DOWEX™ MONOSPHERE™ 99 Ca/310 chromatographic separation resin

Separation Resin for Chromatographic Separations (Designed Specifically for Demanding Separations such as Sugar Alcohols and Crystalline Fructose)

Description

DOWEX MONOSPHERE 99 Ca/310 chromatographic separation resin is a uniform particle size, strongly acidic cation exchange resin specifically designed for use in chromatographic separations of natural and synthesized sweeteners. The process from which it is made results in an extremely uniform product in both particle size and microporosity. DOWEX MONOSPHERE 99 Ca/310 separation resin offers the right combination of particle size and rapid kinetics for achieving separations with high recovery and high purity.

DOWEX MONOSPHERE 99 Ca/310 provides optimum properties for the separation of species having close affinity coefficients. Although the main application is the separation of fructose and dextrose, where DOWEX MONOSPHERE 99 Ca/310 has achieved very high recovery rates and high purity, it has also shown a very high efficiency in separating various polyols and other sweeteners usually not efficiently separated while using more conventional chromatographic separation resins.

DOWEX MONOSPHERE 99 Ca/310 has been used in SMB chromatography systems for the recovery and purification of specialty sweeteners derived from starches.

Product	Type	Matrix	Functional group
DOWEX™ MONOSPHERE™ 99 Ca/310	Strong acid cation	Styrene-DVB, gel	Sulfonate

Typical Physical and Chemical Properties		
Ionic form as delivered		Ca^{++}
Total exchange capacity	eq/L	1.40 - 1.65 (H^+ form)
Water retention capacity	%	60 - 64 (H^+ form)
Whole uncracked beads, min.	%	97
Particle density, approx.	g/mL	1.25
Apparent bulk density, approx.:		
Backwashed, settled and drained	g/L	730 - 780
	lbs/ft^3	44 - 50
Tapped and settled	g/L	760 - 825
	lbs/ft^3	47 - 52

Bead Size Distribution	Microns	
Volume median diameter		290 - 317
Broad range	280 - 343	min. 80%
Narrow range	294 - 329	min. 60%
Fine fines	< 255	max. 3%
Coarse fines	< 275	max. 8%
Fine coarse	> 375	max. 8%
Coarse coarse	> 440	max. 3%

Typical Operating Conditions for DOWEX MONOSPHERE 99 separation resins

Syrup temperature	140 – 160°F (60 – 71°C)
Syrup pH	4 – 7
Recommended dissolved oxygen concentration	< 0.1 ppm
Maximum dissolved oxygen concentration	0.25 ppm
Simulated moving bed operation	with optimized tuning (annually)

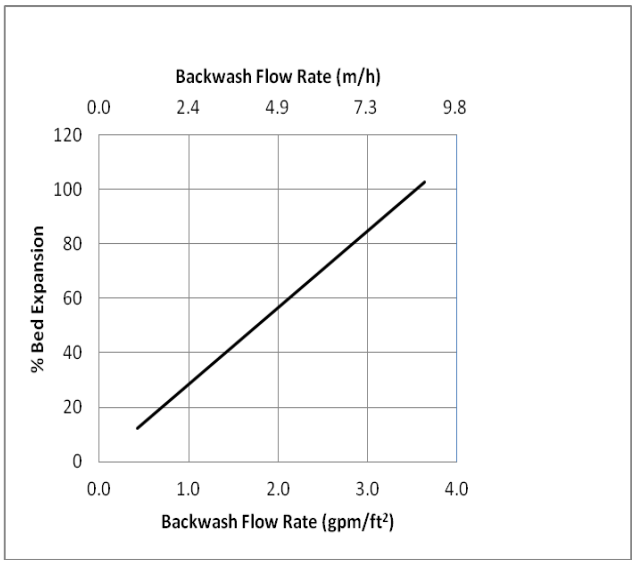
RESIN LIFETIME

The life time of the chromatographic resins will depend on the feed solution quality and especially on oxidizing agents (for example, oxygen) dissolved in the feed stream. Ion exchange resins are organic, and, as such, they are subject to oxidation. Over time, the water retention capacity of the oxidized resin will increase, with the result that pressure drop across the resin bed will increase. Temperature accelerates this resin oxidation. Resins made with lower divinylbenzene (DVB) levels show a faster pressure drop increase upon oxidation than resins made with higher DVB levels.

It is strongly advised to remove oxygen from the feed solutions as well as from the elution water going into the chromatographic resin column and to limit the oxygen concentration to less than 0.1 ppm (0.25 ppm maximum).

Figure 1. Backwash Expansion Data

Temperature = 25°C (77°F)



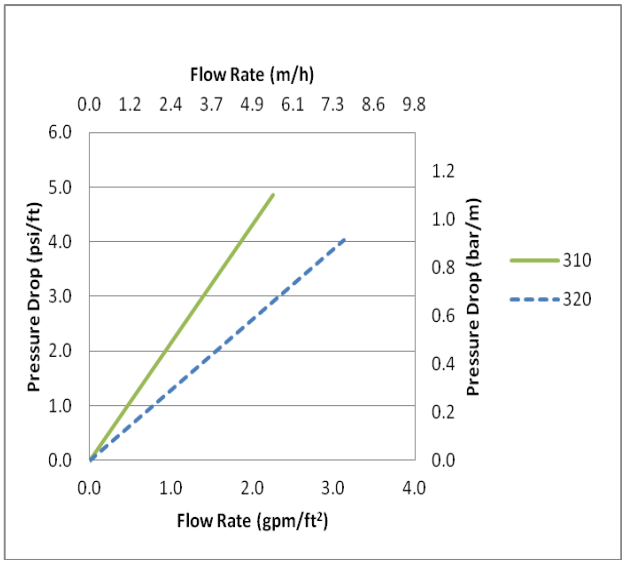
For other temperatures use:

$F_T = F_{77°F}[1+0.0008\ (T_{°F} - 77)]$, where F = gpm/ft^2

$F_T = F_{25°C}\ [1+0.008\ (1.8T_{°C} - 45)]$, where F = m/h

Figure 2. Pressure Drop Data

Pressure Drop – 42% Fructose @ 50% DS,
Temperature = 60°C (140°F)



For other temperature use:

$P_T = P_{20°C} / (0.026T_{°C} + 0.48)$, where P = bar/m

$P_T = P_{68°F} / (0.014T_{°F} + 0.05)$, where P = psi/ft

DOW™ Ion Exchange Resins

For more information about DOW resins, call the Dow Water and Process Solutions business:

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