Biochromatography

Introduction

Interchim Biochromatography encompasses a wide range of technologies, techniques and combination processes to provide the research and developer with a diverse array of tools for the purification of complex biological samples such as proteins, peptides and polypeptides.
Whilst the technologies highlighted have been developed to predominately serve these applications, the industry has also demonstrated that theses techniques can often be useful for purification applications of other complex molecules.

The table below provides a general guide to product selection. It cross references the product versus the technology it can be utilized within.

Product	Reverse phase	HIC	Ion Exchange	Gel Filtration	Affinity	IMAC
Affarose™					X	X
AmiR gel™					X	
Atoll™	RP					
Cellufine®		HIC	IE	GF		
Hydrocell®	RP	HIC	IE			
UptiBeads™					X	
Uptisphere® 300Å	RP					
Uptisphere® Protein A					X	
Uptispin™					X	X

Protein background

Proteins are long chain covalently linked amino acids. Protein structures are folded rather than linear due to varying types of binding forces such as hydrogen, van der Waals, and disulfide bonds. Proteins vary in nature relative to chain length and amino acid sequence.

The primary structure of proteins and peptides refers to the linear number and sequence of amino acids present.

Protein Secondary Structure

The amino acid sequence in a protein determines the form within a particular protein. This constitutes the secondary structures of a protein. In general, proteins fall into two main classes of structure, namely globular proteins or fibrous proteins. Globular proteins are compactly folded and coiled, whereas, fibrous proteins are more filamentous and elongated.

Several kinds of secondary structure exist :

- Alpha-Helix
- 3.10-Helix
- Sheets
- Turns

Super-secondary Structure

Some proteins contain an order within secondary structures that forms a distinct sub-structural classification. These are referred as super-secondary structures.

Tertiary Structure

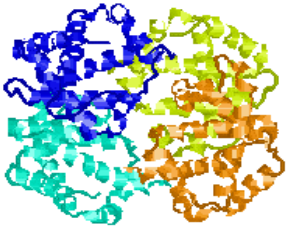
Tertiary structures are complete three-dimensional polypeptide units of a given protein. This incorporates the spatial relationship of different secondary structures from one another within a polypeptide chain and how secondary structures fold into the three-dimensional form of the protein.
Secondary structures of proteins often constitute distinct classifications, therefore a tertiary structure also refers to the relationship of different classifications to one another within a protein. Interactions of different classifications is governed by a range of binding forces, these include hydrogen bonding, hydrophobic interactions, electrostatic interactions and van der Waals forces.

Quaternary Structure

Many proteins contain two or more different polypeptide chains that are held in association by the same non-covalent forces that stabilize the tertiary structures of proteins. Proteins with multiple polypeptide chains are termed oligomeric proteins. The structure formed by monomer-monomer interaction in an oligomeric protein is known as a quaternary structure.

Complex Protein Structures

Proteins are also covalently conjugated with carbohydrates. Proteins covalently associated with carbohydrates are termed glycoproteins. Structural complexes involving protein associated with lipid via non-covalent interactions are termed lipoproteins. Such modifications occur following the synthesis (translation) of proteins and are termed post-translational modifications.



Protein & Peptide Standards

Interchim protein standards and peptides are detailed within the reverse phase section of this chapter (p.C20). Whilst this is considered by Interchim as the primary application for these standards they are also suited to other applications such as Gel Filtration.

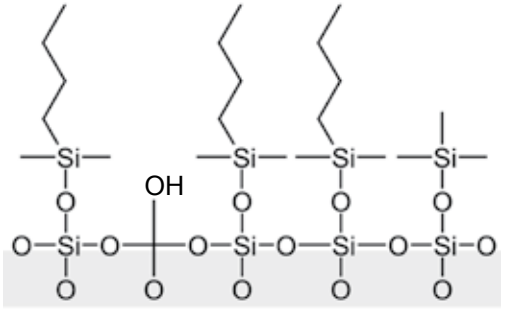
Biochromatography - Reverse Phase

Uptisphere® 300 Å Columns

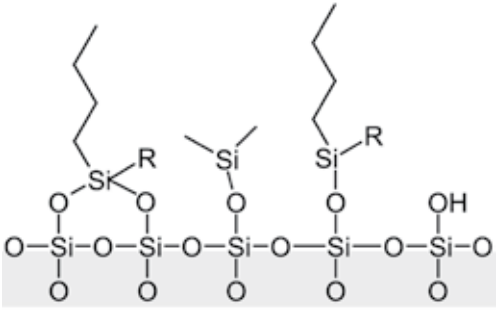
Overview

Uptisphere® Wide Pore 300Å columns are designed for the identification, separation, and purification of proteins, peptides, and polypeptides. Such applications can prove difficult for industry due to the nature of the separation and the mix of analytical -to- biological competence. Interchim's chromatographic & bioscience team have worked with analysts and biologists in identifying appropriate solutions for over 25 years. We have developed and offer the broadest range of silica based bonded phases: mono-, di- and trifunctional bonding technologies combined with C4, C8 and C18 alkyl chains that enhance these complex analyses.

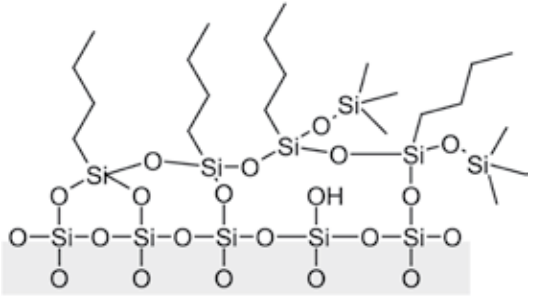
Different stationary phases often have to be adopted for protein analysis due to their independant binding characteristics and spatial interactions. Internal studies on reversed phase proteomic separations highlight certain proteins show better separation on monofunctional bonding whilst others separate better on polyfunctional bonding. Interchim have therefore constructed development kits to allow protein scientists to identify column requirement for a particular analysis / separation.



Mono Functional



Poly Functional Type I



Tri Functional

Phase	Pore Size	Surface Area	Bonding	Chemistry Loading	% Carbon	Endcapped
WOD	300Å	100m²/g	Mono	C18	10%	yes
PXP	300Å	100m²/g	Poly type I	C18	8%	yes
WTF	300Å	100m²/g	Poly (tri)	C18	14%	yes
WC8	300Å	100m²/g	Mono	C8	8%	yes
WC4	300Å	100m²/g	Mono	C4	4%	yes
WD4	300Å	100m²/g	Poly type I	C4	4%	yes
WT4	300Å	100m²/g	Poly (tri)	C4	3%	yes
XTF	500Å	60m²/g	Poly (tri)	C18	N/A	yes

Method development kits

Oligopeptides and peptides

Three same dimension columns packed with the following chemistry :

- Uptisphere® WOD, 300 Å C18 mono functional
- Uptisphere® PXP, 300 Å C18 poly functional type I
- Uptisphere® WTF, 300 Å C18 tri functional

Item	Dimension	P/N
Oligopeptide & peptide kit	250 x 4.6 mm	**CI4220**
Oligopeptide & peptide kit	250 x 2.1 mm	**CI4230**

Polypeptides and proteins

Three same dimension columns packed with the following chemistry :

- Uptisphere® WC4, 300Å C4 mono functional
- Uptisphere® WD4, 300Å C4 poly functional type I
- Uptisphere® WT4, 300Å C4 tri functional

Item	Dimension	P/N
Polypeptide & protein kit	250 x 4.6 mm	**CI4240**
Polypeptide & protein kit	250 x 2.1 mm	**CI4250**

Client specification

Three same dimension columns packed with three chemistries from our range of seven Uptisphere® 300Å.

Item	Dimension	P/N
Method development Kit 5 µm	250 x 4.6 mm	**DEV052546**
Method development Kit 5 µm	250 x 3.0 mm	**DEV052530**
Method development Kit 5 µm	250 x 2.0 mm	**DEV052520**

Validation method kit

Three columns packed with the same chemistry with three different batches

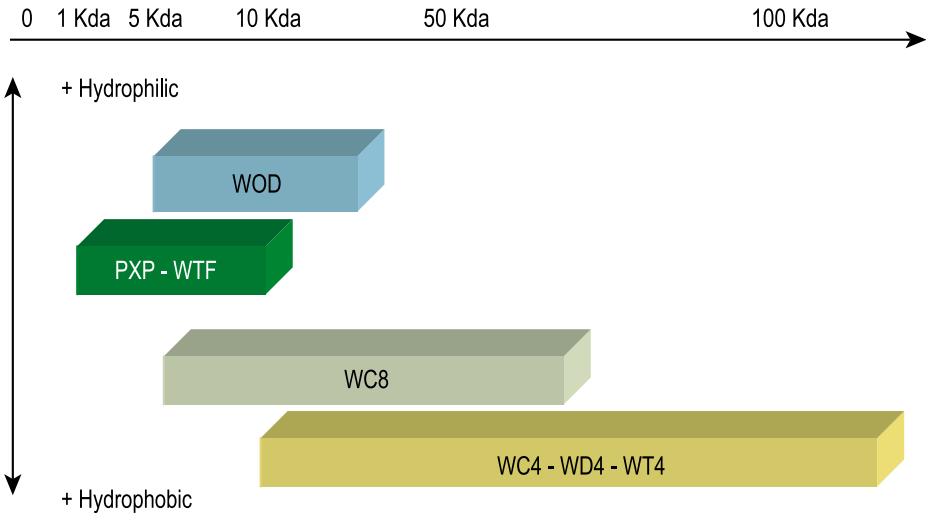
Item	Dimension	P/N
Validation method Kit 5 µm	250 x 4.6 mm	**PP052546**
Validation method Kit 5 µm	250 x 2.1 mm	**PP052521**

Kit specifications

Column capacities :
Analytical, micro, nano, and preparative.
Particle Size :
3, 5, 10, & 15 µm.
Method Development Kits :
Set of three columns with three bonding technologies in C4 or C18.
Prep Method Development Kits :
contain one analytical column and one preparative column packed with the same batch of silica.

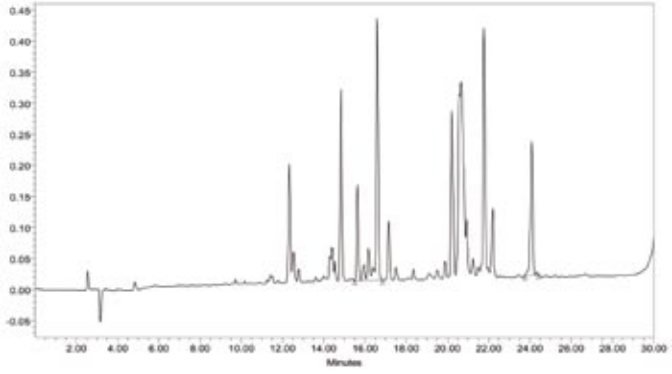
Selection Guide & Column Characteristics

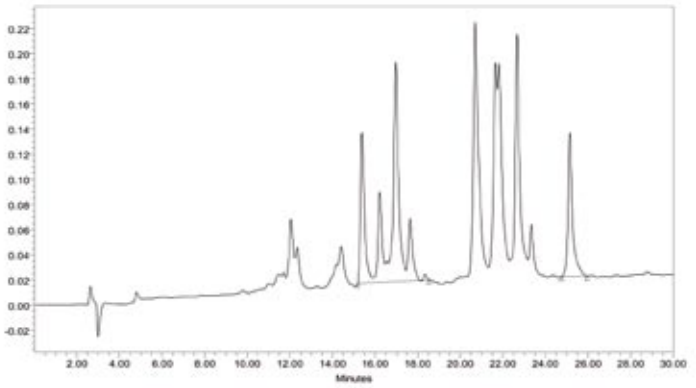
This chart provides a basic guide to column selection based on the molecular weight and hydrophobicity of the peptides and proteins.



Separation of lysozyme
Uptisphere 5 µm WTF, 250 x 4.6 mm vs competitor Column C18

Uptisphere 5 µm WTF, 250 x 4.6 mm
Flow rate : 1 µl /min
Temp : 50°C
Volume : 30.00 µl
Solvent : H_2O/TFA 0.05%/CH_3CN 80 %





Competitor 5 µm C18, 250 x 4.6 mm
Flow rate : 1 µl /min
Volume : 30.00 µl
Solvent : H_2O/TFA 0.05%/CH_3CN 80 %

Modulo-Cart QS and QK

Modulo-Cart QS is Interchim's adopted hardware for the majority of analytical columns. Internal studies have demonstrated a 15% gain in efficency over competitor hardware. The QK system includes a guard holder and cartridge.

Availability :
Lengths : 33 mm -to- 300 mm
i.d. : 1.0 mm -to- 4.6 mm

- Hand tight connection
- Direct connection guard cartridge -to- analytical column
- Frits : easily replacable
- No drying during storage
- The PEEK - Carbon constitution guarantees a long life time

Column i.d. (mm)	Connection tube i.d. (inches)	Flow (ml /min)
2.1 - 3.0	0.005 - 0.007	0.20 - 0.5
3.0, 3.9, 4.0, 4.6	0.007 - 0.010	0.50 - 1.0

Modulo-Cart HS

Reduce your analysis time without sacrificing resolution

Modulo-Cart HS hardware allow you to reduce analysis time without sacrificing resolution. It is specifically dedicated to ultra efficient and fast analysis in the smallest geometry.

Availability :
Lengths : 20, 33, 50 & 75 mm
i.d. : 2.0 & 4.6 mm i.d. and length.

- Fast analysis
- Perfect for fast gradient and LC-MS
- Zero dead volume

Modulo-cart HS need to be used w/ QS connectors CH953820

Modulo-Cart the MC & MCK

1.0 mm internal diameter for high sensitivity

MC columns display an approximate 20 fold increase in sensitivity when compared to a 4.6 mm column. They are particularly suited to trace analysis & research of impurities or metabolites in very low concentrations and are a valuable tool in biochromatography. In addition its high sensitivity leads to low solvent consumption, perfect for LC/MS and LC/RMN applications.

Availability : 20, 50, 100 & 150 mm lengths.

Modulo-Cart MCK columns have a 1 mm pre-installed guard cartridge packed with the stationary phase of your choice.

Column i.d. (mm)	Connection tube i.d. (inches)	Flow (ml /min)
1.0 - 2.1	0.005	0.05 - 0.2

Nano LC - Stainless Steel hardware w/500 µm i.d.

High value or very low quantity biomolecule analysis

For analysis requiring extreme sensitivity. Displays a 50 fold increase in sensitivity compared to a 4.6 mm column.

Frit design dramatically reduces hold up volume and facilitates sample to bed interaction.
Nano LC is ideal for biochemistry where typically samples are valuable and in micro quantities.

Availability :
Lengths : 50, 100 & 150 mm
i.d. 500 µm

i.d.	Flow	Optimal flow	Capacity
500 µm	4 - 12 µl	9 µl	0.1 µg

Nano LC - PEEK hardware w/300 µm i.d.

Extreme sensitivity applications

For analysis requiring extreme sensitivity. Displays a 100 fold increase in sensitivity compared to a 4.6 mm column.

Frit design dramatically reduces hold up volume and facilitates sample to bed interaction.
Nano LC is ideal for biochemistry where typically samples are valuable and in micro quantities.

Availability :
Lengths : 50, 100 & 150 mm
i.d. 300 µm

i.d.	Flow	Optimal flow	Capacity
300 µm	2 - 4 µl	3 µl	0.03 µg

Biochromatography - Reverse Phase

Uptisphere® 300 Å Columns

Uptisphere® 300Å	Phase	Particle size	Dimension	Modulo-Cart QS	Modulo-Cart QK
Octadecyl 300 Å - 100 m^2/g %C : 10 mono functional + "one step" end-capping	**WOD**	3 µm	100 x 2.0 mm	**UP3WOD#10QS**	**UP3WOD#10QK**
	WOD	3 µm	125 x 2.0 mm	**UP3WOD#12QS**	**UP3WOD#12QK**
	WOD	3 µm	150 x 2.0 mm	**UP3WOD#15QS**	**UP3WOD#15QK**
	WOD	5 µm	100 x 2.0 mm	**UP5WOD#10QS**	**UP5WOD#10QK**
	WOD	5 µm	125 x 2.0 mm	**UP5WOD#12QS**	**UP5WOD#12QK**
	WOD	5 µm	150 x 2.0 mm	**UP5WOD#15QS**	**UP5WOD#15QK**
	WOD	5 µm	250 x 2.0 mm	**UP5WOD#25QS**	**UP5WOD#25QK**
	WOD	3 µm	100 x 3.0 mm	**UP3WOD$10QS**	**UP3WOD$10QK**
	WOD	3 µm	125 x 3.0 mm	**UP3WOD$12QS**	**UP3WOD$12QK**
	WOD	3 µm	150 x 3.0 mm	**UP3WOD$15QS**	**UP3WOD$15QK**
	WOD	5 µm	100 x 3.0 mm	**UP5WOD$10QS**	**UP5WOD$10QK**
	WOD	5 µm	125 x 3.0 mm	**UP5WOD$12QS**	**UP5WOD$12QK**
	WOD	5 µm	150 x 3.0 mm	**UP5WOD$15QS**	**UP5WOD$15QK**
	WOD	5 µm	250 x 3.0 mm	**UP5WOD$25QS**	**UP5WOD$25QK**
	WOD	3 µm	100 x 4.6 mm	**UP3WOD-10QS**	**UP3WOD-10QK**
	WOD	3 µm	125 x 4.6 mm	**UP3WOD-12QS**	**UP3WOD-12QK**
	WOD	3 µm	150 x 4.6 mm	**UP3WOD-15QS**	**UP3WOD-15QK**
	WOD	5 µm	100 x 4.6 mm	**UP5WOD-10QS**	**UP5WOD-10QK**
	WOD	5 µm	125 x 4.6 mm	**UP5WOD-12QS**	**UP5WOD-12QK**
	WOD	5 µm	150 x 4.6 mm	**UP5WOD-15QS**	**UP5WOD-15QK**
	WOD	5 µm	250 x 4.6 mm	**UP5WOD-25QS**	**UP5WOD-25QK**
	WOD	10 µm	250 x 4.6 mm	**UP10WOD-25QS**	**UP10WOD-25QK**
Octadecyl 300 Å - 100 m^2/g %C : 8 poly functional type I	**PXP**	5 µm	100 x 2.0 mm	**UP5PXP#10QS**	**UP5PXP#10QK**
	PXP	5 µm	125 x 2.0 mm	**UP5PXP#12QS**	**UP5PXP#12QK**
	PXP	5 µm	150 x 2.0 mm	**UP5PXP#15QS**	**UP5PXP#15QK**
	PXP	5 µm	250 x 2.0 mm	**UP5PXP#25QS**	**UP5PXP#25QK**
	PXP	5 µm	100 x 3.0 mm	**UP5PXP$10QS**	**UP5PXP$10QK**
	PXP	5 µm	125 x 3.0 mm	**UP5PXP$12QS**	**UP5PXP$12QK**
	PXP	5 µm	150 x 3.0 mm	**UP5PXP$15QS**	**UP5PXP$15QK**
	PXP	5 µm	250 x 3.0 mm	**UP5PXP$25QS**	**UP5PXP$25QK**
	PXP	5 µm	100 x 4.6 mm	**UP5PXP-10QS**	**UP5PXP-10QK**
	PXP	5 µm	125 x 4.6 mm	**UP5PXP-12QS**	**UP5PXP-12QK**
	PXP	5 µm	150 x 4.6 mm	**UP5PXP-15QS**	**UP5PXP-15QK**
	PXP	5 µm	250 x 4.6 mm	**UP5PXP-25QS**	**UP5PXP-25QK**
	PXP	10 µm	250 x 4.6 mm	**UP10PXP-25QS**	**UP10PXP-25QK**

Modulo-cart information
p.C7 to C.9

Uptisphere® 300 Å Columns

Uptisphere® 300Å	Phase	Particle size	Dimension	Modulo-Cart QS	Modulo-Cart QK
Octadecyl 300 Å - 100 m^2/g %C : 14 tri functional+ "one step" end-capping	WTF	5 µm	100 x 2.0 mm	UP5WTF#10QS	UP5WTF#10QK
	WTF	5 µm	125 x 2.0 mm	UP5WTF#12QS	UP5WTF#12QK
	WTF	5 µm	150 x 2.0 mm	UP5WTF#15QS	UP5WTF#15QK
	WTF	5 µm	250 x 2.0 mm	UP5WTF#25QS	UP5WTF#25QK
	WTF	5 µm	100 x 3.0 mm	UP5WTF$10QS	UP5WTF$10QK
	WTF	5 µm	125 x 3.0 mm	UP5WTF$12QS	UP5WTF$12QK
	WTF	5 µm	150 x 3.0 mm	UP5WTF$15QS	UP5WTF$15QK
	WTF	5 µm	250 x 3.0 mm	UP5WTF$25QS	UP5WTF$25QK
	WTF	5 µm	100 x 4.6 mm	UP5WTF-10QS	UP5WTF-10QK
	WTF	5 µm	125 x 4.6 mm	UP5WTF-12QS	UP5WTF-12QK
	WTF	5 µm	150 x 4.6 mm	UP5WTF-15QS	UP5WTF-15QK
	WTF	5 µm	250 x 4.6 mm	UP5WTF-25QS	UP5WTF-25QK
Octyl 300 Å - 100 m^2/g %C : 8 mono functional + "one step" end-capping	WC8	5 µm	100 x 2.0 mm	UP5WC8#10QS	UP5WC8#10QK
	WC8	5 µm	125 x 2.0 mm	UP5WC8#12QS	UP5WC8#12QK
	WC8	5 µm	150 x 2.0 mm	UP5WC8#15QS	UP5WC8#15QK
	WC8	5 µm	250 x 2.0 mm	UP5WC8#25QS	UP5WC8#25QK
	WC8	5 µm	100 x 3.0 mm	UP5WC8$10QS	UP5WC8$10QK
	WC8	5 µm	125 x 3.0 mm	UP5WC8$12QS	UP5WC8$12QK
	WC8	5 µm	150 x 3.0 mm	UP5WC8$15QS	UP5WC8$15QK
	WC8	5 µm	250 x 3.0 mm	UP5WC8$25QS	UP5WC8$25QK
	WC8	5 µm	100 x 4.6 mm	UP5WC8-10QS	UP5WC8-10QK
	WC8	5 µm	125 x 4.6 mm	UP5WC8-12QS	UP5WC8-12QK
	WC8	5 µm	150 x 4.6 mm	UP5WC8-15QS	UP5WC8-15QK
	WC8	5 µm	250 x 4.6 mm	UP5WC8-25QS	UP5WC8-25QK
Butyl 300 Å - 100 m^2/g %C : 4 mono functional + "one step" end-capping	WC4	3 µm	100 x 2.0 mm	UP3WC4#10QS	UP3WC4#10QK
	WC4	3 µm	125 x 2.0 mm	UP3WC4#12QS	UP3WC4#12QK
	WC4	3 µm	150 x 2.0 mm	UP3WC4#15QS	UP3WC4#15QK
	WC4	5 µm	100 x 2.0 mm	UP5WC4#10QS	UP5WC4#10QK
	WC4	5 µm	125 x 2.0 mm	UP5WC4#12QS	UP5WC4#12QK
	WC4	5 µm	150 x 2.0 mm	UP5WC4#15QS	UP5WC4#15QK
	WC4	5 µm	250 x 2.0 mm	UP5WC4#25QS	UP5WC4#25QK
	WC4	3 µm	100 x 3.0 mm	UP3WC4$10QS	UP3WC4$10QK
	WC4	3 µm	125 x 3.0 mm	UP3WC4$12QS	UP3WC4$12QK
	WC4	3 µm	150 x 3.0 mm	UP3WC4$15QS	UP3WC4$15QK
	WC4	5 µm	100 x 3.0 mm	UP5WC4$10QS	UP5WC4$10QK
	WC4	5 µm	125 x 3.0 mm	UP5WC4$12QS	UP5WC4$12QK
	WC4	5 µm	150 x 3.0 mm	UP5WC4$15QS	UP5WC4$15QK
	WC4	5 µm	250 x 3.0 mm	UP5WC4$25QS	UP5WC4$25QK
	WC4	3 µm	100 x 4.6 mm	UP3WC4-10QS	UP3WC4-10QK
	WC4	3 µm	125 x 4.6 mm	UP3WC4-12QS	UP3WC4-12QK
	WC4	3 µm	150 x 4.6 mm	UP3WC4-15QS	UP3WC4-15QK
	WC4	5 µm	100 x 4.6 mm	UP5WC4-10QS	UP5WC4-10QK
	WC4	5 µm	125 x 4.6 mm	UP5WC4-12QS	UP5WC4-12QK
	WC4	5 µm	150 x 4.6 mm	UP5WC4-15QS	UP5WC4-15QK
	WC4	5 µm	250 x 4.6 mm	UP5WC4-25QS	UP5WC4-25QK
	WC4	10 µm	250 x 4.6 mm	UP10WC4-25QS	UP10WC4-25QK

Biochromatography - Reverse Phase

Uptisphere® 300 Å Columns

Uptisphere® 300Å	Phase	Particle size	Dimension	Modulo-Cart QS	Modulo-Cart QK
Butyl 300 Å - 100 m²/g %C : 4 poly functional type I	WD4	3 µm	100 x 2.0 mm	UP3WD4#10QS	UP3WD4#10QK
	WD4	3 µm	125 x 2.0 mm	UP3WD4#12QS	UP3WD4#12QK
	WD4	3 µm	150 x 2.0 mm	UP3WD4#15QS	UP3WD4#15QK
	WD4	5 µm	100 x 2.0 mm	UP5WD4#10QS	UP5WD4#10QK
	WD4	5 µm	125 x 2.0 mm	UP5WD4#12QS	UP5WD4#12QK
	WD4	5 µm	150 x 2.0 mm	UP5WD4#15QS	UP5WD4#15QK
	WD4	5 µm	250 x 2.0 mm	UP5WD4#25QS	UP5WD4#25QK
	WD4	3 µm	100 x 3.0 mm	UP3WD4$10QS	UP3WD4$10QK
	WD4	3 µm	125 x 3.0 mm	UP3WD4$12QS	UP3WD4$12QK
	WD4	3 µm	150 x 3.0 mm	UP3WD4$15QS	UP3WD4$15QK
	WD4	5 µm	100 x 3.0 mm	UP5WD4$10QS	UP5WD4$10QK
	WD4	5 µm	125 x 3.0 mm	UP5WD4$12QS	UP5WD4$12QK
	WD4	5 µm	150 x 3.0 mm	UP5WD4$15QS	UP5WD4$15QK
	WD4	5 µm	250 x 3.0 mm	UP5WD4$25QS	UP5WD4$25QK
	WD4	3 µm	100 x 4.6 mm	UP3WD4-10QS	UP3WD4-10QK
	WD4	3 µm	125 x 4.6 mm	UP3WD4-12QS	UP3WD4-12QK
	WD4	3 µm	150 x 4.6 mm	UP3WD4-15QS	UP3WD4-15QK
	WD4	5 µm	100 x 4.6 mm	UP5WD4-10QS	UP5WD4-10QK
	WD4	5 µm	125 x 4.6 mm	UP5WD4-12QS	UP5WD4-12QK
	WD4	5 µm	150 x 4.6 mm	UP5WD4-15QS	UP5WD4-15QK
	WD4	5 µm	250 x 4.6 mm	UP5WD4-25QS	UP5WD4-25QK
	WD4	10 µm	250 x 4.6 mm	UP10WD4-25QS	UP10WD4-25QK
Butyl 300 Å - 100 m²/g %C :3 tri functional + end-capping "one step"	WT4	5 µm	100 x 2.0 mm	UP5WT4#10QS	UP5WT4#10QK
	WT4	5 µm	125 x 2.0 mm	UP5WT4#12QS	UP5WT4#12QK
	WT4	5 µm	150 x 2.0 mm	UP5WT4#15QS	UP5WT4#15QK
	WT4	5 µm	250 x 2.0 mm	UP5WT4#25QS	UP5WT4#25QK
	WT4	5 µm	100 x 3.0 mm	UP5WT4$10QS	UP5WT4$10QK
	WT4	5 µm	125 x 3.0 mm	UP5WT4$12QS	UP5WT4$12QK
	WT4	5 µm	150 x 3.0 mm	UP5WT4$15QS	UP5WT4$15QK
	WT4	5 µm	250 x 3.0 mm	UP5WT4$25QS	UP5WT4$25QK
	WT4	5 µm	100 x 4.6 mm	UP5WT4-10QS	UP5WT4-10QK
	WT4	5 µm	125 x 4.6 mm	UP5WT4-12QS	UP5WT4-12QK
	WT4	5 µm	150 x 4.6 mm	UP5WT4-15QS	UP5WT4-15QK
	WT4	5 µm	250 x 4.6 mm	UP5WT4-25QS	UP5WT4-25QK
	WT4	10 µm	250 x 4.6 mm	UP10WT4-25QS	UP10WT4-25QK
Octadecyl 500 Å - 60 m²/g %C : n.a. poly functional type I	XTF	5 µm	100 x 2.0 mm	UP5XTF#10QS	UP5XTF#10QK
	XTF	5 µm	150 x 2.0 mm	UP5XTF#15QS	UP5XTF#15QK
	XTF	5 µm	250 x 2.0 mm	UP5XTF#25QS	UP5XTF#25QK
	XTF	5 µm	100 x 3.0 mm	UP5XTF$10QS	UP5XTF$10QK
	XTF	5 µm	150 x 3.0 mm	UP5XTF$15QS	UP5XTF$15QK
	XTF	5 µm	250 x 3.0 mm	UP5XTF$25QS	UP5XTF$25QK
	XTF	5 µm	100 x 4.6 mm	UP5XTF-10QS	UP5XTF-10QK
	XTF	5 µm	150 x 4.6 mm	UP5XTF-15QS	UP5XTF-15QK
	XTF	5 µm	250 x 4.6 mm	UP5XTF-25QS	UP5XTF-25QK

Uptisphere® 300 Å Columns

Uptisphere® 300Å	Phase	Particle size	Dimension	Modulo-Cart HS
Octadecyl 300 Å - 100 m²/g %C : 10 mono functional + "one step" end-capping	WOD	3 µm	20 x 2.0 mm	UP3WOD#2HS
	WOD	3 µm	33 x 2.0 mm	UP3WOD#3HS
	WOD	3 µm	50 x 2.0 mm	UP3WOD#5HS
	WOD	5 µm	33 x 2.0 mm	UP5WOD#3HS
	WOD	5 µm	50 x 2.0 mm	UP5WOD#5HS
	WOD	3 µm	50 x 3.0 mm	UP3WOD$5HS
	WOD	5 µm	50 x 3.0 mm	UP5WOD$5HS
	WOD	3 µm	20 x 4.6 mm	UP3WOD-2HS
	WOD	3 µm	33 x 4.6 mm	UP3WOD-3HS
	WOD	3 µm	50 x 4.6 mm	UP3WOD-5HS
	WOD	3 µm	75 x 4.6 mm	UP3WOD-7HS
	WOD	5 µm	33 x 4.6 mm	UP5WOD-3HS
	WOD	5 µm	50 x 4.6 mm	UP5WOD-5HS
	WOD	5 µm	75 x 4.6 mm	UP5WOD-7HS
Octadecyl 300 Å - 100 m²/g %C : 14 tri functional + "one step" end-capping	WTF	5 µm	33 x 2.0 mm	UP5WTF#3HS
	WTF	5 µm	50 x 2.0 mm	UP5WTF#5HS
	WTF	5 µm	50 x 3.0 mm	UP5WTF$5HS
	WTF	5 µm	33 x 4.6 mm	UP5WTF-3HS
	WTF	5 µm	50 x 4.6 mm	UP5WTF-5HS
	WTF	5 µm	75 x 4.6 mm	UP5WTF-7HS

Uptisphere® 300Å	Phase	Particle size	Dimension	Modulo-Cart HS
Butyl 300 Å - 100 m²/g %C : 4 mono functional + "one step" end-capping	WC4	3 µm	20 x 2.0 mm	UP3WC4#2HS
	WC4	3 µm	33 x 2.0 mm	UP3WC4#3HS
	WC4	3 µm	50 x 2.0 mm	UP3WC4#5HS
	WC4	5 µm	33 x 2.0 mm	UP5WC4#3HS
	WC4	5 µm	50 x 2.0 mm	UP5WC4#5HS
	WC4	3 µm	50 x 3.0 mm	UP3WC4$5HS
	WC4	5 µm	50 x 3.0 mm	UP5WC4$5HS
	WC4	3 µm	20 x 4.6 mm	UP3WC4-2HS
	WC4	3 µm	33 x 4.6 mm	UP3WC4-3HS
	WC4	3 µm	50 x 4.6 mm	UP3WC4-5HS
	WC4	3 µm	75 x 4.6 mm	UP3WC4-7HS
	WC4	5 µm	33 x 4.6 mm	UP5WC4-3HS
	WC4	5 µm	50 x 4.6 mm	UP5WC4-5HS
	WC4	5 µm	75 x 4.6 mm	UP5WC4-7HS
Butyl 300 Å - 100 m²/g %C : 4 poly functional type I	WD4	3 µm	20 x 2.0 mm	UP3WD4#2HS
	WD4	3 µm	33 x 2.0 mm	UP3WD4#3HS
	WD4	3 µm	50 x 2.0 mm	UP3WD4#5HS
	WD4	5 µm	33 x 2.0 mm	UP5WD4#3HS
	WD4	5 µm	50 x 2.0 mm	UP5WD4#5HS
	WD4	3 µm	50 x 3.0 mm	UP3WD4$5HS
	WD4	5 µm	50 x 3.0 mm	UP5WD4$5HS
	WD4	3 µm	20 x 4.6 mm	UP3WD4-2HS
	WD4	3 µm	33 x 4.6 mm	UP3WD4-3HS
	WD4	3 µm	50 x 4.6 mm	UP3WD4-5HS
	WD4	3 µm	75 x 4.6 mm	UP3WD4-7HS
	WD4	5 µm	33 x 4.6 mm	UP5WD4-3HS
	WD4	5 µm	50 x 4.6 mm	UP5WD4-5HS
	WD4	5 µm	75 x 4.6 mm	UP5WD4-7HS
Butyl 300 Å - 100 m²/g %C : 3 tri functional + "one step" end-capping	WT4	5 µm	33 x 2.0 mm	UP5WT4#3HS
	WT4	5 µm	50 x 2.0 mm	UP5WT4#5HS
	WT4	5 µm	50 x 3.0 mm	UP5WT4$5HS
	WT4	5 µm	33 x 4.6 mm	UP5WT4-3HS
	WT4	5 µm	50 x 4.6 mm	UP5WT4-5HS
	WT4	5 µm	75 x 4.6 mm	UP5WT4-7HS

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Biochromatography - Reverse Phase

Uptisphere® 300 Å Columns

Uptisphere® 300Å	Phase	Particle size	Dimension	Modulo-Cart MC	Modulo-Cart MCK
Octadecyl	**WOD**	3 µm	20 x 1.0 mm	**UP3WODD2MC**	
300 Å - 100 m^2/g	**WOD**	3 µm	50 x 1.0 mm	**UP3WODD5MC**	**UP3WODD5MCK**
%C : 10	**WOD**	3 µm	150 x 1.0 mm	**UP3WODD15MC**	**UP3WODD15MCK**
mono functional + "one step"	**WOD**	5 µm	50 x 1.0 mm	**UP5WODD5MC**	**UP5WODD5MCK**
end-capping	**WOD**	5 µm	150 x 1.0 mm	**UP5WODD15MC**	**UP5WODD15MCK**
Octadecyl	**WTF**	5 µm	50 x 1.0 mm	**UP5WTFD5MC**	**UP5WTFD5MCK**
300 Å - 100 m^2/g	**WTF**	5 µm	150 x 1.0 mm	**UP5WTFD15MC**	**UP5WTFD15MCK**
%C : 14					
tri functional + "one step"					
end-capping					
Butyl	**WC4**	3 µm	20 x 1.0 mm	**UP3WC4D2MC**	
300 Å - 100 m^2/g	**WC4**	3 µm	50 x 1.0 mm	**UP3WC4D5MC**	**UP3WC4D5MCK**
%C : 4	**WC4**	3 µm	150 x 1.0 mm	**UP3WC4D15MC**	**UP3WC4D15MCK**
mono functional + "one step"	**WC4**	5 µm	50 x 1.0 mm	**UP5WC4D5MC**	**UP5WC4D5MCK**
end-capping	**WC4**	5 µm	150 x 1.0 mm	**UP5WC4D15MC**	**UP5WC4D15MCK**
	WD4	3 µm	20 x 1.0 mm	**UP3WD4D2MC**	
	WD4	3 µm	50 x 1.0 mm	**UP3WD4D5MC**	**UP3WD4D5MCK**
	WD4	3 µm	150 x 1.0 mm	**UP3WD4D15MC**	**UP3WD4D15MCK**
	WD4	5 µm	50 x 1.0 mm	**UP5WD4D5MC**	**UP5WD4D5MCK**
	WD4	5 µm	150 x 1.0 mm	**UP5WD4D15MC**	**UP5WD4D15MCK**
Butyl	**WT4**	5 µm	50 x 1.0 mm	**UP5WT4D5MC**	**UP5WT4D5MCK**
300 Å - 100 m^2/g	**WT4**	5 µm	150 x 1.0 mm	**UP5WT4D15MC**	**UP5WT4D15MCK**
%C: 3					
tri functional + "one step"					
end-capping					

Uptisphere® 300 Å Columns

Uptisphere® 300Å	Phase	Particle size	Dimension	Modulo-Cart SS
Octadecyl	**WOD**	3 µm	50 x 0.5 mm	**UP3WODB5**
300 Å - 100 m²/g	**WOD**	3 µm	100 x 0.5 mm	**UP3WODB10**
%C : 10	**WOD**	3 µm	150 x 0.5 mm	**UP3WODB15**
mono functional + "one step	**WOD**	5 µm	50 x 0.5 mm	**UP5WODB5**
end-capping "	**WOD**	5 µm	100 x 0.5 mm	**UP5WODB10**
	WOD	5 µm	150 x 0.5 mm	**UP5WODB15**
300 Å - 100 m²/g	**WTF**	5 µm	50 x 0.5 mm	**UP5WTFB5**
%C : 14	**WTF**	5 µm	100 x 0.5 mm	**UP5WTFB10**
tri functional + "one step"	**WTF**	5 µm	150 x 0.5 mm	**UP5WTFB15**
end-capping				
Butyl	**WC4**	3 µm	50 x 0.5 mm	**UP3WC4B5**
300 Å - 100 m²/g	**WC4**	3 µm	100 x 0.5 mm	**UP3WC4B10**
%C : 4	**WC4**	3 µm	150 x 0.5 mm	**UP3WC4B15**
mono functional + "one step"	**WC4**	5 µm	50 x 0.5 mm	**UP5WC4B5**
end-capping	**WC4**	5 µm	100 x 0.5 mm	**UP5WC4B10**
	WC4	5 µm	150 x 0.5 mm	**UP5WC4B15**
300 Å - 100 m²/g	**WD4**	3 µm	50 x 0.5 mm	**UP3WD4B5**
%C : 4	**WD4**	3 µm	100 x 0.5 mm	**UP3WD4B10**
poly functional type I	**WD4**	3 µm	150 x 0.5 mm	**UP3WD4B15**
	WD4	5 µm	50 x 0.5 mm	**UP5WD4B5**
	WD4	5 µm	100 x 0.5 mm	**UP5WD4B10**
	WD4	5 µm	150 x 0.5 mm	**UP5WD4B15**
300 Å - 100 m²/g	**WT4**	5 µm	50 x 0.5 mm	**UP5WT4B5**
%C :3	**WT4**	5 µm	100 x 0.5 mm	**UP5WT4B10**
tri functional + "one step"	**WT4**	5 µm	150 x 0.5 mm	**UP5WT4B15**
end-capping				

Uptisphere® 300Å	Phase	Particle size	Dimension	Modulo-Cart PKG
Octadecyl	**WOD**	3 µm	50 x 0.3 mm	**UP3WODA5**
300 Å - 100 m²/g	**WOD**	3 µm	100 x 0.3 mm	**UP3WODA10**
%C : 10	**WOD**	3 µm	150 x 0.3 mm	**UP3WODA15**
mono functional + "one step"	**WOD**	5 µm	50 x 0.3 mm	**UP5WODA5**
end-capping	**WOD**	5 µm	100 x 0.3 mm	**UP5WODA10**
	WOD	5 µm	150 x 0.3 mm	**UP5WODA15**
300 Å - 100 m²/g	**WTF**	5 µm	50 x 0.3 mm	**UP5WTFA5**
%C : 14	**WTF**	5 µm	100 x 0.3 mm	**UP5WTFA10**
tri functional + "one step"	**WTF**	5 µm	150 x 0.3 mm	**UP5WTFA15**
end-capping				
Butyl	**WC4**	3 µm	50 x 0.3 mm	**UP3WC4A5**
300 Å - 100 m²/g	**WC4**	3 µm	100 x 0.3 mm	**UP3WC4A10**
%C : 4	**WC4**	3 µm	150 x 0.3 mm	**UP3WC4A15**
mono functional + "one step"	**WC4**	5 µm	50 x 0.3 mm	**UP5WC4A5**
end-capping	**WC4**	5 µm	100 x 0.3 mm	**UP5WC4A10**
	WC4	5 µm	150 x 0.3 mm	**UP5WC4A15**
300 Å - 100 m²/g	**WD4**	3 µm	50 x 0.3 mm	**UP3WD4A5**
%C : 4	**WD4**	3 µm	100 x 0.3 mm	**UP3WD4A10**
poly functional type I	**WD4**	3 µm	150 x 0.3 mm	**UP3WD4A15**
	WD4	5 µm	50 x 0.3 mm	**UP5WD4A5**
	WD4	5 µm	100 x 0.3 mm	**UP5WD4A10**
	WD4	5 µm	150 x 0.3 mm	**UP5WD4A15**
300 Å - 100 m²/g	**WT4**	5 µm	50 x 0.3 mm	**UP5WT4A5**
%C : 3	**WT4**	5 µm	100 x 0.3 mm	**UP5WT4A10**
tri functional + "one step"	**WT4**	5 µm	150 x 0.3 mm	**UP5WT4A15**
end-capping				

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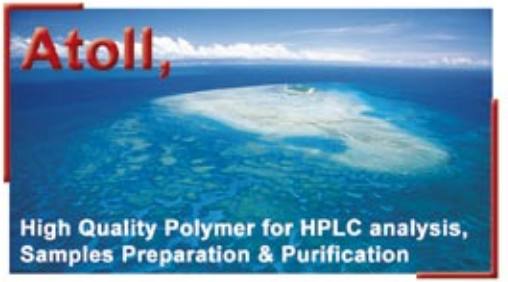
Biochromatography - Reverse Phase

Atoll™ Polymeric columns



Atoll™ is a family of highly cross-linked, spherical, macro-porous co-polymers which exhibit extreme purity. This support has been designed for applications such as solid phase sample preparation and HPLC analysis of biomolecules. It does not swell and can be used with everyday solvents.

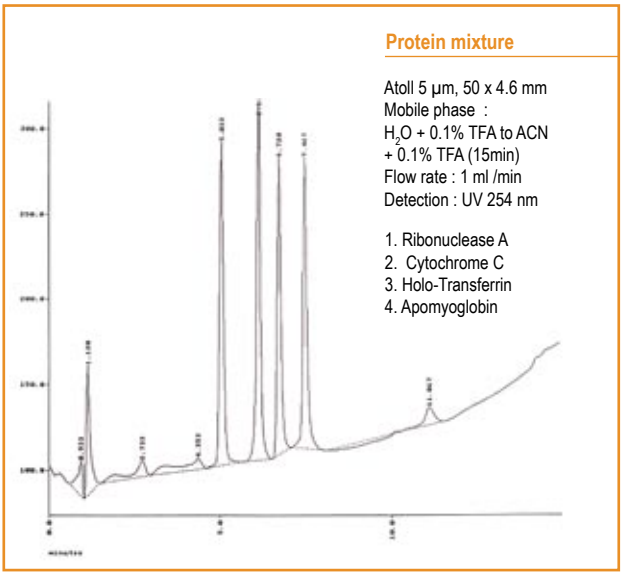
- Ultra pure
- High mechanical resistance
- pH range : 0 - 14

Unlike traditional silica based supports, Atoll™ does not suffer from irreversible adsorption. Sample bio-activity is therefore maintained and sample recovery optimized.

The Atoll Biochromatography family consists of :
Atoll™ NPR : non-porous resin with a 2 µm particle size dedicated to ultra-fast analysis of biomolecules in LC/MS, MS/MS…
Atoll™ MP : porous resin recommended for the purification of pharmaceutical molecules, small basic molecules and peptides
Atoll™ MP3 : macro-porous resin adapted for the separation of hydrophilic peptides, proteins,recombinant proteins and bio-purification.

Atoll™ is available in a variety of housing formats relative to application. i.e. columns, cartridges and 96 well plates for sample preparation

	Atoll NPR	Atoll MP	Atoll MP3
Pore size	0	n.a.	300 Å
Surface area	2.5 m^2/g	500 m^2/g	500 m^2/g
2 µm	X		
3 µm		on request	
5 µm		X	X
10 µm		on request	
15 µm		X	X
30 µm		on request	



Atoll™ Polymeric columns

i.d.	Particle size	Dimension	Atoll NPR	Atoll MP	Atoll MP3
2.0 mm					
	2 µm	33 x 2.0 mm	ATL2NPR#3QS		
		50 x 2.0 mm	ATL2NPR#5QS		
	5 µm	33 x 2.0 mm		ATL5MP#3QS	ATL5MP3#3QS
		50 x 2.0 mm		ATL5MP#5QS	ATL5MP3#5QS
		75 x 2.0 mm		ATL5MP#7QS	ATL5MP3#7QS
		100 x 2.0 mm		ATL5MP#10QS	ATL5MP3#10QS
		150 x 2.0 mm		ATL5MP#15QS	ATL5MP3#15QS
		250 x 2.0 mm		ATL5MP#25QS	ATL5MP3#25QS
4.6 mm					
	2 µm	33 x 4.6 mm	ATL2NPR-3QS		
		50 x 4.6 mm	ATL2NPR-5QS		
	5 µm	33 x 4.6 mm		ATL5MP-3QS	ATL5MP3-3QS
		50 x 4.6 mm		ATL5MP-5QS	ATL5MP3-5QS
		75 x 4.6 mm		ATL5MP-7QS	ATL5MP3-7QS
		100 x 4.6 mm		ATL5MP-10QS	ATL5MP3-10QS
		150 x 4.6 mm		ATL5MP-15QS	ATL5MP3-15QS
		250 x 4.6 mm		ATL5MP-25QS	ATL5MP3-25QS
2.0 mm					
	2 µm	33 x 2.0 mm	ATL2NPR#3QK		
		50 x 2.0 mm	ATL2NPR#5QK		
	5 µm	33 x 2.0 mm		ATL5MP#3QK	ATL5MP3#3QK
		50 x 2.0 mm		ATL5MP#5QK	ATL5MP3#5QK
		75 x 2.0 mm		ATL5MP#7QK	ATL5MP3#7QK
		100 x 2.0 mm		ATL5MP#10QK	ATL5MP3#10QK
		150 x 2.0 mm		ATL5MP#15QK	ATL5MP3#15QK
		250 x 2.0 mm		ATL5MP#25QK	ATL5MP3#25QK
4.6 mm					
	2 µm	33 x 4.6 mm	ATL2NPR-3QK		
		50 x 4.6 mm	ATL2NPR-5QK		
	5 µm	33 x 4.6 mm		ATL5MP-3QK	ATL5MP3-3QK
		50 x 4.6 mm		ATL5MP-5QK	ATL5MP3-5QK
		75 x 4.6 mm		ATL5MP-7QK	ATL5MP3-7QK
		100 x 4.6 mm		ATL5MP-10QK	ATL5MP3-10QK
		150 x 4.6 mm		ATL5MP-15QK	ATL5MP3-15QK
		250 x 4.6 mm		ATL5MP-25QK	ATL5MP3-25QK
10.0 mm					
	15 µm	250 x 10.0 mm		ATL15MP.25M	ATL15MP3.25M
21.2 mm					
	15 µm	250 x 21.2 mm		ATL15MP/25M	AT15MP3/25M
28.0 mm					
	15 µm	250 x 28.0 mm		ATL15MP&25M	ATL15MP3&25M
10.0 mm					
	15 µm	250 x 10.0 mm		ATL15MP.25M	ATL15MP3.25M
21.2 mm					
	15 µm	250 x 21.2 mm		ATL15MP/25M	ATL15MP3/25M
28.0 mm					
	15 µm	250 x 28.0 mm		ATL15MP&25M	ATL15MP3&25M

QS QK

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