



# DOWEX UPCORE MAC-3

**A Weak Acid Cation Exchange Resin Specifically Designed for the UPCORE System**

Product	Type	Matrix	Functional group
DOWEX* UPCORE* MAC-3	Weak acid cation	Polyacrylic, macroporous	Carboxylic acid

Guaranteed Sales Specifications	H <sup>+</sup> form	
Total exchange capacity, min.	eq/l	3.8
	kg/ft <sup>3</sup> as CaCO <sub>3</sub>	83.0
Water content	%	42 - 52
Bead size distribution <sup>†</sup>		
Range, 0.4 mm - 1.2 mm, min.	%	90
>1.2 mm, max (16 mesh)	%	1
<0.35 mm, max (45 mesh)	%	1
Whole beads, min.	%	95

Typical Physical and Chemical Properties	H <sup>+</sup> form	
Total swelling (H <sup>+</sup> → Ca <sup>+</sup> )	%	15
Particle density	g/ml	1.18
Shipping weight	g/l	750
	lbs/ft <sup>3</sup>	47

Recommended Operating Conditions	
Maximum operating temperature	120°C (250°F)
pH range	5-14
Bed depth, min.	1000 mm (3.3 ft)
Pressure drop, design max.	1.5 bar (22 psi)
Pressure drop, max.	2.5 bar (37 psi)
Flow rates:	
Service/fast rinse	5-50 m/h (2-20 gpm/ft <sup>2</sup> )
Regeneration/displacement rinse	5-50 m/h (6-20 gpm/ft <sup>2</sup> ) for H <sub>2</sub> SO <sub>4</sub> 6-12 m/h (2.4-4.8 gpm/ft <sup>2</sup> ) for HCl
Total rinse requirement	3-6 Bed volumes
Regenerant	1-5% HCl, 0.5-0.8% H <sub>2</sub> SO <sub>4</sub>

<sup>†</sup>For additional particle size information, please refer to the Particle Size Distribution Cross Reference Chart (Form No. 177-01775/CH 171-476-E).

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### Typical properties and applications:

DOWEX\* UPCORE\* MAC-3 macroporous weak acid cation exchange resins contains carboxylic acid functional groups attached to a polyacrylic-divinylbenzene matrix. The particle size is specially chosen for use in the UPCORE packed bed counter-current regeneration system. DOWEX UPCORE MAC-3 resin

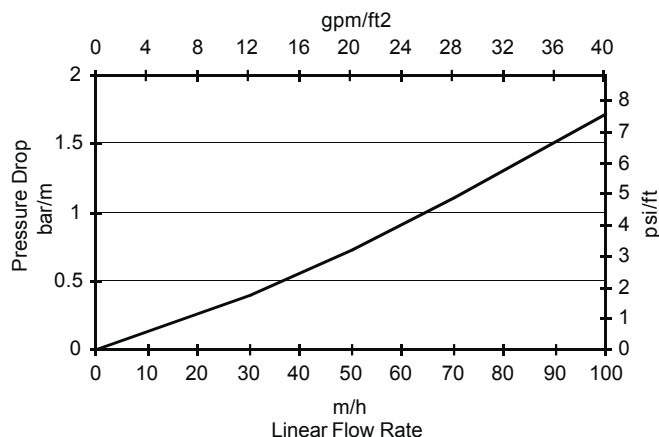
efficiently removes hardness associated with alkalinity. When used in combination with DOWEX UPCORE Mono C-600 resin, DOWEX UPCORE MAC-3 resin can be regenerated with effluent acid from the strong acid cation regeneration. This results in highly efficient regeneration of the cation resin pair.

### Packaging

25 liter bags or 5 cubic feet fiber drums.

**Figure 1. Pressure Drop Data**

Temperature = 20° C (68° F)



### For other temperatures use:

$$P_T = P_{20^\circ\text{C}} / (0.026 T_{\text{C}} + 0.48), \text{ where } P \equiv \text{bar/m}$$

$$P_T = P_{68^\circ\text{F}} / (0.014 T_{\text{F}} + 0.05), \text{ where } P \equiv \text{psi/ft}$$

**Warning:** Oxidizing agents such as nitric acid attack organic ion exchange resins under certain conditions. This could lead to anything from slight resin degradation to a violent exothermic reaction (explosion). Before using strong oxidizing agents, consult sources knowledgeable in handling such materials.

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