Finish First with Monolithic Silica HPLC Columns

Onyx is a silica monolithic HPLC column designed for high speed analysis. The monolithic nature allows for “dilute-and-shoot” applications saving scientists valuable sample preparation time.

- Reduce run times by more than 50%
- “Dilute-and-Shoot” dirty biological samples
- Analytical, capillary, and semi-prep dimensions

Material Characteristics

<table>
<thead>
<tr>
<th>Packing Material</th>
<th>Macropore Size (μm)</th>
<th>Mesopore Size (Å)</th>
<th>Pore Volume (mL/g)</th>
<th>Surface Area (m2/g)</th>
<th>Carbon Load %</th>
<th>Calculated Bonded Phase Coverage (µmole/m²)</th>
<th>End Capping</th>
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<tbody>
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</tbody>
</table>

Maximum Pressure: 200 Bar; pH Range: 2.0-7.5

*50 x 2.0 mm ID only; enhanced 1.5 μm macropore size for higher efficiencies

Monolithic Technology vs. Particle-Based Technology

**Onyx:**
- Monolithic porous silica rod
- Significantly shorter run times
  - Cut methods by more than half
- Low backpressures
  - Less stress on system and column
- High flow rates
  - Due to high porosity
- No inlet bed settling
  - Increased reliability, reproducibility, and lifetime

**Particle-Based Columns:**
- Individual silica particles
- High flow resistance
  - Limits ability to shorten run times
- Increased backpressure
  - Limits life of pumps, seals, and column
- Reduced throughput
  - Long run times
- Bed splitting possible
  - Shortens column life & lessens reproducibility

If Onyx analytical columns do not provide at least an equivalent separation as compared to a competing column of the same monolithic characteristics, similar phase, and dimensions, send in your comparative data within 45 days and keep the Onyx column for FREE.
Dramatically Increase Throughput and Reduce Analysis Time

Onyx columns can be used in a variety of reversed phase methods - anytime you want the advantage of speed and throughput, put Onyx to the test!

You can also scale existing Onyx methods to the new 50 x 2.0 mm ID to gain advantages in sensitivity and solvent savings.

- Option to run from 1 mL/min up to 9 mL/min
- Reduce re-equilibration time from sample to sample
- Shorten total separation time once target compound has eluted with flow gradient options

Versatile Performance!

High Efficiencies

Onyx 2.0 mm ID columns have a reduced macropore of 1.5 μm, providing excellent efficiencies.

Extremely Low Backpressure

The very high porosity of Onyx columns result in very low backpressures, even at high flow rates. Onyx silica monolithic columns rarely exceed 100 bar, even at 9 mL/min, while particle-based columns reach backpressure limits at much lower flow rates.

- Typically 60 % less backpressure than particle-based columns
- Couple columns together to produce extremely high plate counts to separate critical pairs
- Minimal worry of system shutdowns from high backpressure

Backpressure vs. Flow Rate

Antihistamines

Conditions same for both separations:

- Mobile Phase: A: 0.1 % Phosphoric Acid in Water
  B: 0.1 % Phosphoric Acid in Acetonitrile
- Gradient: 10 % to 50 % B in 3.4 min
- Flow Rate: 0.56 mL/min for 2.0 mm ID
  3.0 mL/min for 4.6 mm ID
- Detection: UV @ 210 nm
- Temperature: Ambient
- Sample:
  1. Pyrilamine
  2. Tripelennamine
  3. Chlorpheniramine
  4. Brompheniramine
  5. Chloropyramine
  6. Diphenhydramine
Faster Throughput for Bioanalytical Samples

In DMPK/ADME and clinical environments, polar drugs and metabolites must be separated from complex matrices. This often involves rigorous sample cleanup procedures prior to injection onto the HPLC.

In addition, aggressive gradient conditions often employed require lengthy column re-equilibration times between injections. With backpressure no longer a concern, gradient cycle times can be decreased by increasing flow rate during the hold and re-equilibration step, significantly improving the speed of sample throughput.

Over 40 hours saved!
Compared to a traditional re-equilibration strategy at 0.6 mL/min for 1.0 min

Food and Beverage:
- Flow restrictions and overpressures, due to salts, precipitated proteins, and lipids in the sample matrix, are highly unlikely
- Increase resolving power of very complex food extracts by column coupling
- Analyze very dilute or low-level analytes by a direct, high-flow injection onto the column

Multi-Grain Cereal
- Column: Onyx Monolithic C18
- Dimensions: 200 x 4.6 mm
  (2 x 100 x 4.6 mm columns coupled in series)
- Part No.: CHB-7643
- Mobile Phase: A: 0.1 % TFA in Water
  B: 0.08 % TFA in Acetonitrile
- Gradient: 5–70 % B in 15 minutes
- Flow Rate: 1.0 mL/min
- Detection: UV @ 280 nm
- Col. Temperature: 30 °C
- Sample: Multi-grain cereal
10 mm ID Onyx Semi-Prep Column

- Flow rates from 5 – 35 mL/min
- Loading capacities approaching what is typically observed on 21.2 mm ID columns for some samples
- Pore structure rapidly disrupts DMSO injection slug resulting in better mixing & improved binding of analyte to sorbent
- Long lifetimes when analyzing “dirty” samples due to monolithic nature

Naproxen and Diflunisal

Column: Onyx Monolithic C18
Dimensions: 100 x 10 mm
Part No.: CH0-7878
Mobile Phase: A: 0.1 % TFA in Water
B: 0.1 % TFA in Acetonitrile
Gradient: Hold at 30 % B for 1 min, then from 30 % B to 70 % B in 6 min, back to 30 % B and hold for 3 min
Flow Rate: 5.0 mL/min
Detection: UV @ 254 nm
Temperature: Ambient
Sample: 1. Naproxen 50 mg/mL
2. Diflunisal 50 mg/mL

Batch-to-Batch
Excellent consistency of retention in different batches have been shown. The retention factors, for the probes, were all within 5 % for all the columns.

Column-to-Column
Acidic, basic, neutral polar, and neutral hydrophobic probes were evaluated on the same column to verify run-to-run reproducibility. The plots show less than 1 % variation between the run illustrating reproducibility.

Excellent Reproducibility
Several parameters, such as peak asymmetry and retention factors, were used to test the reproducibility of Onyx silica monolithic columns and ensure that every batch meets the quality control standards of chromatographers worldwide.

Ordering Information

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<thead>
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<th>Part No.</th>
<th>Description</th>
<th>Size (mm)</th>
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For more information:
- Refer to technical note, TN-1025, for more information pertaining to Onyx reproducibility. Call your Phenomenex representative.
- For Fused Silica Capillary Adapter, see p. 349
- For Onyx Normal and Reversed Phase Column Check Standards, see p. 356
- Product based on monolithic technology under license from Merck KGaA, Darmstadt, Germany