Kromasil® 60 Å

SIL, CN, Diol

High performance spherical silica for analytical to process scale liquid chromatography. RP Kromasil 60 Å is manufactured using monofunctional silanes giving high reproducibility and chemical stability.

PRODUCT CHARACTERISTICS

Particle sizes:
SIL: 5 µm, 7 µm, 10 µm, 13 µm and 16 µm
CN: 5 µm, 10 µm and 16 µm
Diol: 5 µm and10 µm

Particle size distribution:
(Coulter Multisizer)
dp_{90}/dp_{10}: < 1.70 (10, 13, 16 µm)
< 1.60 (7 µm)
< 1.55 (5 µm)

Spec surface area:
540 m^2/g (multi-point BET)

Pore volume:
1.2 ml/g (N_2-adsorption)

Pore size:
80 Å (N_2-adsorption)

Pore size distribution:
80% ± 15 Å (N_2-adsorption)

Chemical purity:
Typical figures (AAS or ICP):
Na: < 10 ppm
Al: < 5 ppm
Fe: < 5 ppm

Coverage:
(elemental analysis)
CN: 12% C, 2.3% N, 3.8 µmol/m^2
Diol: 10% C, 3.5 µmol/m^2

Mechanical stability:
Allows repeated packing at up to 700 bar (10,000 psi)

Packed density:
SIL: 0.45 g/ml
CN: 0.48 g/ml
Diol: 0.53 g/ml

PRODUCT CODES

For ordering please use our code system:
Kromasil 60-X-Y
— 60 indicates 60 Å pore size
— X indicates particle size: 5 to 16 µm
— Y indicates phase: SIL, CN or Diol
(for example Kromasil 60-5-CN)

DELIVERY

Kromasil is delivered in polyethylene bottles or in polyethylene bags packed in fibre drums.

Kromasil, patented by Eka Chemicals AB, is manufactured in multi-kilogram batches with high reproducibility.

The development, production and marketing of Kromasil are ISO 9001 certified.

Eka Chemicals AB, Separation Products, SE-445 80 Bohus, Sweden.
Tel. +46 31 58 70 00 Fax +46 31 58 77 27

NAFTA countries: Akzo Nobel / Eka Chemicals Inc., 281 Fields Lane, Brewster, NY 10509, U S A.
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kromasil@eka.com www.kromasil.com

AkzoNobel

Kromasil® 100 Å

SIL, C4, C8, C18, NH2, Phenyl

High performance spherical silica for analytical to process scale liquid chromatography. RP Kromasil 100 Å is manufactured using monofunctional silanes, and is fully end-capped.* This gives high reproducibility and chemical stability.

PRODUCT CHARACTERISTICS

Particle sizes:**
3.5 µm, 5 µm, 7 µm, 10 µm, 13 µm, 16 µm

Particle size distribution:
(Coulter Multisizer)
dp_{90}/dp_{10}: < 1.70 (10, 13, 16 µm)
< 1.60 (7 µm)
< 1.55 (5 µm)
< 1.45 (3.5 µm)

Spec surface area:
320 m^2/g (multi-point BET)

Pore volume:
0.9 ml/g (N_2-adsorption)

Pore size:
110 Å (N_2-adsorption)

Pore size distribution:
80% ± 25 Å (N_2-adsorption)
97% of the BET-surface is accessible for toluene

Chemical purity:
Typical figures (AAS or ICP):
Na: < 10 ppm
Al: < 5 ppm
Fe: < 5 ppm

Coverage:
(elemental analysis)
C4: 8% C, 3.8 µmol/m^2
C8: 12% C, 3.7 µmol/m^2
C18: 20% C, 3.5 µmol/m^2
NH2: 1.7% N, 4.5 µmol/m^2
Phenyl: 14% C, 3.7 µmol/m^2

Chemical stability:***
Kromasil derivatized phases are stable between pH 1.5 and 10 and as high as 12 under certain conditions.

Mechanical stability:
Allows repeated packing at up to 700 bar (10,000 psi)

Packed density:
SIL: 0.50 g/ml
C4: 0.57 g/ml
C8: 0.60 g/ml
C18: 0.66 g/ml
NH2: 0.53 g/ml
Phenyl: 0.59 g/ml

PRODUCT CODES

For ordering please use our code system:
Kromasil 100-X-Y
— 100 indicates 100 Å pore size
— X indicates particle size: 3.5 up to 16 µm
— Y indicates phase: SIL, C4, C8, C18, NH2 or Phenyl
(for example Kromasil 100-5-C18)

DELIVERY

Kromasil is delivered in polyethylene bottles or in polyethylene bags packed in plastic drums.

Kromasil, patented by Eka Chemicals AB, is manufactured in multi-kilogram batches with high reproducibility.

The development, production and marketing of Kromasil are ISO 9001 certified.

*) Kromasil NH2 is derivatized using a trifunctional silane, and is not end-capped.

**) Kromasil Phenyl is available in 5 µm, 10 µm and 16 µm particle size.

***) Applies to derivatized phases except NH2.

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AkzoNobel

Kromasil® 300 Å

SIL, C4, C8, C18

High performance spherical silica for analytical to process scale liquid chromatography. RP Kromasil 300 Å is manufactured using monofunctional silanes, and is fully end-capped. This gives high reproducibility and chemical stability.

PRODUCT CHARACTERISTICS

Particle sizes:
5 µm, 10 µm, 16 µm

Particle size distribution:
(Electrical Sensing Zone Method)
dv_{90}/dv_{10}: < 1.70 (10, 16 µm)
< 1.55 (5 µm)

Spec surface area:
110 m^2/g (multi-point BET)

Pore volume:
0.9 ml/g (Mercury Intrusion Porosimetry)

Pore size:
300 Å (Mercury Intrusion Porosimetry)

Pore size distribution:
80% ± 100 Å (Mercury Intrusion Porosimetry)

Chemical purity:
Typical figures (AAS or ICP):
Na: < 10 ppm
Al: < 5 ppm
Fe: < 5 ppm

Coverage:
(elemental analysis)
C4: 2.9% C, 3.9 µmol/m^2
C8: 4.7% C, 3.8 µmol/m^2
C18: 8.7% C, 3.7 µmol/m^2

Chemical stability:
Kromasil derivatized phases are stable between pH 1.5 and 10 and as high as 12 under certain conditions.

Mechanical stability:
Allows repeated packing at up to 500 bar.

Packed density:
SIL: 0.47 g/ml
C4: 0.48 g/ml
C8: 0.50 g/ml
C18: 0.52 g/ml

PRODUCT CODES

For ordering please use our code system:
Kromasil 300-X-Y
— 300 indicates 300 Å pore size
— X indicates particle size: 5 up to 16 µm
— Y indicates phase: SIL, C4, C8 or C18
(for example Kromasil 300-5-C18)

DELIVERY

Kromasil is delivered in polyethylene bottles or in polyethylene bags packed in fibre drums.

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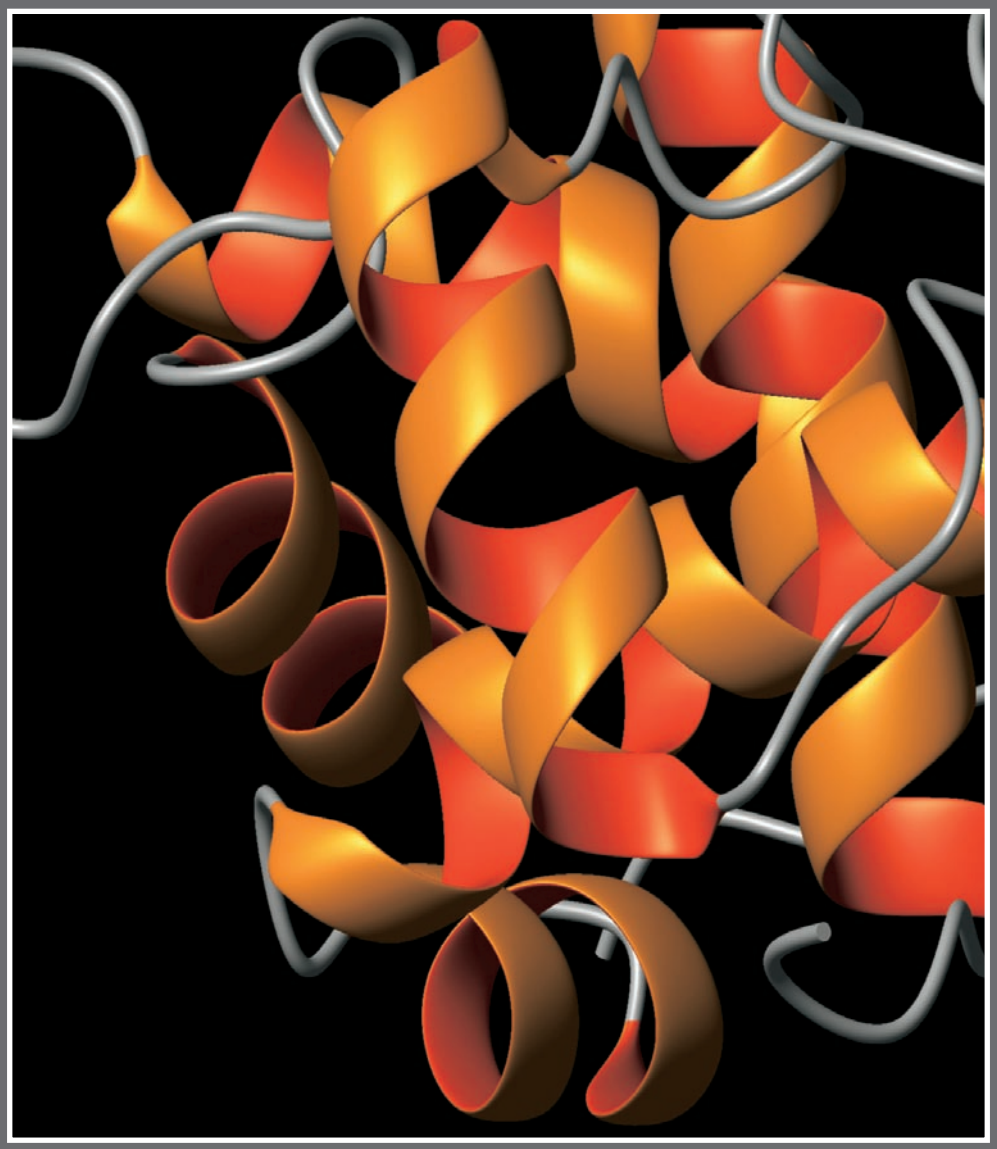
AkzoNobel

Kromasil 300 Å
– for your protein separations



Kromasil®

The way to peak performance
in liquid chromatography

AkzoNobel

Kromasil 300 Å – protein separations from analytical to process scale

Kromasil 300 Å is designed to be the perfect choice for proteins and biomolecules larger than 8–10 kD. A 300 Å material with a narrow pore size distribution ensures a good mass transfer for molecules in this range, resulting in narrow peaks and no size-exclusion effects.

Figures 1 and 2 show FE-SEM studies of Kromasil 300 Å, indicating a very regular pore structure, with no voids or dense clusters.

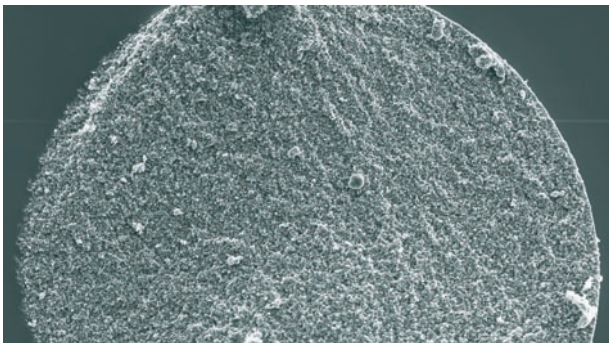


Figure 1 | FE-SEM picture of a cut through a Kromasil 300 Å particle at 5,000 × magnification.

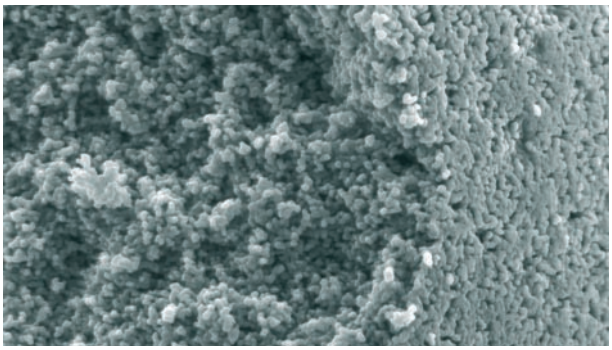


Figure 2 | FE-SEM picture of a cut through a Kromasil 300 Å particle at 35,000 × magnification, showing both the outer surface and the fracture through the particle.

Mechanical stability

Kromasil 300 Å is perfectly spherical, with regular pore structure, and a surface area and pore volume providing high loadability and mechanical stability. The high mechanical stability is especially important when packing large diameter columns with dynamic axial compression (DAC). Figures 3 – 4 show the result of a comparison of mechanical stability between Kromasil 300 Å and competitor "V" 300 Å C4.

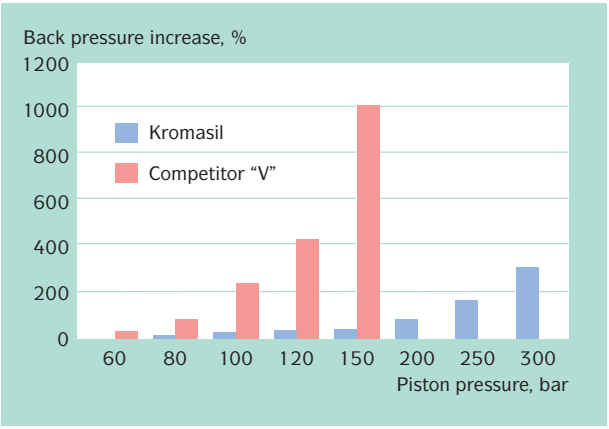


Figure 3 | Back pressure increase after compression in a 50 mm ID DAC column, with a bed length of 25 mm. The back pressure increase is relative to the pressure at 40 bar piston pressure. The study of competitor "V" had to be terminated at 150 bar due to formation of fines.

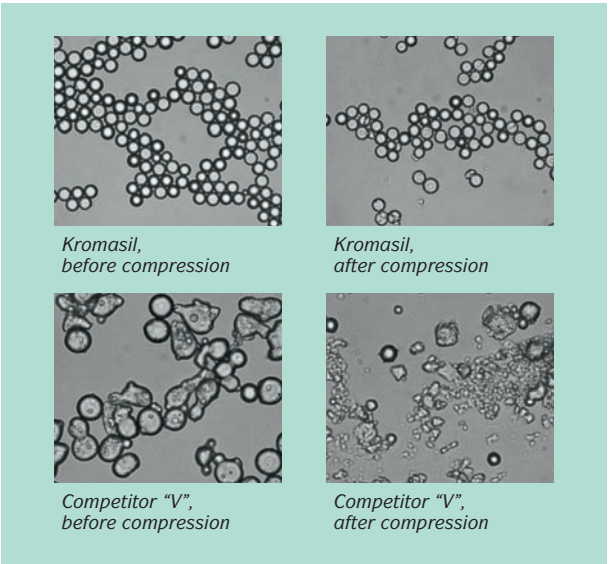


Figure 4 | Light microscope images of Kromasil and competitor "V", before and after compression in the DAC column shown in figure 3. Note that Kromasil was compressed up to 300 bar, while competitor "V" was compressed only up to 150 bar piston pressure.

Chemical stability

The chemical stability is together with mechanical stability the most important factor for determining the lifetime of your column or packing material. At low pH the bonded phase can be hydrolyzed, resulting in a less hydrophobic surface, and reduced retention times for lipophilic compounds. At higher

pH the silica matrix itself can be dissolved, and both silica and bonded phase are lost, causing void formation. This process results in changed retention times and poor peak shape.

The chemical stability for Kromasil C4 and competitor "V" C4 was tested at low, neutral and high pH using conditions giving accelerated breakdown.

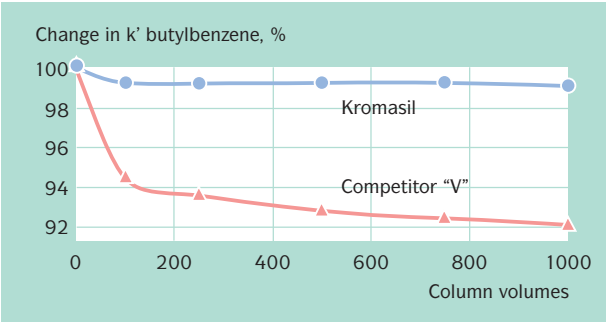


Figure 5 | Chemical stability at low pH.

Conditions: Mobile phase: ACN/H_2O/TFA = 50/50/1 Flow rate: 2 ml/min. Temperature: 20 °C

Material	Leakage of Si at: neutral pH	high pH
Competitor "V"	42 ppm	total dissolution
Kromasil	2 ppm	50 ppm

Table 1 | Chemical stability at neutral and high pH. Columns were purged, and the chemical stability was monitored by analyzing the concentration of silicon in the effluent using AAS.

Conditions, neutral pH test: Mobile phase: ACN/0.25 M Na_2HPO_4 = 20/80, 1000 column volumes. Flow rate: 1 ml/min. Temperature: 60 °C

Conditions, high pH test: Mobile phase: n-propanol/0.1 M NaOH = 50/50, 10 column volumes. Flow rate: 1 ml/min. Temperature: 22 °C

Chromatographic properties

Kromasil 300 Å is designed and manufactured to exhibit a surface chemistry similar to the well-known Kromasil 100 Å silica. This ensures excellent peak shape and resolution for acidic, neutral and basic molecules. Kromasil 300 Å shows symmetrical and narrow peaks even for proteins and other demanding molecules, as shown in figures 6 and 7.

Tryptic digest of BSA

A common test for RP packings aimed for separation of biological material is to run a tryptic digest of BSA. The digest contains fragments of various sizes, and the separation of these into individual peaks is a good evidence of the power of resolution (figure 8).

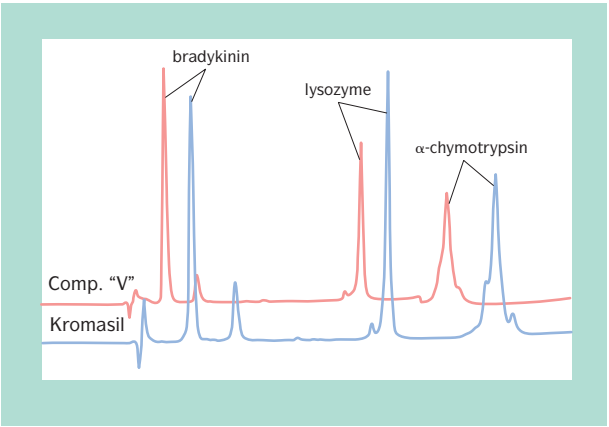


Figure 6 | Peptide and protein separation for Kromasil KR300-5-C4 and competitor "V" 300 Å 5 µm C4.

Conditions: Column: 4.6 mm × 250 mm Mobile phase: A: ACN/H_2O/TFA = 5/95/0.1 B: ACN/H_2O/TFA = 90/10/0.1 Gradient: 25% – 75% ACN in 25 min. Flow rate: 1.0 ml/min. Temperature: 20 °C Detection: UV at 220 nm

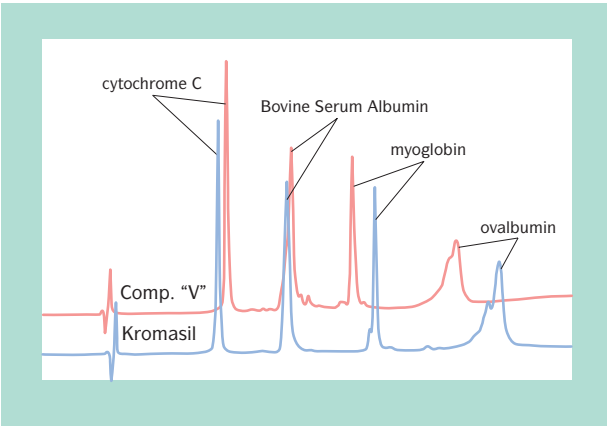


Figure 7 | Protein separation for Kromasil KR300-5-C4 and competitor "V" 300 Å 5 µm C4.

Conditions: Column: 4.6 mm × 250 mm Mobile phase: A: ACN/H_2O/TFA = 5/95/0.1 B: ACN/H_2O/TFA = 90/10/0.1 Gradient: 30% – 70% ACN in 30 min. Flow rate: 1.0 ml/min. Temperature: 20 °C Detection: UV at 220 nm

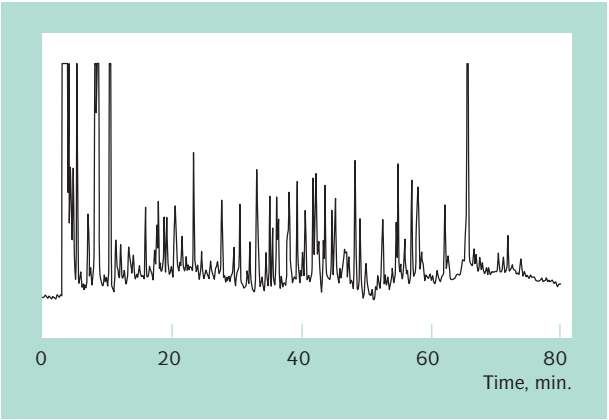


Figure 8 | Tryptic digest of bovine serum albumin (BSA).

Conditions: Column: 4.6 mm × 250 mm, Kromasil KR300-5-C4
Mobile phase: A: ACN/H_2O/TFA = 4/96/0.085 B: ACN/H_2O/TFA = 90/10/0.1
Gradient: 4% ACN for 5 min, 4% – 40% ACN in 75 min.
Flow rate: 1.0 ml/min. Detection: UV at 215 nm Temperature: 22 °C

Cover figure prepared with MOLMOL (Koradi et al., 1996, J Mol Graphics 14, 51).

The moment you adopt our Kromasil High Performance Concept, you join thousands of chromatographers who share a common goal: to achieve better separations when analyzing or isolating pharmaceuticals or other substances.

Not only will you benefit from our patented silica technology, but you gain a strong partner with a reliable track record in the field of silica products. For the past 60 years, Eka Chemicals has pioneered new types of silica. Our long experience in the field of silica chemistry is the secret behind the development of Kromasil, and the success of our Separation Products Group.

Kromasil is available in bulk, or in high-pressure slurry-packed columns. The development, production and marketing of Kromasil are ISO 9001 certified.

Eka Chemicals is a global company with 2,900 people in 28 countries. It is a business unit within Akzo Nobel, one of the world's largest chemical groups, with more than 68,000 employees in 80 countries.

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Kromasil®

0802

Kromasil® Chiral DMB & TBB

High performance spherical silica for analytical to process scale liquid chromatography. The chiral monomers are polymerized with a multifunctional hydrosilane, yielding a network polymer. This incorporates the bifunctional C2-symmetric chiral selector and is covalently bonded onto the silica.

PRODUCT CHARACTERISTICS

Chiral monomers:
DMB = O,O'-bis (3,5-dimethylbenzoyl)-N, N'-diallyl-L-tartar diamide
TBB = O,O'-bis (4-tert-butylbenzoyl)-N, N'-diallyl-L-tartar diamide

Particle sizes:
5 µm, 10 µm, 16 µm

Particle size distribution:
(Coulter Multisizer)
dp_{90}/dp_{10}: < 1.50 (5 µm)
< 1.70 (10, 16 µm)

Spec surface area:
330 m^2/g (multi-point BET)

Pore volume:
0.9 ml/g (N_2-adsorption)

Pore size:
110 Å (N_2-adsorption)

Pore size distribution:
80% ± 25 Å (N_2-adsorption)
97% of the BET-surface is accessible for toluene.

Carbon content:
DMB: 15.0%
TBB: 15.5%

Nitrogen content:
0.6%

Ligand coverage:
0.2 mmol/g (as tartaric acid derivative)

Packed density:
0.66 g/ml

Chemical purity:
Typical figures (AAS or ICP):
Na: < 20 ppm
Al: < 10 ppm
Fe: < 10 ppm

Chemical stability:
Allows the use of most solvents and buffers. TFA buffers can under certain conditions cause some hydrolysis of the phases.

Mechanical stability:
Allows repeated packing at up to 700 bar (10,000 psi).

PRODUCT CODES

For ordering please use our code system:
Kromasil 100-X-Y
— 100 indicates 100 Å pore size
— X indicates particle size: 5 up to 16 µm
— Y indicates phase: DMB or TBB
(for example Kromasil 100-5-TBB)

DELIVERY

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