

GC/MS

## Apex ProSep™ Pre-column Separation Inlet (PSI)

## Innovations In Gas Chromatography

#### Introduction

The Apex ProSep<sup>™</sup> family of products is a result of a cooperative effort between Hewlett-Packard, the market leader in GC/MS, and Apex Technologies, Inc., to develop the latest in sample inlet technologies.

Designed specifically for the HP 5890 Series I & II and the HP 6890 GCs and the HP 5973 MSD family of systems, the ProSep<sup>™</sup> 800, ProSep<sup>™</sup> 800 Plus, and the ProSep<sup>™</sup> 800 XT Pre-column Separation Inlets [PSI] partition analytes of interest from solvent and matrix before chromatographic bands reach the head of the analytical capillary column. This dramatically enhances sensitivity and selectivity while reducing the problems associated with solvent and matrix effects. The ProSep<sup>™</sup> technology is unique because it rapidly separates compounds prior to their introduction onto the capillary column. For applications requiring the analysis of complex sample matrices—*environmental, petrochemical, bio-pharmaceutical, forensic or food/flavor/fragrance*—the Apex technology greatly reduces the sample preparation time and increases overall system sensitivity and selectivity. Customers have experienced up to a 5-fold reduction in sample preparation time and cost of analysis and up to a 50-fold increase in sensitivity.



Figure 1. HP 5973 MSD GC/MS System with the Apex ProSep<sup>™</sup> 800 XT Plus

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#### How It Works

The ProSep<sup>™</sup> theory of operation is quite simple and follows the familiar purge on/purge off functions of a split/splitless injection.

The diagram depicts the sequence of events following injection. See Figure 2. A solvent front is formed within the pre-column while the GC is in split mode (Step 1). The solvent front passes over the head of the GC capillary column and is vented through the split vent (Step 2). This solvent elimination step is completed in 5 to 20 seconds depending on the solvent type and ALS injection volume. As the analytes migrate toward the capillary column, the pre-separation column temperature is ramped and the GC is set to splitless mode (Step 3). The GC remains in the splitless mode for 2 to 3 minutes in order to transfer the complete range of analytes injected. After a splitless analyte transfer, the pre-separation column temperature is ramped to bake out the system (Step 4). Additional purge gas is added to the pre-separation column to flush and dilute heavy matrix artifacts during bake out.

# Installation and Use is Easy and Cost Effective

The ProSep<sup>TM</sup> 800 Series Preseparation Column Module (PCM) installs in minutes, replacing the standard split/splitless injection port. Now your standard HP 7673 or 7683 ALS can inject from 1 to 125  $\mu$ l in a single injection. See Figure 3.





![](_page_1_Picture_8.jpeg)

Figure 3. ProSep<sup>™</sup> 800 XT Pre-separation Column Module (PCM)

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All of the familiar HP GC consumables and fittings are used in the operation of the ProSep<sup>TM</sup>. The Pre-column Separation Inlet (PSI) replaces the standard injection port and now becomes a sample preparation device saving valuable time and money. See Figure 4.

### How Can Apex help?

Apex has an extensive library of GC and GC/MS ProSep<sup>™</sup> applications that have been developed by our clients in real world applications. For the latest in application development and support, contact:

Apex Technologies, Inc. 1095 Nimitzview Dr. Suite 100 Cincinnati, OH 45230 Phone: 513/233-APEX (2739) Fax: 513/233-0902

Or . . . contact us on the Internet: E-mail: solutions@Apex-TechNet.com

Web: www.Apex-TechNet.com

![](_page_2_Figure_7.jpeg)

Figure 4. Diagram of capillary column installation into PCM

![](_page_2_Picture_9.jpeg)

Figure 5. Innovations in gas chromatography

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![](_page_3_Figure_1.jpeg)

![](_page_4_Picture_0.jpeg)

![](_page_4_Picture_1.jpeg)

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