HICHROM

Chromatography Columns and Supplies

LC COLUMNS
Hamilton

Catalogue 9

Hichrom Limited
1 The Markham Centre, Station Road
Theale, Reading, Berks, RG7 4PE, UK
Tel: +44 (0)118 930 3660 Fax: +44 (0)118 932 3484
Email: sales@hichrom.co.uk www.hichrom.co.uk

HAMILTON®

- Spherical polymer matrix
- pH stable from 1 to 13
- 100 and 300Å pore size
- Application specific columns

Hamilton® Company of Reno, Nevada, manufactures a range of polymer-based columns for reversed-phase, ion-exchange and ion exclusion chromatography. Columns are poly(styrene-divinylbenzene) based, apart from PRP-X500 and PRP-X600 which contain a poly(methylmethacrylate) matrix.

Hamilton Phases

Technique	Hamilton Phase	Particle Size (µm)	Pore Size (Å)	Bonding Type	Application
Reversed-phase	PRP-1	5, 7, 10	100	-	General purpose
	PRP-3	10	300	-	Proteins and peptides
	PRP-h5	5	300	Pentafluorinated	Oligonucleotides, proteins and peptides
	PRP-C18	5	100	C18	Small molecule drugs, high pH applications
Anion-exchange	PRP-X100	5, 10	100	Trimethylammonium	Common anions
	PRP-X110	7	100	Trimethylammonium	Low level anions
	PRP-X500	7	Superficially porous	-	Fast separation of large proteins
	PRP-X600	7	Superficially porous	-	Proteins and DNA oligomers
	RCX-10	7	100	Trimethylammonium	Mono- and disaccharides
	RCX-30	7	300	Trimethylammonium	Complex carbohydrates
Cation-exchange	PRP-X200	10	100	Sulphonate	Mono- and divalent cations
	PRP-X400	7	-	Sulphonate	Glyphosate, sugar alcohols
	PRP-X800	7	100	Itaconic acid	Mono- and divalent cations, transition metals
	HC-40	10-15	Gel-type	Calcium counter ion	Oligosaccharides up to DP8
	HC-75	9	Gel-type	Hydrogen counter ion	Organic acids and sugars
				Calcium counter ion	Mono- and disaccharides
				Lead counter ion	Sugar alcohols
Ion exclusion	PRP-X300	7	100	Sulphonate	Organic acids and alcohols

Reversed-phase columns

The high degree of cross-linking of polystyrene with divinylbenzene makes the polymer beads extremely robust. In addition, swelling in organic solvents such as THF or chloroform is negligible due to the cross-linking. Reversed-phase packings have a usable pH range of 1 – 13, allowing the separation of biological samples in the natural state.

PRP-h5 is a fluorinated polystyrene-divinylbenzene phase, in which the integral reversed-phase characteristics eliminate the need for special coating techniques. This enables column performance to be maintained over a long period of time.

PRP-C18 is a C18 bonded polystyrene-divinylbenzene phase with excellent mechanical and thermal stability (>100°C). It can be used for reversed-phase separations in the pH range 1 – 13.

Anion-exchange columns

PRP-X100 ion-exchange columns are designed for the separation of inorganic and organic ions from 10 to 500ppm, using conductivity or UV detection. The phase can separate the 8 common anions (fluoride to sulphate) and can be used with 0 to 100% organic solvent.

PRP-X110 and **PRP-X110S** are recommended for the separation of inorganic and organic anions at 20ppb to 20ppm levels, with UV or conductivity detection (PRP-X110 for non-suppressed and PRP-X110S for suppressed). Figure 1 (page 131) shows the separation of common anions on PRP-X110S.

Cation-exchange columns

PRP-X200 is suitable for analysing inorganic and organic cations using conductivity or UV detection. Mono- or divalent cations from 20ppb to 20ppm can be separated (see Figure 2, page 131), depending on conditions.

PRP-X400 is used to analyse glyphosate and its metabolites in drinking water. It provides unique hydrophilic interaction separations.

PRP-X800 can separate transition metal ions or mono- and divalent cations.

The **HC-40** and **HC-75** gel-type cation-exchange columns are especially useful for determining ethanol in fermentation broths and for separating sugars and sugar alcohols, through size exclusion and ligand exchange. The 4% cross-linked HC-40 uses size exclusion as the primary mechanism, while ligand exchange dominates in the more highly (7.5%) cross-linked HC-75. Figure 3 shows the separation of sugar alcohols with HC-75 lead form.

Ion exclusion columns

PRP-X300 columns separate closely related alcohols and organic acids by a mixed-mode mechanism, which includes H-bonding, reversed-phase and ion exclusion.

Hamilton® (continued)

Column: Hamilton PRP-X110S (150 x 4.1mm)
Eluent: 1.7mM $NaHCO_3$, 1.8mM Na_2CO_3, 0.1mM NaSCN
Flow rate: 2ml/min
Detection: Suppressed conductivity

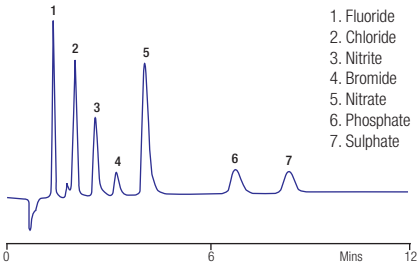

Figure 1. Common anions

Column: Hamilton PRP-X200 (150 x 4.1mm)
Eluent: 1.4mM HNO_3 – CH_3CN (2.3:1)
Flow rate: 2ml/min
Detection: Conductivity

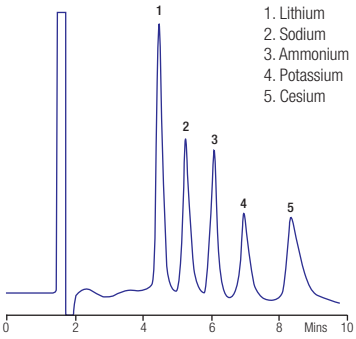

Figure 2. Monovalent cations

Column: Hamilton HC-75 Lead form (305 x 7.8mm)
Eluent: Deionized water
Flow rate: 0.6ml/min
Detection: RI

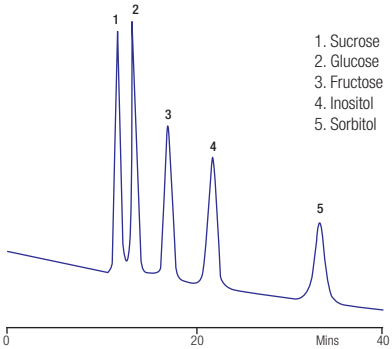

Figure 3. Sugars and sugar alcohols

Ordering Information

Hamilton Phase	Column Dimensions[1] (mm)					Guard Cartridges[3]	
	100 x 4.1	150 x 4.1	250 x 4.1	150 x 4.6[2]	250 x 4.6[2]	Kit[4]	Guard[5] (5/pk)
PRP-1 (5µm)	79479	79444	79820	79423	79571	79447	79445
PRP-1 (10µm)	-	79425	79427	79351	79381	79447	79445
PRP-3	-	79466	79794	79382	79574	79461	79454
PRP-h5	-	-	-	79272	79273	79267	79268
PRP-C18	-	-	-	79676	79677	79685	79686
PRP-X100 (5µm)	79538	79434	-	79174	79181	79448	79446
PRP-X100 (10µm)	79439	-	79433	79354	79455	79448	79446
PRP-X110	-	79732	79734	79738	-	79726	79728
PRP-X500	-	-	-	79573	-	79319[2]	79320[2]
PRP-X600	-	-	-	-	79189	79361[2]	79362[2]
RCX-10	-	-	79440	-	79388	79462	79463
RCX-30	-	-	79803	79370	79877	79371[2]	79372[2]
PRP-X200	79363	79441	79442	79384	79357	79456	79449
PRP-X400	-	79717	79473	-	79387	79376[2]	79377[2]
PRP-X800	-	79855	79828	-	-	79830	79832
PRP-X300	-	79464	79465	79475	-	79460	79453

[1] Other dimensions available
[2] PEEK hardware
[3] For stainless steel columns – guards for PEEK column also available
[4] Kit contains 1 holder and 2 guards
[5] Use with appropriate holder 32908 (SS) or 79447 (PEEK)

Hamilton Phase	Column Dimensions (mm)		
	250 x 4.1	100 x 7.8	305 x 7.8
HC-75 H form	79476	79547	79544
HC-75 Ca form	79431	-	79436
HC-75 Pb form	-	79240	79438