

If you are not completely satisfied with the performance of any Rezex column, as compared to a competing product of the same size and phase, simply return the Rezex column with your comparative data within 45 days for a FULL REFUND.

Carbohydrate and Organic Acid Analysis

- Excellent resolution
- Wide range of selectivities
- Excellent column-to-column reproducibility
- Recommended alternative to Bio-Rad Aminex®, Supelco Supelcogel™ and Waters Sugar-Pak™ at Cost-Effective Prices (see page 215)

Rezex columns contain sulfonated styrene-divinylbenzene spheres in 4 and 8 % cross-link forms as well as various ionic forms, including calcium, sodium, hydrogen, potassium, lead, and silver. So all you have to do is select the column with the appropriate selectivity.

Find the Column For Your Application

Phases Available	Description	Applications	Additional Notes
RCM-Monosaccharide (L19 packing)*	8 % cross-linked resin CALCIUM ionic form	Monosaccharides and sugar alcohols from sweeteners and corn and cane sugars Di, tri, and tetra saccharides	– Our most commonly used column type – Easy regeneration with calcium nitrate solutions
RHM-Monosaccharide (L17 packing)*	8 % cross-linked resin HYDROGEN ionic form	Monosaccharides in combination with organic acids, fatty acids, alcohols, ketones, neutral compounds, or inorganic salts	– Versatile column, generally run with a mobile phase of deionized water
RAM-Carbohydrate	8 % cross-linked resin SILVER ionic form	Selectivity complimentary to other Rezex column types	
RSO-Oligosaccharide	4 % cross-linked resin SILVER ionic form	High resolution of oligosaccharides up to 18 degrees of polymerization (Dp)	– Guard column is recommended to protect the ionic integrity of the matrix
RNO-Oligosaccharide	4 % cross-linked resin SODIUM ionic form	High resolution of oligosaccharides	
RPM-Monosaccharide (L34 packing)*	8 % cross-linked resin LEAD ionic form	Monosaccharides and sugar alcohol analysis. Cellobiose, glucose, xylose, arabinose, and mannose & other cellulose products	
RNM-Carbohydrate (L54 packing)*	8 % cross-linked resin SODIUM ionic form	For matrices which contain high concentration of inorganic sodium, Example-molasses	– Easily regenerated to the original ionic strength
ROA-Organic Acid (L22 packing)*	8 % cross-linked resin HYDROGEN ionic form	Organic acids alone or in combination with carbohydrates, alcohols, fatty acids, or neutral compounds; Amino sugars	– Selectivity can be altered by changing the pH as well as the type of dilute mineral acid used as the mobile phase
RFQ-Fast Acid	8 % cross-linked resin HYDROGEN ionic form	Rapid screening of fruit quality; ethanol, acetic acid, glycerol, & standard alcohol mixtures	– Analytes are routinely chromatographed under 5 minutes
RKP-Potassium	8 % cross-linked resin POTASSIUM ionic form	Analysis of glyphosate	
RCU-USP Sugar Alcohols (L19 packing)*	8 % cross-linked resin CALCIUM ionic form	For sugar analysis according to the USP procedures	– Sorbitol and mannitol can be resolved using simple isocratic conditions

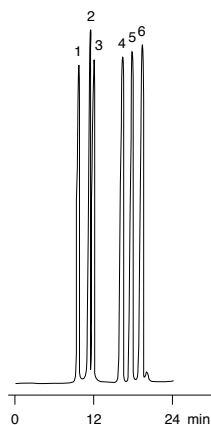
* United States Pharmacopeia (USP)



App ID 5515

Organic Acids

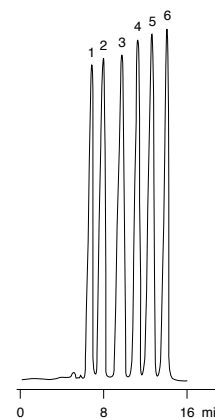
Column: Rezex ROA-Organic Acid
Dimensions: 300 x 7.8 mm
Part No.: 00H-0138-KO
Mobile Phase: 0.005 N Sulfuric Acid
Flow Rate: 0.5 mL/min
Detection: UV @ 210 nm
Temperature: 55 °C
Sample:
 1. Oxalic
 2. Citric
 3. Tartaric
 4. Succinic
 5. Formic
 6. Acetic



App ID 5504

Saccharides

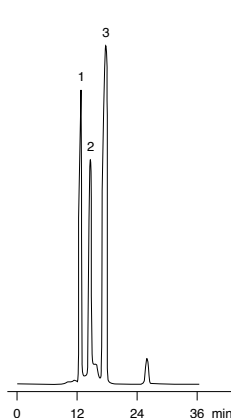
Column: Rezex RCM-Monosaccharide
Dimensions: 300 x 7.8 mm
Part No.: 00H-0130-KO
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Detection: RI
Temperature: 85 °C
Sample:
 1. Melezitose
 2. Maltose
 3. Glucose
 4. Mannose
 5. Fructose
 6. Ribitol



App ID 5505

Apple Juice

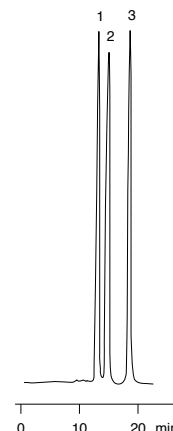
Column: Rezex RCM-Monosaccharide
Dimensions: 300 x 7.8 mm
Part No.: 00H-0130-KO
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Detection: RI
Temperature: 75 °C
Sample:
 1. Sucrose
 2. Glucose
 3. Fructose



App ID 5506

Carbohydrates

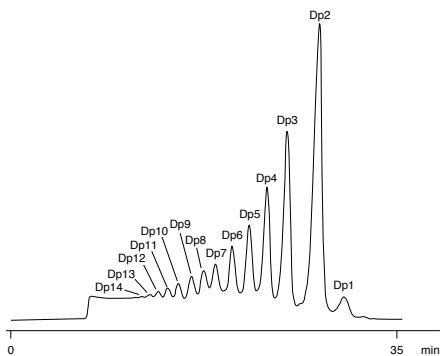
Column: Rezex RKP-Potassium
Dimensions: 300 x 7.8 mm
Part No.: 00H-3252-KO
Mobile Phase: Water
Flow Rate: 0.4 mL/min
Detection: RI
Temperature: 85 °C
Sample:
 1. Maltotriose
 2. Maltose
 3. Glucose



App ID 5507

Oligosaccharides

Column: Rezex RSO-Oligosaccharide
Dimensions: 200 x 10 mm
Part No.: 00P-0133-NO
Mobile Phase: Water
Flow Rate: 0.3 mL/min
Detection: RI
Temperature: 75 °C
Sample: Malto-Oligosaccharides as shown

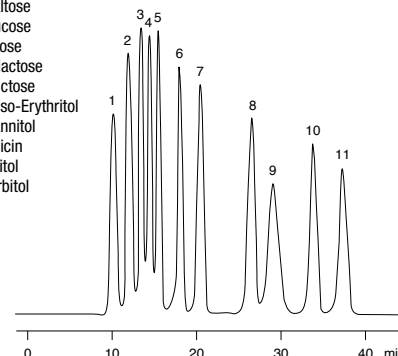


Dp refers to Degree of polymerization

App ID 5508

Saccharides

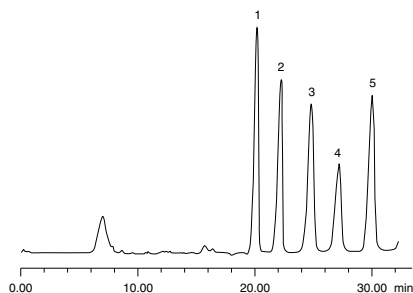
Column: Rezex RPM-Monosaccharide
Dimensions: 300 x 7.8 mm
Part No.: 00H-0135-KO
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Detection: RI
Temperature: 75 °C
Sample:
 1. Stachyose
 2. Maltose
 3. Glucose
 4. Xylose
 5. Galactose
 6. Fructose
 7. Meso-Erythritol
 8. Mannitol
 9. Salicin
 10. Xylitol
 11. Sorbitol



App ID 5518

Food Softeners

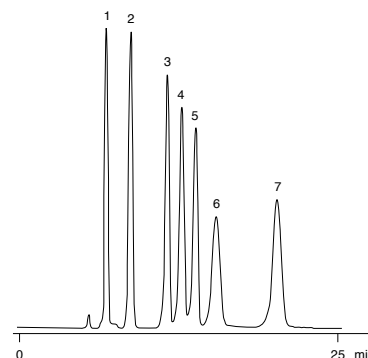
Column: Rezex RCM-Monosaccharide
Dimensions: 300 x 7.8 mm
Part No.: 00H-0130-KO
Mobile Phase: Water
Flow Rate: 0.5 mL/min
Detection: RI
Temperature: 60 °C
Sample:
 1. Glycerol
 2. Methoxypolyethylene Glycol
 3. Triethylene Glycol
 4. Sorbitol
 5. Urea



App ID 5510

Carbohydrates

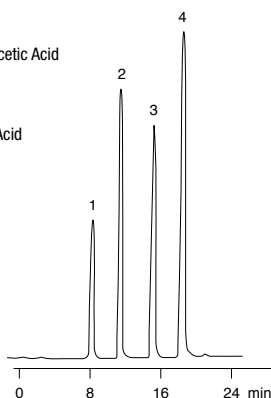
Column: Rezex RNM-Carbohydrate
Dimensions: 300 x 7.8 mm
Part No.: 00H-0136-KO
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Detection: RI
Temperature: 75 °C
Sample:
 1. Stachyose
 2. Cellobiose
 3. Glucose
 4. Fructose
 5. Arabinose
 6. Ribose
 7. Salicin (1 % solution of each)



App ID 5517

Carboxylic Acids

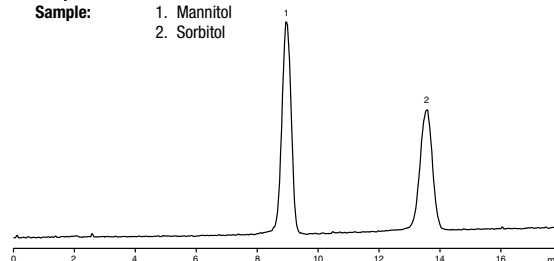
Column: Rezex ROA-Organic Acid
Dimensions: 300 x 7.8 mm
Part No.: 00H-0138-KO
Mobile Phase: Water + 0.5 % Trifluoroacetic Acid
Flow Rate: 1.0 mL/min
Detection: RI
Temperature: 40 °C
Sample:
 1. Acetylene Carboxylic Acid
 2. Maleic Acid
 3. Succinic Acid
 4. Fumaric Acid



App ID 15501

Mannitol and Sorbitol

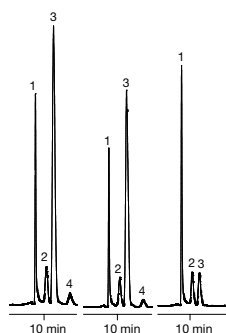
Column: Rezex RPM-Monosaccharide
Dimensions: 100 x 7.8 mm
Part No.: 00D-0135-KO
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Detection: ELSD
Temperature: 80 °C
Sample:
 1. Mannitol
 2. Sorbitol



App ID 14987, 14988, 14989

Fermentation Broth

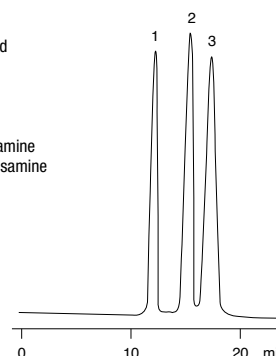
Column: Rezex RCM-Monosaccharide
Dimensions: 300 x 7.8 mm
Part No.: 00H-0130-KO
Mobile Phase: Water
Flow Rate: 0.5 mL/min
Detection: ELSD
Temperature: 80 °C
Sample:
 1. Sucrose
 2. Glucose
 3. Galactose
 4. Fructose



App ID 5514

Amino Sugars

Column: Rezex ROA-Organic Acid
Dimensions: 300 x 7.8 mm
Part No.: 00H-0138-KO
Mobile Phase: 1 % Phosphoric Acid
Flow Rate: 0.6 mL/min
Detection: RI
Temperature: Ambient
Sample:
 1. Glucose
 2. N-Acetylglucosamine
 3. N-Acetylgalactosamine



REZEX™ VS. BIO-RAD AMINEX®

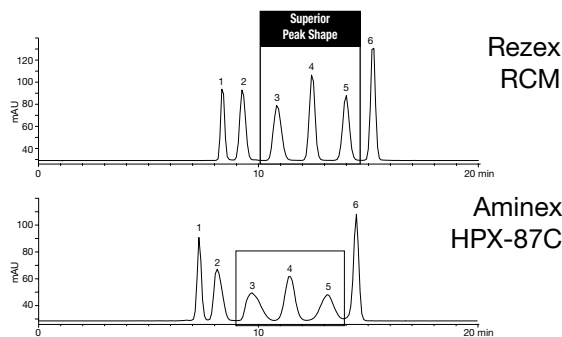
Phenomenex guarantees satisfaction when using Rezex HPLC columns. As illustrated below, Rezex offers advantages that enhance chromatographic results, increase throughput, and simplify quantitation.

Easier, Accurate Quantitation Due to improved peak shape

App ID 14975, 14976

Saccharides

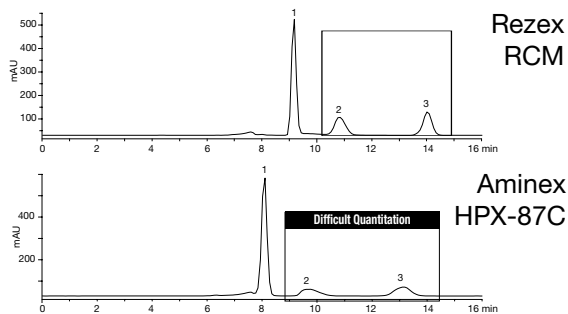
Column: Rezex RCM-Monosaccharide
Aminex HPX-87C
Dimensions: 300 x 7.8 mm
Part No.: 00H-0130-KO
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Detection: ELSD
Temperature: 80 °C
Sample: 1. Melezitose 4. Mannose
2. Maltose 5. Fructose
3. Glucose 6. Ribitol



App ID 14981, 14982

Orange Juice

Column: Rezex RCM-Monosaccharide
Aminex HPX-87C
Dimensions: 300 x 7.8 mm
Part No.: 00H-0130-KO
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Detection: ELSD
Temperature: 80 °C
Sample: 1. Sucrose
2. Glucose
3. Fructose

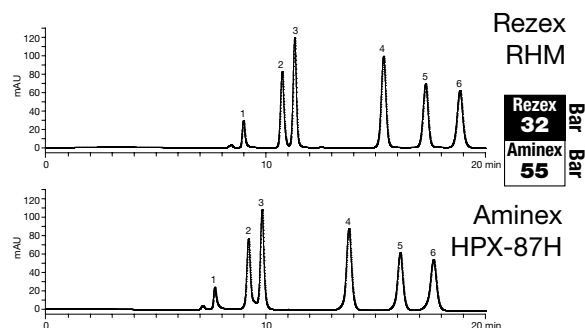


Longer Column Lifetime & Faster Run Times Due to lower backpressures

App ID 14962, 14963

Aliphatic Acids

Column: Rezex RHM-Monosaccharide
Aminex HPX-87H
Dimensions: 300 x 7.8 mm
Part No.: 00H-0132-KO
Mobile Phase: 0.005N H₂SO₄
Flow Rate: 0.5 mL/min
Detection: UV @ 210 nm
Temperature: 40 °C
Sample: 1. Oxalic Acid 4. Succinic Acid
2. Citric Acid 5. Formic Acid
3. Tartaric Acid 6. Acetic Acid

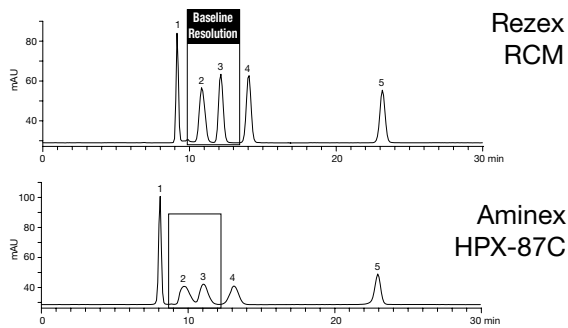


Baseline Separation of Critical Sample Components Due to improved resolution

App ID 14977, 14978

Sugars

Column: Rezex RCM-Monosaccharide
Aminex HPX-87C
Dimensions: 300 x 7.8 mm
Part No.: 00H-0130-KO
Mobile Phase: Water
Flow Rate: 0.6 mL/min
Detection: ELSD
Temperature: 80 °C
Sample: 1. Sucrose 4. Fructose
2. Glucose 5. Sorbitol
3. Galactose



Specifications and Operating Recommendations

	RCM Monosaccharide	RSO Oligosaccharide	RNO Oligosaccharide	RNM Carbohydrate	RAM Carbohydrate
Part Number	00H-0130-K0	00P-0133-N0	00P-0137-N0	00H-0136-K0	00H-0131-K0
Ionic Form	Calcium	Silver	Sodium	Sodium	Silver
Standard Dimensions	300 x 7.8 mm	200 x 10 mm	200 x 10 mm	300 x 7.8 mm	300 x 7.8 mm
Matrix	Sulfonated Styrene Divinyl Benzene				
Cross Linking	8 %	4 %	4 %	8 %	8 %
Particle Size	8 µm	12 µm	12 µm	8 µm	8 µm
Min. Efficiency (p/m) based on last peak	35,000	N/A	N/A	30,000	35,000
Typical Pressure (psi @ Max Flow Rate)	350	200	200	350	350
Max. Pressure (psi @ Max Flow Rate)	600	300	300	600	600
Max. Flow Rate (mL/min)	0.6 (see pressure)	0.3	0.3	0.6	0.6
Max. Temperature (°C)	85	85	85	85	85
Typical Mobile Phase	Water	Water	Water	Water	Water
pH Range	Neutral	Neutral	Neutral	Neutral	Neutral
Guard Column Part No.	03B-0130-K0	03R-0133-N0	03R-0137-N0	03B-0136-K0	03B-0131-K0
Cleaning, Regeneration and Storage					
Organic Modifiers (Max)	10 % Methanol, IPA, EtOH, Acetonitrile				
Inorganic Modifiers Avoid	5 % CaSO ₄ , Ca(NO ₃) ₂ , CaCl ₂	5 % Silver Nitrate	5 % Sodium Salts	5 % Sodium Salts	2 % Silver Nitrate
	>10 % Methanol, Acids, Bases, Non-Calcium Salts/ Metal Ions	>5 % Methanol, Acids, Bases, Non-Silver Salts/ Metal Ions	>10 % Methanol, Acids, Bases, Non-Sodium Salts/ Metal Ions	>10 % Methanol, Acids, Bases, Non-Sodium Salts/ Metal Ions	>5 % Methanol, Acids, Bases, Non-Silver Salts/ Metal Ions
Cleaning Solvent	100 % Water	100 % Water	100 % Water	100 % Water	100 % Water
Flow Rate(mL/min)	0.6	0.2	0.2	0.4	0.4
Temperature (°C)	85	75	75	75	75
Duration (hrs)	12	12	12	12	12
Regeneration Solvent	0.1M Ca(NO ₃) ₂	0.1M AgNO ₃	0.1M NaNO ₃	0.1M NaNO ₃	0.1M AgNO ₃
Flow Rate (mL/min)	0.2	0.1	0.2	0.2	0.2
Temperature (°C)	85	-	85	85	85
Duration (hrs)	4-16	-	4-16	4-16	4-16
Ship/Storage Solvent	Water	Water	Water	Water	Water

	RPM Monosaccharide	RHM Monosaccharide	ROA Organic Acid	RFQ Fast Acid	RCU Sugar Alcohols
Part Number	00H-0135-K0	00H-0132-K0	00H-0138-K0	00D-0223-K0	00G-0130-D0
Ionic Form	Lead	Hydrogen	Hydrogen	Hydrogen	Calcium
Standard Dimensions	300 x 7.8 mm	300 x 7.8 mm	300 x 7.8 mm	100 x 7.8 mm	250 x 4.0 mm
Matrix	Sulfonated Styrene Divinyl Benzene				
Cross Linking	8 %	8 %	8 %	8 %	8 %
Particle Size	8 µm	8 µm	8 µm	8 µm	8 µm
Min. Efficiency (p/m) based on last peak	35,000	35,000	50,000 (Acetic Acid)	30,000	12,000
Typical Pressure (psi @ Max Flow Rate)	350	350	350	350	350
Max. Pressure (psi @ Max Flow Rate)	600	600	600	600	600
Max. Flow Rate (mL/min)	0.6	0.6	0.6	1.0	0.4
Max. Temperature (°C)	85	85	85	85	85
Typical Mobile Phase	Water	Water	0.005N H ₂ SO ₄	0.005N H ₂ SO ₄	Water
pH Range	Neutral	Neutral	1-3	1-3	Neutral
Guard Column Part No.	03B-0135-K0	03B-0132-K0	03B-0138-K0	03B-0223-K0	03A-0130-D0
Cleaning, Regeneration and Storage					
Organic Modifiers (Max)	Up to 10 % Methanol, IPA, EtOH, Acetonitrile				
Inorganic Modifiers Avoid	5 % Lead Nitrate	5 % HNO ₃ , H ₃ PO ₄	5 % HNO ₃ , H ₃ PO ₄	5 % HNO ₃ , H ₃ PO ₄	5 % CaSO ₄ , Ca(NO ₃) ₂ , CaCl ₂
	>10 % Methanol, Acids, Bases, Non-Lead Salts/ Metal Ions	>10 % Methanol, Acids, Bases, Salts, Metal Ions	>10 % Methanol, Acids, Bases, Salts, Metal Ions, pH > 3	>10 % Methanol, Acids, Bases, Salts, Metal Ions, pH > 3	>10 % Methanol, Acids, Bases, Non-Calcium Salts or Metal Ions
Cleaning Solvent	100 % Water	100 % Water	100 % Water	100 % Water	100 % Water
Flow Rate(mL/min)	0.6	0.6	0.5	0.6	0.2
Temperature (°C)	85	85	Ambient	85	85
Duration (hrs)	12	12	12	12	12
Regeneration Solvent	0.1M Pb(NO ₃) ₂	0.025M H ₂ SO ₄	0.025M H ₂ SO ₄	0.025M H ₂ SO ₄	0.1M Ca(NO ₃) ₂
Flow Rate (mL/min)	0.2	0.2	0.2	0.2	0.2
Temperature (°C)	85	85	Ambient	85	85
Duration (hrs)	4-16	4-16	4-16	4-16	4-16
Ship/Storage Solvent	Water	Water	0.005N H ₂ SO ₄	0.005N H ₂ SO ₄	Water



If you are not completely satisfied with the performance of any Rezex column, as compared to a competing product of the same size and phase, simply return the Rezex column with your comparative data within 45 days for a FULL REFUND.

Retention Times for Some Carbohydrates and Sugar Alcohols

Counter Ion Analyte	RAM Ag ⁺	RCM Ca ⁺²	RNM Na ⁺	RHM H ⁺	RPM Pb ⁺²
Adonitol (Ribitol)	11.54	14.93	11.10	11.11	20.15
D-Altrose	11.95	12.71	11.45	10.21	15.82
D-(-)-Arabinose	13.01	13.56	12.65	11.24	16.47
D-(+)-Cellobiose	8.86	8.60	8.49	8.02	11.00
D-(+)-Digitoxose	11.90	13.82	11.39	12.59	15.32
Dulcitol	11.64	21.61	11.10	10.71	33.25
Meso-Erythritol	12.31	15.49	11.78	12.14	19.82
D-(-)-Fructose	12.05	13.65	11.76	10.31	17.71
L-(-)-Fucose	12.75	13.19	12.30	11.65	16.19
D-(+)-Galactose	11.87	11.73	11.47	10.19	14.94
Gentiobiose	8.70	8.40	8.40	7.87	10.53
D-(+)-Glucose	11.04	10.37	10.71	9.62	12.92
Inositol	12.59	13.35	12.14	9.98	18.87
Isomaltose	9.11	8.74	8.76	8.02	11.28
Lactose	9.27	9.03	8.78	8.32	11.89
Lactulose	9.75	10.32	9.23	8.57	13.95
D- Lyxose	12.41	14.06	11.98	10.68	16.66
D- Maltose	9.16	8.81	8.75	8.18	11.59
Maltotriose	8.27	8.10	7.94	7.51	11.02
Maltulose	9.25	9.47	8.82	8.27	12.40
D- Mannitol	11.36	17.82	10.80	10.59	24.90
D-(+)-Mannose	12.04	12.04	11.54	10.16	16.39
Melibiose	9.26	9.04	8.82	8.14	11.97
D-(+)-Melezitose	8.00	7.93	7.66	7.54*	9.94
D-(+)-Raffinose	8.10	8.16	7.76	7.88*	10.28
L-(+)-Rhamnose	11.50	12.18	11.00	10.90	14.47
D-(-)-Ribose	14.59	23.38	14.34	11.42	33.48
Salicin	18.51	18.58	17.36	14.98	26.81
D-Sorbitol	11.91	22.45	11.39	10.83	35.97
Stachyose	7.60	7.59	7.30	7.27	9.72
Sucrose	9.03	8.71	8.65	9.24*	11.00
Trehalose	8.91	8.72	8.49	8.32	11.01
Xylitol	12.69	22.01	12.16	11.78	32.38
D-(+)-Xylose	12.06	11.62	11.68	10.24	13.84

* Partial hydrolysis results.

Conditions:

Dimensions: 300 x 7.8 mm
Mobile Phase: Water (degassed)
Flow Rate: 0.6 mL/min
Temperature: 80 °C
Detection: RI @ 40 °C

Column Cross Reference Chart

Phenomenex Rezex™	Bio-Rad Aminex®	Supelco Supelcogel™	Waters Sugar-Pak™
RCM-Monosaccharide	HPX-87C 125-0095	Supelcogel Ca	Sugar-Pak 1
RHM-Monosaccharide	HPX-87H 125-0140	Supelcogel C-610H & H	N/A
RPM-Monosaccharide	HPX-87P 125-0098	Supelcogel Pb	N/A
RNM-Carbohydrate	HPX-87N 125-0143	N/A	N/A
RSO-Oligosaccharide	HPX-42A 125-0097	Supelcogel Ag1 & Ag2	N/A
ROA-Organic Acid	HPX-87H 125-0140	Supelcogel C-610H & H	N/A
RFQ-Fast Acid	Fast Acid 125-0100	N/A	N/A
RKP-Potassium	HPX-87K 125-0142	Supelcogel K	N/A
RCU-USP Sugar Alcohols	Sugar Alcohols 125-0094	N/A	N/A

ORDERING INFORMATION

SecurityGuard™ Analytical Cartridges require universal holder Part No.: KJO-4282

Columns						Guards SecurityGuard™ Cartridges			
Description	Part No.	Cross Linkage	Ionic Form	Size (mm)	Price	Part No.	Size (mm)	Price	4 x 3.0 mm /8pk
RCM-Monosaccharide	00H-0130-KO	8 %	Calcium	300 x 7.8		03B-0130-KO	50 x 7.8		AJ0-4493
RHM- Monosaccharide	00H-0132-KO	8 %	Hydrogen	300 x 7.8		03B-0132-KO	50 x 7.8		AJ0-4490
RAM-Carbohydrate	00H-0131-KO	8 %	Silver	300 x 7.8		—	—		AJ0-4491
RSO-Oligosaccharide	00P-0133-NO	4 %	Silver	200 x 10.0		03R-0133-NO	60 x 10.0		AJ0-4491
RNO-Oligosaccharide	00P-0137-NO	4 %	Sodium	200 x 10.0		03R-0137-NO	60 x 10.0		—
RPM-Monosaccharide (for USP procedure)	00H-0135-KO 00D-0135-KO	8 % 8 %	Lead Lead	300 x 7.8 100 x 7.8		03B-0135-KO 03B-0135-KO	50 x 7.8 50 x 7.8		AJ0-4492 AJ0-4492
RNM-Carbohydrate	00H-0136-KO	8 %	Sodium	300 x 7.8		03B-0136-KO	50 x 7.8		—
ROA-Organic Acid	00H-0138-KO	8 %	Hydrogen	300 x 7.8		03B-0138-KO	50 x 7.8		AJ0-4490
RKP-Potassium	00H-3252-KO	8 %	Potassium	300 x 7.8		—	—		—
RFQ-Fast Acid	00D-0223-KO	8 %	Hydrogen	100 x 7.8		03B-0223-KO	50 x 7.8		AJ0-4490
RCU-USP Sugar Alcohols Column	00G-0130-DO	8 %	Calcium	250 x 4.0		03A-0130-DO	30 x 4.0		AJ0-4493

for ID: 3.2-8.0 mm



See pp. 344-345 for Column Heaters.



See pp. 87-88 for our full line of Column Performance Check Standards.