

## MN Flash adsorbents a unique variety of phases

### ★ Key features

- Flash columns and cartridges from MACHEREY-NAGEL are available with all CHROMABOND® SPE / Flash packings (more than 40 phases, e.g., C<sub>18</sub>, C<sub>8</sub>, OH, Alox). Additionally you can choose from our range of POLYGOPREP silica packings in particle sizes from 20 to 130 µm and pore sizes from 60 to 4000 Å.
- For high performance Flash separations spherical silica featuring very high separation efficiency can be requested

### 🔧 Technical characteristics

- Specification of modified and plain silica, acid-washed irregular silica, pore size 60 Å, particle size 45 µm, specific surface 500 m<sup>2</sup>/g, pH stability 2–8



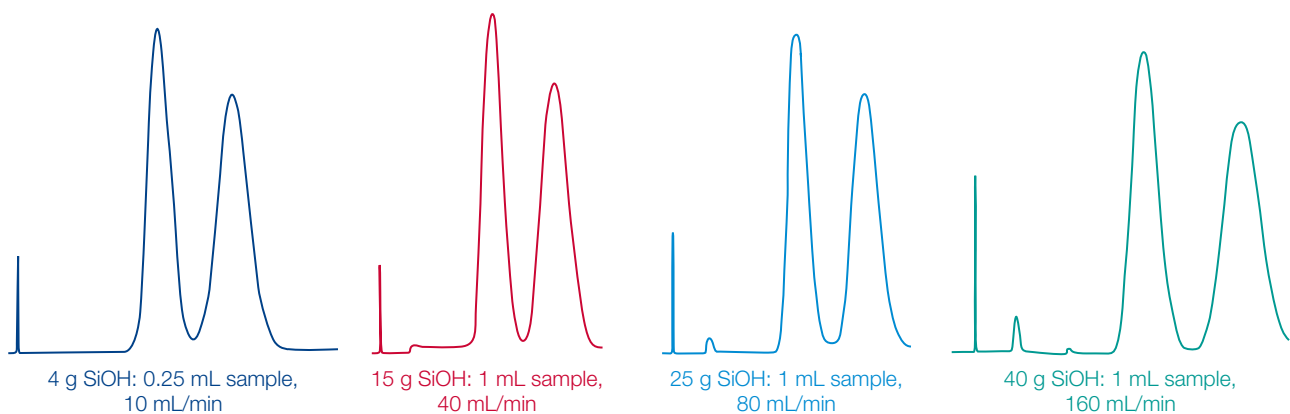
Comparison of separation efficiency and price of irregular versus spherical silica

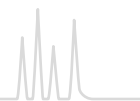
## Separation efficiency and reproducibility

Our optimized automatic packing process leads to an excellent packing quality, irrespective of the phase or particle size distribution (normal phase or reversed phase, spherical or irregular particles). MACHEREY-NAGEL, as a manufacturer of silicas, has decades of experience in the production of first class separation phases and columns. This leads to highest separation efficiencies of the columns, a constant back pressure (via controlled narrow particle size distribution) and good reproducibilities from cartridge to cartridge.

The separation efficiency is in the first place not influenced by the dimension or the geometry of the Flash RS cartridges. The chromatograms below show an identical resolution and peak form for different column dimensions, when flow and sample amount is adjusted correctly. This is advantageous for optimization and upscaling experiments.

## Resolution and peak shape for different column dimensions





## MN TLC and Flash products

- Same selectivity and easy upscaling from TLC to Flash separations
- Saving time and money, because expensive optimizations are not required

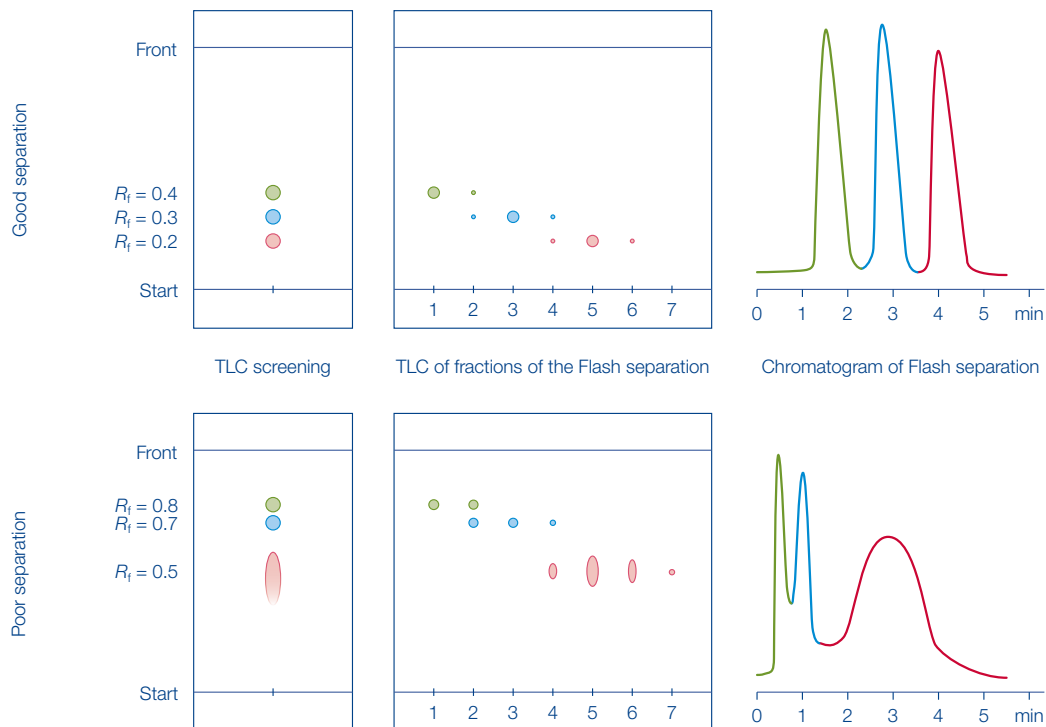
TLC is often used for the development of a selective and reproducible method in Flash chromatography, because it is often necessary to test a large number of eluent and / or adsorbent

## TLC screening

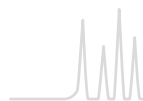
For TLC separation you should start with an unmodified silica and a nonpolar eluent of low viscosity (e.g., mixtures of *n*-hexane – ethyl acetate or *n*-hexane – acetone). By changing the composition of the eluent the  $R_f$  value of the TLC separation is adjusted to approx. 0.3. Increasing polarity of the eluent decreases the  $R_f$

combinations. MN TLC plates and sheets are coated with the same base silica, which is used in our CHROMABOND® Flash cartridges. This is an important prerequisite for the reproducible transfer of a TLC separation to the Flash column, because the parameters are identical in both systems.

values. The difference in  $R_f$  values between the substances to be separated should be at least 0.1 to allow a reliable separation in the subsequent flash chromatography. Variation of the eluent components (e.g., acetone, dichloromethane) can be used to enhance the separation by eluent specific selectivity.



Our program of TLC plates can be found from page 273 onwards.



## Technical support for Flash RS and Flash BT

### Loadability

- Due to the narrow particle size distribution, the excellent packing quality and the optimized stationary phases (acid washed silica, reduced particulate matter) our cartridges can realize highest loadability at best possible separation efficiency.
- Additionally, the large range of different cartridge lengths and diameters eases to find the optimum in loadability for a given sample amount.

### Rule of thumb for the loadability

| Separation | Loadability | g sample / g adsorbent |
|------------|-------------|------------------------|
| difficult  | low         | ≤ 1 %                  |
| easy       | high        | ≥ 10 %                 |

### Loadability table CHROMABOND® Flash RS and BT

| SiOH cartridge | Average loadability per cartridge [g] |                 |
|----------------|---------------------------------------|-----------------|
|                | difficult separation                  | easy separation |
| RS/BT 4        | 0.04                                  | 0.4             |
| RS/BT 15       | 0.15                                  | 1.5             |
| RS/BT 25       | 0.25                                  | 2.5             |
| RS/BT 40       | 0.4                                   | 4               |
| RS/BT 80       | 0.8                                   | 8               |
| RS/BT 120      | 1.2                                   | 12              |
| RS/BT 200      | 2                                     | 20              |
| RS/BT 330      | 3.3                                   | 33              |
| RS 800         | 8                                     | 80              |
| RS 1600        | 16                                    | 160             |

### Back pressure and pressure stability

The back pressure always depends on flow rate and viscosity of the eluent mixture, column length and diameter and the particle size. The high performance CHROMABOND® Flash RS cartridges up to 200 g silica are stable up to 15 bar (220 psi, > 200 g: 12 bar).

Back pressure of CHROMABOND® Flash RS SiOH cartridges (eluent hexane – ethyl acetate 9:1 or 8:2)

| Flow rate | 20 mL/min           | 40 mL/min | 80 mL/min | 120 mL/min | 160 mL/min | 200 mL/min | 240 mL/min |
|-----------|---------------------|-----------|-----------|------------|------------|------------|------------|
| Cartridge |                     |           |           |            |            |            |            |
| RS/BT 4   | 0.75 bar            | 1.5 bar   |           |            |            |            |            |
| RS/BT 15  | 0.25 bar            | 0.75 bar  | 1.5 bar   | 2.0 bar    |            |            |            |
| RS/BT 25  | 0.5 bar             | 1.0 bar   | 1.75 bar  | 3.0 bar    | 4.0 bar    | 5.0 bar    |            |
| RS/BT 40  |                     | 0.75 bar  | 1.5 bar   | 2.25 bar   | 3.0 bar    | 3.25 bar   | 3.5 bar    |
| RS/BT 80  |                     |           | 1.5 bar   | 2.5 bar    | 3.0 bar    | 3.5 bar    | 4.0 bar    |
| RS/BT 120 |                     |           | 1.0 bar   | 1.5 bar    | 2.0 bar    | 2.5 bar    | 3.0 bar    |
| RS/BT 200 |                     |           | 1.0 bar   | 1.5 bar    | 2.0 bar    | 2.5 bar    | 3.0 bar    |
| RS/BT 330 | (typical flow rate) |           | 1.5 bar   | 2.25 bar   | 3.0 bar    | 3.5 bar    | 4.0 bar    |

Conditioning volumes for CHROMABOND® Flash RS cartridges (normally 1.5 column volumes of the eluent)

| Cartridge | Volume of eluent for conditioning |
|-----------|-----------------------------------|
| RS/BT 4   | 20 mL                             |
| RS/BT 15  | 60 mL                             |
| RS/BT 25  | 90 mL                             |
| RS/BT 40  | 140 mL                            |
| RS/BT 80  | 280 mL                            |

### Upscaling of the optimum flow rate

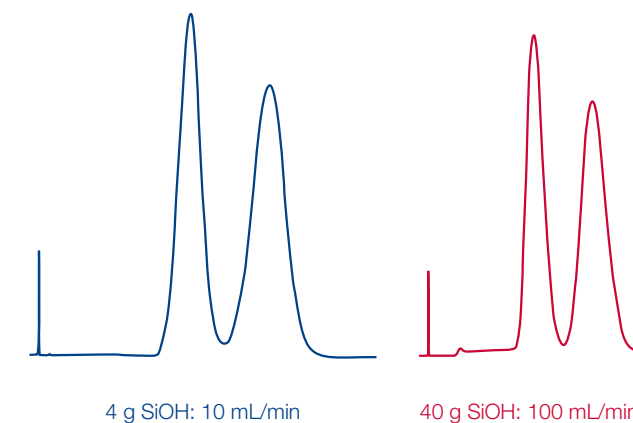
This depends on the eluent, the separation problem, the amount of adsorbent and also on the dimensions of the column.

In the simplest case the upscaling relation is proportional to the amount of adsorbent (for equal eluent polarity).

For the flow rate the following would apply e.g.,

4 g silica → optimum flow: ~ 6–12 mL/min

40 g silica → optimum flow: ~ 60–120 mL/min



Upscaling of the flow rate

We recommend using a pressure guard, because short time pressure peaks (viscosity of eluent or gradient changes) can exceed the pressure limit.