

- **PH-3: phenyl column with excellent aromatic and polar compound selectivity**
- **3  $\mu\text{m}$  ODS-3: high efficiency alternative to the 5  $\mu\text{m}$  ODS-3 columns**
- **Columns stable from pH 2 to 9**

If Prodigy does not provide at least an equivalent separation as compared to a competing column of the same particle size, similar phase and dimensions, send in your comparative data within 45 days and keep the Prodigy column for FREE.

## Material Characteristics

Phase	Particle Shape/Size ( $\mu\text{m}$ )	Pore Size ( $\text{\AA}$ )	Pore Volume (mL/g)	Surface Area ( $\text{m}^2/\text{g}$ )	Carbon Load %	Calculated Bonded Phase Coverage ( $\mu\text{mole}/\text{m}^2$ )	End Capping
Silica	Spher. 5	150	—	310	0	—	No
ODS (2)	Spher. 5	150	1.1	310	18.5, Monomeric	3.50	Yes
C8	Spher. 5	150	1.1	310	12.6, Monomeric	5.00	Yes
ODS (3)	Spher. 3, 5, 10	100	—	450	15.5, Monomeric	—	Yes
Phenyl-3 (PH-3)	Spher. 5	100	—	450	10.0, Polymeric	—	No
Silica	Spher. 5	100	—	450	0	—	No
ODS-PREP	Spher. 10	100	—	350	18.0, Monomeric	3.01	Yes

## PRODIGY PHENYL PH-3

### A Polar Phenyl-Ethyl Column

- **Polymerically bonded phenyl-ethyl phase**
- **Excellent for aromatic, polar compounds as well as difficult pharmaceutical drug separations**
- **Different selectivity for many applications versus Luna Phenyl-Hexyl and Synergi Polar-RP**
- **Excellent option for applications requiring a USP L11 column**

Prodigy PH-3 is a phenyl phase that combines high purity B-type silica, polymeric bonding, moderate surface coverage as well as an ethyl-linker to provide a unique selectivity for a phenyl phase. Prodigy PH-3 is less hydrophobic than Luna Phenyl-Hexyl and Synergi Polar-RP due in part to differences in carbon load, linker, and endcapping. These differences make Prodigy PH-3 a specific option for applications requiring a phenyl phase: separations that can use  $\pi$ - $\pi$  interactions between analytes and bonded phase to enhance aromatic selectivity differences. Typical applications where Prodigy PH-3 excels include polar aromatics as well as mixtures of polar and non-polar compounds.

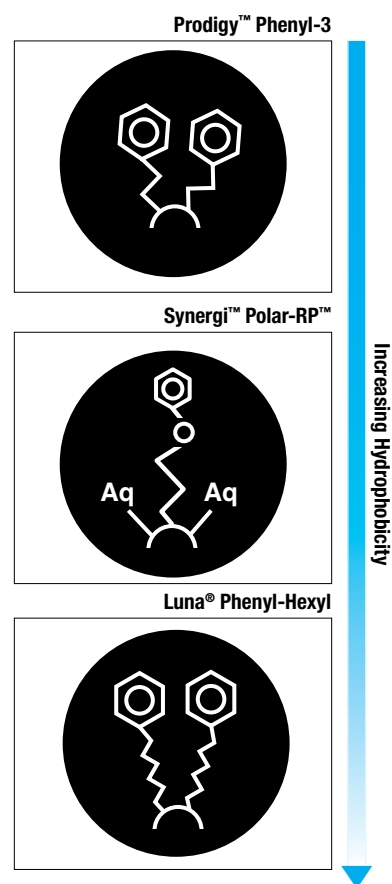
### Phenomenex Solutions for Phenyl Phase Selectivity

The ability to participate in  $\pi$ - $\pi$  interactions gives Phenomenex phenyl phases selectivities not available from conventional C8 or C18 columns. Three different phenyl phases are available, each offering unique phase characteristics:

**Prodigy Phenyl-3** - a polymerically bonded ethyl-linked phenyl phase with the lowest hydrophobicity of the phenyl phases. Low hydrophobicity and no additional polar functionality result in aromatic interactions being most focused with this phase.

**Synergi Polar-RP** - an ether-linked phenyl phase with polar endcapping that has moderate hydrophobicity. By having polar endcapping and a polar embedded group Synergi Polar-RP has the most polar selectivity of the phenyl phases. (see p. 237)

**Luna Phenyl-Hexyl** - a phenyl column with a hexyl linker and non-polar endcapping results in a phenyl phase with significant hydrophobicity. Such high hydrophobicity results in a phenyl phase with strong aromatic and hydrophobic selectivity. (see p. 158)



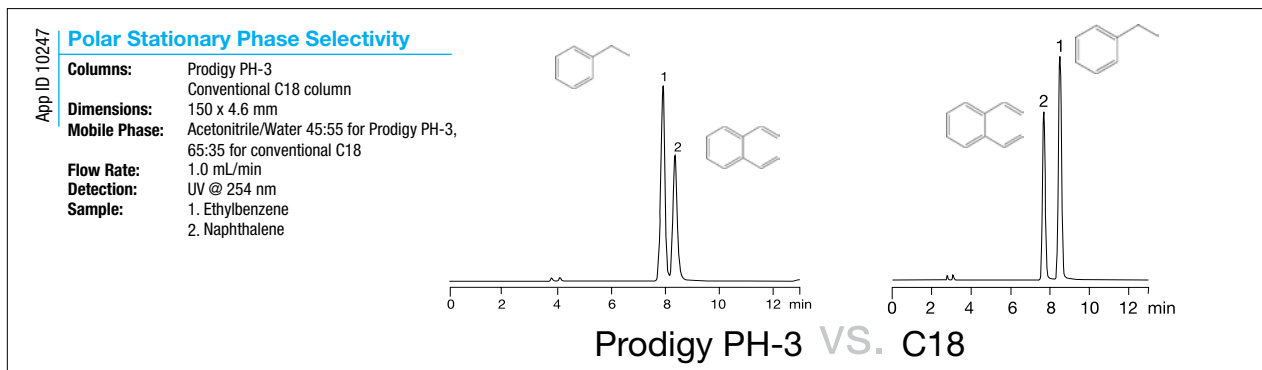
## Using a Phenyl Phase



Phenyl phases can provide separations not achievable on C18 or C8; such as increased retention for polar, aromatic compounds as well as reversals in analyte elution order. The unique selectivity is due to the interactions between the  $\pi$  electrons of the phenyl ring and  $\pi$  electrons from aromatic groups of the analytes. To fully express a phenyl's unique aromatic selectivity, **methanol** should be used as the organic component rather than acetonitrile. It is presumed the  $\pi$  electrons of the "CN" bond in acetonitrile compete for the phenyl "binding sites" on the stationary phase, thus limiting the amount of  $\pi$ - $\pi$  interaction between the stationary phase and the analyte molecules, and the separation would then be based only on hydrophobic retention.

Synergi is a trademark of Phenomenex, Inc.  
Luna is a registered trademark of Phenomenex, Inc.

## Phenyl PH-3 (continued)



App ID 10257

### Food Additives

**Column:** Prodigy 5 µm PH-3

**Dimensions:** 150 x 4.6 mm

**Part No.:** 00F-4298-E0

**Mobile Phase:** Acetonitrile / 20 mM Potassium phosphate pH 3.0 (25:75)

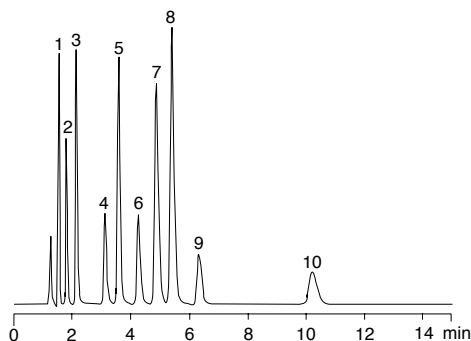
**Flow Rate:** 1.5 mL/min

**Temperature:** 40 °C

**Detection:** 0 - 1.6 min UV @ 230 nm  
1.6 - 2 min UV @ 210 nm  
2 min - UV @ 230 nm

**Sample:**

1. Saccharin
2. Aspartame
3. *p*-Hydroxybenzoic Acid
4. Caffeine
5. Benzoic Acid
6. *p*-Hydroxybenzoic Acid Methyl Ester
7. *p*-Toluic Acid
8. Dehydroacetic Acid
9. *p*-Hydroxybenzoic Acid Ethyl Ester
10. *p*-Hydroxybenzoic Acid Propyl Ester



App ID 10251

### Pseudoephedrine, Chlorpheniramine, and Dextromethorphan in Cough and Cold Formulations

**Column:** Prodigy 5 µm PH-3

**Dimensions:** 150 x 4.6 mm

**Part No.:** 00F-4298-E0

**Mobile Phase:** Methanol / Water (60:40) containing 2.5 mM Monobasic potassium phosphate, 3 mM Triethylamine, 0.5 mM Sodium lauryl sulfate, and 0.1 % Phosphoric acid

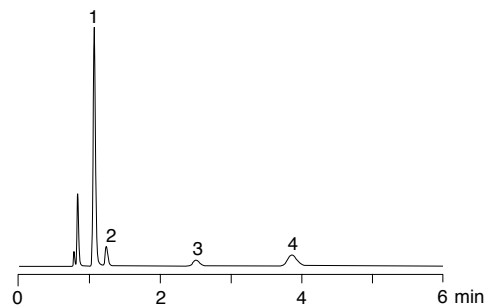
**Flow Rate:** 2.0 mL/min

**Temperature:** 25 °C

**Detection:** UV @ 214 nm

**Sample:**

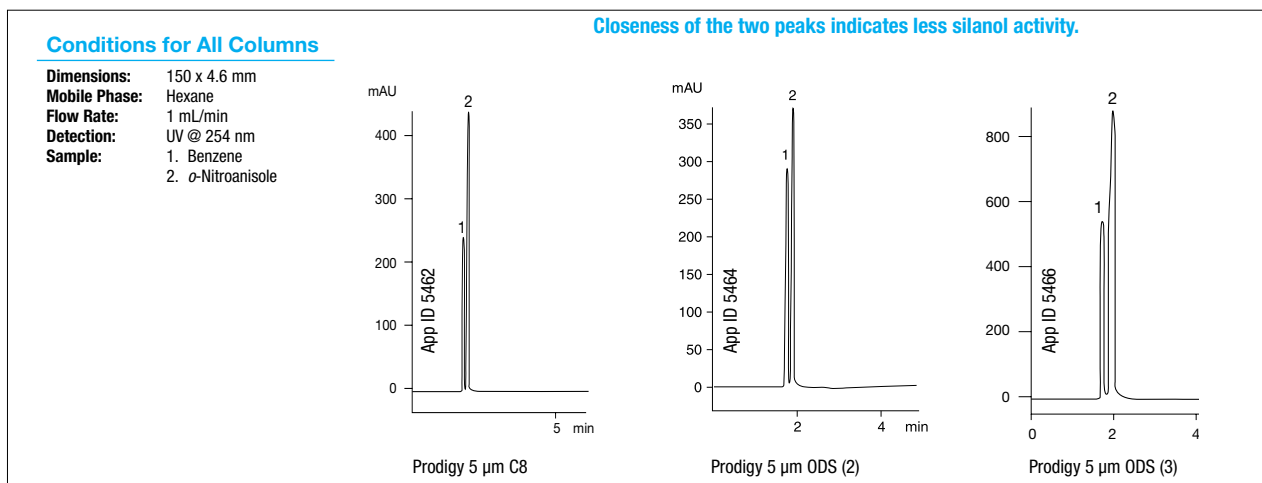
1. Acetaminophen
2. Pseudoephedrine (USP tailing factor 1.67)
3. Chlorpheniramine (USP tailing factor 1.41, Rs from peak 2 = 10.68)
4. Dextromethorphan (USP tailing factor 1.31, Rs from peak 3 = 6.51)



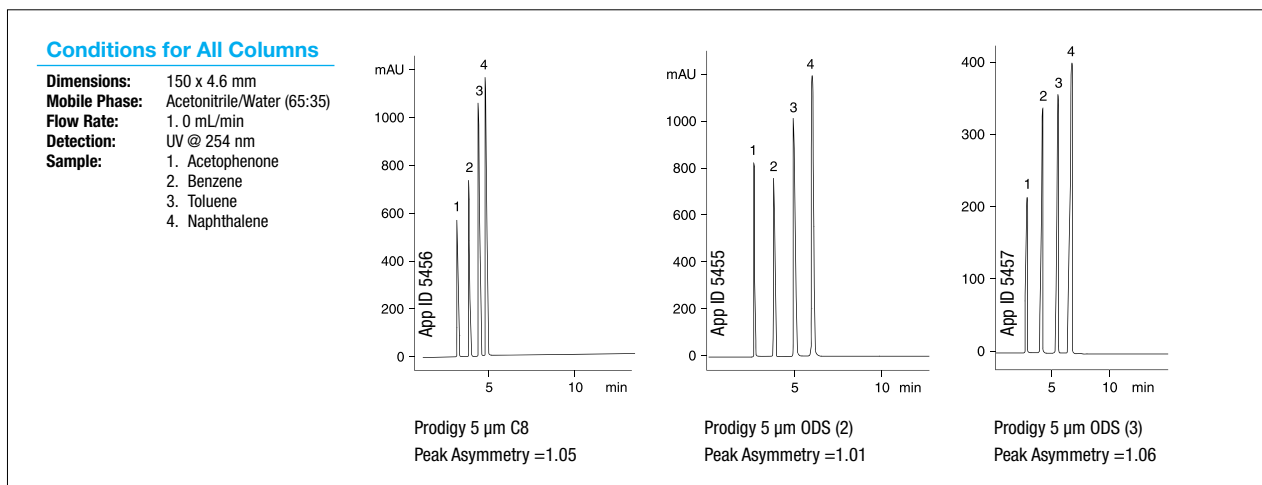
## ODS AND C8

### Low Silanol Activity

This inert test, performed in normal phase mode, is sensitive to the presence of free silanols. When residual silanol groups are present, *o*-nitroanisole elution is delayed. Increased retention, i.e., delayed elution of *o*-nitroanisole with respect to benzene, indicates adsorption of its methoxy group to residual free silanols on the bonded phase.



### Excellent Peak Asymmetry



## ORDERING INFORMATION

SecurityGuard™ Analytical Cartridges require universal holder Part No.: KJO-4282

3 µm ODS-3 Columns (mm)						SecurityGuard™ Cartridges		
Phases	100 x 2.0	100 x 4.0	30 x 4.6	75 x 4.6	100 x 4.6	150 x 4.6	4 x 2.0 mm* /10pk	4 x 3.0 mm* /10pk
ODS-3 100 Å	00D-4222-B0	00D-4222-D0	00A-4222-E0	00C-4222-E0	00D-4222-E0	00F-4222-E0	AJO-4286 for ID: 2.0-3.0 mm	AJO-4287 3.2-8.0 mm

PEEK columns available upon request.

3 µm and 5 µm ODS-3V Columns (mm)			
Phases	Part No.	Size (mm)	Price
3 µm ODS-3V	00D-4243-E0	100 x 4.6	
3 µm ODS-3V	00F-4243-E0	150 x 4.6	
5 µm ODS-3V	00F-4241-E0	150 x 4.6	
5 µm ODS-3V	00G-4241-E0	250 x 4.6	

5 µm Microbore Columns (mm)		
Phases	50 x 1.0	150 x 1.0
C8 150 Å	—	00F-3301-A0
ODS-2 150 Å	—	00F-3300-A0
ODS-3 100 Å	00B-4097-A0	00F-4097-A0

5 µm Minibore Columns (mm)					SecurityGuard™ Cartridges
Phases	50 x 2.0	100 x 2.0	150 x 2.0	250 x 2.0	4 x 2.0 mm* /10pk
C8 150 Å	00B-3301-B0	—	00F-3301-B0	—	AJO-4289
ODS-2 150 Å	—	00D-3300-B0	00F-3300-B0	—	AJO-4286
ODS-3 100 Å	00B-4097-B0	00D-4097-B0	00F-4097-B0	00G-4097-B0	AJO-4286
Phenyl-3 (PH-3) 100 Å	00B-4298-B0	00D-4298-B0	00F-4298-B0	00G-4298-B0	AJO-4350 for ID: 2.0-3.0 mm

5 µm MidBore™ Columns (mm)						SecurityGuard™ Cartridges	
Phases	150 x 3.0	250 x 3.0	100 x 3.2	150 x 3.2	250 x 3.2	4 x 2.0 mm* /10pk	4 x 3.0 mm* /10pk
C8 150 Å	00F-3301-Y0	00G-3301-Y0	—	—	00G-3301-R0	AJO-4289	AJO-4290
ODS-2 150 Å	—	00G-3300-Y0	—	00F-3300-R0	00G-3300-R0	AJO-4286	AJO-4287
ODS-3 100 Å	00F-4097-Y0	00G-4097-Y0	00D-4097-R0	00F-4097-R0	00G-4097-R0	AJO-4286	AJO-4287
Phenyl-3 (PH-3) 100 Å	00F-4298-Y0	00G-4298-Y0	—	—	—	AJO-4350 for ID: 2.0-3.0 mm	AJO-4351 3.2-8.0 mm

5 µm and 10 µm Analytical Columns (mm)						SecurityGuard™ Cartridges
Phases	30 x 4.6	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0 mm* /10pk
5 µm Silica 150 Å	—	—	—	—	00G-3302-E0	AJO-4348
5 µm C8 150 Å	00A-3301-E0	00B-3301-E0	00D-3301-E0	00F-3301-E0	00G-3301-E0	AJO-4290
5 µm ODS-2 150 Å	00A-3300-E0	00B-3300-E0	00D-3300-E0	00F-3300-E0	00G-3300-E0	AJO-4287
5 µm Silica 100 Å	—	00B-4098-E0	00D-4098-E0	—	00G-4098-E0	AJO-4348
5 µm ODS-3 100 Å	00A-4097-E0	00B-4097-E0	00D-4097-E0	00F-4097-E0	00G-4097-E0	AJO-4287
5 µm Phenyl-3 (PH-3) 100 Å	00A-4298-E0	00B-4298-E0	00D-4298-E0	00F-4298-E0	00G-4298-E0	AJO-4351
10 µm Silica-3 100 Å	—	—	—	—	00G-4245-E0	AJO-4348
10 µm ODS-3 100 Å	—	—	—	—	00G-4244-E0	AJO-4287 for ID: 3.2-8.0 mm

5 µm and 10 µm Semi-Preparative and Preparative Columns (mm)					SecurityGuard™ Cartridges	
Phases	250 x 10	250 x 21.2	250 x 50	10 x 10 mm† /3pk	15 x 21.2 mm** /ea	
5 µm ODS-3 100 Å	00G-4097-N0	00G-4097-P0	—	AJO-7221	AJO-7839	
5 µm Phenyl-3 100 Å	00G-4298-N0	—	—	AJO-7314	AJO-7841	
10 µm ODS-3 100 Å	00G-4244-N0	00G-4244-P0	00G-4244-V0	AJO-7221 for ID: 9-16 mm	AJO-7839 18-30 mm	

10 µm-PREP Columns (mm)					Guards	SecurityGuard™ Cartridges		
Phases	250 x 4.6	250 x 10	250 x 21.2	250 x 50	50 x 50	4 x 3.0 mm* /10pk	10 x 10 mm† /3pk	15 x 21.2 mm** ea
ODS-PREP	00G-4088-E0	00G-4088-N0	00G-4088-P0	00G-4088-V0	03B-4088-V0	AJO-4287 for ID: 3.2-8.0 mm	AJO-7221 9-16 mm	AJO-7839 18-30 mm



See p. 218 for SecurityGuard Cartridge Holders.

\*SecurityGuard™ Analytical Cartridges require holder, Part No.: KJO-4282  
 †Semi-prep SecurityGuard™ Cartridges require holder, Part No.: AJO-7220  
 \*\*PREP SecurityGuard™ Cartridges require holder, Part No.: AJO-8223