PRODUCT MANUAL

IonPac® TRACE METAL CONCENTRATOR (TMC-1) COLUMN

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PRODUCT MANUAL

for the

IONPAC® TRACE METAL CONCENTRATOR COLUMN (TMC-1)

(P/N 049000)

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SECTION 1 - INTRODUCTION

The Trace Metal Concentrator Column (TMC-1) is used in Chelation Ion Chromatography. This manual describes the operation of the TMC-1. The following DIONEX Technical Note describes an important application which requires the TMC-1.

Technical Note #	Description
25	**Determination of Transition Metals in Complex Matrices by Chelation Ion Chromatography™**

The TMC-1 contains a 17-µm, fully sulfonated, high capacity cation-exchange resin and has an ion-exchange capacity of 0.3 µeq/column. The TMC-1 has high affinity for alkaline-earth, transition and lanthanide metals. In normal operation, however, Group I and II sample cations are removed in the MetPac CC-1 concentrator column. The TMC-1 is specifically designed for interfacing the MetPac CC-1 Column (P/N 042156) with the IonPac CS5 Analytical Column (P/N 037028), or the IonPac CS5A Anilytical Column (P/N 046100 or 052516).

The operating back pressure of the TMC-1 should be less than 300 psi under normal operating conditions. Typically, the TMC-1 is used in conjunction with the Chelation IC System where the back pressure should not exceed 1,500 psi.

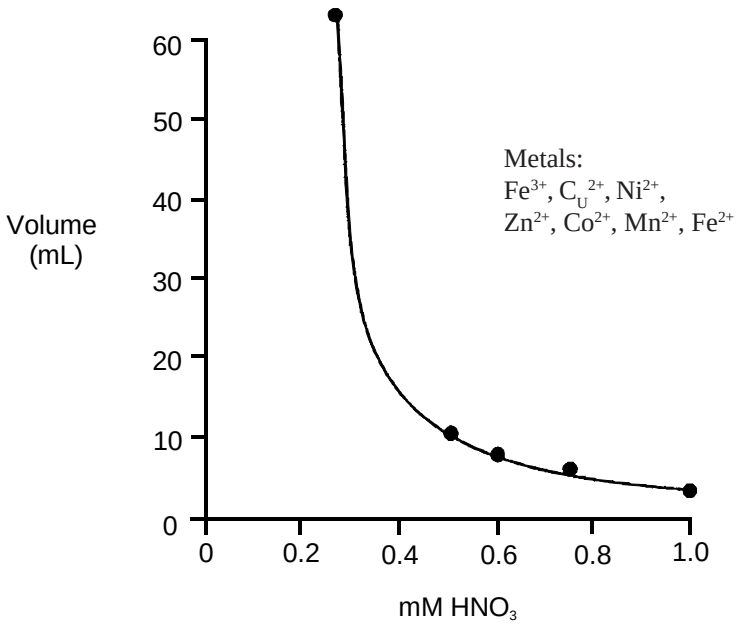

Figure 1

Retention Volume vs Concentration of HNO_3 for Transition Metals on TMC-1

SECTION 2 - OPERATION

2.1 Chemicals Required

The chemicals and water required to prepare the reagents and eluents should be of the highest purity available. Use deionized water with a specific resistance of 18.2 megohm-cm. Prepared reagents can be purchased from DIONEX. See Technical Note No. 25 for reagent ordering information and preparation procedures.

2.2 Solutions Required

Table 1
Chelation Concentration Reagents

	1 liter	6 Pack
2 M Nitric Acid	P/N 033442	P/N 033443
2 M Ammonium Acetate	P/N 033440	P/N 033441
0.1 M Ammonium Nitrate	P/N 033444	P/N 033445 (for CIC only)

2.3 Concentration Methods

The TMC-1 is used to interface the MetPac CC-1 with the IonPac CS5 or CS5A Analytical Column when performing Chelation IC (see Technical Note No. 25 for operation of the Chelation IC System).

Install the TMC-1 as indicated in Technical Note No. 25, Figure 3, “Schematic of Chelation IC System 1,” or Figure 4, “Schematic of Chelation IC System 2.”

The concentrated transition metals can be eluted from the TMC-1 using nitric acid. Use DIONEX 2.0 M Nitric Acid Chelation Concentration Reagent (P/N 033442 or 033443) for the most reliable results. The elution volumes of various transition metals, as a function of nitric acid concentration, is given in Figure 1, “Retention Volume vs. Concentration of HNO_3 for Transition Metals on TMC-1.” The TMC-1 is compatible with most acids and bases up to a concentration of 3.0 M.

Due to the relatively high capacity of the TMC-1, it should not be used in place of other cation concentrators such as the IonPac CG2 or CG3.

The recommended cleaning procedure is a 15 minute rinse with 0.02 M oxalic acid at 2.0 mL/min. This cleaning procedure effectively removes both ionic and colloidal metal contamination.

SECTION 3 - TROUBLESHOOTING GUIDE

The purpose of the Troubleshooting Guide is to help you solve operating problems that may arise while using the Trace Metal Concentrator Column (TMC-1). For more information on problems that originate with the Sample Concentration Module or 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 DIONEX Office nearest you (see, "DIONEX Worldwide Offices").

3.1 High Back Pressure from a Contaminated Inlet Bed Support

If the TMC-1 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.

Bed Support Assembly	P/N 042955
Seal Washer	P/N 042956
Bed Support	P/N 053889
End Fitting	P/N 042367

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/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.

3.2 High Background, or Noise

Normally, problems such as high background, noise or baseline instability will not be attributable to the TMC-1. These problems usually originate in either the analytical column or the post-column detection chemistry. Before checking the TMC-1 as the source of system background noise, consult the appropriate troubleshooting sections in the analytical column Product Manual, the Ion Chromatograph Operator's Manual and the detector manual.

If the source of the high background noise is isolated to the TMC-1, then proceed with the following steps:

a) Make sure that the eluents and regenerant are correctly formulated.

b) Make sure that the eluents are made from chemicals with the recommended purity (see Section 2, "Operation").

c) Make sure that deionized water used to prepare the reagents has a specific resistance of 18.2 megohm-cm.

3.3 Poor Peak Shape

In some instances, poor peak shape in Chelation IC may be caused by a contaminated TMC-1. To clean the TMC-1, wash with 2.0 M HNO_3 for 10 minutes at 3.0 mL/min. Following the HNO_3 wash, rinse the column with deionized water for 3 min at 3.0 mL/min. Replace the cleaned column in the Chelation IC System and run through the Chelation IC program once before doing an analytical run.

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