

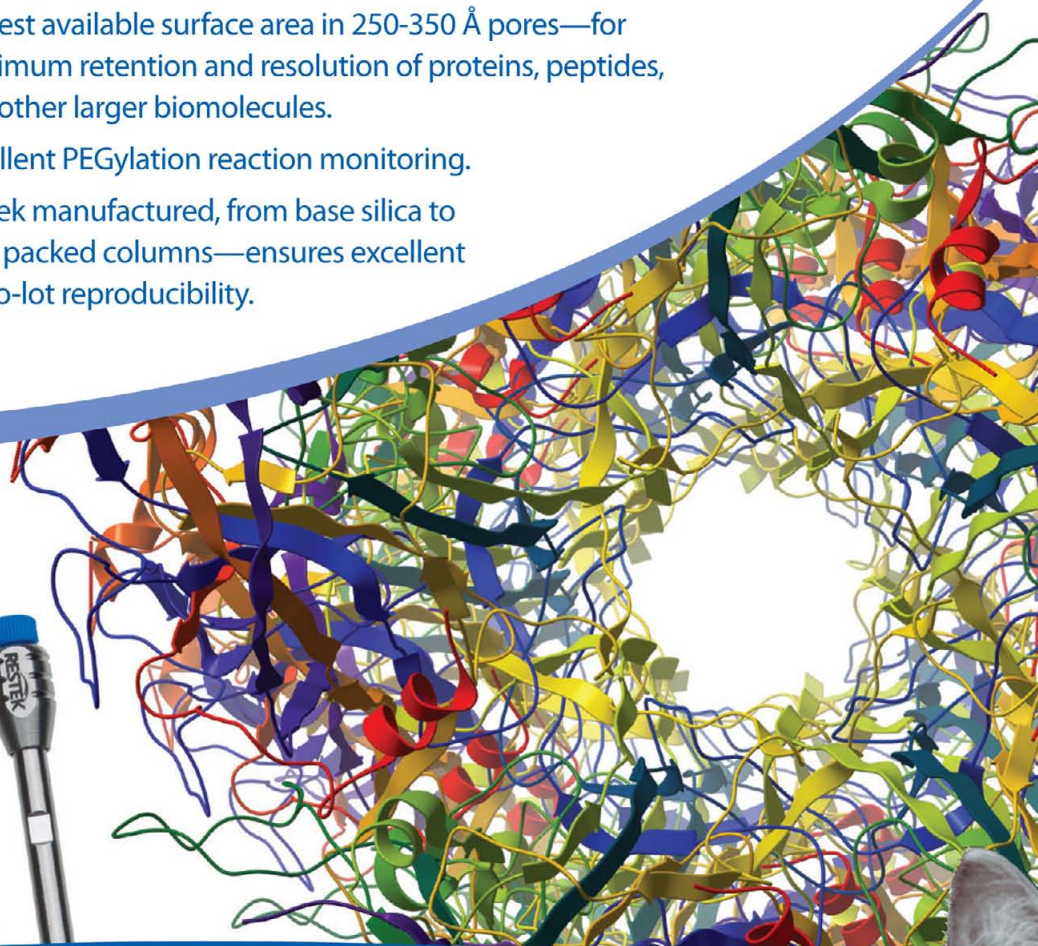


Restek LC

# Viva Wide Pore HPLC Columns

## Exceptional Performance for Large Biomolecules!

- Largest available surface area in 250-350 Å pores—for maximum retention and resolution of proteins, peptides, and other larger biomolecules.
- Excellent PEGylation reaction monitoring.
- Restek manufactured, from base silica to final packed columns—ensures excellent lot-to-lot reproducibility.



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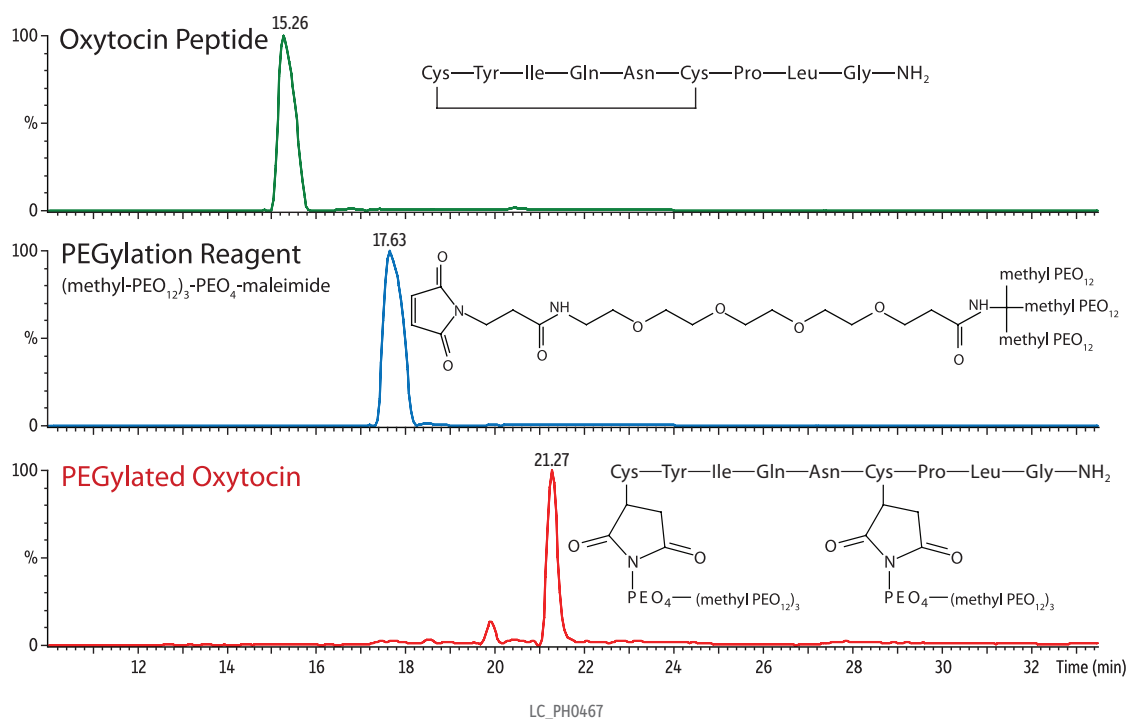
# Viva Wide Pore HPLC Columns

Conventional reversed phase HPLC packing materials with 60-150 Å pore sizes are not generally suitable for large biomolecule separations, as the analytes are not able to access the surface area within these pores. As well, the smaller pores can become fouled with strongly retained large molecular weight compounds. Silicas with wider pores address this need for increased retention, and thus more resolving power. Larger analytes can enter the wider pores and access more of the surface area, increasing retention and overall resolution. For analytes with molecular weights larger than 3,000, pore diameters of 250-350 Å offer the best combination of retention and pressure stability (note that pressure stability decreases as pore diameter increases). Viva wide pore silica has the greatest available surface area in 250-350 Å pores of all materials tested and the tightest distribution of pores around the mean diameter.

## PEGylation of Oxytocin

PEGylation is the covalent attachment of polyethylene glycol (PEG) units to therapeutic proteins and peptides and is an important tool in drug discovery. PEGylation is used to enhance drug delivery while maintaining the therapeutic function of the active compound. The PEG moieties added typically are large and result in very high molecular weight compounds. Viva wide pore HPLC columns are ideal for separation of these large molecules. PEGylation reactions can be easily monitored by taking advantage of the retentive power of Viva wide pore HPLC columns. The chromatograms in Figure 1 are extracted ion chromatograms for the peptide oxytocin, a PEGylation reagent, and the resulting PEGylated oxytocin. Excellent resolution is achieved for these compounds demonstrating the effectiveness of Viva wide pore HPLC columns in monitoring PEGylation reactions.

**Figure 1:** Easily monitor PEGylation reactions using Viva wide pore HPLC columns.



**Column** Viva C18 (cat.# 9514561)  
**Dimensions:** 150 mm x 1.0 mm ID  
**Particle Size:** 5 µm  
**Pore Size:** 300 Å  
**Temp.:** ambient  
**Sample** oxytocin PEGylation reaction products  
**Diluent:** 0.1% formic acid in water (v:v)  
**Conc.:** 300 pmoles/µL  
**Inj. Vol.:** 20 µL

**Mobile Phase** 0.1% formic acid in water:0.1% formic acid in acetonitrile (60:40)  
**Flow:** 0.1 mL/min  
**Detector** Micromass Quattro II  
**Interface:** ESI  
**Ion Mode:** pos  
**Source Temp.:** 200 °C  
**Capillary:** 2.25 kV  
**Cone:** 40 V

## Viva C18 Columns (USP L1)



### Chromatographic Properties

The general-purpose Restek® C18 is a conventional monomeric octadecylsilane column suitable for analyses of a wide range of compounds from acidic through slightly basic.

Length	1.0 mm ID cat.#	2.1 mm ID cat.#	3.0 mm ID cat.#	4.6 mm ID cat.#
<b>3 µm Columns</b>				
30 mm	9514331	9514332	951433E	9514335
50 mm	9514351	9514352	951435E	9514355
100 mm	9514311	9514312	951431E	9514315
150 mm	9514361	9514362	951436E	9514365
<b>5 µm Columns</b>				
30 mm	9514531	9514532	951453E	9514535
50 mm	9514551	9514552	951455E	9514555
100 mm	9514511	9514512	951451E	9514515
150 mm	9514561	9514562	951456E	9514565
200 mm	9514521	9514522	951452E	9514525
250 mm	9514571	9514572	951457E	9514575

**Column Characteristics:**

particle size:	3 µm or 5 µm, spherical
pore size:	300 Å
carbon load:	9%
end-cap:	yes
pH range:	2.5 to 8
temperature limit:	80 °C
USP phase code:	L1
phase category:	C18, octadecylsilane
ligand type:	monomeric C18

**C18**

## Viva C8 Columns (USP L7)



### Chromatographic Properties

Our C8 is a conventional monomeric octylsilane column offering a shorter alkyl chain to provide less hydrophobic retention and improved basic peak shape over a traditional C18 phase. Like our C18, this general-purpose Restek® C8 is suitable for a wide range of compounds from acidic through slightly basic.

Length	1.0 mm ID cat.#	2.1 mm ID cat.#	3.0 mm ID cat.#	4.6 mm ID cat.#
<b>5 µm Columns</b>				
30 mm	9513531	9513532	951353E	9513535
50 mm	9513551	9513552	951355E	9513555
100 mm	9513511	9513512	951351E	9513515
150 mm	9513561	9513562	951356E	9513565
200 mm	9513521	9513522	951352E	9513525
250 mm	9513571	9513572	951357E	9513575

**Column Characteristics:**

particle size:	5 µm, spherical
pore size:	300 Å
carbon load:	5%
end-cap:	yes
pH range:	2.5 to 8
temperature limit:	80 °C
USP phase code:	L7
phase category:	C8, octylsilane
ligand type:	monomeric C8

**C8**

## Viva C4 Columns (USP L26)



### Chromatographic Properties

Base-deactivated, wide-pore packing exhibits excellent peak shape for a wide range of compounds. Less retention in reversed-phase assays than Viva C18 or Viva C8.

Length	1.0 mm ID cat.#	2.1 mm ID cat.#	3.0 mm ID cat.#	4.6 mm ID cat.#
<b>5 µm Columns</b>				
30 mm	9512531	9512532	951253E	9512535
50 mm	9512551	9512552	951255E	9512555
100 mm	9512511	9512512	951251E	9512515
150 mm	9512561	9512562	951256E	9512565
200 mm	9512521	9512522	951252E	9512525
250 mm	9512571	9512572	951257E	9512575

**Column Characteristics:**

particle size:	5 µm, spherical
pore size:	300 Å
carbon load:	3.5%
end-cap:	yes
pH range:	2.5 to 8
temperature limit:	80 °C
USP phase code:	L26
phase category:	C4, butylsilane
ligand type:	monomeric C4

**C4**

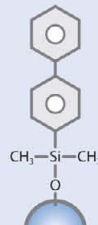
## Viva Biphenyl Columns (USP L11)



### Chromatographic Properties

Since 2005, the Restek® Biphenyl has offered a greater degree of dispersion than conventional phenyls and a greater degree of polarizability than phenyl hexyls, creating higher selectivity and a greater range of usability. Because of these heightened interactions, this column shows substantial increases in retention—especially for dipolar, unsaturated, or conjugated solutes—and enhanced orthogonal selectivity when using methanol mobile phases. It is ideal for increasing sensitivity and selectivity in LC-MS analyses.

Length	1.0 mm ID cat.#	2.1 mm ID cat.#	3.0 mm ID cat.#	4.6 mm ID cat.#
<b>5 µm Columns</b>				
30 mm	9516531	9516532	951653E	951653S
50 mm	9516551	9516552	951655E	951655S
100 mm	9516511	9516512	951651E	951651S
150 mm	9516561	9516562	951656E	951656S
200 mm	9516521	9516522	951652E	951652S
250 mm	9516571	9516572	951657E	951657S



Biphenyl

### Column Characteristics:

particle size:	5 µm, spherical
pore size:	300 Å
carbon load:	7%
end-cap:	yes
pH range:	2.5 to 8
temperature limit:	80 °C
USP phase:	L11
phase category:	phenyl
ligand type:	unique Biphenyl

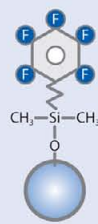
## Viva PFP Propyl Columns (USP L43)



### Chromatographic Properties

The Restek® PFP Propyl is a great choice for the retention and selectivity of charged bases, electronegative compounds, and amine-containing compounds. Unlike a conventional cyano column, the Restek® PFP Propyl is much more amenable to LC-MS because it is more reliable and efficient with acidic mobile phases. This versatile column is also compatible with highly aqueous mobile phases and HILIC separations.

Length	1.0 mm ID cat.#	2.1 mm ID cat.#	3.0 mm ID cat.#	4.6 mm ID cat.#
<b>5 µm Columns</b>				
30 mm	9519531	9519532	951953E	951953S
50 mm	9519551	9519552	951955E	951955S
100 mm	9519511	9519512	951951E	951951S
150 mm	9519561	9519562	951956E	951956S
200 mm	9519521	9519522	951952E	951952S
250 mm	9519571	9519572	951957E	951957S



PFP Propyl

### Column Characteristics:

particle size:	5 µm, spherical
pore size:	300 Å
carbon load:	5%
end-cap:	yes
pH range:	2.5 to 8
temperature limit:	80 °C
USP phase code:	L43
phase category:	fluorophenyl propyl
ligand type:	pentafluorophenyl propyl

## Viva Silica Columns (USP L3)



### Chromatographic Properties

Base-deactivated spherical silica is useful for normal-phase or HILIC separations.

Length	1.0 mm ID cat.#	2.1 mm ID cat.#	3.0 mm ID cat.#	4.6 mm ID cat.#
<b>5 µm Columns</b>				
30 mm	9510531	9510532	951053E	951053S
50 mm	9510551	9510552	951055E	951055S
100 mm	9510511	9510512	951051E	951051S
150 mm	9510561	9510562	951056E	951056S
200 mm	9510521	9510522	951052E	951052S
250 mm	9510571	9510572	951057E	951057S



Silica

### Column Characteristics:

particle size:	5 µm, spherical
pore size:	300 Å
pH range:	2.5 to 8
temperature limit:	80 °C
USP phase code:	L3
phase category:	bare silica
ligand type:	none

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