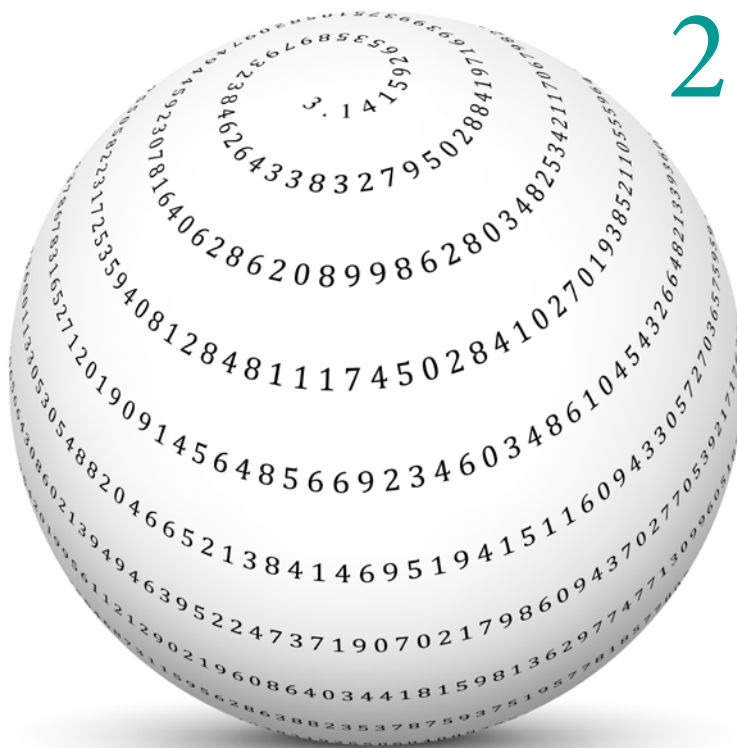


MACHEREY-NAGEL

NUCLEODUR[®] π^2

Chromatography



For enhanced π - π interactions in HPLC

- Hydrophobic phase with alternative selectivity compared to classical C₁₈ modifications
- Meets USP L 11
- Suitable for 100 % aqueous mobile phase

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Since 1911

Key features

- Hydrophobic phase with alternative selectivity compared to classical C₁₈ modifications
- Separation mode based on 2 retention mechanisms: π - π interactions and hydrophobic interactions
- Better retention of aromatic and unsaturated substances
- Excellent performance under highly aqueous conditions

Technical characteristics

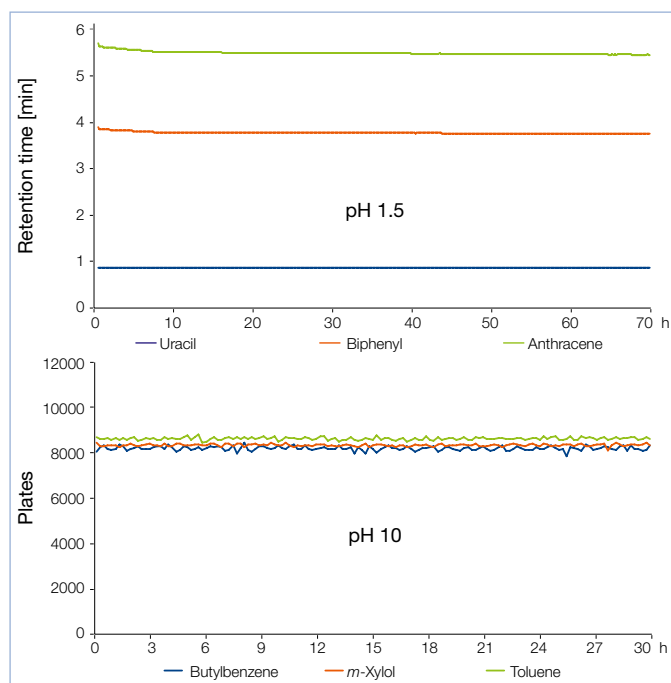
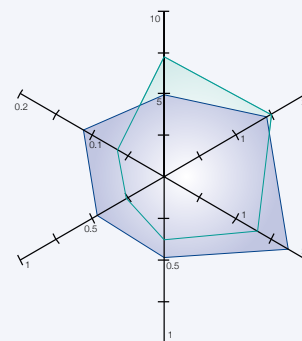
- Phase with biphenylpropyl modification and multi-endcapping
- Pore size 110 Å, particle size 5 μ m, carbon content 17 %, pH stability 1.5–10

Recommended application

Overall sophisticated analytical separations, especially aromatic and unsaturated compounds, polar compounds like pharmaceuticals, antibiotics, steroids

USP L11

Similar phases: Pinnacle® DB Biphenyl, Ultra Biphenyl



High pH stability

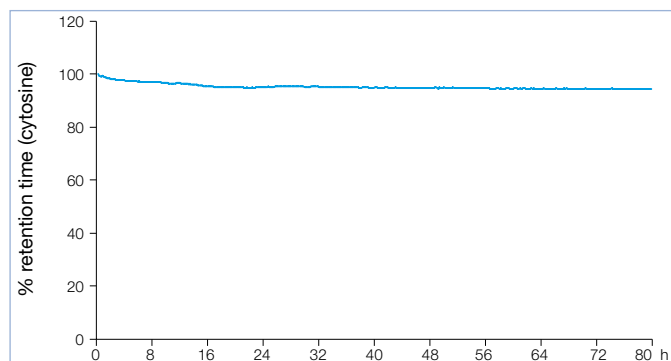
MN Appl. No. 127890

Column: 125 x 4 mm NUCLEODUR® π^2 , 5 μ m
 Eluent: acetonitrile–water (60:40, v/v) + 1 % TFA, pH 1.5
 Injection: 1 μ L uracil, biphenyl, anthracene in acetonitrile
 Flow: 1 mL/min
 Temperature: 60 °C
 Detection: UV, 254 nm

Eluent: 50 mmol/L ammonium acetate in water–methanol (20:80, v/v), adjusted to pH 10 by 25 % ammonium hydroxide
 Injection: 5 μ L butylbenzene, *m*-xylol, toluene in methanol
 Flow: 1 mL/min
 Temperature: 30 °C
 Detection: UV, 254 nm

Robust HPLC phase

Even under extreme pH conditions plate numbers and retention times remain stable over very long periods.



Stability under aqueous conditions

MN Appl. No. 127900

Column: 125 x 4 mm NUCLEODUR® π^2 , 5 μ m
 Eluent: 20 mmol/L potassium dihydrogen phosphate in water (adjusted to pH 3.1 by 85 % phosphoric acid)
 Injection: 1 μ L cytosine in methanol–buffer (1:1)
 Flow: 1 mL/min
 Temperature: 20 °C
 Detection: UV, 220 nm

Enhanced stability

Excellent performance using 100 % aqueous mobile phase.



Steroids

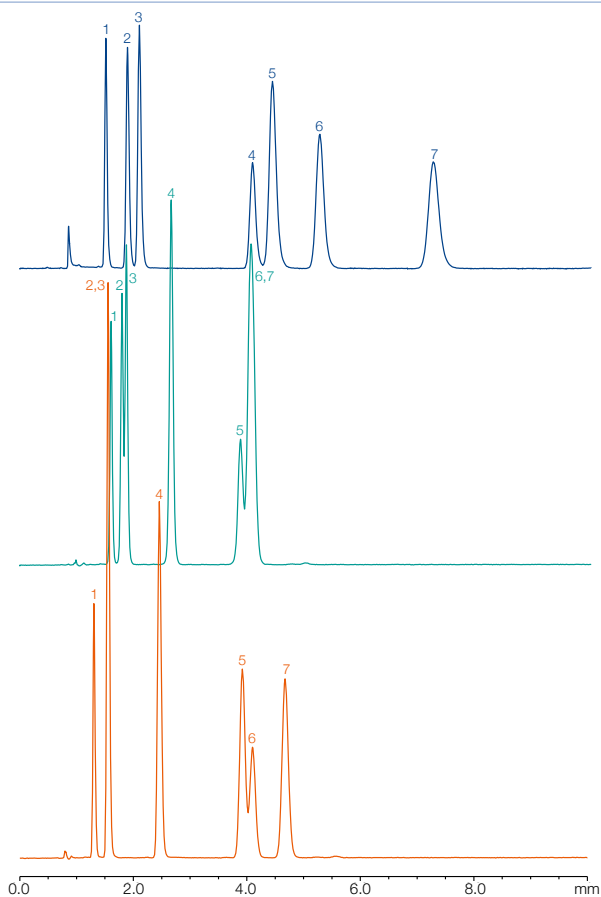
MN Appl. No. 127910

Columns: 125 x 4 mm each
 NUCLEODUR® π², 5 μm
 NUCLEODUR® Phenyl-Hexyl, 5 μm
 NUCLEODUR® C₁₈ Gravity, 5 μm

Eluent: acetonitrile – water (45:55, v/v)
 Injection: 1 μL
 Flow: 1 mL/min
 Temperature: 25 °C
 Detection: UV, 230 nm

Peaks

1. Estriol
2. Hydrocortisone
3. Prednisone
4. β-Estradiol
5. Corticosterone
6. Cortisonacetate
7. Testosterone



Alternative selectivity

A complete separation was only achieved on NUCLEODUR® π².



Sulfonamide antibiotics

MN Appl. No. 127920

Columns*: 100 x 3 mm each
 NUCLEODUR® π², 5 μm
 Pinnacle® DB Biphenyl, 5 μm
 Ultra Biphenyl, 5 μm

Eluent: A) 0.1 % TFA in water
 B) 0.1 % TFA in methanol
 20 % B for 2 min, 20–60 % B in 2 min, 60 % B for 10 min

Flow rate: 0.56 mL/min

Temperature: 30 °C

Detection: UV, 280 nm

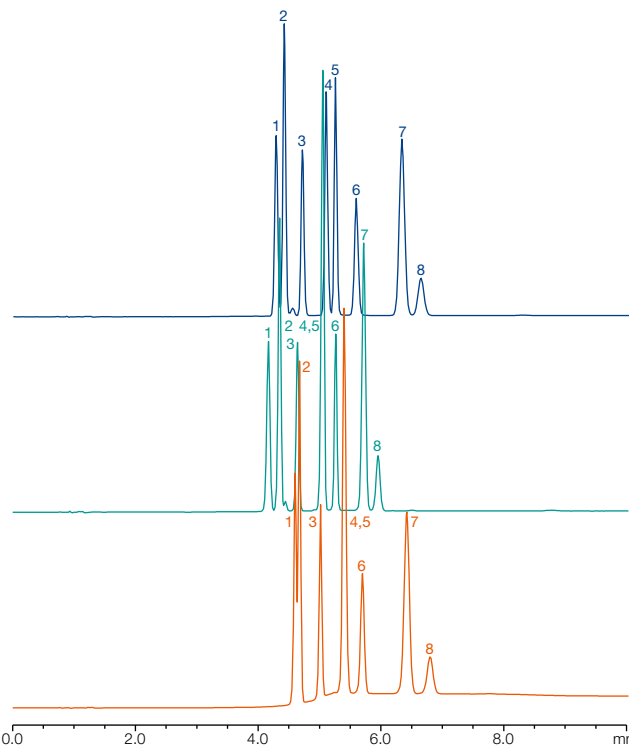
Injection: 1 μL

Peaks

1. Sulfathiazole
2. Sulfadiazine
3. Sulfachloropyridazine
4. Sulfamerazine
5. Sulfadimidine
6. Sulfamethoxazole
7. Sulfadimethoxine
8. Sulfaquinoxaline

Better separation

Compared to other biphenyl columns NUCLEODUR® π² provides baseline separation of different sulfonamide antibiotics.



Acidic pharmaceuticals

MN Appl. No. 127930

Columns*: 100 x 3 mm each
 NUCLEODUR® π², 5 μm
 Pinnacle® DB Biphenyl, 5 μm
 Ultra Biphenyl, 5 μm

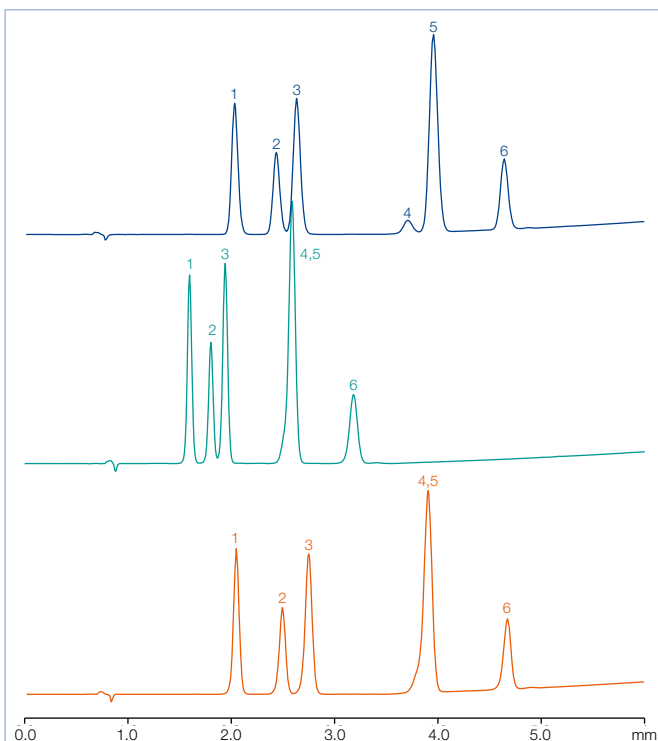
Eluent: A) 0.1 % TFA in water
 B) 0.1 % TFA in acetonitrile
 50 % B for 2.5 min, 50–70 % B in 3.5 min, 70 % B for 4 min

Flow rate: 0.56 mL/min
 Temperature: 30 °C
 Detection: UV, 280 nm
 Injection: 1 μL

- Peaks
1. Sulindac
 2. Suprofen
 3. Ketoprofen
 4. Fenopropfen
 5. Ibuprofen
 6. Diclofenac

Improved performance

Fenopropfen and ibuprofen are separated only on NUCLEODUR® π².



*Same conditions for all used columns. The shown chromatograms may not be representative of other applications.

Ordering information

Length	50 mm	75 mm	100 mm	125 mm	150 mm	250 mm
NUCLEODUR® π², 5 μm						
EC columns (pack of 1)						
2 mm ID	760620.20	760621.20	760622.20	760623.20	760624.20	760625.20
3 mm ID	760620.30	760621.30	760622.30	760623.30	760624.30	760625.30
4 mm ID	760620.40	760621.40	760622.40	760623.40	760624.40	760625.40
4.6 mm ID	760620.46	760621.46	760622.46	760623.46	760624.46	760625.46
EC guard columns** (pack of 3)	4 x 2 mm: 761810.20	4 x 3 mm: 761810.30				

** EC guard columns require the Column Protection System guard column holder 718966



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