



## PRODUCT MANUAL

### BORATETRAP COLUMN (P/N 047078)

#### QUICKSTART STEPS AND LINKS

Click blue text below to get started.

1. See [Section 2, "Example Applications"](#) for example applications.

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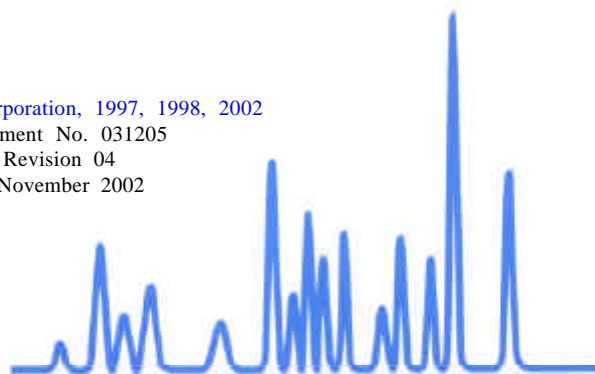
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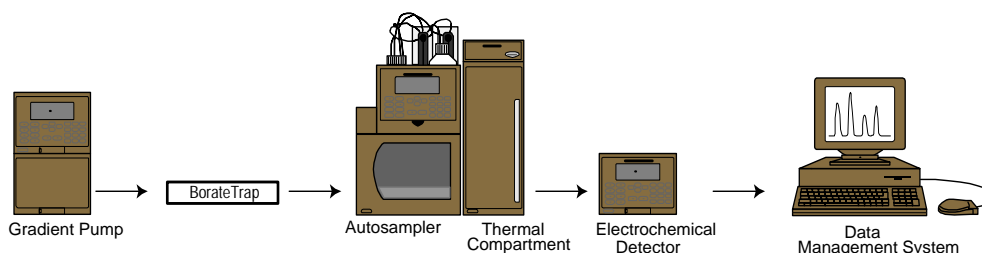
## SECTION 1 - INTRODUCTION

The BorateTrap column is used to clean up contaminated water when borate is present in the water used to make eluents for carbohydrate analysis. This manual describes the use of the BorateTrap column.

The BorateTrap is packed with a 20  $\mu\text{m}$ , high capacity resin which has high selectivity for borate. The maximum operating pressure is 4,000 psi (27.57 MPa) and the recommended maximum flow rate is 4 mL/min. The normal operating pressure range is 100 - 150 psi (0.69 - 1.03 MPa) at 1 mL/min. This column is intended to be used as a trap column between the pump and the injection valve for removing borate from hydroxide eluents.

Borate is known to be one of the first ions to break through a water deionization system. Its presence in the water used to make eluents for carbohydrate analysis can cause significant loss of peak efficiency, as seen by peak tailing, for certain analytes, most notably mannose, fructose and the alditols.

### 1.1 Recommended System



**Figure 1**  
**BorateTrap System**

Table 1, "BorateTrap Performance," shows the effect of placing a BorateTrap column in the eluent line when 1 mg/L borate, as  $\text{BO}_3$ , is in the water. Line 1 shows normal peak asymmetry for mannose when eluents do not contain borate. Line 2 shows the growing asymmetry values, most significant for mannose, when 1 mg/L borate has been in the system for 10 minutes. Line 3 shows this effect after 20 minutes. Lines 4 and 5 show the effect of placing a BorateTrap between the pump and injection valve, after 10 and 20 minutes respectively.

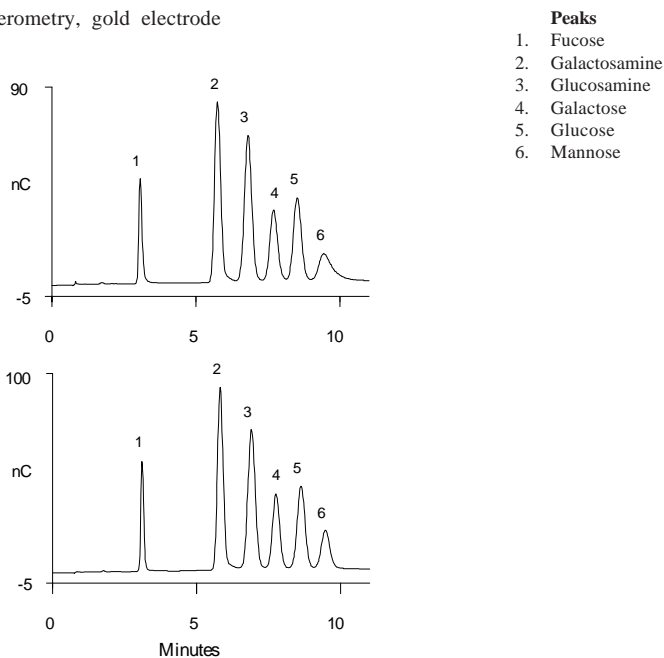
**Table 1**  
**BorateTrap Performance**

| Condition                        | Peak Asymmetry<br>Mannose |
|----------------------------------|---------------------------|
| 1. Initial, 18 m $\text{M}$ NaOH | 1.10                      |
| 2. 1 mg/L borate / 10 min.       | 1.39                      |
| 3. 1 mg/L borate / 20 min.       | 1.53                      |
| 4. BorateTrap installed 10 min.  | 1.32                      |
| 5. BorateTrap installed 20 min.  | 1.11                      |

## SECTION 2 - EXAMPLE APPLICATIONS

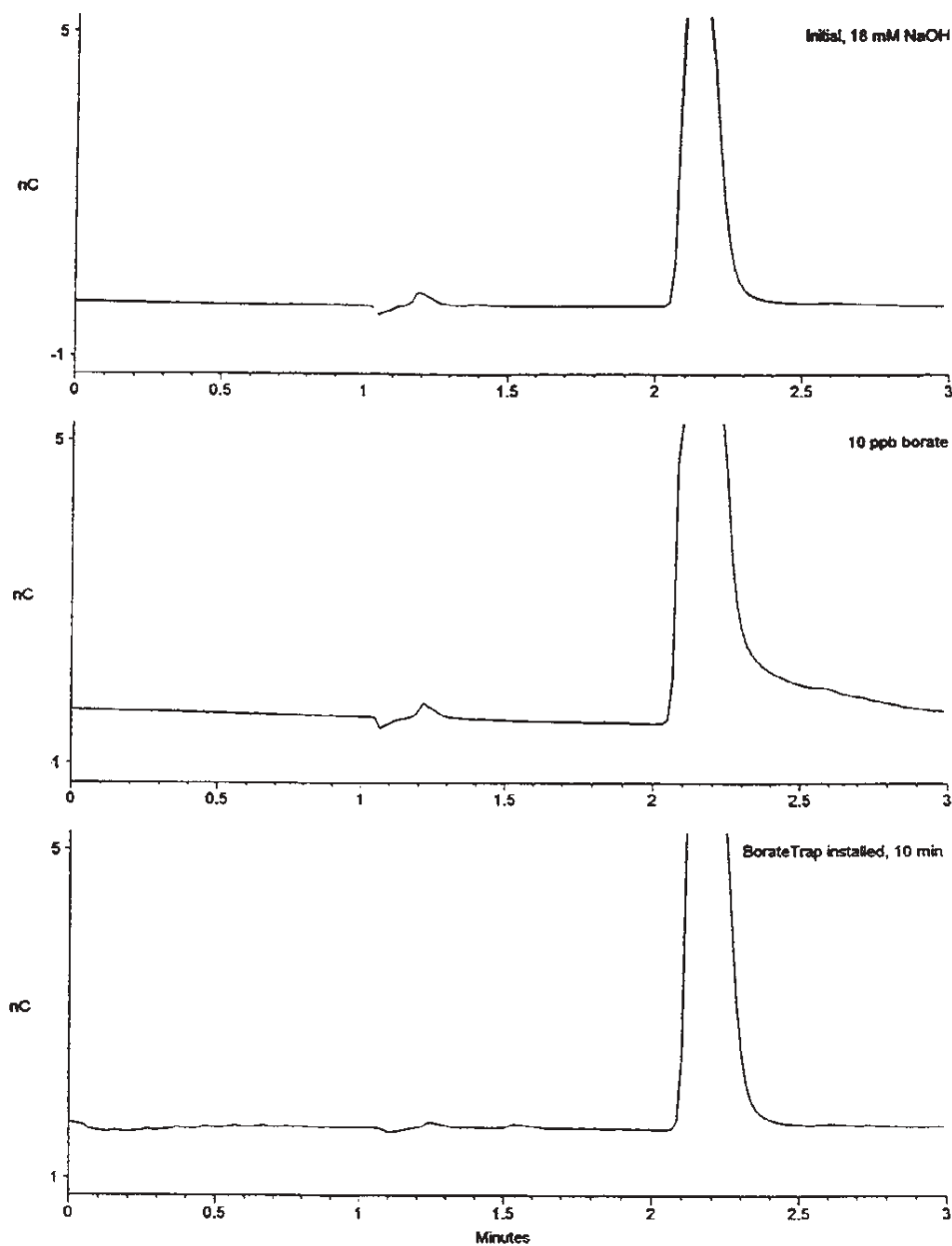
Borate can affect monosaccharide peak symmetry, even when present in the low part-per-billion concentration range. Borate is one of the first ions to break through a water deionization system. Its presence in the water that is used to make up eluents for carbohydrate analysis can cause a significant loss of peak efficiency, especially for mannose and reduced monosaccharides. The BorateTrap is used immediately before the injection valve and serves to remove borate from the eluent just before chromatography.

Column: CarboPac™ PA10  
Eluent: 18 mM NaOH, 10 ng/mL borate  
Flow Rate: 1.5 mL/min  
Detector: Pulsed amperometry, gold electrode



**Figure 2**  
Effect of Borate and the BorateTrap on Monosaccharide Peak Symmetry

Figure 3a shows the typical peak shape for dulcitol on a CarboPac MA1 column. In order to show the impact of borate in the eluent on the peak shape, 10  $\mu\text{g/L}$  borate was added to the eluents. Figure 3b shows the effect 10 minutes after the borate has been in the eluents. On installation of the borate trap between the pump and the injection valve, the peak shape of dulcitol improved dramatically. Figure 3c shows the significant improvement in peak asymmetry 10 min. after the BorateTrap was installed.



**Figure 3**  
**Effect of Borate Contamination in Eluent on Peak Asymmetry of Dulcitol**

The BorateTrap is a practical means to maintain optimum operation of your carbohydrate system. However, Dionex recommends that attention is paid to the operation and upkeep of your water system.

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## SECTION 3 - TROUBLESHOOTING GUIDE

The purpose of the Troubleshooting Guide is to help you solve operating problems that may arise while using the BorateTrap Column. For more information on problems that originate with the Ion Chromatograph, refer to the Troubleshooting Guide in the appropriate operator's manual. If you cannot solve the problem on your own, call the nearest DIONEX Office (see, "DIONEX Worldwide Offices").

### 3.1 High Back Pressure from a Contaminated Inlet Bed Support

**If the BorateTrap displays high back pressure, the bed support in the column inlet may be contaminated.** Follow the instructions below to change the bed support assembly using one of the two spare bed support assemblies included in the ship kit provided with the column.

- A. Disconnect the column from the system.**
- B. Carefully unscrew the inlet (top) column end fitting using two open-end wrenches.**
- C. Remove the old bed support.** Turn the end fitting over and tap it against a benchtop or other hard, flat surface to remove the bed support and seal assembly. If the bed support must be pried out of the end fitting, use a sharp pointed object such as a pair of tweezers, but be careful that you **do not scratch the walls of the end fitting**. Discard the old assembly.
- D. Place a new bed support assembly in the end fitting.** Use the end of the column to carefully start the bed support assembly into the end fitting.

| <b>Part</b>          | <b>P/N</b> |
|----------------------|------------|
| Bed Support Assembly | 042955     |
| End Fitting          | 052809     |

- E. Screw the end fitting back onto the column.** Tighten it fingertight and then using two open-end wrenches, tighten it an additional 1/4 turn (25 in x lb). Tighten further only if leaks are observed.

#### NOTE

If any of the column packing becomes lodged between the end of the column and the bed support washer assembly, no amount of tightening will seal the column. Make sure that the washer and the end of the column are clean before screwing the end fitting back onto the column.

- F. Reconnect the column to the system and resume operation.**
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