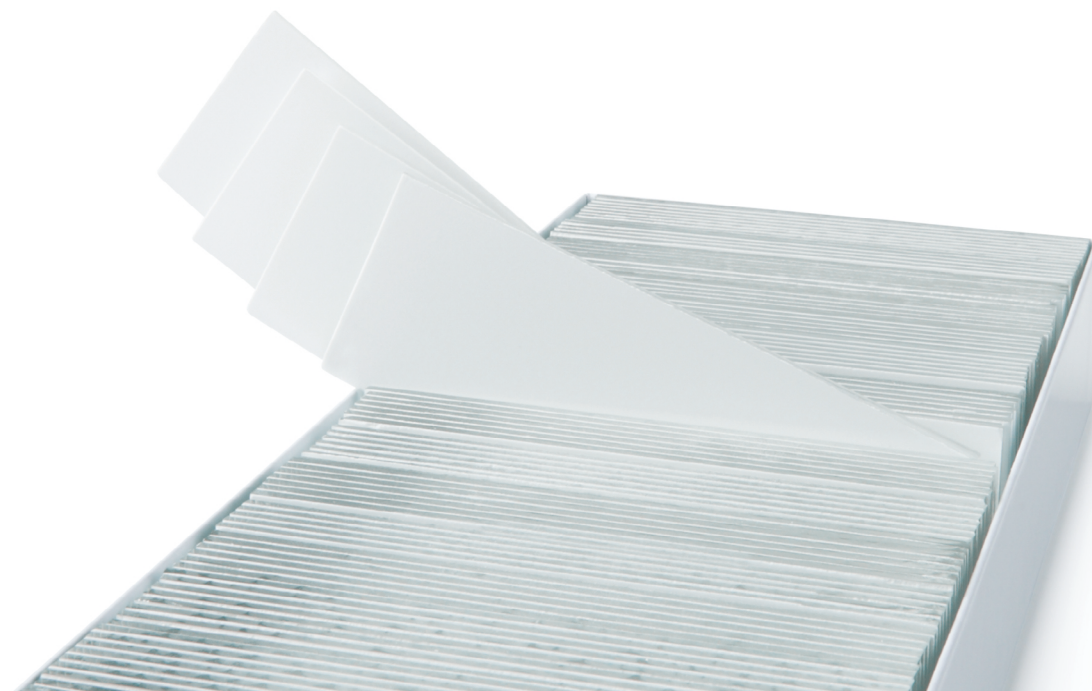
Problem solved

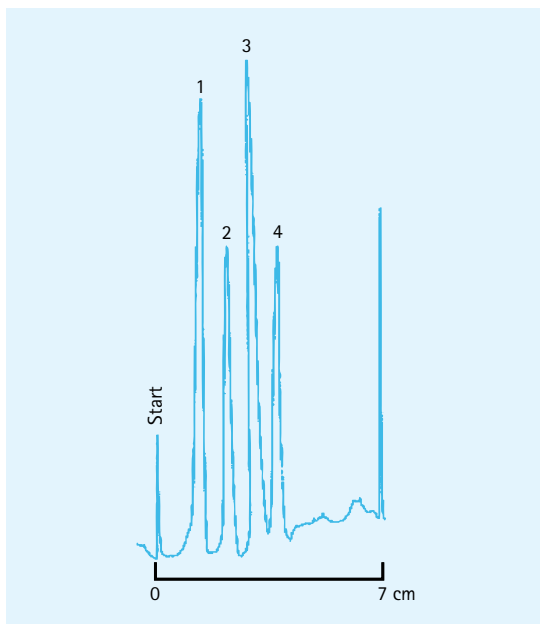
RP-modified silica plates

CN-, Diol- and  $\text{NH}_2$ -modified silica plates

Your benefits

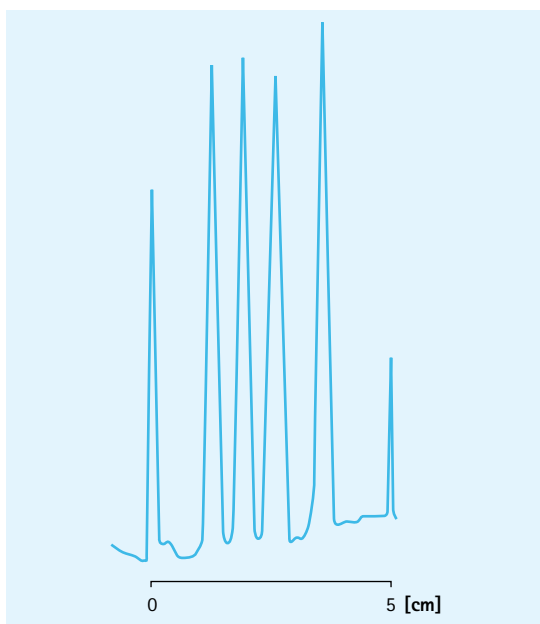
Applications





**Separation of oligonucleotides on a HPTLC NH<sub>2</sub>-modified silica gel 60 plate**

<b>Sample</b>	1. ApUpG 2. ApApU 3. ApApC 4. ApApA all 0.1%
<b>Sample volume</b>	200 nl
<b>Mobile phase</b>	Ethanol-water (60:40 v/v) plus 0.2 mM lithium chloride
<b>Detection</b>	UV 254 nm (TLC/HPTLC Scanner 2)



**Separation of gallic acid and esters on HPTLC silica RP-18 WF<sub>254S</sub>**

<b>Sample</b>	1. Dodecyl gallate 2. Butyl gallate 3. Ethyl gallate 4. Methyl gallate 5. Gallic acid
<b>Sample volume</b>	200 nl
<b>Mobile phase</b>	1 N acetic acid / methanol (70+30)
<b>Migration distance</b>	5 cm
<b>Detection</b>	UV 265 nm (TLC/HPTLC Scanner, Camag)

*RP-modified silica plates are especially suited for analysis of basic or acid substances as demonstrated by the good separation of gallic acid and its esters on HPTLC silica RP-18 WF<sub>254S</sub>*



## RP-modified silica plates (TLC and HPTLC)

Coating Material	Format [cm]	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Silica gel 60 RP-2 (silanized)*	20 x 20	25 plates	glass	M1057460001	5746-7
Silica gel 60 RP-2 F <sub>254s</sub> (silanized)*	20 x 20	25 plates	glass	M1057470001	5747-7
Silica gel 60 RP-8 F <sub>254s</sub> *	20 x 20	25 plates	glass	M1153880001	15388-7
	10 x 20	50 plates	glass	M1154240001	15424-6
	5 x 10	25 plates	glass	M1156840001	15684-1
Silica gel 60 RP-18 F <sub>254s</sub> *	20 x 20	25 plates	glass	M1153890001	15389-7
	10 x 20	50 plates	glass	M1154230001	15423-6
	5 x 20	50 plates	glass	M1156830001	15683-3
	5 x 10	25 plates	glass	M1156850001	15685-1
Silica gel 60 RP-18 F <sub>254s</sub>	20 x 20	20 sheets	aluminum	M1055590001	5559-7
	5 x 7.5	20 sheets	aluminum	M1055600001	5560-4
HPTLC silica gel 60 RP-2 F <sub>254s</sub>	10 x 10	25 plates	glass	M1137260001	13726-5
HPTLC silica gel 60 RP-8 F <sub>254s</sub>	10 x 10	25 plates	glass	M1137250001	13725-5
HPTLC silica gel 60 RP-18	20 x 10	25 plates	glass	M1059140001	5914-6
HPTLC silica gel 60 RP-18 W	20 x 10	25 plates	glass	M1142960001	14296-6
HPTLC silica gel 60 RP-18 F <sub>254s</sub>	20 x 10	25 plates	glass	M1162250001	-
	10 x 10	25 plates	glass	M1137240001	13724-5
HPTLC silica gel 60 RP-18 W F <sub>254s</sub>	10 x 10	25 plates	glass	M1131240001	13124-1

Layer thickness: 200 µm | \* Layer thickness: 250 µm | W: water resistant

F<sub>254s</sub>: fluorescent indicator | F<sub>254s</sub>\*: acid stable fluorescent indicator

CN-, Diol- and NH<sub>2</sub>- modified silica plates (TLC and HPTLC)

Coating Material	Format [cm]	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Silica gel 60 NH <sub>2</sub> F <sub>254s</sub>	20 x 20	20 sheets	aluminum	M1055330001	105533-7
HPTLC silica gel 60 CN F <sub>254s</sub>	10 x 10	25 plates	glass	M1164640001	16464-5
HPTLC silica gel 60 Diol F <sub>254s</sub>	10 x 10	25 plates	glass	M1126680001	12668-5
HPTLC silica gel 60 Diol F <sub>254s</sub>	20 x 10	25 plates	glass	M1056360001	-
HPTLC silica gel 60 NH <sub>2</sub>	20 x 10	25 plates	glass	M1125720001	12572-6
HPTLC silica gel 60 NH <sub>2</sub> F <sub>254s</sub>	20 x 10	25 plates	glass	M1131920001	-
HPTLC silica gel 60 NH <sub>2</sub> F <sub>254s</sub>	10 x 10	25 plates	glass	M1156470001	15647-5

Layer thickness: 200 µm

F<sub>254s</sub>: acid stable fluorescent indicator



# Cellulose plates (TLC and HPTLC)

## Analysis of polar substances

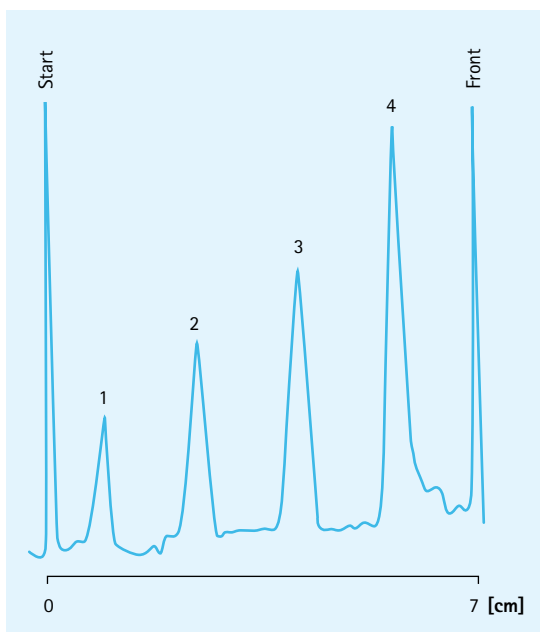
**For water lovers** Hydrophilic substances present their own challenges during separation. That's why we offer a particularly suitable solution: partition chromatography using the organic sorbent cellulose. The range includes classical TLC grade or the more sensitive HPTLC plates. TLC cellulose layers are based on microcrystalline cellulose for standard separations. In contrast, HPTLC cellulose layers utilize a high-purity, rod-shaped microcrystalline cellulose, resulting in highly reduced diffusion of analytes for critical high performance separations.

**For more options** EMD Millipore cellulose plates are available with or without fluorescent indicator. The fluorescent indicator used is a special fluorescent pigment that is stimulated to intense blue fluorescent reemission at long wave UV light of 366 nm and at short wave UV light of 254 nm.

The special PEI cellulose is polyethylenimine-modified, and acts as a strong basic anion exchanger. Due to these special characteristics it is mainly useful for analysis of substances with exchange-active groups, such as amino acids, peptides and nucleotides or nucleosides.

**Applications** Typical applications of cellulose plates include the analysis of amino acids, carbohydrates, phosphates, nucleic acids and nucleic acid derivatives for:

- 2-dimensional separations such as amino acid "fingerprints"
- Metabolic studies



### Separation of oligo-nucleotides

<b>Sample</b>	1. $(\text{NaPO}_3)_3$ 2. $\text{Na}_5\text{P}_3\text{O}_{10}$ 3. $\text{Na}_4\text{P}_2\text{O}_7$ 4. $\text{Na}_2\text{HPO}_4$
<b>Sample volume</b>	250 nl
<b>Mobile phase</b>	16% trichloroacetic acid dioxane sol. ammonia in 1 l water; 70/30
<b>Migration distance</b>	7 cm
<b>Detection</b>	586 nm (TLC/HPTLC Scanner, Camag)

*HPTLC cellulose is highly suited to separate polar compounds as demonstrated by the separation of phosphates.*



## Separation of amino acids

**Sample** Amino acid-mixture

**Detection** Ninhydrin spray

*2-dimensional separation of amino acids on a HPTLC cellulose plate*

## Cellulose plates (TLC and HPTLC)

Coating Material	Format [cm]	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Cellulose	20 x 20	25 plates	glass	M1057160001	5716-7
	10 x 20	50 plates	glass	M1057300001	5730-6
	10 x 10	100 plates	glass	M1056320001	5632-5
Cellulose F	20 x 20	25 plates	glass	M1057180001	5718-7
	10 x 20	50 plates	glass	M1057280001	5728-6
Cellulose	20 x 20	25 sheets	aluminum	M1055520001	5552-7
	500 x 20	1 roll	aluminum	M1055630001	-
Cellulose F	20 x 20	25 sheets	aluminum	M1055740001	5574-7
Cellulose	20 x 20	25 sheets	plastic	M1055770001	5577-7
Cellulose F	20 x 20	25 sheets	plastic	M1055650001	5565-7
HPTLC cellulose	20 x 10	50 plates	glass	M1057860001	5786-6
	10 x 10	25 plates	glass	M1057870001	5787-5
HPTLC cellulose F	20 x 10	50 plates	glass	M1150360001	15036-6
	10 x 10	25 plates	glass	M1150350001	15035-5
HPTLC cellulose	20 x 20	25 sheets	aluminum	M1160920001	16092-1
PEI cellulose F	20 x 20	25 plates	glass	M1057250001	5725-7
PEI cellulose F	20 x 20	25 sheets	plastic	M1055790001	5579-7

PEI cellulose plates should be stored cold (0–4°C) and dry to reduce deterioration. As plates become old they might get yellow colorations and should be discarded. F: fluorescent indicator with excitation wavelength 254/366 nm

# Concentrating zone plates (TLC, HPTLC, PLC)

## Quick and easy application of small to large volumes of diluted samples

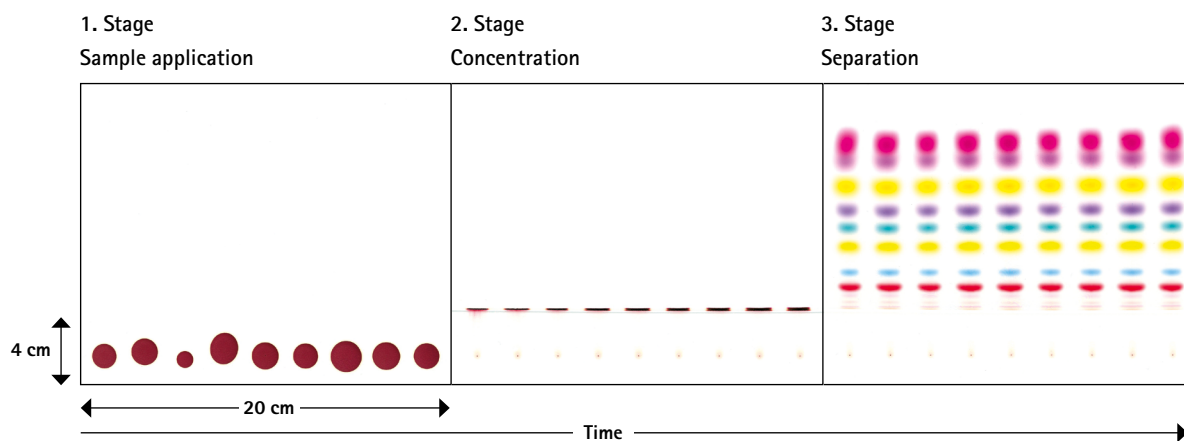
**A matter of seconds** Manual sample application need not be labor intensive or time consuming. EMD Millipore's concentrating zone plates are made to make your daily work easy. They are based on different adsorption properties of two silica adsorbents: an inert large pore concentrating adsorbent where the samples are applied, and a selective separation layer for the separation. Regardless of the shape, size or position of the spots, the sample always concentrates – within seconds – as a narrow band at the interface of the two adsorbents, where the separation starts.

**A quicker clean up** In addition, the concentrating zone can serve as a clean-up step for analytes in complex matrices. Analytical TLC and HPTLC concentration zone plates provide concentrating areas of 2.5 cm, whereas the concentrating zone of preparative plates (PLC) is 4 cm in length. The special RP-18 silica concentrating zone plate is optimized for the high-resolution separation of polycyclic aromatic hydrocarbons (PAH) according to DIN 38409-H13. These samples are derived from organic material by pyrolysis or incomplete combustion.

- Your benefits**
- Quick and easy sample application
  - Highly facilitated sample loading
  - Better resolution due to sharp bands
  - Includes a purification and concentration step

**Applications** Concentrating zone plates make sample application easy, whenever manual sample application has to be used.

Stages of the development of a PLC concentrating zone plate silica gel 60. Separation of lipophilic dyes with toluene as mobile phase. Dot-like sample application



## TLC concentrating zone plates

Coating Material	Format [cm]	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Silica gel 60 concentrating zone 2.5 x 20 cm	20 x 20	25 plates	glass	M1118450001	11845-7
Silica gel 60 concentrating zone 2.5 x 10 cm	10 x 20	50 plates	glass	M1118440001	11844-6
Silica gel 60 concentrating zone 2.5 x 20 cm*	20 x 20	25 sheets	aluminum	M1055820001	5582-7
Silica gel 60 F <sub>254</sub> concentrating zone 2.5 x 20 cm	20 x 20	25 plates	glass	M1117980001	11798-7
Silica gel 60 F <sub>254</sub> concentrating zone 2.5 x 10 cm	10 x 20	50 plates	glass	M1118460001	11846-6
Silica gel 60 F <sub>254</sub> concentrating zone 2.5 x 20 cm*	20 x 20	25 sheets	aluminum	M1055830001	5583-7

Layer thickness: 250 µm | \* Layer thickness: 200 µm

 F<sub>254</sub>: fluorescent indicator

## HPTLC concentrating zone plates

Coating Material	Format [cm]	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
HPTLC silica gel 60 concentrating zone 2.5 x 20 cm	20 x 10	50 plates	glass	M1137490001	13749-6
HPTLC silica gel 60 concentrating zone 2.5 x 10 cm	10 x 10	25 plates	glass	M1137480001	13748-5
HPTLC silica gel 60 F <sub>254</sub> concentrating zone 2.5 x 20 cm	20 x 10	50 plates	glass	M1137280001	13728-6
HPTLC silica gel 60 F <sub>254</sub> concentrating zone 2.5 x 10 cm	10 x 10	25 plates	glass	M1137270001	13727-5
HPTLC silica gel 60 F <sub>254</sub> concentrating zone 2.5 x 5 cm	5 x 10	25 plates	glass	M1131870001	13187-1
HPTLC silica gel 60 RP-18 PAH concentrating zone 2.5 x 20 cm	20 x 10	25 plates	glass	M1150370001	15037-6
HPTLC silica gel 60 RP-18 F <sub>254s</sub> concentrating zone 2.5 x 20 cm	20 x 10	25 plates	glass	M1154980001	15498-6

Layer thickness: 200 µm

 F<sub>254</sub>: fluorescent indicator | F<sub>254s</sub>: acid stable fluorescent indicator

## PLC concentrating zone plates, glass backed

Coating Material	Format [cm]	Layer thickness	Content	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Silica gel 60 F <sub>254</sub> concentrating zone 4 x 20 cm	20 x 20	0.5 mm	20 plates	M1137940001	13974-7
	20 x 20	1 mm	15 plates	M1137920001	13792-7
	20 x 20	2 mm	12 plates	M1137930001	13793-7

 F<sub>254</sub>: fluorescent indicator

# Kieselguhr and mixed layer plates

## For specific applications

**Nature's filter** Kieselguhr is a natural diatomaceous earth that can be used for the separation of polar or moderately polar compounds. For the mixed layer plates a combination of classical silica gel 60 and kieselguhr is utilized, providing favorable properties for certain applications such as separations of inorganic ions, herbicides or steroids.

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### TLC plates kieselguhr, silica gel / kieselguhr

Coating Material	Format [cm]	Layer thickness	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Kieselguhr F <sub>254</sub>	20 x 20	200 µm	25 plates	glass	<b>M1057380001</b>	<b>5738-7</b>
Kieselguhr F <sub>254</sub>	20 x 20	200 µm	25 sheets	aluminum	<b>M1055680001</b>	<b>5568-7</b>
Silica gel 60 / Kieselguhr F <sub>254</sub>	20 x 20	200 µm	25 sheets	aluminum	<b>M1055670001</b>	<b>5567-7</b>

F<sub>254</sub>: fluorescent indicator



# GLP plates (TLC and HPTLC)

## With individual laser coding for GLP applications

Laser coded GLP plates make documentation, archiving and back tracing of your separations simpler than ever before. All plates are marked with item, batch and individual plate number, which makes them great for GLP. Based on the same proven EMD Millipore silica 60, our GLP plates perform exactly as the corresponding TLC or HPTLC plates. The plates are available in various formats, with or without fluorescence indicator  $F_{254}$ , which is stimulated to green emission at 254 nm.

- Convenient back tracing of article, batch, and individual plate number
- Every plate can easily be documented and archived
- Same reliable performance as other EMD Millipore plates

Great laboratory practices (GLP)

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Your benefits



GLP-Plate with additional information

### GLP plates

Coating Material	Format [cm]	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
TLC GLP silica gel 60 $F_{254}$	20 x 20	25 plates	glass	M1055660001	105566-7
	10 x 20	25 plates	glass	M1057020001	-
HPTLC GLP silica gel 60	10 x 20	25 plates	glass	M1133260001	-
HPTLC GLP silica gel 60 $F_{254}$	10 x 20	25 plates	glass	M1056130001	5613-6
	10 x 10	25 plates	glass	M1055640001	-

$F_{254}$ : fluorescent indicator

# Multiformat plates (TLC and HPTLC)

## Multiple sizes in one single plate

**Snap to size** One size fits all with EMD Millipore Multiformat plates. That's because the glass is pre-scored for easy breaking to various sizes. The plates utilize the same silica coating as the corresponding TLC or HPTLC plate, thus deliver chromatograms that are identical to those of the non-scored plates. Depending on the scoring, up to 7 different formats are possible: 20 x 20 cm, 15 x 20 cm, 10 x 20 cm, 5 x 20 cm, 10 x 15 cm, 10 x 10 cm and 5 x 10 cm.

- Your benefits**
- Easy snapping with fingers to smaller sizes
  - Up to 7 formats in one plate



*Note: To prevent the glass backing from uncontrolled and irregular breaking avoid putting plates directly on hot metal plates, drying cabinets or plate heaters after development or staining. When heat drying is necessary, use distance holders of low thermal conductivity between glass and hot metal plate i.e. glass rods or similar.*

### Multiformat plates

Coating Material	Scored [cm]	Content	No. of plates possible	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Multiformat silica gel 60 F <sub>254</sub> 20 x 20	5 x 10	25 plates	200	M1056200001	105620-7
Multiformat silica gel 60 F <sub>254</sub> 20 x 20	5 x 20	20 plates	80	M1056080001	5608-7
HPTLC Multiformat silica gel 60 F <sub>254</sub> 10 x 10	5 x 5	25 plates	100	M1056350001	5635-5
HPTLC Multiformat silica gel 60 10 x 10	5 x 5	100 plates	400	M1056440001	5644-5

F<sub>254</sub>: fluorescent indicator



# ProteoChrom® HPTLC plates

## For peptide analysis

To support the increasing importance of proteomics in the pharmaceutical industry, we offer our latest breakthrough: ProteoChrom® HPTLC plates. Optimized for highly efficient separation, these plates are especially suitable for the analysis of peptides and protein digests.

For ProteoChrom® HPTLC Silica gel 60 F<sub>254s</sub> plates, an extra thin layer of high performance EMD Millipore silica gel is used, providing highly efficient separation characteristics for 1-D analysis of peptides and protein digests. Up to 20 peptides can be resolved and as little as 1 - 2 ng per band can be visualized.

For ProteoChrom® HPTLC Cellulose sheets, an extra thin layer of optimized microcrystalline cellulose is utilized. Specially developed protocols for development and staining enable a straightforward 2-D analysis in just 4 hours.

- Highly reproducible: optimized separation and staining procedures
- Convenient, easy to follow, detailed protocols included
- Sensitive: extra thin layers of 100 µm
- Highly stable in water, ideal for use with aqueous solvent systems

The new ProteoChrom® plates open a new application field for thin layer chromatography.

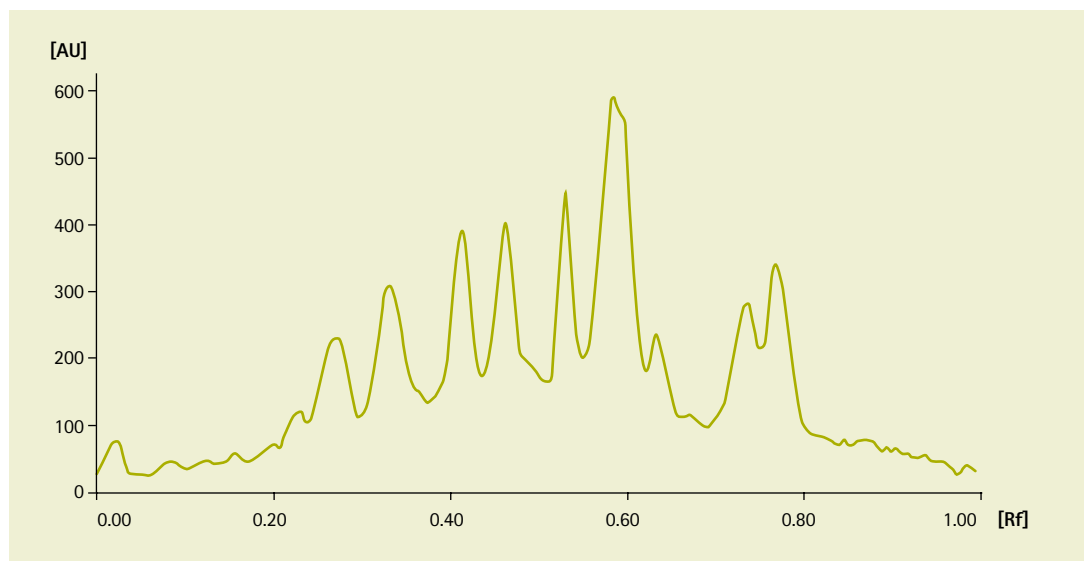
Innovate with  
our latest innovation

23

Highly sensitive

Your benefits

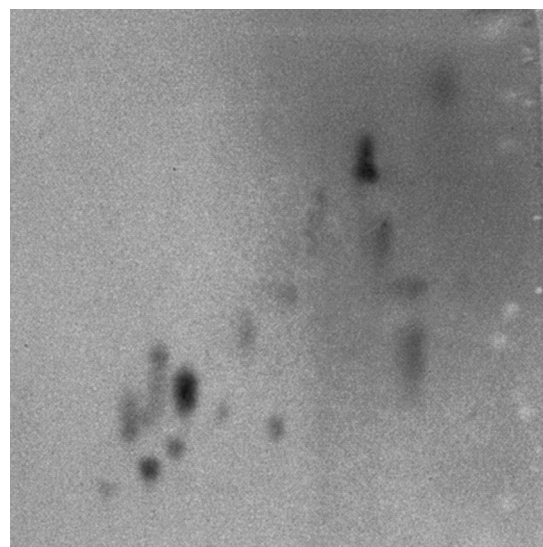
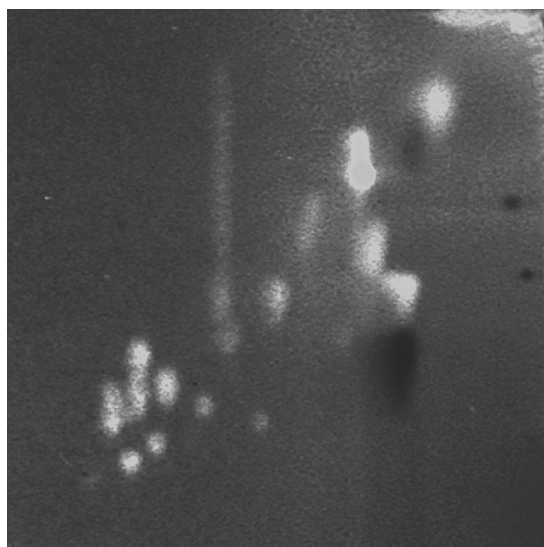
Applications



Densitogram of a tryptic digest of b-Casein. A tryptic digest of b-Casein was separated on a ProteoChrom® HPTLC Silica gel 60 F<sub>254s</sub> plate followed by fluorescamine staining and scanned with a CAMAG TLC Scanner III in fluorescence mode at UV 366.

## Applications

Cytochrome C tryptic digests were 2-D separated on ProteoChrom® HPTLC Cellulose sheet followed by either (chromaticity of the pictures was modified):



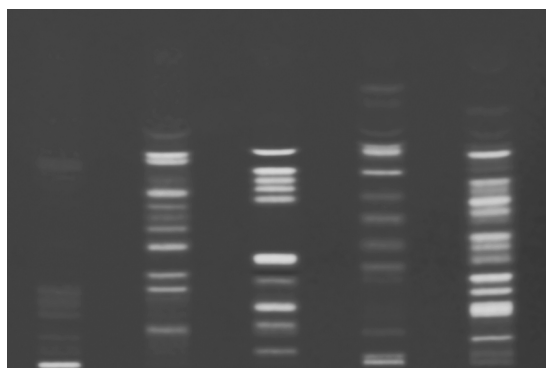
(A) fluorescamine staining, or

(B) staining with ninhydrin

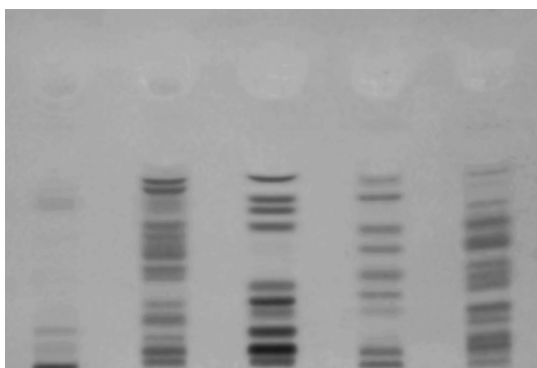
### 2-dimensional HPTLC of single protein digests on a ProteoChrom® HPTLC Cellulose sheet

Sample volume	5 µl
Concentration	2 mg/ml
Application system	Automatic TLC Sampler 4 (CAMAG)
Mobile phases	1st dimension: 2-butanol/pyridine/acetic acid/water (30/20/6/24), 1D 2nd dimension: 2-butanol/pyridine/ammonia (25%) / water (39/34/10/26), 2D
Migration distance	5 cm
Migration time	1st dimension: 44 min 2nd dimension: 50 min
Staining/detection	A: Fluorescamine      B: Ninhydrin

Tryptic digests of various proteins were separated on a ProteoChrom® HPTLC Silica gel 60 F<sub>254s</sub> plate followed by either (chromaticity of the pictures was modified):



(A) fluorescamine staining, or



(B) staining with ninhydrin

#### 1-dimensional separation of single protein digests on a ProteoChrom® HPTLC Silica gel 60 F<sub>254s</sub> plate

Sample volume	A: 1.5 µl	B: 4 µl
Concentration	2 mg/ml	
Application system	Automatic TLC Sampler 4 (CAMAG)	
Mobile phases	2-butanol/pyridine/ammonia (25%) / water (39/34/10/26)	
Migration distance	5 cm	
Migration time	45 min	
Staining/detection	A: Fluorescamine	B: Ninhydrin

#### ProteoChrom® HPTLC plates

Coating Material	Format [cm]	Layer thickness	Content	Backing	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
ProteoChrom® HPTLC silica gel 60 F <sub>254s</sub>	20 x 10	100 µm	25 plates	glass	M1056500001	-
ProteoChrom® HPTLC Cellulose	10 x 10	100 µm	25 sheets	aluminum	M1056510001	-

F<sub>254s</sub>: acid stable fluorescent indicator

Each ProteoChrom® package includes an insert sheet with detailed instructions for solvent systems, running conditions and staining solution, enabling straightforward experiments without time-consuming optimization work.

# TLC silica gel 60G plates

## Highly robust plates with gypsum as binder, fully compliant with international pharmacopoeia

**The status quo** Traditionally, TLC monographs in pharmacopoeia refer to products using silica G, containing gypsum as binder, or silica H with no foreign binder. There are about 200 monograph methods in the European Pharmacopoeia (Ph Eur) referring to these plates\*.

**Ph Eur and USP** Fully compliant with international pharmacopoeia

These new TLC silica gel 60G plates are recommended for customers in QA/QC labs using older Ph Eur monograph methods, which require TLC plates with gypsum binder, and who do not wish to switch to classical EMD Millipore TLC plates with organic binders.

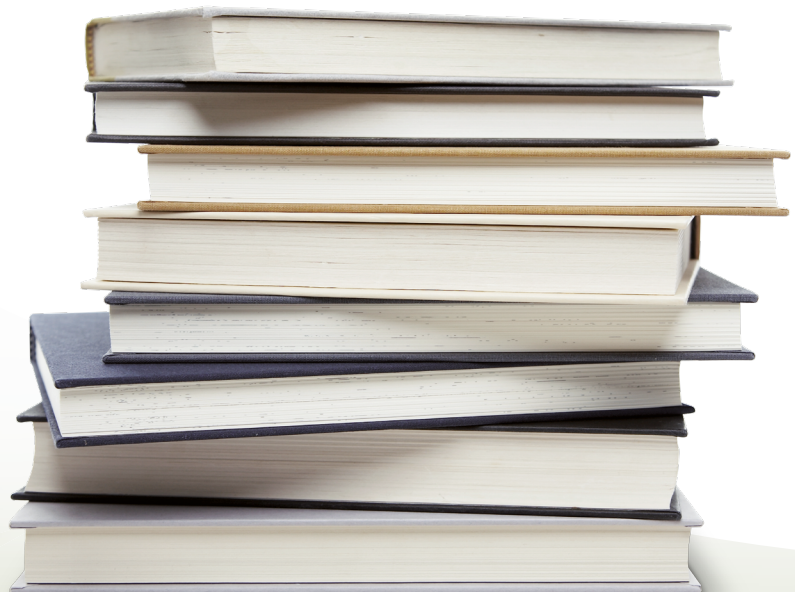
EMD Millipore's classical TLC plates fulfill the performance test requirements of Ph Eur for G plates with gypsum, even though they use modern organic binders. Today, many customers routinely use these classical TLC plates in place of gypsum plates, and indeed several monographs have been updated to officially confirm this change.

**Additional information  
about Ph Eur**

The following publications (german only) feature monographs of Ph Eur on pre-coated TLC plates:  
*P. Pachaly: DC-Atlas-Dünnschicht-Chromatographie in der Apotheke, Wissenschaftliche Verlagsgesellschaft Stuttgart 1999, ISBN 3-8047-1623-7.* Includes many documented monographs of Ph Eur on EMD Millipore TLC plates.

*Jürgen Wolf: Mikro-DC, PZ-Schriftenreihe: Vorschriften auf Basis des Ph Eur, DAB und DAC. Govi-Verlag, Eschborn 1999, ISBN 3-7741-0736-X.* This book features a broad range of monographs of the Ph Eur evaluated on EMD Millipore TLC aluminum sheets Si 60.

\* **The United States Pharmacopoeia (USP) does not distinguish between TLC plates with gypsum or organic binder, thus EMD Millipore standard plates can always be used.**



In addition to the standard EMD Millipore QC test, the new TLC silica gel 60G plates are tested using the TLC performance test described by Ph Eur.

**Description:** Chromatographic separation. Apply to the plate an appropriate volume (10 µl for a normal TLC plate and 1 µl to 2 µl for a fine particle size plate) of TLC performance test solution R (Reagent 1116600). Develop over a path length two-thirds of the plate height, using a mixture of 20 volumes of methanol R and 80 volumes of toluene R. The plate is not satisfactory, unless the chromatogram shows four clearly separated spots, the spot of bromocresol green with an  $R_f$  value less than 0.15, the spot of methyl orange with an  $R_f$  value in the range of 0.1 to 0.25, the spot of methyl red with an  $R_f$  value in the range of 0.35 to 0.55 and the spot of Sudan red G with an  $R_f$  value in the range of 0.75 to 0.98.

Ph Eur  
performance test for  
TLC/HPTLC plates

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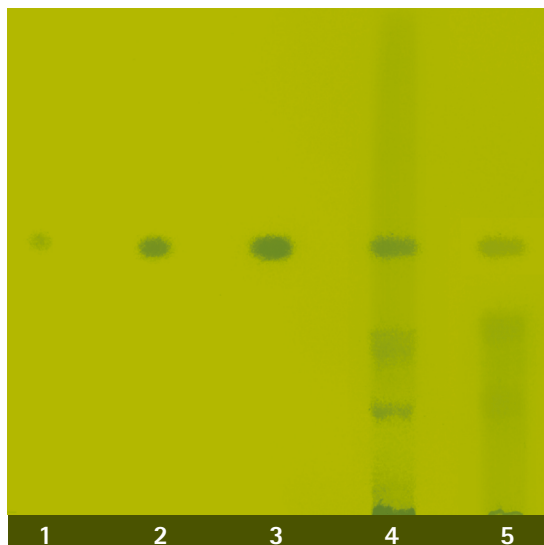
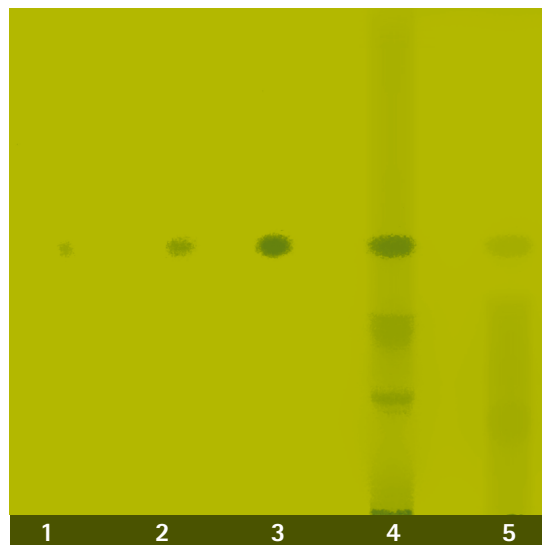
The chromatogram shows four clearly separated spots under Ph Eur test conditions and fulfils Ph Eur requirements (see  $R_f$  values).

#### Ph Eur performance test on EMD Millipore TLC silica gel 60G plate

Parameter	Specification [ $hR_f$ values*]	Typical value
Separation	4 clearly separated spots	passed
Bromocresol green	< 15	5
Methyl orange	10 – 25	10
Methyl red	35 – 55	38
Sudan red G	75 – 98	82

\*  $hR_f = R_f \times 100$

## Applications

A.\*Silica Gel 60G F<sub>254</sub> (chromaticity of the picture was modified)B.\*Silica Gel 60 F<sub>254</sub> (chromaticity of the picture was modified)

Samples	Track	Application volume
	1: Coffeine	0.5 µl (0.1 mg/ml)
	2: Coffeine	1.0 µl (0.1 mg/ml)
	3: Coffeine	2.0 µl (0.1 mg/ml)
	4: Coffee	2.0 µl
	5: Coca-Cola	2.0 µl
Sample application	Capillaries 0.5 µl, 1 µl and 2 µl	
Stationary phase	A. TLC plates silica gel 60 G F <sub>254</sub> (Ord. No. M1003900001)	
	B. TLC plates silica gel 60 F <sub>254</sub> (Ord. No. M1057150001)	
Chromatography	In the normal flat bottom chamber 20x20 cm with Isopropanol/ n-Heptan/ water 7:3:1	
Migration distance	100 mm	
Migration time	145 min	
Documentation	UV 254 nm	

## TLC silica gel 60G, glass backed

Coating Material	Format [cm]	Content	Backing	Ord. No. From Jan. 1st, 2013	Ord. No. Until Dec. 31st, 2012
TLC Silica gel 60G F <sub>254</sub>	20 x 20	25 plates	glass	M1003900001	-
TLC Silica gel 60G	20 x 20	25 plates	glass	M1003840001	-

Both new plates have similar separation performance to our classical TLC plates; the only difference is that gypsum is used as binder.

F<sub>254</sub>: fluorescent indicator

# Loose sorbents for the preparation of TLC plates

## Standardized sorbents for reliable results

Silica gel 60 sorbent is the most versatile and most widely used material in TLC. To suit a broad range of TLC and PLC needs, EMD Millipore offers various silica gel 60 sorbents with a particle size distribution of 5 - 40  $\mu\text{m}$ : silica with gypsum as binder, silica with no foreign binder, and silica gel with fluorescence indicator. In addition, high quality aluminum oxide, cellulose microcrystalline and kieselguhr are offered.

Self-coating of layers is time consuming and requires experimental experience for high quality results. For analytical TLC, particularly for quantitative work we highly recommend the use of pre-coated plates.

Unique quality,  
unlimited flexibility



## Loose sorbents for TLC and PLC plates (particle size 5 – 40 µm)

Coating Material	Method	Package	Contents of one package	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Silica gel 60 G	Classical TLC	Plastic	1 kg	M1077311000	-
		Tin	5 kg	M1077315000	M1077315003
		Tin	25 kg	M1077319025	-
Silica gel 60 G F <sub>254</sub>	Classical TLC	Plastic	1 kg	M1077301000	-
		Tin	5 kg	M1077305000	-
		Tin	25 kg	M1077309025	-
Silica gel 60 G F <sub>254</sub> *	TLC	Plastic	1 kg	M1116781000	-
Silica gel 60 H	TLC	Plastic	1 kg	M1077361000	-
		Tin	2.5 kg	M1077362500	-
		Tin	25 kg	M1077369025	7736-9
Silica gel 60 H*	TLC	Plastic	1 kg	M1116951000	-
Silica gel 60 H F <sub>254</sub>	TLC	Plastic	1 kg	M1077391000	-
		Tin	2.5 kg	M1077392500	-
		Tin	25 kg	M1077399025	-
Silica gel 60 H F <sub>254+366</sub>	TLC	Plastic	1 kg	M1077411000	-
Silica gel 60 P F <sub>254</sub>	PLC	Plastic	1 kg	M1077471000	-
		Tin	2.5 kg	M1077472500	M1077472500
		Tin	25 kg	M1077479025	-
Silica gel 60 P F <sub>254+366</sub>	PLC	Plastic	1 kg	M1077481000	-
		Tin	2.5 kg	M1077482500	-
Silica gel 60 P F <sub>254</sub> with gypsum	PLC	Plastic	1 kg	M1077491000	-
		Tin	2.5 kg	M1077492500	-
		Tin	25 kg	M1077499025	-

\* Mean particle size 15 µm | G: with gypsum | H: without foreign binder | P: for preparative work

F<sub>254</sub>: fluorescent indicator

## Aluminum oxide for TLC and PLC (particle size 5 – 40 µm)

Material	Method	pH of 10% aqueous suspension	Package	Contents of one package	Ord. No. From Oct. 1st, 2012
Aluminum oxide 60 G neutral	TLC	7.5	Plastic	2.5 kg	M1010902500
		7.5	Plastic	25 kg	M1010909025
Aluminum oxide 60 G F <sub>254</sub> neutral	TLC	7.5	Plastic	500 g	M1010920500

## Other sorbents for TLC

Material	Particle size	Package	Contents of one package	Ord. No. From Oct. 1st, 2012
Cellulose microcrystalline	< 20 µm	Plastic	500 g	M1023300500



# Accessories

We think of every detail of your analysis and equip you with all the tools you need to ensure that your work is a success.

Well-equipped

To visualize colorless substances, an even and very finely divided spray solution is essential for optimal staining of TLC plates. EMD Millipore's TLC sprayer allows you to spray derivatization reagents homogeneously onto the developed chromatograms. It is equipped with two different spray heads (white and black) of 1.5 mm (i.d.), optimized for both low- and high-viscosity solutions. The electro-pneumatically operated sprayer uses compressed air driven by accumulator power and inductive charging. Our ready-to-use spray solutions can be screwed directly onto the sprayer, eliminating cumbersome pouring of the solutions.

TLC sprayer

The three most common spray solutions used in TLC are offered in a ready-to-use format with optimized packing that fits directly onto the sprayer.

Spray solutions

Two UV lamps, powered by five 1.5 V baby cells (8UM2) are intended for the quick detection of substances under short- or long-wavelength UV light.

UV lamp

## Accessories and auxiliaries

Product	Contents of one package	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Micro capillaries 2.0 µl	50 capillaries	M1102900001	-
UV lamp 254 nm	1 unit	M1125370001	12537-1
UV lamp 366 nm	1 unit	M1132030001	-
TLC sprayer with two spray heads	1 unit	M1085400001	-
Spray heads for TLC sprayer	5 pieces (0.8 mm); 1 piece (1.25 mm)	M1085410001	-
Glass bottles 50 ml	10 bottles	M1106470001*	-
Glass bottles 100 ml	10 bottles	M1106460001*	-

\* Available from Apr. 1st, 2014

## Ready-to-use spray solutions

Product	Solvent	Package	Contents of one package	Ord. No. From Oct. 1st, 2012	Ord. No. Until Sep. 30th, 2012
Dragendorff-Reagent	Acetic acid / ethyl acetate / water	Glass	100 ml	M1020350100	-
Molybdato-phosphoric acid	2-propanol	Glass	100 ml	M1004800100	-
Ninhydrin	2-propanol	Glass	100 ml	M1067050100	-

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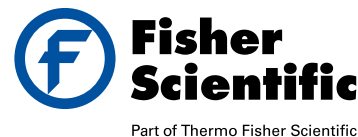
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