

## MACHEREY-NAGEL

# Thin layer chromatography



State-of-the-art products for TLC and HPTLC

- Quality
- Efficiency
- Selectivity



**MACHEREY-NAGEL**

[www.mn-net.com](http://www.mn-net.com)



Since 1911

# Thin layer chromatography

## MACHEREY-NAGEL – TLC for more than 5 decades

MN ready-to-use layers for TLC and HPTLC

- Comprehensive range of plate sizes, surface chemistries and backings
- Pre-coated plates ready for immediate use
- Homogeneous, smooth and well adhering layers
- Available with UV indicator or non-impregnated
- Consistent high quality from batch-to-batch and from plate-to-plate

### Reasons for using TLC

- Fast and cost-saving separation technique
- Multiple sample application possible
- Developed plate serves as analytical documentation media
- Time consuming sample preparation steps can be omitted



## Benefits of TLC

TLC does not require complex or costly maintained instrumentation. The investment for performing successful TLC can be hundred times less than for HPLC. Since the separated compounds remain on the plate, they can be used for further experiments. Method development is simplified by TLC. The amount of solvents required for development is much less than with HPLC.

# Thin layer chromatography

## Standard analytical TLC plates and sheets

Thin layer chromatography can be used for both qualitative and quantitative analysis. Standard analytical TLC plates typically have adsorbent layers that are nominally between 0.20–0.25 mm in thickness.

## Preparative TLC plates

Preparative TLC is used for purification and isolation of analytes from impurities. Preparative TLC layers ( $\geq 0.5$  mm) are available on glass plates only.



# Thin layer chromatography

In order to meet your individual application requirements three different types of backings are available.

## TLC / HPTLC backings

### TLC plates – glass backing

Glass plates are robust, heat proof and chemically resistant to all common mobile phases and visualization reagents.

### POLYGRAM® TLC sheets – polyester backing

Polyester sheets are easy to handle, lightweight and flexible. Can be cut with scissors. Developed POLYGRAM® sheets can also be stored for documentation in laboratory notebooks.

### ALUGRAM® TLC sheets – aluminum backing

Aluminum sheets are easy to handle, lightweight and flexible. High performance silica on ALUGRAM® Xtra sheets provides outstanding wettability for precise colorization results, even with 100 % aqueous detection reagents. Moreover ALUGRAM® Xtra sheets are easy to cut with scissors. No flaking of silica occurs!



## Physical properties of backing materials

Material	glass	polyester	aluminum
Thickness (approx.)	1.3 mm	0.2 mm	0.15 mm
Weight, packing and storage requirement	high	low	low
Torsional strength	ideal	low	relatively high
Temperature stability	high	max. 185 °C	high
Susceptible to breakage	yes	no	no
Can be cut with scissors	no	yes	yes
<b>Chemical resistance of support material</b>			
Against solvents	high	high	high
Against mineral acids and conc. ammonia	high	high	low
<b>Stability of the binder system of NP plates in water</b>			
Suitability for aqueous detection reagents	depends on phase	good	ALUGRAM®: low to moderate ALUGRAM® Xtra: moderate to high

# Thin layer chromatography

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## Most commonly used silica gel layers

### SIL G

- Standard layer (soft)
- Available on glass plates, polyester and aluminum sheets
- Thicker layers for preparative TLC (PLC) on glass plates

### ADAMANT

- Outstanding hardness and abrasion resistance
- Excellent separation efficiency
- Low-noise background of the layer
- Available on glass plates

### SIL HD

- Hard layer with good abrasion resistance
- High luminosity
- Brilliant staining properties (e.g., with potassium permanganate -  $\text{KMnO}_4$ )
- Excellent separation efficiency
- Good wettability for precise colorization results – even with 100 % aqueous detection reagents
- Low-noise background of the layer
- Available on glass plates

### Further layer materials

- Modified silica gel
- Cellulose
- Aluminum oxide
- Polyamide
- Special materials



# Thin layer chromatography

Several layers on glass plates...

...for extended selectivity.



## SIL G

smooth surface · easy to „scrape off“ · low polarity binder

## ADAMANT

hardest surface · can be pen labeled

## SIL HD

hard surface · excellent UV indicator system · brilliant staining properties

Plate size*	Plates per pack	SIL G**	REF	ADAMANT	REF	SIL HD	REF
<b>TLC glass plates</b>							
5 x 10 cm	50	SIL G-25	809017	ADAMANT	821040	SIL HD	809217
10 x 10 cm	25			ADAMANT	821050	SIL HD	809210
10 x 20 cm	50	SIL G-25	809012			SIL HD	809212
20 x 20 cm	25	SIL G-25	809013	ADAMANT	821060	SIL HD	809213
5 x 10 cm	50			ADAMANT UV <sub>254</sub>	821010	SIL HD UV <sub>254</sub>	809227
10 x 10 cm	25	SIL G-25 UV <sub>254</sub>	809020	ADAMANT UV <sub>254</sub>	821020	SIL HD UV <sub>254</sub>	809220
10 x 20 cm	50	SIL G-25 UV <sub>254</sub>	809022	ADAMANT UV <sub>254</sub>	821025	SIL HD UV <sub>254</sub>	809222
20 x 20 cm	25	SIL G-25 UV <sub>254</sub>	809023	ADAMANT UV <sub>254</sub>	821030	SIL HD UV <sub>254</sub>	809223

\* Further plate sizes available

\*\* Also available as preparative TLC glass plates (PLC) with 0.50, 1.00 and 2.00 mm layer thickness

# Thin layer chromatography

## Nano TLC glass plates for HPTLC

Higher efficiency on smaller particles provide

- Sharper separations
- Shorter developing times and migration distances
- Smaller sample volumes 0.01–0.1  $\mu\text{L}$
- Minimal diffusion
- Increased detection sensitivity

Analytical HPTLC glass plates

- Silica 60, mean pore size 60  $\text{\AA}$
- Specific pore volume 0.75 mL/g
- Thickness of layer 0.20 mm
- Mean particle size range 2–10  $\mu\text{m}$

### Comparison of TLC and HPTLC glass plates for separation of anthraquinone dyes

Layers: A) TLC  
B) HPTLC

Sample: 1  $\mu\text{L}$ , about 0.1 %

Eluent: toluene – cyclohexane (4:3, v/v)

Migration time: A) 30 min, B) 15 min

Peaks:

1. Blue 3
2. Violet 2
3. Red
4. Green
5. Blue 1
6. Greenish blue
7. Violet 1

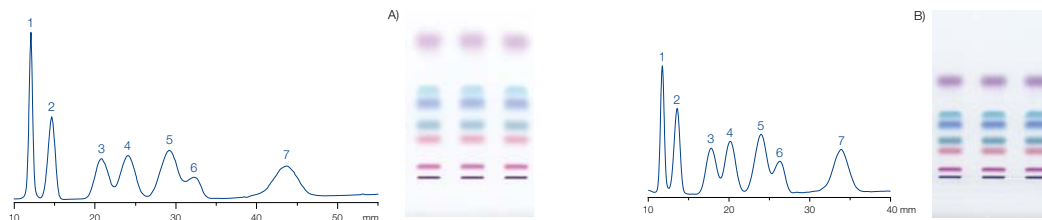


Plate size*	Plates per pack	Nano-SIL HD UV <sub>254</sub> **	Nano-SIL HD	Nano-ADAMANT UV <sub>254</sub> **	Nano-ADAMANT
<b>HPTLC glass plates</b>					
5 x 5 cm	100	811221	811211	821100	821130
10 x 10 cm	25	811222	811212	821110	821140
10 x 20 cm	50	811223	811213	821120	821150

\* Further plate sizes available

\*\* Contains fluorescent indicator

# Thin layer chromatography

## Polyester sheets for TLC

- Silica 60, mean pore size 60 Å
- Specific pore volume 0.75 mL/g
- Particle size 5–17 µm
- Standard grade
- The binder system for POLYGRAM® sheets is also completely stable in purely aqueous eluents



## POLYGRAM® SIL G

Designation	Thickness of layer	Plate size*	Fluorescent indicator	Plates per pack	REF
SIL G	0.20 mm	2.5 x 7.5 cm	–	200	805902
SIL G	0.20 mm	4 x 8 cm	–	50	805032
SIL G	0.20 mm	5 x 20 cm	–	50	805012
SIL G	0.20 mm	20 x 20 cm	–	25	805013
SIL G	0.20 mm	40 x 20 cm	–	25	805014
SIL G UV <sub>254</sub>	0.20 mm	2.5 x 7.5 cm	UV <sub>254</sub>	200	805901
SIL G UV <sub>254</sub>	0.20 mm	4 x 8 cm	UV <sub>254</sub>	50	805021
SIL G UV <sub>254</sub>	0.20 mm	5 x 20 cm	UV <sub>254</sub>	50	805022
SIL G UV <sub>254</sub>	0.20 mm	20 x 20 cm	UV <sub>254</sub>	25	805023
SIL G UV <sub>254</sub>	0.20 mm	40 x 20 cm	UV <sub>254</sub>	25	805024
SIL G UV <sub>254</sub>	0.20 mm	500 x 20 cm	UV <sub>254</sub>	1 roll	805017

\* Further plate sizes available

## POLYGRAM® SIL N-HR

- Different binder system compared to SIL G results in different separation characteristics
- Higher gypsum content

Designation	Thickness of layer	Plate size*	Fluorescent indicator	Plates per pack	REF
SIL N-HR UV <sub>254</sub>	0.20 mm	5 x 20 cm	UV <sub>254</sub>	50	804022
SIL N-HR UV <sub>254</sub>	0.20 mm	20 x 20 cm	UV <sub>254</sub>	25	804023

\* Further plate sizes available



# Thin layer chromatography

## Silica layers on aluminum sheets

ALUGRAM® Xtra SIL G (TLC) and ALUGRAM® Xtra Nano-SIL G (HPTLC)

- Silica 60, mean pore size 60 Å
- Specific pore volume 0.75 mL/g
- Particle size 5–17 µm (TLC), 2–10 µm (HPTLC)
- Outstanding wettability for precise colorization results, even with 100 % aqueous detection reagents
- Excellent separation efficiency and reproducibility from lot to lot
- Easy and reliable cutting due to an optimized binder system, no flaking of silica

Tailored for individual requirements



Designation	Thickness of layer	Plate size*	Fluorescent indicator	Plates per pack	REF
<b>ALUGRAM® Xtra aluminum sheets</b>					
SIL G	0.20 mm	20 x 20 cm	–	25	818233
SIL G UV <sub>254</sub>	0.20 mm	4 x 8 cm	UV <sub>254</sub>	50	818331
SIL G UV <sub>254</sub>	0.20 mm	20 x 20 cm	UV <sub>254</sub>	25	818333
<b>HPTLC ALUGRAM® Xtra aluminum sheets</b>					
Nano-SIL G	0.20 mm	20 x 20 cm	–	25	818241
Nano-SIL G UV <sub>254</sub>	0.20 mm	20 x 20 cm	UV <sub>254</sub>	25	818343

\* Further plate sizes available

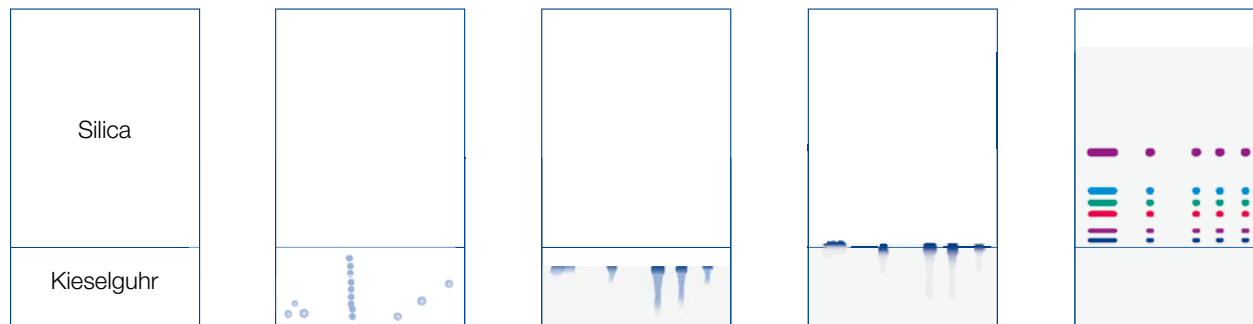
# Thin layer chromatography

## Preadsorbent zone

SILGUR and Nano-SILGUR with concentrating zone

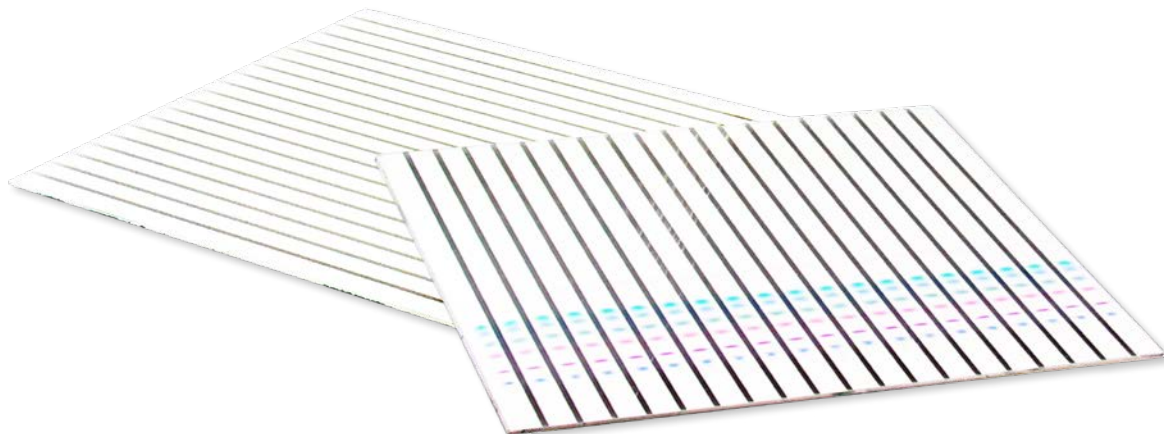
After sample application in the kieselguhr layer the spots migrate to the kieselguhr/silica interface forming narrow bands. Separation then takes place in the silica layer.

- Concentrates sample spots on the plate
- Simplifies sample application



## Channeled SILGUR plates

TLC plates with 19 channels help to prevent cross contamination by separating several samples. Spot areas can be determined more easily.



## Thin layer chromatography



Designation	Thickness of layer	Plate size*	Fluorescent indicator	Plates per pack	REF
<b>Glass plates</b>					
SILGUR-25	0.25 mm	10 x 20 cm	–	50	810012
SILGUR-25	0.25 mm	20 x 20 cm	–	25	810013
SILGUR-25 UV <sub>254</sub>	0.25 mm	10 x 20 cm	UV <sub>254</sub>	50	810022
SILGUR-25 UV <sub>254</sub>	0.25 mm	20 x 20 cm	UV <sub>254</sub>	25	810023
<b>Glass plates – Channel plates</b>					
SILGUR-25-C UV <sub>254</sub>	0.25 mm	20 x 20 cm	UV <sub>254</sub>	25	810123
<b>ALUGRAM® Xtra aluminum sheets</b>					
SILGUR	0.20 mm	10 x 20 cm	–	20	818412
SILGUR	0.20 mm	20 x 20 cm	–	25	818413
SILGUR UV <sub>254</sub>	0.20 mm	10 x 20 cm	UV <sub>254</sub>	20	818422
SILGUR UV <sub>254</sub>	0.20 mm	20 x 20 cm	UV <sub>254</sub>	25	818423
<b>HPTLC glass plates</b>					
Nano-SILGUR-20	0.20 mm	10 x 10 cm	–	25	811032
Nano-SILGUR-20 UV <sub>254</sub>	0.20 mm	10 x 10 cm	UV <sub>254</sub>	25	811042
<b>HPTLC ALUGRAM® Xtra aluminum sheets</b>					
Nano-SILGUR	0.20 mm	10 x 10 cm	–	25	818432
Nano-SILGUR UV <sub>254</sub>	0.20 mm	10 x 10 cm	UV <sub>254</sub>	25	818442

\* Further plate sizes available

# Thin layer chromatography

## TLC accessories

Description	REF
Simultaneous developing chamber for TLC for up to 5 plates in format 20x20 cm	814019
for up to 2 plates in format 10x10 cm	814018
MN ALUGRAM® scissors	818666



### Distributed By:

Greyhound Chromatography and Allied Chemicals  
6, Kelvin Park, Birkenhead, Merseyside, CH41 1LT



Tel: +44 (0)151 649 4000

Fax: +44 (0)151 649 4001

Email: [info@greyhoundchrom.com](mailto:info@greyhoundchrom.com) Sales: [sales@greyhoundchrom.com](mailto:sales@greyhoundchrom.com)

[www.mn-net.com](http://www.mn-net.com)

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