

# Gemini<sup>®</sup> pH-LC<sup>™</sup>



# pH-LC<sup>™</sup>

# TAKE A LOOK INSIDE

## TWIN™ Technology

TWIN (Two-In-One™) Technology is what gives Gemini its superior performance edge.

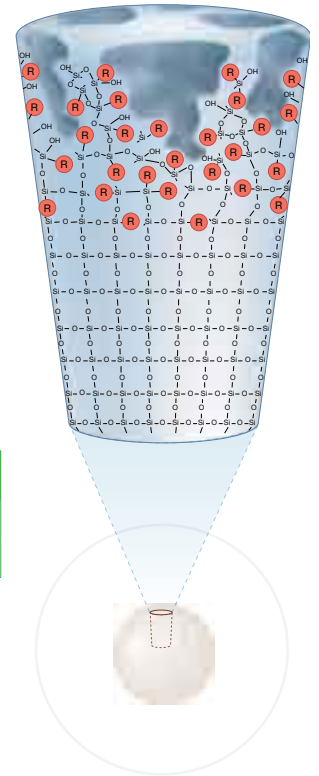
During the final stage of silica manufacturing, a unique silica-organic layer is grafted to create a completely new composite particle. Since the internal base silica is unaltered by this manufacturing process, the particle retains the mechanical strength and rigidity of silica, providing **excellent efficiency**, while the silica-organic shell protects the particle from chemical attack.

### It's About Options:

- ⊙ Extended pH Stability (1-12)
- ⊙ Efficiency of Silica
- ⊙ Mechanical Strength of Silica
- ⊙ 100 % Aqueous Stable

### Material Characteristics:

Packing Material	Particle Shape/Size (µm)	Pore Size (Å)	Surface Area (m <sup>2</sup> /g)	Carbon Load	End Capping
Gemini C18	Spherical 3,5,10	110	375	14 %	TMS
Gemini C6-Phenyl	Spherical 3,5	110	375	12 %	TMS



# FORM FOLLOWS FUNCTION

## Format Options

Gemini media is available in a **variety of formats** to match your chromatographic needs, whether it's high-sensitivity narrow bore columns, superior efficiency analytical columns, or preparative scale Axia™ packed technology.

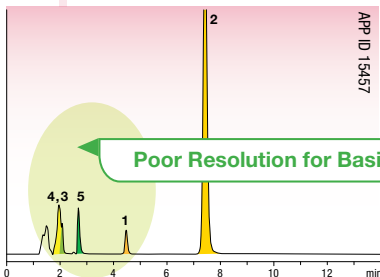


## pH-LC™

Extended pH 1-12 Stability for Alternate Selectivity

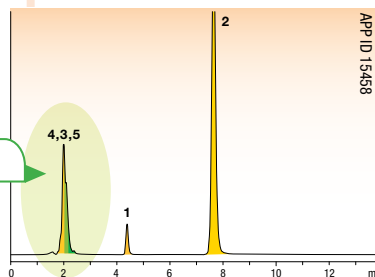
### pH 1.5

1.0 % TFA in Water



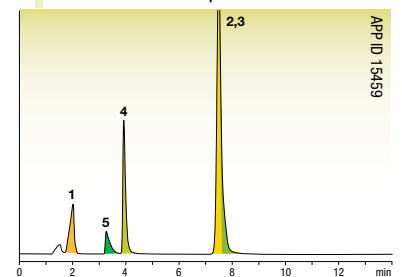
### pH 4.0

20 mM Ammonium Formate



### pH 7.0

20 mM Phosphate Buffer

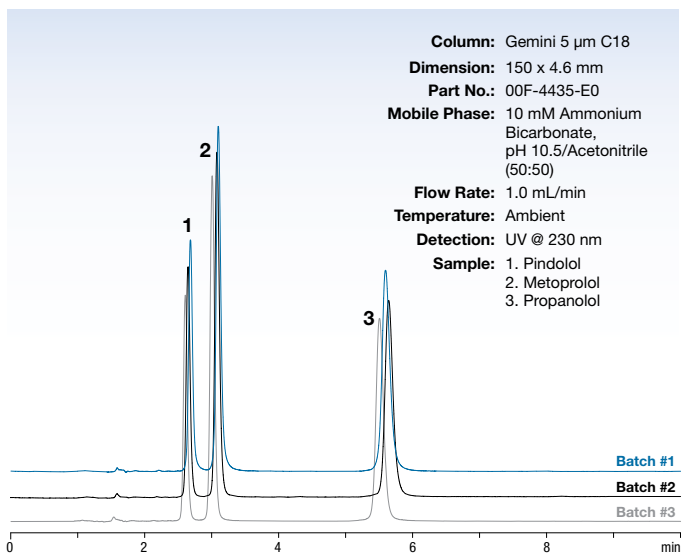


# REPRODUCIBLE PHASES

## From Batch-to-Batch

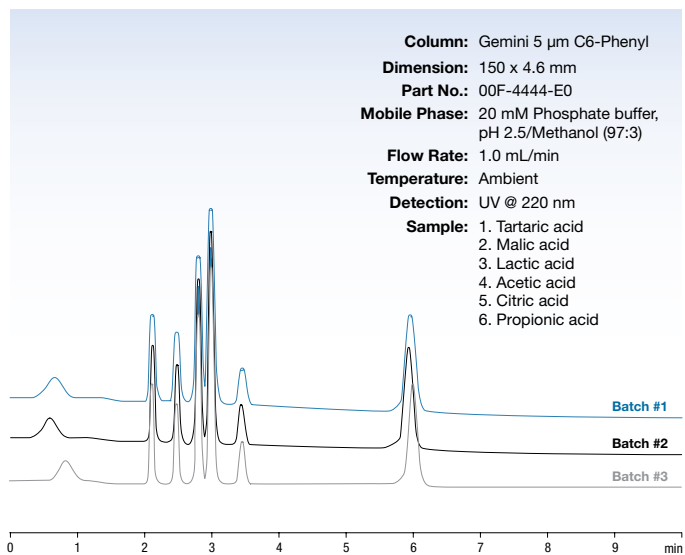
### Gemini® C18

Even under low buffer conditions and at high pH, Gemini provides the **stability and reproducibility** needed for developing and transferring critical methods. With each Gemini phase and particle size, multiple batches are available for validating methods. In addition, Gemini is available and supported in 70 countries.



### Gemini® C6-Phenyl

Gemini C6-Phenyl incorporates the same tightly controlled silica manufacturing procedures as our Gemini C18 phase to deliver **reproducible performance** you can depend on.



100 TIMES INCREASE IN STABILITY\*

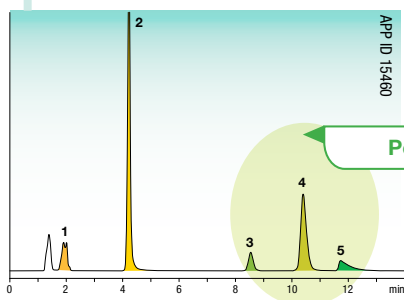
10

11

12

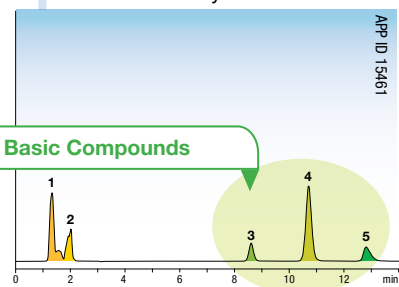
**pH 10.0**

10 mM Ammonium Bicarbonate Buffer



**pH 12.0**

20 mM Triethylamine Buffer



Poor Resolution for Basic Compounds

**Column:** Gemini 5 µm C18  
**Dimension:** 150 x 4.6 mm  
**Part No.:** 00F-4435-E0  
**Mobile Phase:** Acetonitrile/Buffers at various pH's (see chromatograms), (50:50)  
**Flow Rate:** 1.0 mL/min  
**Temperature:** 22 °C  
**Detection:** UV @ 254 nm  
**Sample:** 1. Chlorpropamide (pK<sub>a</sub> 5.0), 2. Butylparaben, 3. Lidocaine (pK<sub>a</sub> 7.9), 4. Triprolidine (pK<sub>a</sub> 6.5), 5. Dextromethorphan (pK<sub>a</sub> 9.2)

\*Compared to a traditional column with a pH 1-10 range.

Did you know that by modifying the mobile phase pH, **alternative selectivity** can be achieved with ionizable compounds? Acidic compounds will typically have an increase in retention at a pH below their pK<sub>a</sub> value, while basic compounds will typically have a increase

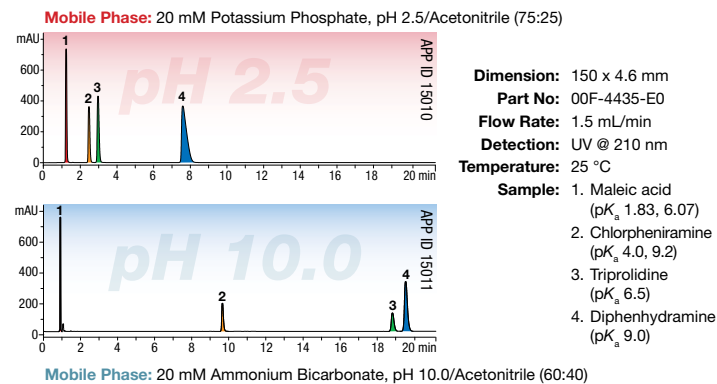
in retention when the pH is above their pK<sub>a</sub> value. Shown above is an example of this behavior and how, by modifying the pH, one can **modify selectivity**.

## pH SELECTIVITY

Because the majority of pharmaceutically active compounds are ionizable (the uncharged species exhibit longer retention on reversed phase media), modifying the mobile phase pH is a powerful tool for **manipulating retention and selectivity**.

### Cold Products

Gemini C18



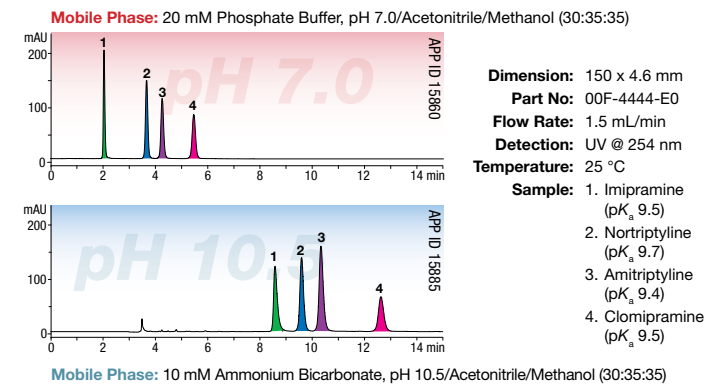
**Operating at these conditions:**

- For Acidic Compounds: Operate 2 pH units **below**  $pK_a$
- For Basic Compounds: Operate 2 pH units **above**  $pK_a$

Improve Peak Shape & Increase Retention

### Tricyclic Antidepressants

Gemini C6-Phenyl

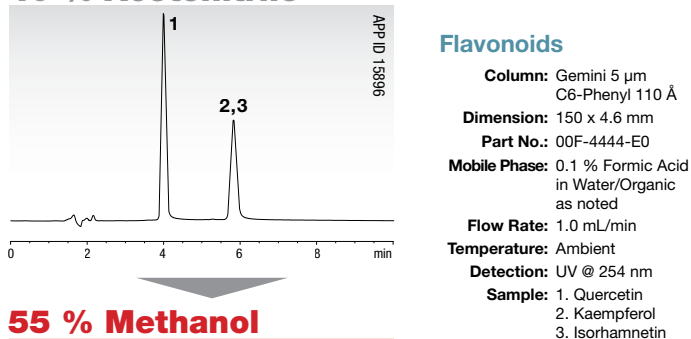


## AROMATIC SELECTIVITY

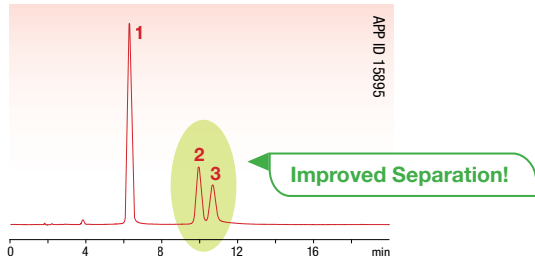
Phenyl phases offer another group of **selectivity options**.  $\pi$ - $\pi$  interactions between aromatic groups can influence retention order of aromatic compounds. Varying the organic mobile phase can modulate such interactions:

- Acetonitrile **Reduces** Aromatic Interactions
- Methanol **Increases** Aromatic Interactions

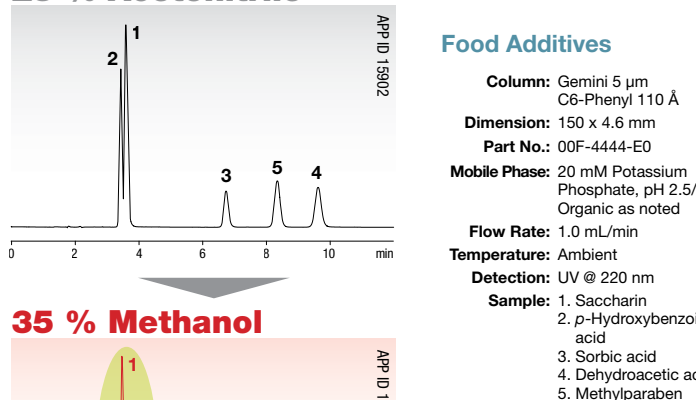
### 40 % Acetonitrile



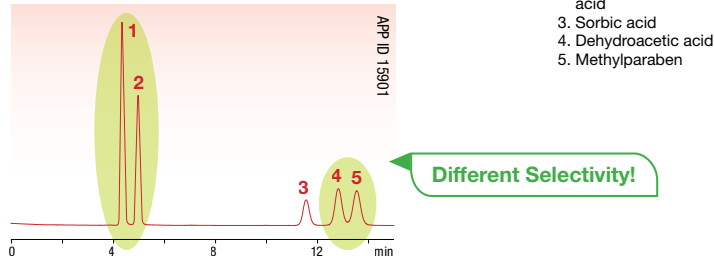
### 55 % Methanol



### 25 % Acetonitrile



### 35 % Methanol



# ORDERING INFORMATION



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

3 µm Microbore, Minibore and Narrow Bore Columns (mm)										SecurityGuard Cartridges
	50 x 1.0	20 x 2.0	30 x 2.0	50 x 2.0	100 x 2.0	150 x 2.0	50 x 3.0	100 x 3.0	150 x 3.0	4 x 2.0 mm <sup>†</sup>
Phase										/10 pk
C18	00B-4439-A0	00M-4439-B0	00A-4439-B0	00B-4439-B0	00D-4439-B0	00F-4439-B0	00B-4439-Y0	00D-4439-Y0	00F-4439-Y0	AJ0-7596
CS-Phenyl	00B-4443-A0	00M-4443-B0	00A-4443-B0	00B-4443-B0	00D-4443-B0	00F-4443-B0	00B-4443-Y0	00D-4443-Y0	00F-4443-Y0	AJ0-7914 for ID: 2.0-3.0 mm

3 µm Analytical Columns (mm)							SecurityGuard Cartridges
	20 x 4.0	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 <sup>†</sup>
Phase							/10 pk
C18	00M-4439-D0	00A-4439-E0	00B-4439-E0	00D-4439-E0	00F-4439-E0	00G-4439-E0	AJ0-7597
CS-Phenyl	00M-4443-D0	00A-4443-E0	00B-4443-E0	00D-4443-E0	00F-4443-E0	00G-4443-E0	AJ0-7915 for ID: 3.2-8.0 mm

5 µm Microbore, Minibore and Narrow Bore Columns (mm)										SecurityGuard Cartridges
	150 x 1.0	30 x 2.0	50 x 2.0	150 x 2.0	250 x 2.0	50 x 3.0	100 x 3.0	150 x 3.0	250 x 3.0	4 x 2.0 mm <sup>†</sup>
Phase										/10 pk
C18	00F-4435-A0	00A-4435-B0	00B-4435-B0	00F-4435-B0	00G-4435-B0	00B-4435-Y0	00D-4435-Y0	00F-4435-Y0	00G-4435-Y0	AJ0-7596
CS-Phenyl	Inquire	00A-4444-B0	00B-4444-B0	00F-4444-B0	00G-4444-B0	00B-4444-Y0	Inquire	00F-4444-Y0	00G-4444-Y0	AJ0-7914 for ID: 2.0-3.0 mm

5 µm Analytical Columns (mm)						SecurityGuard Cartridges
	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 <sup>†</sup>
Phase						/10 pk
C18	00A-4435-E0	00B-4435-E0	00D-4435-E0	00F-4435-E0	00G-4435-E0	AJ0-7597
CS-Phenyl	00A-4444-E0	00B-4444-E0	00D-4444-E0	00F-4444-E0	00G-4444-E0	AJ0-7915 for ID: 3.2-8.0 mm



5 µm Semi-Prep and Preparative Columns (mm)							SecurityGuard Cartridges	
	50 x 10	150 x 10	250 x 10	150 x 21.2	250 x 21.2	250 x 30	10 x 10 mm	15 x 21.2 mm <sup>**</sup>
Phase							/3 pk	/ea
C18	00B-4435-N0	00F-4435-N0	00G-4435-N0	00F-4435-P0	00G-4435-P0	00G-4435-U0	AJ0-7598	AJ0-7846
CS-Phenyl	Inquire	Inquire	00G-4444-N0	00F-4444-P0	00G-4444-P0	00G-4444-U0	AJ0-7314 for ID: 9-16 mm	AJ0-7841 18-30 mm

5 µm Axia <sup>®</sup> Packed High-Throughput Columns (mm)						SecurityGuard Cartridges
	50 x 21.2	100 x 21.2	50 x 30	75 x 30	100 x 30	15 x 21.2 mm <sup>**</sup>
Phase						/ea
C18	00B-4435-P0-AX	00D-4435-P0-AX	00B-4435-U0-AX	00C-4435-U0-AX	00D-4435-U0-AX	AJ0-7846
CS-Phenyl	00B-4444-P0-AX	00D-4444-P0-AX	00B-4444-U0-AX	00C-4444-U0-AX	00D-4444-U0-AX	AJ0-7841 for ID: 18-30 mm



10 µm Semi-Prep Columns (mm)						SecurityGuard Cartridges		
	250 x 4.6	50 x 10	100 x 10	150 x 10	250 x 10	4 x 3.0 mm <sup>†</sup>	10 x 10 mm	15 x 21.2 mm <sup>**</sup>
Phase						/10 pk	/3 pk	/ea
C18	00G-4436-E0	00B-4436-N0	00D-4436-N0	00F-4436-N0	00G-4436-N0	AJ0-7597 for ID: 3.2-8.0 mm	AJ0-7598 9-16 mm	AJ0-7846 18-30 mm

10 µm Preparative Columns (mm)							Guards		SecurityGuard Cartridges	
	150 x 21.2	250 x 21.2	150 x 30	250 x 30	150 x 50	250 x 50	30 x 21.2 mm	50 x 21.2 mm	15 x 21.2 mm <sup>**</sup>	
Phase										/ea
C18	00F-4436-P0	00G-4436-P0	00F-4436-U0	00G-4436-U0	00F-4436-V0	00G-4436-V0	03A-4436-P0	03B-4436-P0	AJ0-7846 for ID: 18-30 mm	

10 µm Axia Packed High-Throughput Columns (mm)					SecurityGuard Cartridges
	50 x 21.2	100 x 21.2	50 x 30	100 x 30	15 x 21.2 mm <sup>**</sup>
Phase					/ea
C18	00B-4436-P0-AX	00D-4436-P0-AX	00B-4436-U0-AX	00D-4436-U0-AX	AJ0-7846 for ID: 18-30 mm

<sup>†</sup> SecurityGuard Analytical Cartridges Require Holder, Part No.: **KJ0-4282**

<sup>\*\*</sup> Semi-Prep SecurityGuard Cartridges Require Holder, Part No.: **AJ0-7220**

<sup>\*\*</sup> PREP SecurityGuard Cartridges Require Holder, Part No.: **AJ0-8223**

# Our Products Are Available Worldwide



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