

TLC PLATES

- Economical separation method
- High sample throughput
- Pilot procedure for HPLC and flash chromatography
- Versatile range of ready-to-use layers

Thin layer chromatography (TLC) is a simple, fast and highly versatile separation tool for both qualitative and quantitative analyses. The areas of application cover virtually all classes of compounds. About 80% of all TLC separations are performed using unmodified silica as the separation medium. Other commonly used adsorbents include modified silica, aluminium oxide and cellulose. Silica has the advantage of being able to use thicker layers (up to 2mm), suitable for preparative TLC.

Macherey-Nagel TLC Plates

Macherey-Nagel offers a wide selection of TLC plates. In addition to glass plates, flexible plates are available on aluminium sheets (ALUGRAM®) and polyester sheets (POLYGRAM®). These are more economical than glass plates and have the advantage of being easy to cut. ALUGRAM Xtra aluminium sheets exhibit outstanding wettability even with 100% aqueous eluents. They also show improved cutting properties due to an optimised binder system. TLC plates produced by Macherey-Nagel are coated with the same silica used for Macherey-Nagel flash products.

The properties of a range of unmodified silica adsorbents for TLC and HPTLC are summarised below.

Standard unmodified silica	
SIL G	Silica 60, standard grade, particle size 5-17µm
ADAMANT	Silica 60, improved binder system, optimised particle size distribution
DURASIL	Silica 60, special binder system, more polar than SIL G
SIL N-HR	High purity silica 60, special binder system, higher gypsum content
SILGUR	Silica 60 with kieselguhr concentrating zone
Unmodified silica for HPTLC	
Nano-SIL	Nano silica 60, standard grade, particle size 2-10µm
Nano-ADAMANT	Nano silica 60, optimised binder system and particle size distribution
Nano-DURASIL	Nano silica 60, special binder system
Nano-SILGUR	Nano silica 60, with kieselguhr concentrating zone

SIL G

Standard grade silica (SIL G) has a pore size of 60Å and a particle size of 5-17µm. The binder is stable in almost all organic solvents and resistant towards aggressive visualisation reagents.

ADAMANT

ADAMANT glass TLC plates are based on standard grade silica 60, with optimised particle size distribution for increased separation efficiency, and an improved binder system resulting in outstanding hardness and abrasion resistance. They are suitable for trace analyses due to a UV indicator with increased brilliance and a low background noise.

Nano Silica HPTLC (Nano-SIL) Plates

For high performance TLC separations, the same silica 60 is used, but with a particle size distribution of 2-10µm. This narrower particle size fractionation allows sharper separations, shorter development times, shorter migration distances and increased detection sensitivity compared to SIL G plates.

TLC and HPTLC Plates with Concentrating Zone (SILGUR and nano-SILGUR)

Plates with concentrating zones are a valuable aid for manual sample application. The kieselguhr concentrating zone is completely inert towards a large number of compounds. Samples always form a narrow band at the interface of the silica and kieselguhr adsorbents, irrespective of shape, size or position of the spots in the concentrating zone (see Figure 1). Separation then takes place in the silica layer.

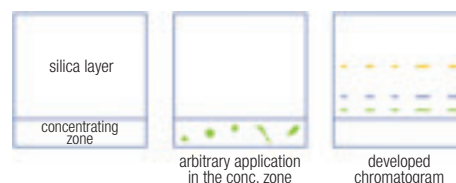


Figure 1. TLC plate with concentrating zone

Modified Silica Layers

Although the majority of TLC separations are performed on unmodified hydrophilic silica, reversed-phase TLC plates are also available. These are prepared by total (100%) or partial (50%) bonding of C18 groups to the nano silica (2-10µm, 60Å). Nano-SIL CN, NH₂ and Diol are also available – please contact Hichrom for details.

Other Adsorbents

A range of aluminium oxide and cellulose adsorbent TLC plates are available as glass plates, or polyester or aluminium sheets. In addition, a range of alternative adsorbents for specific applications is offered.

Ordering information for unmodified silica plates for TLC and HPTLC is given on the following page. Please contact Hichrom for details of TLC and HPTLC plates with modified silica or other adsorbents.

Macherey-Nagel TLC Plates (continued)



Ordering Information

Standard Silica (SIL G) TLC plates

Description	Layer (mm)	Plate Size ¹ (cm)	Pack Size	Cat. No.	Price
Glass plates					
SIL G-25	0.25	5 x 10	50 ²	809017	
SIL G-25	0.25	5 x 20	100	809011	
SIL G-25	0.25	10 x 20	50	809012	
SIL G-25	0.25	20 x 20	25	809013	
SILGUR-25	0.25	10 x 20	50	810012	
SILGUR-25	0.25	20 x 20	25	810013	
POLYGRAM polyester sheets					
SIL G	0.20	4 x 8	50	805032	
SIL G	0.20	5 x 20	50	805012	
SIL G	0.20	20 x 20	25	805013	
ALUGRAM aluminium sheets					
SIL G	0.20	5 x 10	50	818161	
SIL G	0.20	10 x 20	20	818163	
SIL G	0.20	20 x 20	25	818033	
ALUGRAM Xtra aluminium sheets					
SIL G	0.20	5 x 10	50	818261	
SIL G	0.20	5 x 20	50	818232	
SIL G	0.20	20 x 20	25	818233	
SILGUR	0.20	10 x 20	20	818412	
SILGUR	0.20	20 x 20	25	818413	

¹ Other dimension plates available² Other pack sizes available

Standard Silica (SIL G) TLC plates with UV indicator

Description	Layer (mm)	Plate Size ¹ (cm)	Pack Size	Cat. No.	Price
Glass plates					
SIL G-25 UV ₂₅₄	0.25	5 x 10	50 ²	809027	
SIL G-25 UV ₂₅₄	0.25	5 x 20	100	809021	
SIL G-25 UV ₂₅₄	0.25	10 x 20	50	809022	
SIL G-25 UV ₂₅₄	0.25	20 x 20	25	809023	
SILGUR-25 UV ₂₅₄	0.25	10 x 20	50	810022	
SILGUR-25 UV ₂₅₄	0.25	20 x 20	25	810023	
POLYGRAM polyester sheets					
SIL G/UV ₂₅₄	0.20	4 x 8	50	805021	
SIL G/UV ₂₅₄	0.20	5 x 20	50	805022	
SIL G/UV ₂₅₄	0.20	20 x 20	25	805023	
ALUGRAM aluminium sheets					
SIL G/UV ₂₅₄	0.20	5 x 10	50	818160	
SIL G/UV ₂₅₄	0.20	10 x 20	20	818162	
SIL G/UV ₂₅₄	0.20	20 x 20	25	818133	
ALUGRAM Xtra aluminium sheets					
SIL G/UV ₂₅₄	0.20	5 x 10	50	818360	
SIL G/UV ₂₅₄	0.20	5 x 20	50	818332	
SIL G/UV ₂₅₄	0.20	20 x 20	25	818333	
SILGUR UV ₂₅₄	0.20	10 x 20	20	818422	
SILGUR UV ₂₅₄	0.20	20 x 20	25	818423	

Nano-SIL TLC plates

Description	Layer (mm)	Plate Size ¹ (cm)	Pack Size	Cat. No.	Price
Glass plates					
Nano-SIL-20	0.20	5 x 5	100	811011	
Nano-SIL-20	0.20	10 x 20	50	811013	
Nano-SILGUR-20	0.20	10 x 10	25	811032	
ALUGRAM aluminium sheets					
Nano-SIL G	0.20	20 x 20	25	818141	
ALUGRAM Xtra aluminium sheets					
Nano-SIL G	0.20	5 x 20	50	818240	
Nano-SIL G	0.20	20 x 20	25	818241	
Nano-SILGUR	0.20	10 x 10	25	818432	

¹ Other dimension plates available

Nano-SIL TLC plates with UV indicator

Description	Layer (mm)	Plate Size ¹ (cm)	Pack Size	Cat. No.	Price
Glass plates					
Nano-SIL-20 UV ₂₅₄	0.20	5 x 5	100	811021	
Nano-SIL-20 UV ₂₅₄	0.20	10 x 20	50	811023	
Nano-SILGUR-20 UV ₂₅₄	0.20	10 x 10	25	811042	
ALUGRAM aluminium sheets					
Nano-SIL G/UV ₂₅₄	0.20	20 x 20	25	818143	
ALUGRAM Xtra aluminium sheets					
Nano-SIL G/UV ₂₅₄	0.20	5 x 20	50	818342	
Nano-SIL G/UV ₂₅₄	0.20	20 x 20	25	818343	
Nano-SILGUR UV ₂₅₄	0.20	10 x 10	25	818442	

ADAMANT Silica TLC plates (glass)

Description	Layer (mm)	Plate Size ¹ (cm)	Pack Size	Cat. No.	Price
ADAMANT	0.25	5 x 10	50 ²	821040	
ADAMANT	0.25	10 x 10	25	821050	
ADAMANT	0.25	20 x 20	25	821060	

¹ Other dimension plates available² Other pack sizes available

ADAMANT Silica TLC plates (glass) with UV indicator

Description	Layer (mm)	Plate Size ¹ (cm)	Pack Size	Cat. No.	Price
ADAMANT UV ₂₅₄	0.25	2.5 x 7.5	100	821005	
ADAMANT UV ₂₅₄	0.25	5 x 10	50 ²	821010	
ADAMANT UV ₂₅₄	0.25	10 x 10	25	821020	
ADAMANT UV ₂₅₄	0.25	10 x 20	50	821025	
ADAMANT UV ₂₅₄	0.25	20 x 20	25	821030	

Merck Millipore TLC Plates

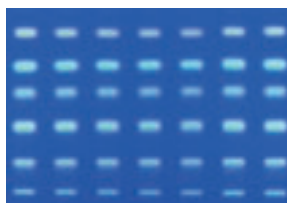
Merck Millipore offer a wide range of classical TLC plates for manual operation and HPTLC (High Performance TLC) plates for automated operations. Merck Millipore introduced the first pre-coated plates on the market. TLC plates in a wide range of chemistries, sizes and backing materials, to suit a variety of applications, are offered. The features of a selection of these plates are summarised below.

Classical Silica TLC Plates. These are based on Merck silica gel with a pore size of 60Å and surface area of 520m²/g. Classical silica TLC plates have a layer thickness of 250µm (glass plates) or 200µm (aluminium or plastic backed plates) and a mean particle size of 10-12µm.

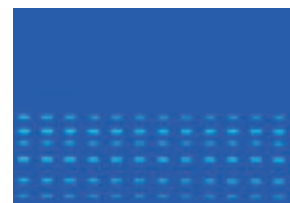
Applications: Wide range

High Performance Silica Plates (HPTLC). Merck HPTLC plates offer higher speed and higher sensitivity than classical TLC plates. They utilise optimised silica gel 60 with a particle size of only 5-6µm and thinner layers (<200µm). Glass or aluminium backed plates, with or without fluorescent indicator are available.

Applications: Identity testing in analysis of herbal medicines, quantitative QC separations of drugs, trace analysis in food



A. Classical TLC silica gel 60 plate



B. HPTLC silica gel 60 plate

LiChrospher® HPTLC Plates. LiChrospher® HPTLC plates are based on spherical silica particles (60Å pore size, 7µm particle size), for the ultimate TLC performance, speed and sensitivity, enabling high throughput analysis of complex samples. They enable lower detection limits and higher resolution to be achieved, compared to TLC.

Applications: Complex low concentration samples eg. pesticide mixtures, pharmaceuticals

RP-Modified Silica Plates (TLC and HPTLC). RP-modified (RP-2, RP-8 or RP-18) silica layers are suitable for separations insufficiently resolved on unmodified silica. Glass and aluminium backed plates are available.

Applications: Amides, antibiotics, fatty acids, non-polar substances using aqueous solvents

CN-, Diol- and NH₂-Modified Plates (TLC and HPTLC). These are less polar than the classical silica phases and therefore suited for the separation of hydrophilic or charged substances. The amino modified plates offer an alternative to PEI cellulose.

Applications: CN-silica – benzodiazepines, pesticides, plasticisers, tetracyclines, antibiotics

Diol-silica – glycosides, anabolic steroids, aromatic amines, dihydroxybenzoic acids

NH₂-silica – charged compounds eg. nucleotides, phenols, sulphones

Aluminium Oxide TLC Plates. These TLC plates utilise neutral or basic aluminium oxide of 60Å or 150Å pore size, with or without fluorescence indicator to suit different application needs. Under aqueous conditions basic compounds are best separated on basic aluminium oxide plates, while neutral compounds are best separated on neutral plates.

Cellulose Plates (TLC and HPTLC). Cellulose plates are ideal for separating hydrophilic compounds by partition chromatography. Glass, aluminium and plastic backed TLC plates as well as glass and aluminium backed HPTLC plates are available.

Applications: Amino acids, carbohydrates, phosphates, nucleic acids and nucleic acid derivatives

PEI (Polyethyleneimine) Cellulose Plates. PEI modified cellulose acts as a strong basic anion-exchanger.

Applications: Amino acids, peptides, nucleotides, nucleosides, sugar phosphates

Concentrating Zone Plates (TLC, HPTLC, PLC). Merck's concentrating zone plates are based on the different adsorption properties of two adsorbents. The first is a large pore concentrating adsorbent where the samples are applied; the second is a selective layer for separation. Regardless of the spots' shape, size, or position, the sample always concentrates as a narrow band where the two adsorbents overlap and where the separation starts.

Mixed Layer Plates. Merck's mixed layer plates utilise a combination of classical silica gel 60 and kieselguhr, to provide good separation properties for certain special applications.

Applications: Inorganic ions, herbicides, some steroids

Preparative Layer Plates (PLC). PLC plates allow the separation of mg to gram samples using up to 2mm thick layers on glass backed plates. Plates are available with layers of silica gel, RP-18 modified silica or aluminium oxide in several layer thicknesses (0.5mm to 2mm), with or without fluorescent indicator.

Please contact Hichrom for further details and ordering information for the above products and alternative TLC plates and accessories not listed.

- Transfer methods from TLC to CLC
- Fast and economic methods
- Purification of organic synthesis products

Flash chromatography is a fast and economic column liquid chromatographic (CLC) method used in the preparative scale purification of organic compounds. The most commonly used stationary phase is silica gel (40-63 μ m), but other adsorbents and particle sizes can be used. Both prepacked flash columns and bulk media are available.

Macherey-Nagel Flash Cartridges

TLC is frequently used as a pre-test for flash chromatography development. TLC plates produced by Macherey-Nagel are coated with the same silica used for flash columns, enabling reproducible transfer of TLC results to flash columns.

CHROMABOND® Flash RS Cartridges

- Convenient operation and reliable upscaling
- Increases flexibility
- Increases analytical safety
- Saves time and money

Macherey-Nagel offers a range of ready-to-use flash cartridges for use with Isco® flash systems or as a stand-alone version for all pump and detector combinations. A wide selection of adsorbent type, cartridge dimensions and pore sizes is available (see Figure 1). CHROMABOND® Flash RS cartridges are ideal for flash separations from 10mg up to 160g. They can be used as a stand-alone system with any pump, detector and fraction collector combination using the CHROMABOND Flash Starter Kit (see Figure 2). Macherey-Nagel also supplies flash cartridges suitable for Biotage and other flash systems. Please enquire for further details.

Ordering information for a selection of unbonded silica and C18 bonded silica phases is given below. Please enquire for other phases and other dimension cartridges not listed.



Figure 1. CHROMABOND Flash RS Cartridges



Figure 2. CHROMABOND Flash Starter Kit

Ordering Information

Column Type	Column Dimensions (mm)	Adsorbent SiOH				Adsorbent C18 ec			
		Weight (g)	Pack Size	Cat. No.	Price	Weight (g)	Pack Size	Cat. No.	Price
CHROMABOND Flash RS cartridges for Isco Systems^{1, 2}									
RS 4	98 x 12.4	4	20	732800		4.3	2	732810	
RS 15	116 x 21.2	15	20	732801		16.4	1	732811	
RS 25	165 x 21.2	25	15	732802		26	1	732812	
RS 40	171 x 26.4	40	15	732803		43	1	732813	
RS 200	200 x 60.0	200	6	732806		220	1	732816	
CHROMABOND Flash Starter Kit ³				730798					
CHROMABOND Flash cartridges for Biotage Flashmaster™ Systems²									
FM 15/2	90 x 15.8	2	50	730881		2	50	730890	
FM 25/5	100 x 20.5	5	50	730891		5	50	730884	
FM 70/10	154 x 26.8	10	30	730885		10	20	730886	
FM 150/50	170 x 38.2	50	20	730887		50	10	730888	

¹ Cartridges packed with NH₂, OH, CN and ALOX phases also available ² Other dimension cartridges available ³ Please enquire for details of contents

YMC-DispoPackAT Flash Cartridges

- Irregular (40-63 μ m) and spherical (25 μ m) particles
- Compatible with virtually all Flash systems
- Fast and easy installation using luer/luer-lock connectors
- High reproducibility

YMC DispoPackAT flash cartridges are available packed with irregular (40-63 μ m) or spherical (25 μ m) particles. The smaller spherical particles allow a doubling of the flow rate, due to generation of lower back pressures, compared with standard irregular silica. As a result, improved resolution is achieved in less time. Figure 3 illustrates the 50% time saving through the use of high resolution at high flow conditions. Figure 4 shows the typical reproducibility achievable using YMC-DispoPackAT SIL. Cartridges are available with adsorbent weight ranging from 12g to 800g.



Specifications

Particle Shape	Irregular	Spherical
Particle Size (μ m)	40-63	25
Pore Size (Å)	60 (SIL), 150 (NH ₂ , Diol, ODS)	80
Available Bondings	SIL, NH ₂ , Diol, ODS	SIL, NH ₂ , Diol, ODS
Available Sizes (g)	12, 40, 120, 300, 800	12, 40, 120, 300, 800

Flash cartridge: YMC-DispoPackAT SIL-25 (40g)
Eluent: n-Hexane – ethyl acetate (90:10)
Detection: UV, 254nm

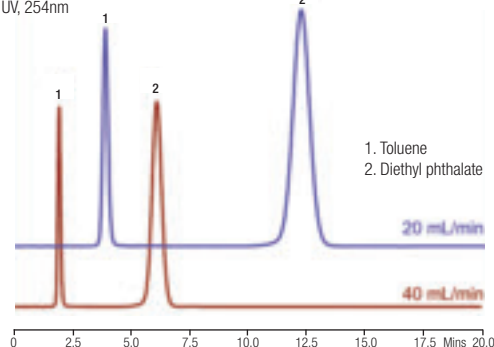


Figure 3. High resolution at high flow

Flash cartridge: YMC-DispoPackAT SIL (12g)
Eluent: n-Hexane – ethyl acetate (90:10)
Flow rate: 10ml/min
Detection: UV, 254nm

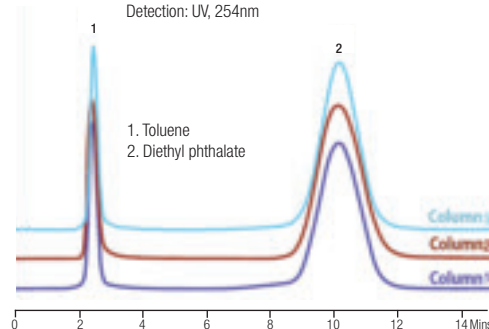


Figure 4. High reproducibility

Irregular particles

Cartridge Weight (g)	Pack Size	YMC-DispoPackAT Phase			
		SIL	NH ₂	Diol	ODS
12	24	DPA12SLK06I5224	DPA12NHK15I5224	DPA12DLK15I5224	DPA12ABK15I5224
40	12	DPA40SLK06I5212	DPA40NHK15I5212	DPA40DLK15I5212	DPA40ABK15I5212
120	6	DPAA2SLK06I5206	DPAA2NHK15I5206	DPAA2DLK15I5206	DPAA2ABK15I5206
300	1	DPAC0SLK06I5201	DPAC0NHK15I5201	DPAC0DLK15I5201	DPAC0ABK15I5201
800	1	DPAH0SLK06I5201	DPAH0NHK15I5201	DPAH0DLK15I5201	DPAH0ABK15I5201

Spherical particles

Cartridge Weight (g)	Pack Size	YMC-DispoPackAT Phase			
		SIL-25	NH ₂ -25	Diol-25	ODS-25
12	24	DPA12SLK08S2524	DPA12NHK08S2524	DPA12DLK08S2524	DPA12ABK08S2524
40	12	DPA40SLK08S2512	DPA40NHK08S2512	DPA40DLK08S2512	DPA40ABK08S2512
120	6	DPAA2SLK08S2506	DPAA2NHK08S2506	DPAA2DLK08S2506	DPAS2ABK08S2506
300	1	DPAC0SLK08S2501	DPAC0NHK08S2501	DPAC0DLK08S2501	DPAC0ABK08S2501
800	1	DPAH0SLK08S2501	DPAH0NHK08S2501	DPAH0DLK08S2501	DPAH0ABK08S2501

Bulk Material

Please contact Hichrom for details of YMC bulk materials.