ASTRA® Sugar Ca(S) column Manual

Overview

ASTRA® Sugar Ca(S) columns have been developed for fast separation of carbohydrates, oligosaccharides and sugar alcohols. The ASTRA® Sugar Ca(S) columns are delivered in dimensions of 300 × 8 mm (ID) and they are packed with carefully selected ion-exchange polymer, cross-linked sulfonated styrene-divinyl benzene (SDVB) with calcium ionic form. To obtain the best performance, certain procedures regarding installation, operation, handling and storage should be followed carefully as explained in this Manual.

ASTRA® Sugar Ca(S) technical specification

Product line	**Astra Sugar Series**
Particle type	Phenyl-resin-SO_3
Ionic form	Ca^{2+}
Crosslinking	Proprietary
Particle size	10 µm
Max. Flow rate	1.5 mL/min
Optimum Flow rate	0.5 – 1.0 mL/min
Max. pressure	60 bar
Max. temperature	90 °C
Optimum temperature	60 to 85 °C
pH range	7 to 12
Storage solvent	UPW / 0.05% NaN_3
Storage temperature	4 °C
Mobile phase	UPW
USP Code	L19

UPW = Ultra-Pure-Water

ASTRA® Sugar Ca(S) use and storage

Attention

Please ensure that you change the ion free water regularly to prevent bacterial growth. Changing of the column temperature should be done very slowly, e.g. 10 °C in 20 minutes. Do not exceed the maximum allowable pressure.

Start the column use

Set the flow rate at 0.05 mL/min. Keep heating the column slowly, until it reaches required temperature. After that temperature is attained and satisfactory baseline is achieved, gradually set the flow rate at the prescribed level.

Recommended storage

If column is not used for 1-3 days: Keep temperature of the column as it was and reduce the flow rate to 0.05 mL/min for standby mode. Do not cool the column.

If column is not used for 4 days and more: Reduce the flow rate to 0.05 mL/min. Switch of column oven and let system cool down to about 20 °C while pumping eluent. Switch off eluent pump, remove the column and use delivered plastic plugs (plastic plugs have to be „long enough“ to fit stably into the thread). Put the column into a refrigerator (cold dark place at 4 °C, do not freeze). After 1–4 hours, check the plastic plugs for tightness and make sure no water can evaporate from column. Store the column for the time you need in the refrigerator.

You can use 0.05% NaN_3 dissolved in water to rinse the column (to prevent bacterial contamination) if storage is planned for more than two weeks.

Recommended cleaning procedure

Run the column at standby mode (0.05 mL/min, UPW, 80 °C) within several hours to reach a satisfactory baseline.

Regeneration

Regeneration can be done by using

- 0.05M $CaCl_2$ or $Ca(NO_3)_2$ solution in water
- With flow rate 0.15 mL/min and temperature 80 °C approx. 6 h
- Followed by rinsing with 0.3 mL/min with UPW for a further 6–8 h

The success of the regeneration is checked by comparing with the initial selectivity.

Retention times for some saccharides, sugar alcohols and alcohols

Flow rate	**1.0 mL/min**	**Flow rate**	**0.5 mL/min**
Erythritol	9.978	Erythritol	19.773
Ethanol	10.842	Ethanol	21.663
Fructose	8.517	Fructose	16.677
Galactose	7.707	Galactose	15.187
Glucose	7.095	Glucose	13.985
Glycerol	10.047	Glycerol	20.104
Isopropanol	12.397	Isopropanol	24.791
Lactose	6.375	Lactose	12.552
Lactulosa	7.030	Lactulosa	14.057
Maltitol	7.743	Maltitol	15.148
Maltose	6.260	Maltose	12.340
Mannitol	10.202	Mannitol	19.798
Mannose	8.089	Mannose	16.210
Melezitose	5.760	Melezitose	11.375
Methanol	10.659	Methanol	21.303
Sorbitol	12.178	Sorbitol	23.452
Sucrose	6.174	Sucrose	12.189
Xylitol	12.217	Xylitol	23.704
Xylose	7.671	Xylose	15.151

Conditions

Dimensions	300 × 8.0 mm
Mobile phase	UPW
Flow rate	1.0 mL/min or 0.5 mL/min
Temperature	70 °C
Detection	RID @ 55 °C