

VertiSep™ MMS

VertiSep™ MMS HPLC Columns

- Multifunctional silica-based column
- Used in specific applications and recommended by USP
- High surface area offers high resolution for gradient elution of difficult separation compounds
- Polymeric bonding offers high stability and longer column life time
- Excellent Column-to-Column reproducibility
- Available in 5 phases : CN/NH₂, C₈/NH₂, C₈/C₁₈, C₈/SCX, C₈/SAX and Ph/C₆

VertiSep™ MMS columns are multifunctional Silica based columns used as alternative to single phase for specific applications. VertiSep™ MMS are high surface of 450 m²/g offer high capacity and high resolution for gradient elution. VertiSep™ MMS columns are manufactured to minimize lot-to-lot variation with a strict QC program to ensure excellent column-to-column reproducibility.

VertiSep™ MMS CN/NH₂ is a multifunctional phases of Cyano and Amine offering reversed phase, normal phase and weak anion exchange interactions for good thermal and chemical stabilities. Selectivity and rapid equilibrium allow a range of separation mechanisms to be used, including adsorption, reversed phase and weak anion exchange depending on mobile phase used. VertiSep™ MMS CN/NH₂ is a good choice for Carbohydrate separations and recommended for USP L18.

VertiSep™ MMS C₈/NH₂ column is a multifunctional phase of C₈ and Amine offering both reversed phase and normal phase interaction. VertiSep™ MMS C₈/NH₂ is used for difficult applications i.e. hydrophobic as well as ionic compounds which previously required special conditions can be developed by controlling ionization via mobile phase adjustments, buffer strength and organic modifier composition. VertiSep™ MMS C₈/NH₂ is recommended for USP L28.

VertiSep™ MMS C₈/C₁₈ column is multifunctional phase of C₈ and C₁₈ groups for the reversed phase separation of basic molecules. VertiSep™ MMS C₈/C₁₈ offers more excellent gradient separation to C₁₈ or C₈ only for applications especially pharmaceutical applications and recommended for USP L42.

VertiSep™ MMS C₈/SCX is a multifunctional phase of C₈ and SCX (Strong Cationic Exchanger) offering both reversed phase and strong cationic interactions. VertiSep™ MMS C₈/SCX is used for separation of basic drugs and metabolites from physiological fluids. VertiSep™ MMS C₈/SCX is recommended for USP L44. Difficult applications which previously required special conditions can be developed by controlling ionization via mobile phase adjustments, buffer strength and organic modifier composition.

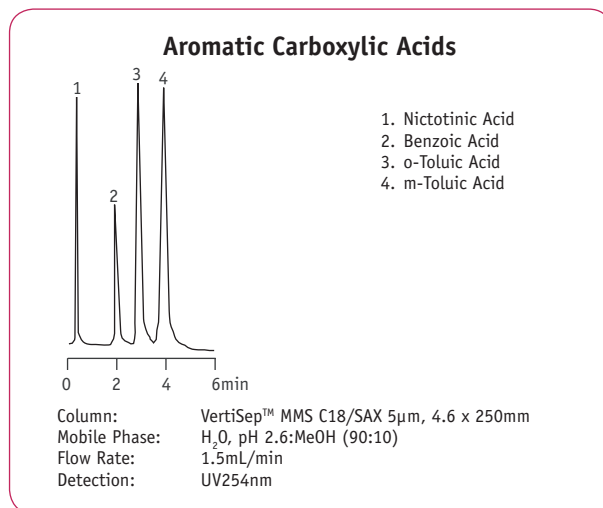
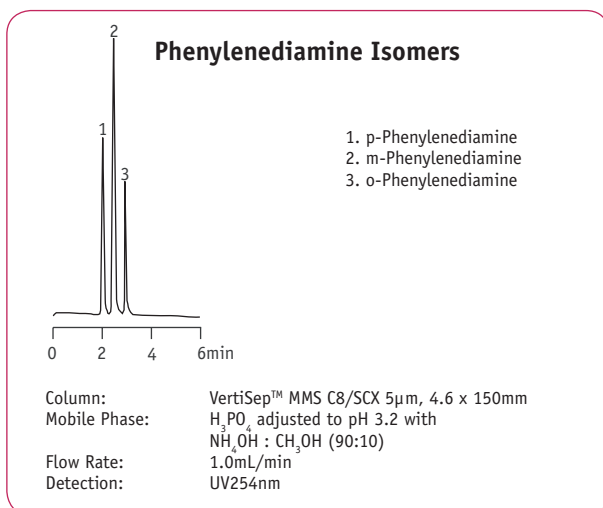
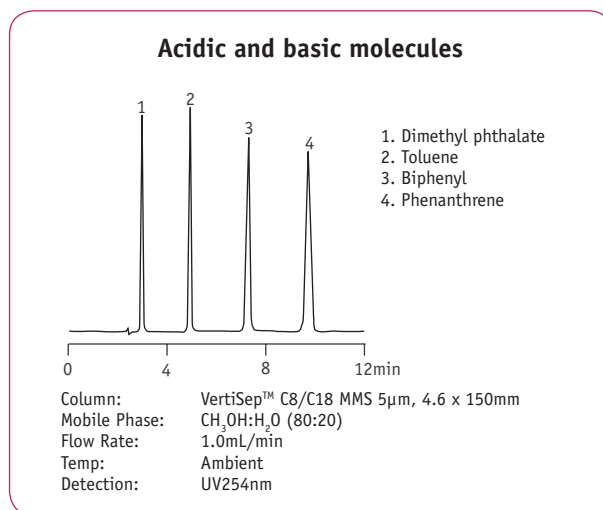
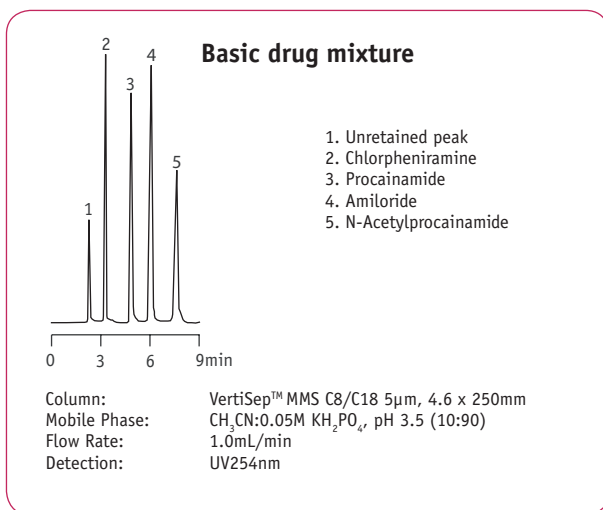
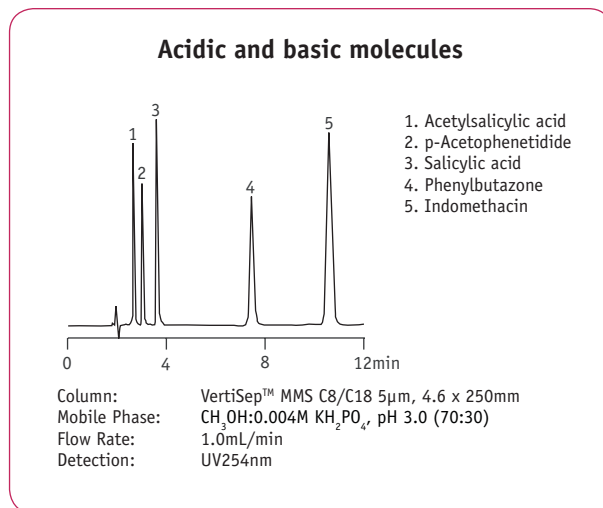
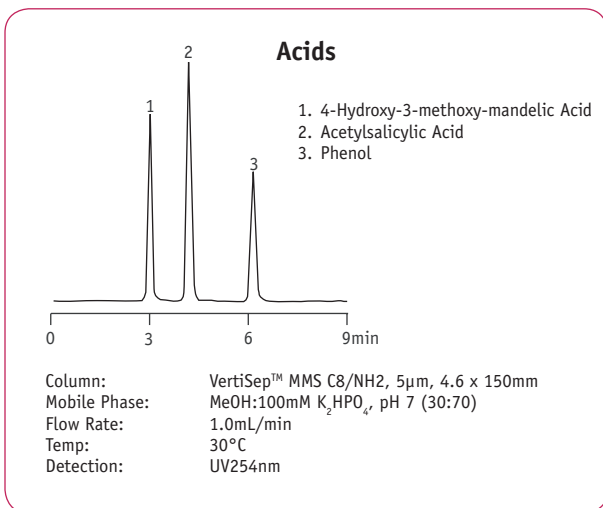
VertiSep™ MMS C₈/SAX is multifunctional phase of C₈ and SAX (Strong Anionic Exchanger) offering both reversed phase and strong anionic interactions. VertiSep™ MMS C₈/SAX is used for acidic drugs and metabolites from physiological fluids. Difficult applications which previously required special conditions can be developed by controlling ionization via mobile phase adjustments, buffer strength and organic modifier compositions.



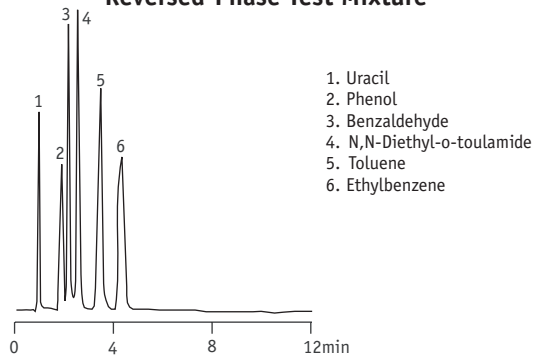
| Packing | Particle Size (mm) | Carbon Load (%) | Pore Size (Å) | Pore Volume (mL/g) | Surface Area (m ² /g) | End Capped |
|---------------------------------|--------------------|-----------------|---------------|--------------------|----------------------------------|------------|
| CN/NH ₂ | 5 | 16 | 100 | 1.0 | 450 | No |
| C ₈ /NH ₂ | 5 | 11 | 100 | 1.0 | 450 | No |
| C ₈ /C ₁₈ | 5 | 14 | 100 | 1.0 | 450 | Yes |
| C ₈ /SCX | 5 | 9 | 100 | 1.0 | 450 | No |
| C ₈ /SAX | 5 | 9 | 100 | 1.0 | 450 | No |
| Ph/C ₆ | 5 | 9 | 100 | 1.0 | 450 | Yes |

VertiSep™ MMS Ph/C₆ is multifunctional phase of Phenyl and Hexyl (C₆) offering both Phenyl and a short Alkyl phase interactions, dense bonding and endcapping to minimize silanol effect and increases chemical stability. VertiSep™ MMS Ph/C₆ offers dual selectivity of Phenyl ring and Hexyl chain for Aromatic and Amine compounds and recommended for USP L11.

VertiSep™ MMS are manufactured by statistic process control of Silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.



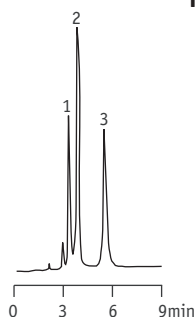
Reversed-Phase Test Mixture



1. Uracil
2. Phenol
3. Benzaldehyde
4. N,N-Diethyl-o-toulamide
5. Toluene
6. Ethylbenzene

Column: VertiSep™ MMS C8/NH2 5µm, 4.6 x 100mm
 Mobile Phase: ACN:H₂O (50:50)
 Flow Rate: 1.0mL/min
 Detection: 1.0 AUFS, UV254nm

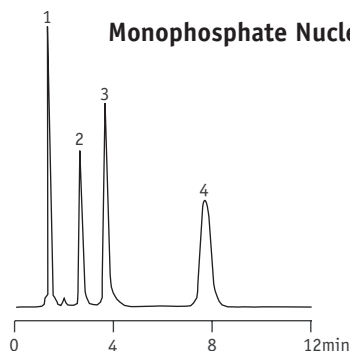
Tetracyclines



1. Oxytetracycline
2. Tetracycline
3. Demeclocycline

Column: VertiSep™ MMS C8/SCX 5µm, 4.6 x 100mm
 Mobile Phase: 0.04M KH₂PO₄, pH 2.5:ACN (90:10)
 Flow Rate: 1.0mL/min
 Detection: UV280nm

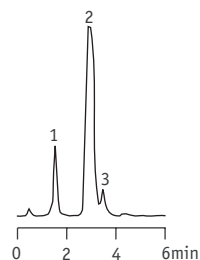
Monophosphate Nucleotides



1. CMP
2. UMP
3. AMP
4. GMP

Column: VertiSep™ MMS C8/NH2 5µm, 4.6 x 100mm
 Mobile Phase: 0.2M KH₂PO₄, pH 3.5:ACN (90:10)
 Flow Rate: 1.0mL/min
 Detection: 1.0 AUFS, UV254nm

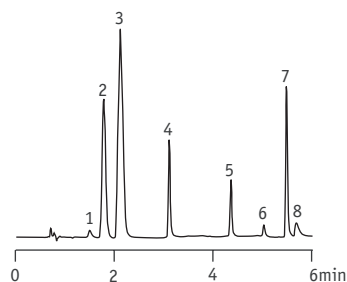
Tripeleannamine



1. Methyl paraben
2. Tripeleannamine
3. Propyl paraben

Column: VertiSep™ C8/SCX MMS 5µm, 4.6 x 100mm
 Mobile Phase: 0.05M KH₂PO₄, pH 4.5:CH₃OH (50:50)
 Flow Rate: 1.5mL/min
 Detection: 1.0 AUFS, UV254nm

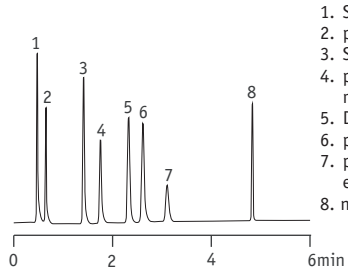
Cough and Cold Medicine



1. p-Aminophenol
2. Benzoic acid
3. Acetaminophen
4. Pseudoephedrine
5. Butyl paraben
6. Chlorpheniramine
7. Diphenhydramine
8. Dextromethorphan

Column: VertiSep™ MMS Ph/C6 5µm, 4.6 x 100mm
 Mobile Phase: A: ACN, B: CH₃OH:20mM KH₂PO₄, pH 9.0 (80:20)
 Gradient: Time/%B: 0/100, 5/20
 Flow Rate: 1.0mL/min
 Detection: UV214nm

Food Additives



1. Saccharin
2. p-Hydroxybenzoic acid
3. Sorbic acid
4. p-Hydroxybenzoic acid methyl ester
5. Dehydroacetic acid
6. p-Toluic acid
7. p-Hydroxybenzoic acid ethyl ester
8. n-Propyl p-hydroxybenzoate

Column: VertiSep™ MMS Ph/C6 5µm, 4.6 x 150mm
 Mobile Phase: A: 50mM KH₂PO₄+ 0.1%H₃PO₄, B: ACN
 Flow Rate: 1.0mL/min
 Gradient: Time/%B: 0/25, 18/75 hold 12 min
 Detection: UV230nm

VertiSep™ MMS

| Ordering Information | | | | | |
|----------------------|--------------------|------------|------------------|----------|-----------|
| Phase | Particle Size (µm) | Formats | I.D. Length (mm) | QTY | Part No. |
| VertiSep™ MMS | | | | | |
| CN/NH2 | 5 | Ultra-Fast | 3.2 x 50 | 1 | 03NR-C221 |
| | 5 | LC/MS | 3.2 x 100 | 1 | 03NR-C321 |
| | 5 | LC/MS | 3.2 x 150 | 1 | 03NR-C421 |
| | 5 | Hi-Speed | 4.0 x 50 | 1 | 03NR-D221 |
| | 5 | Analytical | 4.0 x 100 | 1 | 03NR-D321 |
| | 5 | Analytical | 4.0 x 150 | 1 | 03NR-D421 |
| | 5 | Analytical | 4.0 x 250 | 1 | 03NR-D521 |
| | 5 | Hi-Speed | 4.6 x 50 | 1 | 03NR-E221 |
| | 5 | Analytical | 4.6 x 100 | 1 | 03NR-E321 |
| | 5 | Analytical | 4.6 x 150 | 1 | 03NR-E421 |
| | 5 | Analytical | 4.6 x 250 | 1 | 03NR-E521 |
| | C8/NH2 | 5 | Ultra-Fast | 3.2 x 50 | 1 |
| 5 | | LC/MS | 3.2 x 100 | 1 | 03NS-C321 |
| 5 | | LC/MS | 3.2 x 150 | 1 | 03NS-C421 |
| 5 | | Hi-Speed | 4.0 x 50 | 1 | 03NS-D221 |
| 5 | | Analytical | 4.0 x 100 | 1 | 03NS-D321 |
| 5 | | Analytical | 4.0 x 150 | 1 | 03NS-D421 |
| 5 | | Analytical | 4.0 x 250 | 1 | 03NS-D521 |
| 5 | | Hi-Speed | 4.6 x 50 | 1 | 03NS-E221 |
| 5 | | Analytical | 4.6 x 100 | 1 | 03NS-E321 |
| 5 | | Analytical | 4.6 x 150 | 1 | 03NS-E421 |
| 5 | | Analytical | 4.6 x 250 | 1 | 03NS-E521 |
| C8/C18 | | 5 | Ultra-Fast | 3.2 x 50 | 1 |
| | 5 | LC/MS | 3.2 x 100 | 1 | 03NT-C321 |
| | 5 | LC/MS | 3.2 x 150 | 1 | 03NT-C421 |
| | 5 | Hi-Speed | 4.0 x 50 | 1 | 03NT-D221 |
| | 5 | Analytical | 4.0 x 100 | 1 | 03NT-D321 |
| | 5 | Analytical | 4.0 x 150 | 1 | 03NT-D421 |
| | 5 | Analytical | 4.0 x 250 | 1 | 03NT-D521 |
| | 5 | Hi-Speed | 4.6 x 50 | 1 | 03NT-E221 |
| | 5 | Analytical | 4.6 x 100 | 1 | 03NT-E321 |
| | 5 | Analytical | 4.6 x 150 | 1 | 03NT-E421 |
| | 5 | Analytical | 4.6 x 250 | 1 | 03NT-E521 |
| | C8/SCX | 5 | Ultra-Fast | 3.2 x 50 | 1 |
| 5 | | LC/MS | 3.2 x 100 | 1 | 03NU-C321 |
| 5 | | LC/MS | 3.2 x 150 | 1 | 03NU-C421 |
| 5 | | Hi-Speed | 4.0 x 50 | 1 | 03NU-D221 |
| 5 | | Analytical | 4.0 x 100 | 1 | 03NU-D321 |
| 5 | | Analytical | 4.0 x 150 | 1 | 03NU-D421 |
| 5 | | Analytical | 4.0 x 250 | 1 | 03NU-D521 |
| 5 | | Hi-Speed | 4.6 x 50 | 1 | 03NU-E221 |
| 5 | | Analytical | 4.6 x 100 | 1 | 03NU-E321 |
| 5 | | Analytical | 4.6 x 150 | 1 | 03NU-E421 |
| 5 | | Analytical | 4.6 x 250 | 1 | 03NU-E521 |

| Ordering Information | | | | | |
|----------------------|--------------------|------------|------------------|----------|-----------|
| Phase | Particle Size (µm) | Formats | I.D. Length (mm) | QTY | Part No. |
| VertiSep™ MMS | | | | | |
| C8/SAX | 5 | Ultra-Fast | 3.2 x 50 | 1 | 03NV-C221 |
| | 5 | LC/MS | 3.2 x 100 | 1 | 03NV-C321 |
| | 5 | LC/MS | 3.2 x 150 | 1 | 03NV-C421 |
| | 5 | Hi-Speed | 4.0 x 50 | 1 | 03NV-D221 |
| | 5 | Analytical | 4.0 x 100 | 1 | 03NV-D321 |
| | 5 | Analytical | 4.0 x 150 | 1 | 03NV-D421 |
| | 5 | Analytical | 4.0 x 250 | 1 | 03NV-D521 |
| | 5 | Hi-Speed | 4.6 x 50 | 1 | 03NV-E221 |
| | 5 | Analytical | 4.6 x 100 | 1 | 03NV-E321 |
| | 5 | Analytical | 4.6 x 150 | 1 | 03NV-E421 |
| | 5 | Analytical | 4.6 x 250 | 1 | 03NV-E521 |
| | Ph/C6 | 5 | Ultra-Fast | 3.2 x 50 | 1 |
| 5 | | LC/MS | 3.2 x 100 | 1 | 03N4-C321 |
| 5 | | LC/MS | 3.2 x 150 | 1 | 03N4-C421 |
| 5 | | Hi-Speed | 4.0 x 50 | 1 | 03N4-D221 |
| 5 | | Analytical | 4.0 x 100 | 1 | 03N4-D321 |
| 5 | | Analytical | 4.0 x 150 | 1 | 03N4-D421 |
| 5 | | Analytical | 4.0 x 250 | 1 | 03N4-D521 |
| 5 | | Hi-Speed | 4.6 x 50 | 1 | 03N4-E221 |
| 5 | | Analytical | 4.6 x 100 | 1 | 03N4-E321 |
| 5 | | Analytical | 4.6 x 150 | 1 | 03N4-E421 |
| 5 | | Analytical | 4.6 x 250 | 1 | 03N4-E521 |

| Ordering Information | | | | | |
|--|--------------------|---------|------------------|-----|-----------|
| Phase | Particle Size (µm) | Formats | I.D. Length (mm) | QTY | Part No. |
| VertiSep™ MMS Guard Cartridges* | | | | | |
| CN/NH2 | 5 | Guard | 3.2 x 10 | 1 | 03NR-C123 |
| | 5 | Guard | 4.6 x 10 | 1 | 03NR-E123 |
| C8/NH2 | 5 | Guard | 3.2 x 10 | 1 | 03NS-C123 |
| | 5 | Guard | 4.6 x 10 | 1 | 03NS-E123 |
| C8/C18 | 5 | Guard | 3.2 x 10 | 1 | 03NT-C123 |
| | 5 | Guard | 4.6 x 10 | 1 | 03NT-E123 |
| C8/SCX | 5 | Guard | 3.2 x 10 | 1 | 03NU-C123 |
| | 5 | Guard | 4.6 x 10 | 1 | 03NU-E123 |
| C8/SAX | 5 | Guard | 3.2 x 10 | 1 | 03NV-C123 |
| | 5 | Guard | 4.6 x 10 | 1 | 03NV-E123 |
| Ph/C6 | 5 | Guard | 3.2 x 10 | 1 | 03N4-C123 |
| | 5 | Guard | 4.6 x 10 | 1 | 03N4-E123 |

*Guard holder required

| Ordering Information | | | |
|----------------------------------|-----|-----------|--|
| Description | QTY | Part No. | |
| Guard Holder with Coupler | | | |
| For column I.D. 2.1-7.8 mm | 1 | 0300-0001 | |