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GC Know-How Now

A quarterly e-newsletter only from PerkinElmer

Summer 2007

Welcome to the Summer 2007 edition of GC Know-How Now!

This quarterly e-newsletter from PerkinElmer was created to help you get the most from your gas chromatography system. Scroll down to see more information! We hope you will find this a useful tool.

In this issue:

This issue's featured article

The Application of Novel GC Oven Technology to Improve Productivity in Routine Environmental Methods

Semivolatile organic analysis (SVOA) by GC/MS, volatile organic analysis (VOA) by GC/MS, and diesel range organic (DRO) analysis by GC-FID are three of the most common gas chromatography (GC) methods performed in most environmental laboratories. As laboratories push to increase profits and better meet customer needs, each step in the sample-analysis process must be optimized; one key aspect of this optimization is instrumental throughput.

Author: **William Goodman**
PerkinElmer, Inc.

Introduction

The application briefs cited at the end of this article demonstrate the benefits of the new PerkinElmer® Clarus® 600 GC and GC/MS and TurboMatrix™ Headspace Trap (the latter in the case of Method 8260) and will help guide laboratories towards maximizing instrument efficiency and throughput for SVOA, VOA, and DRO analysis.

Technologies Employed

The optimization of instrumental throughput relies on the following technologies:

- **Short narrow-bore column**: A smaller capillary column i.d. achieves adequate resolution with a reduced length, resulting in shorter chromatographic run times.
- **Fast oven heat-up**: The Clarus 600 GC's novel oven design and high-power oven heater enable the use of oven programs with temperature ramp rates up to 155 °C/min.
- **Fast oven cool-down**: Optimized oven design allows fast cool-down to near-ambient temperatures, further reducing the injection-to-injection time.
- **Near-ambient chromatography**: While not directly increasing throughput, the ability to reach 30 °C in a short time improves peak shape for the highly volatile components.

Announcements

NEW Online Seminars: Training and Advances in GC & GC/MS Applications

NEW GC Online Resource

GC Know-How Now Archives

What's new in GC Consumables

NEW Headspace Screw Top Vials

Environmental VOA Consumables Kit

Upcoming Trade Shows

Puerto Rico Chemistry Conference (PR Chem) 2007
August 7-10, 2007
San Juan, PR - USA

National Environmental Monitoring Conference (NEMC) 2007
August 20-24, 2007
Cambridge, MA - USA

The International Association of Forensic Toxicologists (TIAFT) 2007
August 26-30, 2007
Seattle, WA - USA

Japan Analytical Instruments Manufacturers' Association (JAIMA) 2007
August 29-31, 2007
Makuhari Messe - Japan

Analitica Latin America
Sept 26-28, 2007
São Paulo, SP - Brazil

American Society of Crime Lab Directors (ASCLD) 2007
October 1-4, 2007
Orlando, FL - USA

- **Autosampler pre-rinse**: In methods requiring liquid injection, the Clarus 600 autosampler will begin its rinsing program during the previous GC run. Once the GC is ready, the autosampler will perform a limited number of rinse steps before collecting the final aliquot, saving valuable time between runs.
- **Overlapping thermostatting**: The TurboMatrix Headspace Trap used for Method 8260 is equipped with a 12-position vial oven which reproducibly thermostats the next sample to be injected during the previous sample's acquisition. As soon as the GC becomes ready, the next sample will inject.

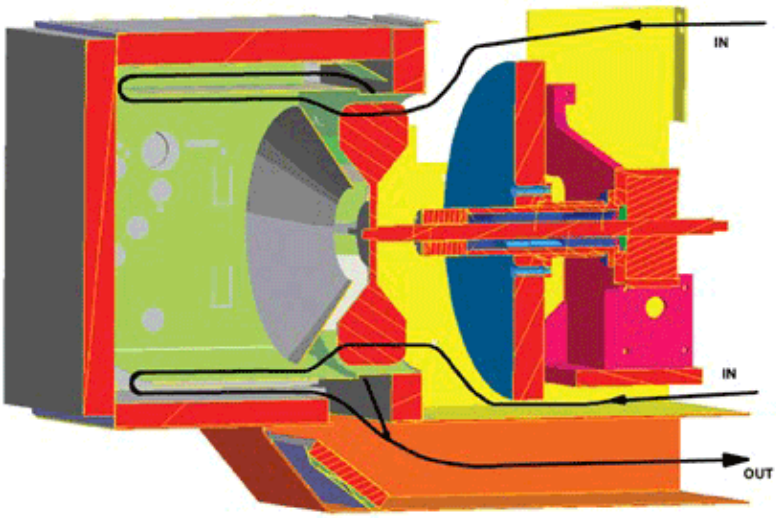

Figure 1. Unique airflow paths in Clarus 600 GC oven allow the fastest combined heat-up and cool-down rates.

Discussion

The efficiency of the GC/MS system in SVOA (U.S. EPA Method 8270) and VOA (U.S. EPA Method 8260) analysis is limited by the 12-hour QA/QC "clock". These methods require that both the tune and calibration criteria are verified every 12 hours. Following verification, you have the 12 hours into which you can fit as many sample analyses as possible. The goal of the procedures described in these application briefs was to minimize the injection-to-injection time to approximately 20 minutes, allowing for approximately 35 injections in a 12-hour period.

DRO analyses (U.S. EPA Method 8015) often fall under state-specific modified methods, such as Massachusetts EPH, Connecticut ETPH, and Florida TRPH. Each of these methods measures the total area of semivolatile hydrocarbons in the diesel volatility range. In the analysis of Method 8015, two injection-to-injection times were achieved as a result of varying hydrocarbon ranges dictated by state-specific methods. Across the range of C_{10}–C_{28} (the minimum range), the injection-to-injection time was approximately 11 minutes, and across the range of C_{10}–C_{44} (maximum range) the injection-to-injection time was approximately 17 minutes. The throughput increases in this study were attributed to a narrow-bore column (0.10 mm i.d.), fast oven heat-up (up to 155 °C/min), autosampler pre-rinse and fast oven cool-down.

14th National Analytical Chemistry Meeting
October 7-11, 2007
João Pessoa, PB - Brazil

Society of Forensic Toxicologists (SOFT) 2007
October 15-19, 2007
Raleigh, NC - USA

Gulf Coast Conference 2007
October 16-17, 2007
Galveston, TX - USA

Beijing Conference and Exhibition on Instrumental Analysis (BCEIA) 2007
October 18-21, 2007
Bejjing - China

Upcoming GC Training Sessions

To search for GC and GC/MS courses, click here.

Additional Application Information

GC applications library

GC/MS applications library

NEW Online Seminars: Training and Advances in GC & GC/MS Applications

The following **application briefs** demonstrate the application of the novel technology included in the Clarus 600 GC and GC/MS as well as TurboMatrix Headspace Trap to SVOA, VOA, and DRO analysis, maximizing instrument efficiency and throughput.

- Applying Novel GC Oven Technology to Increase Throughput in Analysis of Diesel Range Organics – Method 8015
- Increasing Sample Throughput in Method 8260 Using the Novel Oven Design of the Clarus 600 GC/MS
- Rapid Analysis of Semivolatile Organic Compounds by Method 8270D using the Clarus GC/MS

Download any of these application briefs and sign up for the next issue of GC Know-How Now.

The following **online seminars** are also available for your viewing:

- Solutions to Improve Throughput Using Standard Environmental GC/MS Methods
- Increased Throughput in the Analysis of Diesel Range Organics Using Novel GC Oven Technology

To view the webcast of your choice, please click on the respective link.

For previous issues of GC Know-How Now or to sign up for future releases, click here.

Visit our new GC online resource at www.perkinelmer.com/GC for more information about our comprehensive gas chromatography offering.

PerkinElmer—the clear choice in gas chromatography

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PerkinElmer, Inc.
940 Winter Street
Waltham, MA 02451 USA
Phone: (800) 762-4000 or
(+1) 203-925-4602
www.perkinelmer.com

For a complete listing of our global offices, visit www.perkinelmer.com/lasoffices

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