

## 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

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.



### Material Characteristics

Packing Material	Macropore Size (µm)	Mesopore Size (Å)	Pore Volume (mL/g)	Surface Area (m²/g)	Carbon Load %	Calculated Bonded Phase Coverage (µmole/m²)	End Capping
Onyx Silica	2	130	1.0	300	0	0	No
Onyx C8	2	130	1.0	300	11	3.8	Yes
Onyx C18	2	130	1.0	300	18	3.6	Yes
Onyx C18*	1.5	130	1.0	300	18	3.6	Yes
Onyx HD-C18	1	130	1.0	300	18	3.6	Yes

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

## High Resolution Monolithic Columns—Onyx HD-C18

- 50 % higher performance compared to our standard Onyx columns
- Backpressure 2 times lower than particle packed columns
- 30 % longer column lifetime compared to some particle packed columns

## 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

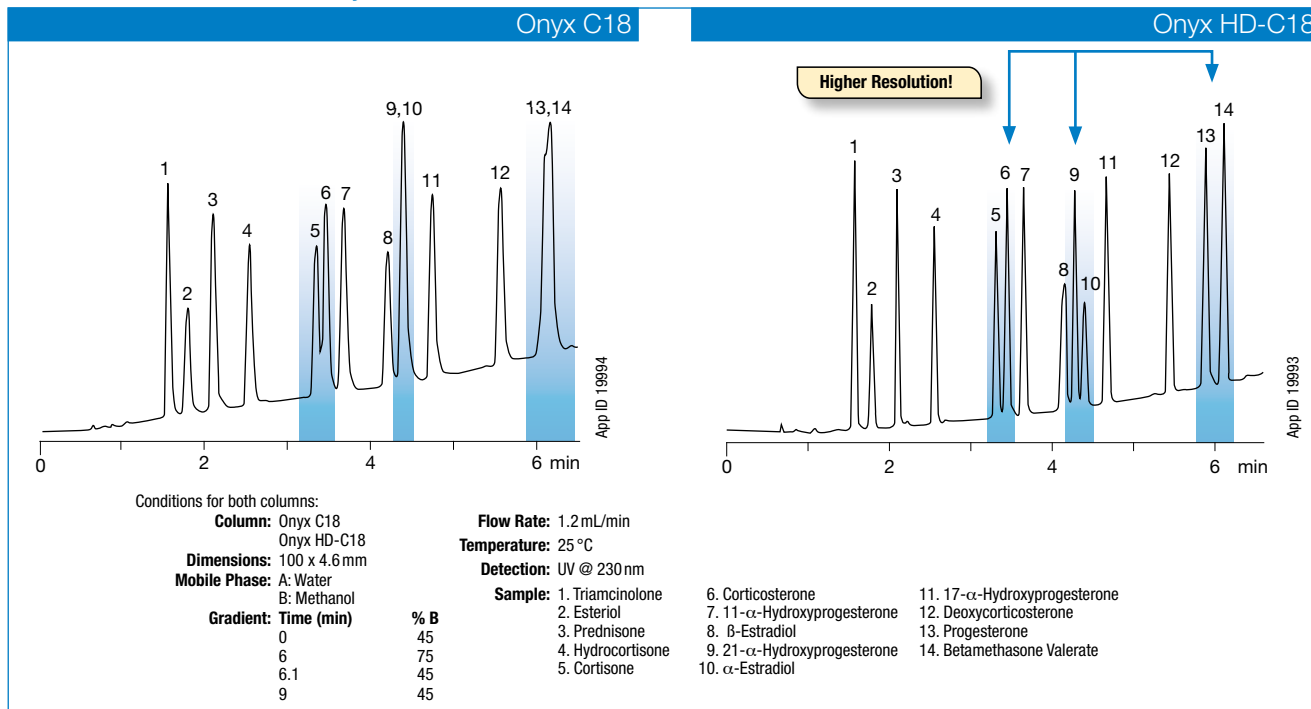
- **Individual silica particles**
- **High flow resistance**  
Limits ability to shorten run times
- **Increased backpressure**  
Limits life of pumps, seals, and column
- **Reduced throughput**  
Long run times
- **Bed splitting possible**  
Shortens column life & lessens reproducibility



## 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!

### Increased Resolution of Steroids with Onyx HD-C18

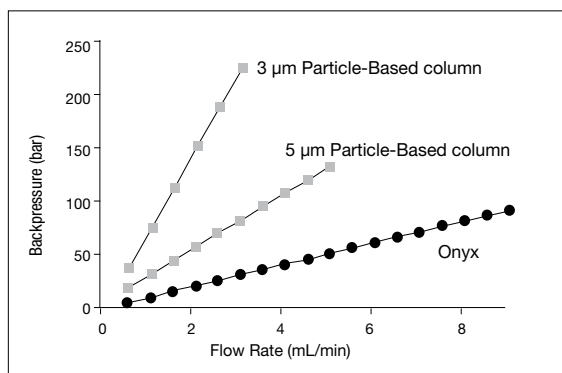


## Extremely Low Backpressure

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

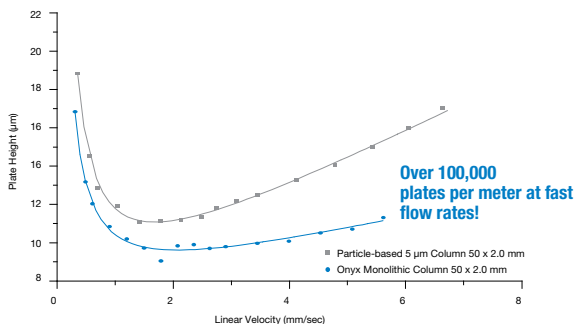
### Backpressure vs. Flow Rate



- 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

## High Efficiencies

Onyx 2.0mm ID columns have a reduced macropore of 1.5  $\mu$ m, providing excellent efficiencies.



Conditions same for both separations:

- Columns:** Particle-based 5  $\mu$ m Column 50 x 2.0 mm ID  
Onyx Monolithic Column 50 x 2.0 mm ID
- Mobile Phase:** Acetonitrile/Water (65:35)
- Flow Rate:** As noted
- Detection:** UV @ 254 nm
- Temperature:** 30 °C
- Samples:** 1. Uracil  
2. Acetophenone  
3. Benzene  
4. Toluene  
5. Naphthalene

## Faster Throughput for Bioanalytical Samples

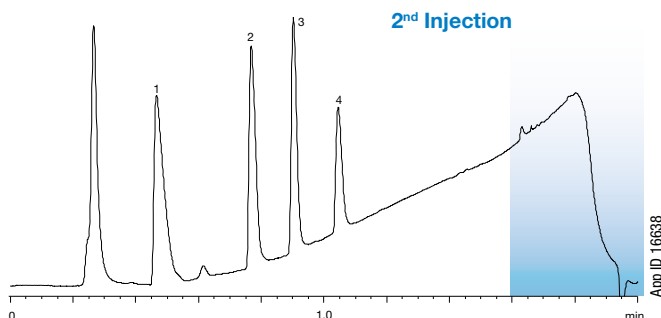
In DMPK/ADME and clinical environments, polar drugs and metabolites must be separated from complex matrices. This often involves rigorous sample cleanup procedures prior to injection onto the HPLC.

In addition, aggressive gradient conditions often employed require lengthy column re-equilibration times between injections. With

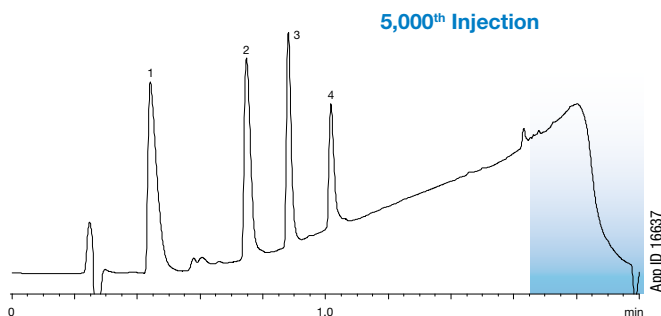
backpressure no longer a concern, gradient cycle times can be decreased by increasing flow rate during the hold and re-equilibration step, significantly improving the speed of sample throughput.

### Over 40 hours saved!

Compared to a traditional re-equilibration strategy at 0.6 mL/min for 1.0 min



**Fast Cycle Times!** 0.6 mL/min → 1 mL/min



Conditions same for both separations:

**Column:** Onyx Monolithic C18

**Dimensions:** 50 x 2.0 mm

**Part No.:** CH0-8373

**Mobile Phase:** A: 0.1 % Formic acid in Water

B: 0.1 % Formic acid in Acetonitrile

**Gradient:** 5 % B to 95 % B in 1.5 min at 0.6 mL/min

**Equilibrate:** 5 % B for 0.5 min at 1.0 mL/min

**Temperature:** 45 °C

**Detection:** UV @ 230 nm

**Sample:** (100 µg/mL) in 1:3 Human plasma: Acetonitrile

1. Atenolol

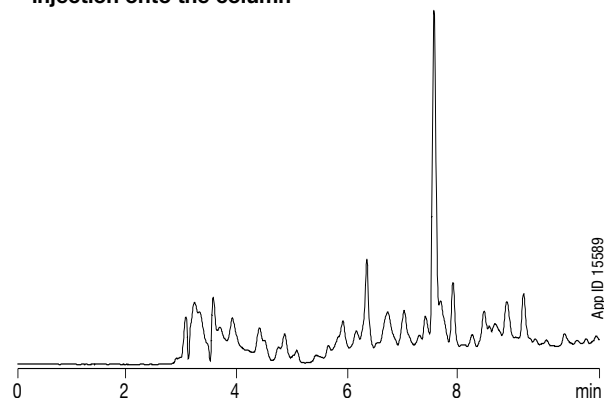
2. Pindolol

3. Metoprolol

4. Alprenolol

## 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.:** CH0-7643

**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 21.2mm 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

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.

## 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.



Refer to technical note, TN-1025, for more information pertaining to Onyx reproducibility. Call your Phenomenex representative.

### Ordering Information

Part No.	Description	Size (mm)	Price
<b>Capillary Columns</b>			
CHO-8388	Onyx Monolithic C18	150 x 0.05	
CHO-7646	Onyx Monolithic C18	150 x 0.1	
CHO-8389	Onyx Monolithic HD-C18	150 x 0.1	
CHO-8390	Onyx Monolithic C18	150 x 0.2	
CHO-8391	Onyx Monolithic HD-C18	150 x 0.2	
CHO-8392	Onyx Monolithic C18 Trapping Column	50 x 0.2	
CHO-8393	Onyx Monolithic C8	150 x 0.1	
<b>Analytical Columns</b>			
CHO-8373	Onyx Monolithic C18	50 x 2.0	
CHO-8467	Onyx Monolithic C18	100 x 2.0	
CHO-8464	Onyx Monolithic C18	25 x 3.0	
CHO-8463	Onyx Monolithic C18	50 x 3.0	
CHO-8158	Onyx Monolithic C18	100 x 3.0	
CHO-7643	Onyx Monolithic C18	100 x 4.6	
CHO-7644	Onyx Monolithic C18	50 x 4.6	
CHO-7645	Onyx Monolithic C18	25 x 4.6	
CHO-8611	Onyx Monolithic HD-C18	100 x 4.6	
CHO-8612	Onyx Monolithic HD-C18	50 x 4.6	
CHO-8613	Onyx Monolithic HD-C18	25 x 4.6	
CHO-7647	Onyx Monolithic C8	100 x 4.6	
CHO-7648	Onyx Monolithic Si	100 x 4.6	
<b>SemiPrep Columns</b>			
CHO-7878	Onyx Monolithic C18	100 x 10.0	
<b>Guard Cartridge System</b>			
KJO-8468	Onyx Monolithic C18 Guard Cartridge Kit (3/pk cartridges + holder)	5 x 2.0	
CHO-8469	Onyx Monolithic C18 Guard Cartridges (3/pk)	5 x 2.0	
KJO-8465	Onyx Monolithic C18 Guard Cartridge Kit (3/pk cartridges + holder)	5 x 3.0	
CHO-8466	Onyx Monolithic C18 Guard Cartridges (3/pk)	5 x 3.0	
KJO-7651	Onyx Monolithic C18 Guard Cartridge Kit (3/pk cartridges + holder + wrench)	5 x 4.6	
CHO-7649	Onyx Monolithic C18 Guard Cartridges (3/pk)	5 x 4.6	
KJO-8615	Onyx Monolithic HD-C18 Guard Cartridge Kit (3/pk cartridges + holder + wrench)	5 x 4.6	
CHO-8616	Onyx Monolithic HD-C18 Guard Cartridge (3/pk)	5 x 4.6	
KJO-7652	Onyx Monolithic C18 Guard Cartridge Kit (3/pk cartridges + holder + wrench)	10 x 4.6	
CHO-7650	Onyx Monolithic C18 Guard Cartridges (3/pk)	10 x 4.6	
<b>Column Coupler</b>			
AQO-7654	Onyx Column Coupler, 0.020 in. ID		



For Fused Silica Capillary Adapter, see p. 367



For Onyx Normal and Reversed Phase Column Check Standards, see p. 372



Product based on monolithic technology under license from Merck KGaA, Darmstadt, Germany