

MACHEREY-NAGEL

# Adsorbents

Chromatography



## Polyamide and other purification media

- Large portfolio of various adsorbents
- For small, medium and large scale purifications
- Consistently high quality

**MACHEREY-NAGEL**

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# Adsorbents

## Overview of adsorbents

MACHEREY-NAGEL offers a variety of different adsorbents for small, medium and large scale purifications for all kinds of applications. Each adsorbent has its special properties which you can take advantage of.

Adsorbent	Application
Polyamide 6	Separation of lipophilic and hydrophilic substances
Standard silica	Separation of lipophilic substances
Reversed phase silica	Separation of very lipophilic or highly hydrophilic substances
Aluminum oxide	Separation of lipophilic substances
Kieselguhr	Separation of hydrophilic substances (after impregnation)
Florisil®	Mainly sample preparation
Cellulose	Separation of hydrophilic substances

## Polyamide 6 (ε-polycaprolactam)

Polyamide 6 (ε-polycaprolactam) is widely used for the chromatographic separation of natural products with phenolic functional groups, e. g., flavonoids, anthraquinones, flavonols as well as carboxylic acids and aromatic nitro compounds. Polyamide is produced by hydrolytic polymerization of ε-caprolactam. It possesses a melting temperature of above 200 °C. A special characteristic of this material in comparison with silica and other resins is its water adsorption properties. The saturation concentration at 23 °C is about 9.5 %. The resulted degrees of swelling in different aqueous solutions are displayed in the table below.

### Degrees of swelling in different aqueous solutions for Polyamide 6

Solution	Swelling rate* [%]
Water (100 %)	2.5
20 % Methanol (v/v methanol / water)	3.7
50 % Methanol (v/v methanol / water)	7.3
50 % Isopropanol (v/v isopropanol / water)	7.1

\*Swelling determined after 2 hours saturation

As stationary phase polyamide can be used in normal or reversed phase mode due to its medium polarity. The separation mechanism is mainly based on hydrogen bonding. The elution strength of the solvent increases in the following order: water < methanol < acetone < diluted aq. sodium hydroxide solution < formamide < dimethylformamide.

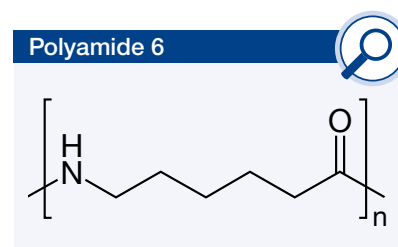
Polyamide exhibits a good resistance towards aliphatic hydrocarbons (e. g., hexane, heptane), aromatic hydrocarbons (e. g., naphthalene, toluene), esters (e. g., ethyl acetate), ethers (e. g., diethyl ether, dioxane), aldehydes (e. g., formaldehyde), ketones (e. g., acetone) and alcohols (e. g., ethanol, isopropanol, methanol). Polyamide is stable within the pH range of 3 to 9 at 25 °C.

### Overview of different polyamide adsorbents for column chromatography

Designation	Particle size	Pack of 1 kg	Pack of 5 kg
Polyamide-CC 6	< 0.07 mm	815610.1	815610.5
Polyamide-CC 6	0.05–0.16 mm	815620.1	815620.5
Polyamide-CC 6	0.10–0.30 mm	815600.1	815600.5

CC = column chromatography

Packaging: pack of 1 and 5 kg in plastic container



# Adsorbents

## Standard silica 60

Silica is the most important purification medium in chromatography due to its excellent price-performance ratio, versatility and availability. It is prepared by the precipitation of water glass with sulfuric acid. Usually, it is used for lipophilic compounds in normal phase mode. MACHEREY-NAGEL provides different particle sizes and quantities you can choose from.



- Base material: Highly porous, amorphous silicic acid in the form of hard, opalescent particles
- Surface chemistry: Unmodified silica gel (SiOH)
- Mode: Normal phase (NP)
- Particle shape: Irregular
- pH stability: 2.0–8.0
- Pore size: ~ 60 Å
- Pore volume: ~ 0.75 mL/g
- Spec. surface BET: ~ 500 m<sup>2</sup>/g
- For higher demands on the performance of column packings we recommend our high-purity irregular POLYGOPREP silicas

Designation	Particle size	Pack of 1 kg	Pack of 5 kg	Pack of 25 kg
Silica 60, 0.015–0.04 mm	–	815650.1	815650.5	815650.25
Silica 60, 0.025–0.04 mm	–	815300.1	815300.5	815300.25
Silica 60, 0.04–0.063 mm	230–400 mesh	815380.1	815380.5	815380.25
Silica 60 M, 0.04–0.063 mm	230–400 mesh	815381.1	815381.5	815381.25
Silica 60, 0.05–0.1 mm	130–270 mesh	815390.1	815390.5	815390.25
Silica 60, 0.05–0.2 mm	70–270 mesh	815320.1	815320.5	815320.25
Silica 60, 0.063–0.2 mm	70–230 mesh	815330.1	815330.5	815330.25
Silica 60, < 0.063 mm	+ 230 mesh	815400.1	815400.5	815400.25
Silica 60, < 0.08 mm	+ 190 mesh	815310.1	815310.5	
Silica 60, 0.1–0.2 mm	70–130 mesh	815340.1	815340.5	815340.25
Silica 60, 0.2–0.5 mm	35–70 mesh	815350.1	815350.5	815350.25
Silica 60, 0.5–1.0 mm	18–35 mesh	815360.1	815360.5	

Packaging: pack of 1 and 5 kg in plastic container, pack of 25 kg in plastic bag in cardboard drum

## Reversed phase silica

In liquid chromatography (LC), reversed phase (RP) silica is mostly used in combination with aqueous solvents and solvent mixtures to separate very unpolar or highly polar compounds. RP18-modified silica is quite unpolar in contrast to normal phase (unmodified, NP) silica. There is no sufficient interaction with very unpolar compounds and therefore almost no retention on NP silica. In contrast, highly polar compounds stick to NP silica due to very strong polar interactions, which prevent successful chromatographic separations. Due to its unpolar alkyl chains RP18-modified silica can overcome the before-mentioned obstacles. Furthermore, it is much less prone to humidity and shows less catalytic activity. This is important e.g. during the separation of unstable or sensitive compounds.



- Base material: Highly porous, amorphous silicic acid in the form of hard, opalescent particles, high purity
- Surface chemistry: Octadecyl (C18, ODS) modification
- Mode: Reversed phase (RP)
- Particle shape: Irregular
- pH stability: 2.0–8.0

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Overview of different reversed phase silica adsorbents for column chromatography

Designation	Particle size	Pore size	Carbon content	Endcapped	Pack of 100 g	Pack of 1000 g
POLYGOPREP 60-12 C18	10–15 µm	60 Å	12 %	no	711009.100	711009.1000
POLYGOPREP 60-20 C18	15–25 µm	60 Å	12 %	no	711031.100	711031.1000
POLYGOPREP 60-30 C18	25–40 µm	60 Å	12 %	no	711480.100	711480.1000
POLYGOPREP 60-50 C18	40–63 µm	60 Å	12 %	no	711500.100	711500.1000
POLYGOPREP 100-12 C18	10–15 µm	100 Å	14 %	no	711018.100	711018.1000
POLYGOPREP 100-20 C18	15–25 µm	100 Å	14 %	no	711019.100	711019.1000
POLYGOPREP 100-30 C18	25–40 µm	100 Å	14 %	no	711032.100	711032.1000
POLYGOPREP 100-50 C18	40–63 µm	100 Å	14 %	no	711021.100	711021.1000
POLYGOPREP 300-12 C18	10–15 µm	300 Å	4 %	yes	711024.100	711024.1000
POLYGOPREP 300-20 C18	15–25 µm	300 Å	4 %	yes	711025.100	711025.1000
POLYGOPREP 300-30 C18	25–40 µm	300 Å	4 %	yes	711020.100	711020.1000
POLYGOPREP 300-50 C18	40–63 µm	300 Å	4 %	yes	711030.100	711030.1000
POLYGOPREP 1000-30 C18	25–40 µm	1000 Å	1 %	yes	711028.100	711028.1000
POLYGOPREP 1000-50 C18	40–63 µm	1000 Å	1 %	yes	711029.100	711029.1000

Packaging: pack of 100 g in glass container, pack of 1000 g in plastic container

## Adsorbents pre-packed in flash cartridges

MACHEREY-NAGEL offers a large portfolio of CHROMABOND® flash cartridges (sizes 4–3000 g) packed with various adsorbents, e. g., irregular silica (40–63 µm and 15–40 µm), spherical silica (15 and 25 µm) and octadecyl-modified (C18 ec) irregular silica. Now available upon request are flash cartridges packed with polyamide.



### Registered Trademarks

CHROMABOND® MACHEREY-NAGEL GmbH & Co. KG (Germany)

Florisil® U. S. Silica Company (USA)

POLYGOPREP® MACHEREY-NAGEL GmbH & Co. KG (Germany)



Your local distributor

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

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