

- **PH-3: phenyl column with excellent aromatic and polar compound selectivity**
- **3 μ ODS-3: high efficiency alternative to the 5 μ 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 (μ)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m ² /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

PHENYL PH-3

A Polar Phenyl-Ethyl Column

- **Polymerically bonded phenyl-ethyl groups**
- **Excellent for aromatic, polar compounds and difficult pharmaceuticals**
- **Different selectivity to C8, C18 and Cyano phases**
- **Our choice for applications requiring a USP L11 column**

The surface of Prodigy PH-3 particles is covered with phenyl-ethyl groups (see figure at right). The phenyl-ethyl groups of Prodigy PH-3 columns participate in π - π interactions with analytes containing aromatic rings or double bonds.

In general, Prodigy PH-3 columns are about one-half as retentive as conventional C18 columns, slightly less retentive than conventional C8 phases, but more retentive than standard cyano phases. Due to their ability to participate in π - π interactions, Prodigy PH-3 columns may actually be more retentive than C8 or C18 columns towards certain polar aromatic compounds, depending on running conditions. This selectivity for highly-polar aromatics, which are poorly retained on alkyl-bonded phases, combined with the reduced retentivity towards non-polar compounds, makes Prodigy PH-3 an excellent choice for the analysis of complex mixtures of polar and non-polar analytes.

Using a Phenyl Phase

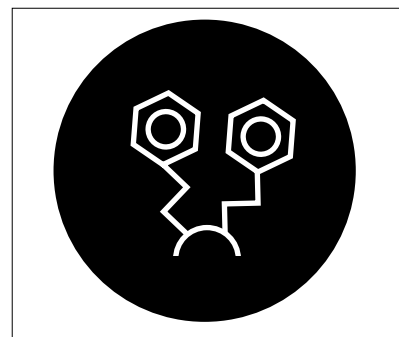


Phenyl phases can provide separations not achievable on C18 or C8; such as increased retention for polar, aromatic compounds as well as reversals in analyte elution order. The unique selectivity is due to the interactions between the π electrons of the phenyl ring and π electrons from aromatic groups 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 π electrons of the "CN" bond in acetonitrile compete for the phenyl "binding sites" on the stationary phase, thus limiting the amount of π - π interaction between the stationary phase and the analyte molecules and the separation is based only on hydrophobic retention.

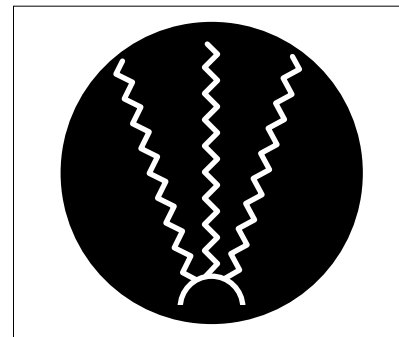
Polar Stationary Phase Selectivity

The ability to participate in π - π interactions gives Prodigy PH-3 a selectivity not available from conventional C8 or C18 columns. For example, the elution order of ethylbenzene and naphthalene are reversed on the PH-3 column due to its affinity for the dual aromatic rings of naphthalene. See next page.

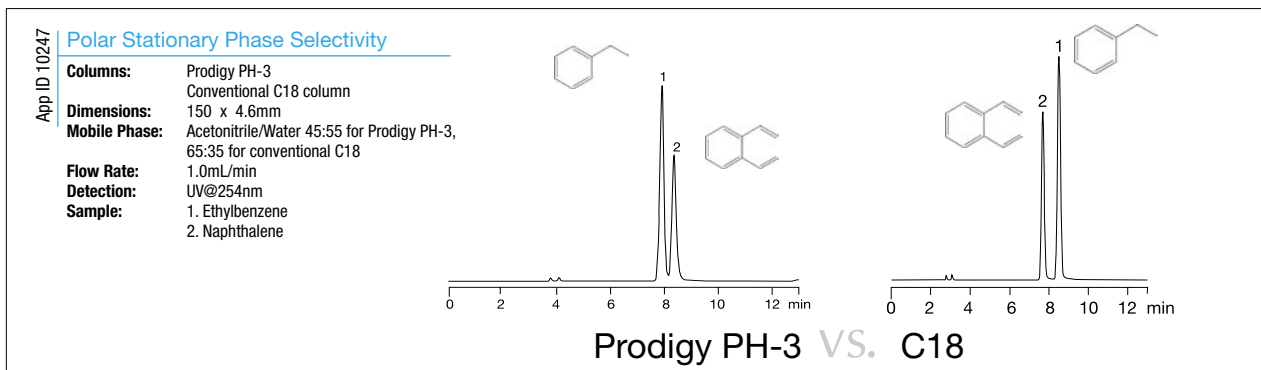
Prodigy™ Phenyl-3



Luna® C18(2)



Phenyl PH-3 (continued)



App ID 10257 **Food Additives**

Column: Prodigy 5 μ PH-3

Dimensions: 150 x 4.6 mm

Order No.: 00F-4298-E0

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

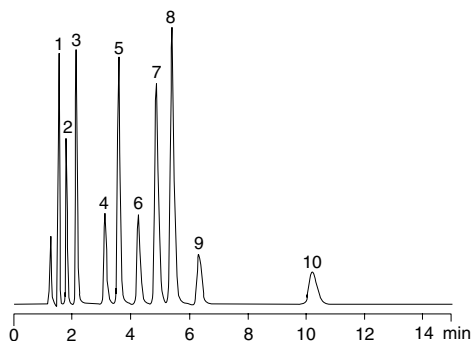
Flow Rate: 1.5mL/min

Temperature: 40°C

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

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 μ PH-3

Dimensions: 150 x 4.6mm

Order No.: 00F-4298-E0

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

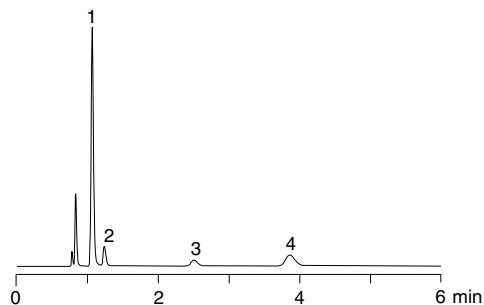
Flow Rate: 2.0mL/min

Temperature: 25°C

Detection: UV@214nm

Sample:

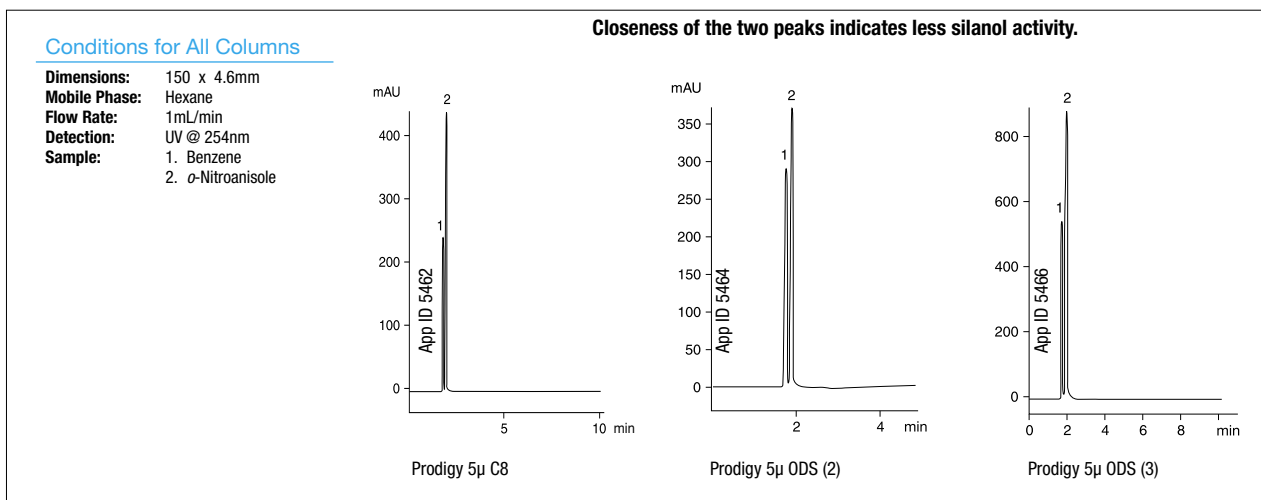
1. Acetaminophen
2. Pseudoephedrine (USP tailing factor 1.67)
3. Chlorpheniramine (USP tailing factor 1.41, Rs from peak 2 = 10.68)
4. Dextromethorphan (USP tailing factor 1.31, Rs from peak 3 = 6.51)



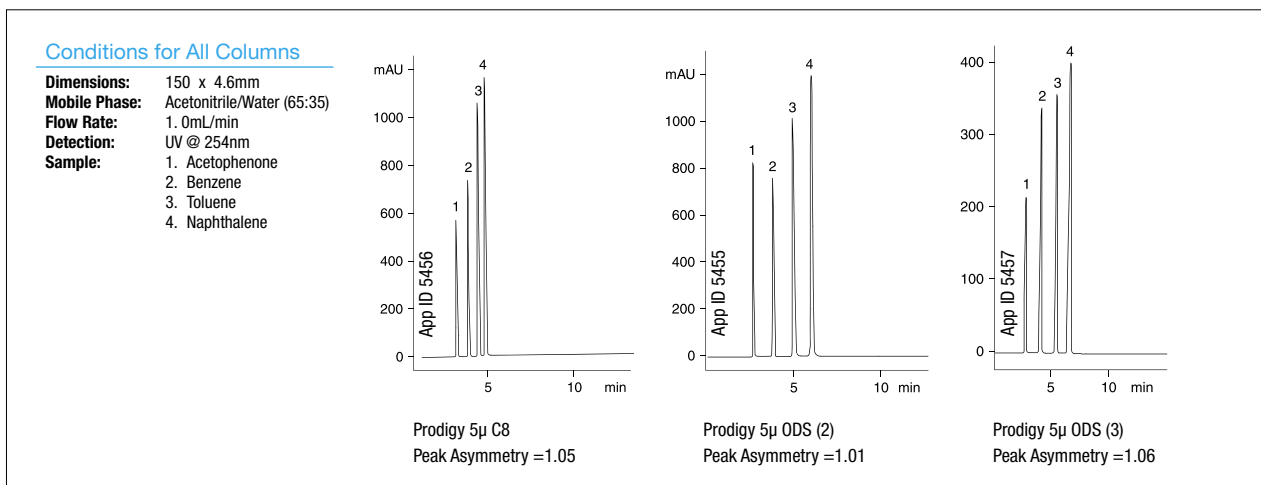
ODS AND C8

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.



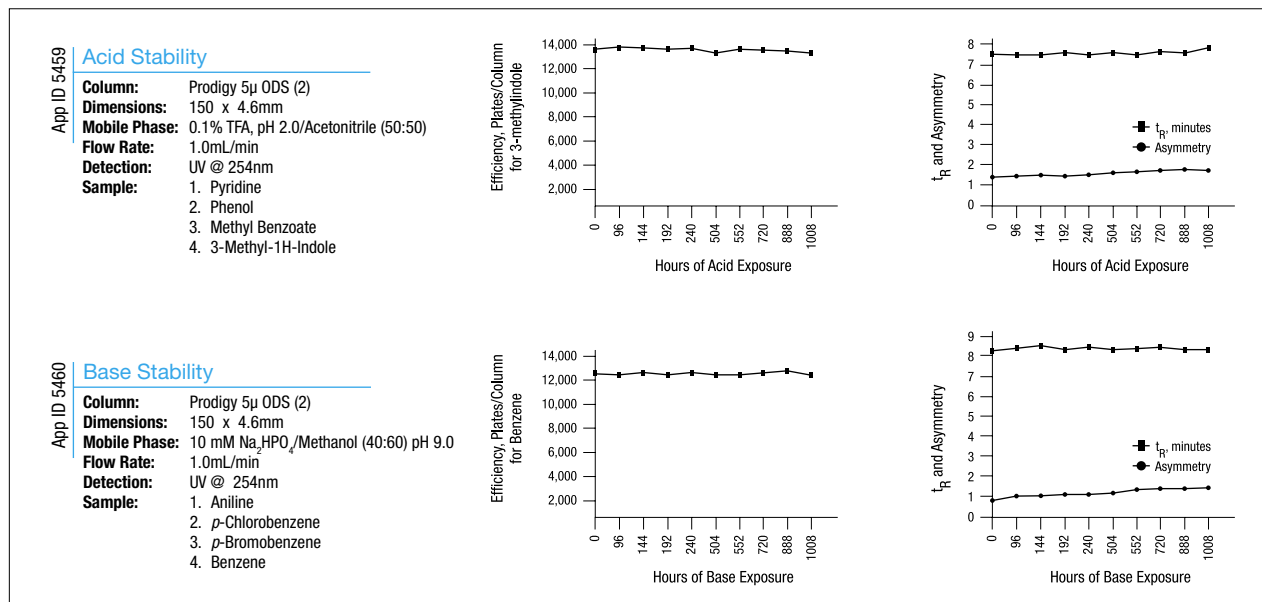
Excellent Peak Asymmetry



ODS and C8 (continued)

Stability

Prodigy columns are stable for >1000 hours when exposed to acidic (pH 2.0) or basic (pH 9.0) conditions.



ORDERING INFORMATION

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

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

PEEK columns available upon request.

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

5µ Microbore Columns (mm)				Guards
Phases	50 x 1.0	100 x 1.0	150 x 1.0	30 x 1.0
C8 150Å	—	—	00F-3301-A0	—
ODS-2 150Å	—	—	00F-3300-A0	—
Silica 100Å	—	—	00F-4098-A0	—
ODS-3 100Å	00B-4097-A0	00D-4097-A0	00F-4097-A0	03A-4097-A0

ORDERING INFORMATION (CONTINUED)

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

5µ Minibore Columns (mm)					SecurityGuard™ Cartridges	
Phases	50 x 2.0 (LC/MS)	100 x 2.0	150 x 2.0 (LC/MS)	250 x 2.0	4 x 2.0mm /10pk	4 x 3.0mm /10pk
Silica 150Å	00B-3302-B0	00D-3302-B0	—	—	AJO-4347	AJO-4348
C8 150Å	00B-3301-B0	00D-3301-B0	00F-3301-B0	00G-3301-B0	AJO-4289	AJO-4290
ODS-2 150Å	00B-3300-B0	00D-3300-B0	00F-3300-B0	00G-3300-B0	AJO-4286	AJO-4287
ODS-3 100Å	00B-4097-B0	00D-4097-B0	00F-4097-B0	00G-4097-B0	AJO-4286	AJO-4287
Phenyl-3 (PH-3) 100Å	00B-4298-B0	00D-4298-B0	00F-4298-B0	00G-4298-B0	AJO-4350	AJO-4351

for ID: 2.0-3.0mm 3.2-8.0mm

5µ 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 2.0mm /10pk	4 x 3.0mm /10pk
Silica 150Å	—	—	—	—	00G-3302-R0	AJO-4347	AJO-4348
C8 150Å	00F-3301-Y0	00G-3301-Y0	—	00F-3301-R0	00G-3301-R0	AJO-4289	AJO-4290
ODS-2 150Å	00F-3300-Y0	00G-3300-Y0	00D-3300-R0	00F-3300-R0	00G-3300-R0	AJO-4286	AJO-4287
Silica 100Å	—	—	—	00F-4098-R0	—	AJO-4347	AJO-4348
ODS-3 100Å	00F-4097-Y0	00G-4097-Y0	00D-4097-R0	00F-4097-R0	00G-4097-R0	AJO-4286	AJO-4287
Phenyl-3 (PH-3) 100Å	00F-4298-Y0	00G-4298-Y0	—	00F-4298-R0	00G-4298-R0	AJO-4350	AJO-4351

for ID: 2.0-3.0mm 3.2-8.0mm

5µ and 10µ Analytical Columns (mm)					SecurityGuard™ Cartridges		
Phases	30 x 4.6 (LC/MS)	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 2.0mm /10pk	4 x 3.0mm /10pk
5µ Silica 150Å	—	—	—	00F-3302-E0	00G-3302-E0	AJO-4347	AJO-4348
5µ C8 150Å	00A-3301-E0	00B-3301-E0	00D-3301-E0	00F-3301-E0	00G-3301-E0	AJO-4289	AJO-4290
5µ ODS-2 150Å	00A-3300-E0	00B-3300-E0	00D-3300-E0	00F-3300-E0	00G-3300-E0	AJO-4286	AJO-4287
5µ Silica 100Å	—	00B-4098-E0	00D-4098-E0	00F-4098-E0	00G-4098-E0	AJO-4347	AJO-4348
5µ ODS-3 100Å	00A-4097-E0	00B-4097-E0	00D-4097-E0	00F-4097-E0	00G-4097-E0	AJO-4286	AJO-4287
5µ Phenyl-3 (PH-3) 100Å	00A-4298-E0	00B-4298-E0	00D-4298-E0	00F-4298-E0	00G-4298-E0	AJO-4350	AJO-4351
10µ Silica-3 100Å	—	—	—	—	00G-4245-E0	AJO-4347	AJO-4348
10µ ODS-3 100Å	—	—	—	—	00G-4244-E0	AJO-4286	AJO-4287

for ID: 2.0-3.0mm 3.2-8.0mm

5µ and 10µ Semi-Preparative Columns (mm)				SecurityGuard™ Cartridges
Phases	250 x 10	250 x 21.2	250 x 50	10 x 10mm /3pk
5µ Silica 100Å	00G-4098-N0	—	—	AJO-7223
5µ ODS-3 100Å	00G-4097-N0	00G-4097-P0	—	AJO-7221
5µ Phenyl-3 100Å	00G-4298-N0	—	—	AJO-7314
10µ ODS-3 100Å	00G-4244-N0	00G-4244-P0	00G-4244-V0	AJO-7221

for ID: 9-16mm

10µ-PREP

- Available in semi-prep and prep columns
- Bulk material also available

ORDERING INFORMATION

10µ-Prep Columns (mm)				Guards	SecurityGuard™ Cartridges	
Phases	250 x 4.6	250 x 10	250 x 21.2	250 x 50	50 x 50	10 x 10mm
Silica-Prep	00G-4009-E0	00G-4009-N0	—	—	—	AJO-7223
ODS-Prep	00G-4088-E0	00G-4088-N0	00G-4088-P0	00G-4088-V0	03B-4088-VD	AJO-7221



See p. 213 for for Semi-prep SecurityGuard Cartridge Holders.