



Gas Chromatography

**Stay ahead**  
with measurably more production

TRACE 1600 Series Gas Chromatograph  
AI/AS 1610 Liquid Autosampler

thermo scientific

# Maximize uptime with a GC always ready to run

If your gas chromatograph is only running part time, you're missing the benefits of a system that delivers measurably more production time. That's the advantage of the time- and space-saving Thermo Scientific™ TRACE™ 1600 Series Gas Chromatograph (GC). With a proprietary modular design and plug-and-play injectors and detectors, you have full flexibility to perform maintenance offline and explore a multitude of configurations on the same GC system to make the most of every production hour. When combined with the Thermo Scientific™ AI/AS 1610 Liquid Autosampler, the system provides reliable automated sample injection to stay ahead of any sample-throughput demand.

## Minimize unexpected downtime

Automated consumables tracking with alert notifications minimize unexpected downtime and waste due to unnecessary replacement. Instrument health is easily monitored via the touchscreen and health status icon which is on continuous display.

## Perform time-consuming maintenance offline

Due to the tubing-free design of the injector modules, routine maintenance, such as septum or liner replacement, can be performed on the instrument easily and rapidly, avoiding downtime. If more extensive maintenance is needed, unique Thermo Scientific™ Instant Connect (iConnect™) injector and detector modules can be kept as easily interchangeable spares, allowing analyses to continue. Modules store their calibration information, ensuring consistent, repeatable results with no need for instrument re-qualification. If you need a spare, or to add additional capability, the modules are easily purchased online\* with one-day delivery. Self-installable components and simple replacement procedures ensure troubleshooting and maintenance tasks can be quickly and easily performed by laboratory staff, reducing the need to wait for service.

\*Modules available for online delivery include SSL, PTV, FID and TCD.

## Boost laboratory efficiency

Versatile modular configurability of the TRACE Series Gas Chromatograph minimizes idle time, maximizing the productive use of your laboratory's GC systems. The suite of iConnect injectors and detectors can be readily shared among multiple GC systems in numerous configurations to quickly adapt your GC to new applications or samples so it's always ready to run without incurring additional installation costs.

## Save time with robust unattended operation

The slide-in self-aligning AI/AS 1610 Liquid Autosampler provides reliable unattended sample analysis, saving valuable time and increasing productivity, while improving data quality with high-precision injections. With simultaneous injection into two channels, the dual-tower Gemini configuration can run up to 310 samples in half the time.

**Always ready to go**, the TRACE 1600 Series GC substantially reduces non-productive time due to simplified troubleshooting procedures, off-line maintenance capabilities and a flexible configuration to quickly respond to different analytical priorities.

Full range of self-installable injector and detector modules to minimize GC downtime



High-resolution touchscreen to support daily operations with video instructions that walk through common procedures



Instrument health icon is always visible on the GC touchscreen to alert users to maintenance needs



Simplify and speed up column installation with quick, easy, and safe tool-free column connector and the ability to work comfortably in an illuminated oven



Easily add robust, unattended sample analysis to increase sample throughput, enabling simultaneous injections into two channels with the Gemini configuration



# Fast track to profitability

Reducing costs provides a way to exceed profitability targets and stay competitive. With the TRACE 1600 Series Gas Chromatograph, you save in many ways: on power, gas, bench space, and on instrument hardware and consumables.

GC and GC-MS operating conditions*	Estimated cylinder lifetime	
	Conventional operation	With the iConnect Helium Saver module
<b>Around-the-clock analyses</b> 24 hours, 7 days a week, 365 days a year	<b>5.6 months</b>	<b>2 years</b>
<b>Daily operations</b> Leaving the GC idle at the end of workdays and on weekends	<b>1.8 years</b>	<b>7 years</b>

\*Conditions: Operating a Thermo Scientific TRACE 1600 Series Gas Chromatograph with helium at 1 mL/min carrier, 60:1 split ratio and using a typical helium cylinder of 48 L volume at 2250 psig.

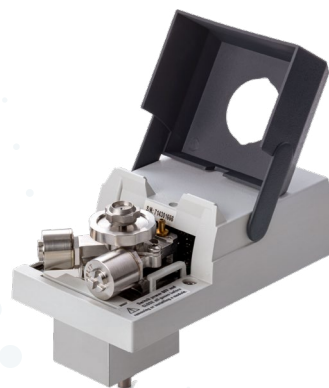
## Reduce helium consumption during run without changing methods

Available as a user-installable upgrade kit for the iConnect SSL injector, Thermo Scientific™ HeSaver-H<sub>2</sub>Safer™ technology dramatically reduces helium consumption during instrument operation and idle time, without the need to change validated analytical methods.

This patented technology feeds helium only to the analytical column, limiting its use to the carrier flow during sample analysis. Lower in cost, nitrogen is used for head column pressurization, septum purge, split, and sample transfer. Even with continuous operation, laboratories can extend helium cylinder life by years, reducing concern about helium shortage and supply delays.

The HeSaver-H<sub>2</sub>Safer can be used in combination with the SSL Gas Saver mode, to automatically reduce the split flow after split injection and combine consumption saving for the pressuring gas as well.

When hydrogen is used as carrier gas, HeSaver-H<sub>2</sub>Safer technology limits the flow rate to a few mL/min, eliminating hydrogen safety concerns and the additional cost of hydrogen sensor installation.



Standard SSL injectors can be quickly adapted by user to work in the HeSaver-H<sub>2</sub>Safer mode.

### Save power costs and go green

The proprietary reduced-thermal-mass oven consumes less power while offering the industry's fastest startup. From a power-off state, the heated zones can reach their set points in just a few minutes, reducing non-productive wait time and costly power use. Additionally, the reduced size and weight make the instrument easier and less costly to move, reducing the environmental impact.

### Eliminate consumables waste

Only replace consumables when needed. Instrument health monitoring and automated consumables tracking make it possible to optimize consumables use, avoiding unnecessary and costly replacement.

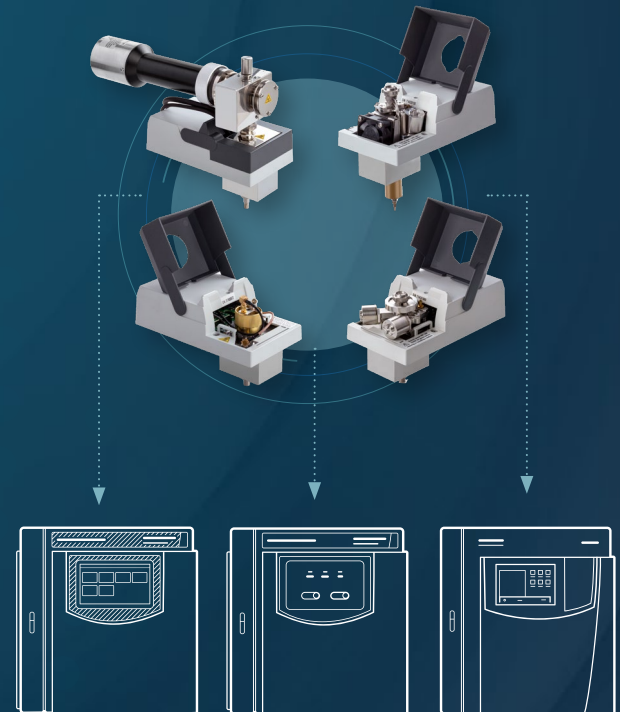
### Conserve bench space

The TRACE 1600 Series Gas Chromatograph provides a full-size oven in a small footprint saving valuable bench space with its reduced size and weight. Additionally, with the possibility of numerous configurations and sharable injector and detector modules, you may not need as many GC instruments, freeing up space for other uses.

Even with an easy-to-access full-size oven, the instrument uses 20% less bench space than other conventional benchtop GC systems.

### Get more from GC investments

GC modularity fundamentally transforms the way laboratories manage analytical technology, unlocking new saving opportunities while addressing technical and business needs. The full range of iConnect injectors and detectors for the TRACE 1600 Series Gas Chromatograph enables you to quickly address multiple applications using the same instrument. Because the modules can be shared among all TRACE GC systems in numerous configurations, you don't need to keep backup systems, just spare modules.



iConnect injectors and detectors permit you to share modules with the TRACE 1300 and 1600 Series Gas Chromatographs, increasing return on investment by maximizing instrument productive time.



# Perform everyday tasks with extraordinary ease

Training new staff to use the instrument efficiently and obtain trusted results shouldn't slow down the laboratory activity. The TRACE 1600 Series Gas Chromatograph and AI/AS 1610 Liquid Autosampler feature exceptional usability, streamlining adoption and operations for a completely new user experience.



## Match instrument control to need

If you don't need or want local instrument control access, take advantage of the TRACE 1600 Gas Chromatograph's simplified single-button start/stop user interface. It's ideal for local or remote control using Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) software and when only essential instrument interaction is preferred to safeguard methods.



The TRACE 1600 Gas Chromatograph includes a single-button start/stop interface for essential user interaction with the instrument.

## Simplify work with an intuitive, multi-function touchscreen

Real-time signal, diagnostics, and run log are easy to view. Video tutorials, and interactive graphics for common tasks can be displayed to speed learning and support users' daily work.



The large and intuitive touchscreen provides instrument control, method development, status information, instrument health monitoring, and interactive graphics and video tutorials.

The Integrated Electronic Gas Control (IEC) integrates gas manifolds, connections, restrictions, valves with the electronics for temperature and gas control in each module, eliminating tubes and cables for easy access and replacement.

Color-coded status indicator provides at-a-glance autosampler status information that is easy to see, even from a distance.

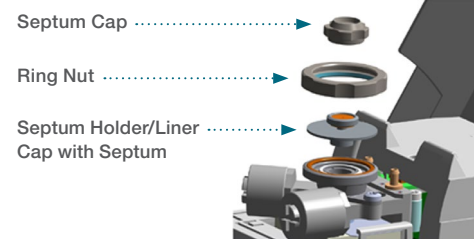
Illuminated syringe compartment featuring a magnifying window facilitates syringe viewing and replacement.

Easy and safe operations due to the self-alignment, single-cable connection and “best injection selection” setting for automatic optimization of the injection mode through injector type recognition.

## Streamline daily procedures

Tool-free column installation, self-installable iConnect injectors and detectors, and slide-in self-aligning liquid autosampler, simplify everyday operation, reducing the need for service or expert operators. iConnect modules can be replaced in just two minutes, which is the time required for the removal of three screws.

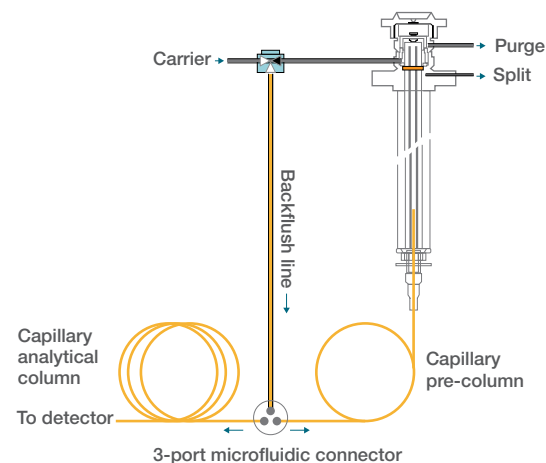
Each module is identified by a serial number for easy tracking and can be qualified as a separate item, allowing it to be changed on the instrument while maintaining compliance with quality protocols. Because the modules store their calibration information, analytical results remain consistent and recalibration is not required after replacement.



iConnect SSL and PTV injectors feature a tubing-free design for easy and immediate access to the septum, liner and injector body, ensuring simple and quick maintenance procedures.



Thermo Scientific™ iConnect™ Column Lock enables rapid, tool- and leak-free column installation, without risk of over tightening.



iConnect SSL and PTV injectors are available with integrated backflush, for pre-, mid- and post-column self-adjusted flow reversal, to prevent system contamination and shorten run cycle time. No auxiliary gas is required, making method setup easier.

# Expand automated throughput for liquid, gas, and solid samples

Laboratories with large sample loads require reliable and robust automated workflows to deliver results on time. The TRACE 1600 Series Gas Chromatograph is compatible with the portfolio of Thermo Scientific sample handling devices—as well as autosamplers from other manufacturers—for scalable levels of throughput. Whether you analyze liquid, gas, or solid samples, you can increase sample throughput with the robustness and precision required by the most demanding applications.

## Enhance sample handling with scalable liquid injection

The AI/AS 1610 Liquid Autosampler offers a fit-for-purpose solution for robust, easy-to-use unattended sample analysis, saving valuable time while improving data quality with high-precision injections. Highly effective syringe washing using up to four solvent types ensures reliable performance. The AI/AS 1610 Autosampler also offers enhanced functionalities and custom settings to cope with large volume injection and demanding viscous or polar samples.

Scalable, the AI/AS 1610 Autosampler features 8- or 155-vial capacity and single- or Gemini dual-tower configurations. With simplified setup and control via Chromeleon CDS software, the dual-tower option allows simultaneous injection into two channels, making it possible to run up to 310 samples in half of time. Additionally, overlapping operation during the GC cooling step minimizes run cycle time, boosting sample throughput.

## Or choose flexibility

The Thermo Scientific™ TriPlus™ 100 LS Liquid Autosampler is compatible with a variety of vial volumes and well plates, for maximum sample capacity and vial-type flexibility. Based on a renowned XYZ robotic platform, the TriPlus 100 LS Autosampler is designed to increase liquid sample handling automation and throughput in laboratories dedicated to high-volume analytical testing of liquid samples.

## Headspace injection

For analyses of volatile compounds in non-volatile matrices, the Thermo Scientific™ TriPlus™ 500 Headspace (HS) Autosampler offers reliable and robust unattended operation in 12-, 120-, and 240-vial configurations. Valve-and-loop technology and direct column connection ensure the highest level of performance to facilitate compliance in regulated environments. It is compatible and can be mounted with the AI/AS 1610 Liquid Autosampler for an all-in-one configuration.

## All-in-one robotic autosampler

The Thermo Scientific™ TriPlus™ RSH SMART Autosampler offers the highest level of automation with the largest sample capacity, combined liquid, headspace, solid-phase micro-extraction (SPME) and ITEX-DHS injection capability, and unattended sample preparation workflows. Automation is enhanced by the innovative SMART technology that tracks a consumable's ID and usage parameters through a chip embedded in SMART syringes and SPME/SPME Arrow fibers. Key information is stored in Chromeleon CDS records supporting GLP compliance and is used to trigger consumable health notifications to maintain system uptime and high-quality, reliable data.



## Automation, sample throughput

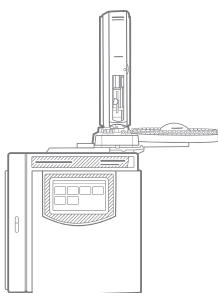


TriPlus 500 Headspace Autosampler  
12-vial configuration

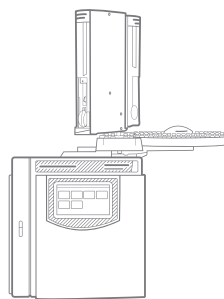


TriPlus 500 Headspace Autosampler  
120- and 240-vial configuration

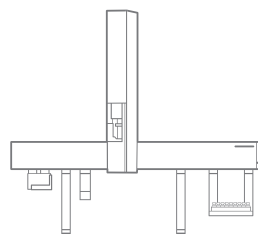
### Headspace injection



AI/AS 1610 Liquid Autosampler

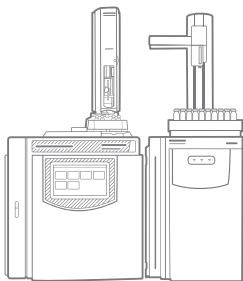


AI/AS 1610 Gemini  
(Dual-tower) configuration

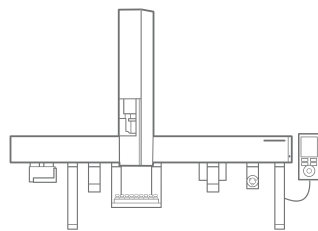


TriPlus 100 LS Liquid Autosampler

### Liquid injection



TriPlus 500 Headspace Autosampler  
and AI/AS 1610 Liquid Autosampler



TriPlus RSH SMART Autosampler

### All-in-one

### Use third-party devices from your CDS

For more analytical versatility, the TRACE 1600 Series Gas Chromatograph is compatible with the most advanced Markes International thermal desorption (TD) and Teledyne Tekmar purge-and-trap (P&T) solutions. Control of these third-party devices is fully integrated into Chromeleon CDS, providing enhanced usability, traceability, and ease of compliance.

TD is a pre-concentration technique for the GC analysis of volatile and semi-volatile organic compounds (VOCs) in solid, liquid, or gas samples. The technique provides a safe and environmentally-friendly option to solvent extraction, complies with standard methods and is easily automated and validated. P&T devices concentrate and prepare soil and water samples for GC-based environmental testing of VOCs.

**Markes International TD** platforms offer solutions for sampling from sorbent tubes, online samples, canisters, and bags.

The **Tekmar P&T** allows precise and automated preparation of water and soil samples, offering full compliance with EPA methods.

Additional **third-party sampling devices**, such as pyrolyzers or volatiles enrichment solutions, can be combined with the TRACE 1600 Series Gas Chromatograph.\*

*\*Consult a local representative to confirm compatibility*

# Access superior GC productivity for hyphenated methods

The TRACE 1600 Series Gas Chromatograph offers extended uptime, cost savings, and ease of use that augments the power of the comprehensive portfolio of Thermo Scientific systems for hyphenated methods.



## Thermo Scientific™ ISQ™ 7610 single quadrupole GC-MS system

Extended uptime and robustness maximize sample throughput for targeted and untargeted screening, confirmation and quantitation using library-searchable full-scan mass spectra or selected ion monitoring (SIM).



## Thermo Scientific™ TSQ™ 9610 triple quadrupole GC-MS/MS system

Highest selectivity and sensitivity with high-speed, high-capacity MS/MS selected reaction monitoring (SRM) for quantitation of target compounds in complex matrices.



### Thermo Scientific™ Orbitrap Exploris™ GC mass spectrometers

For unknown compound identification or analysis of difficult matrices, Thermo Scientific™ Orbitrap™ technology provides high-resolution accurate-mass (HRAM) data with sub-ppm mass accuracy. Acquire full-scan data for targeted and untargeted screening, confirmation, unknown identification, quantitation, and retrospective analysis.



### Thermo Scientific™ GCI Series Interface for GC-ICP-MS

Seamlessly integrates GC and inductively-coupled plasma mass spectrometry (ICP-MS) systems as an easy-to-use solution for advanced speciation studies of volatile compounds.

# The right choice for any workflow

Applicable to many different analytical sectors and suitable for many different applications—from essential analytical testing and QA/QC assessment to research—gas chromatography offers the highest separating power and peak capacity to resolve complex mixtures. Configurable with Chromeleon CDS-controlled front-end solutions, including highly-sensitive quadrupoles and high-resolution mass spectrometers, the TRACE 1600 Series Gas Chromatograph offers a powerful tool for the simplest and most challenging analytical workflows.





## Pharmaceuticals

### Accelerate the pharmaceutical pipeline

GC- and GC-MS-based analyses of volatile impurities in active pharmaceutical ingredients (API), excipients, finished drug products, and raw-material testing are necessary for QA/QC and process improvements. Coupled with HRAM Orbitrap mass spectrometers, the TRACE 1600 Series Gas Chromatograph is an ideal solution for the analysis of untargeted contaminants and extractables and leachables (E&L). Chromeleon CDS software completes the solution, meeting pharmaceutical industry requirements for compliance and enterprise-level scalability.



## Oil and gas

### Meet oil and gas GC and GC-MS testing requirements

Testing is essential for high-quality oil and gas production and distribution during upstream, midstream, and downstream processes. Due to difficult matrices, the range of contaminants, and sensitivity requirements, these analyses are especially challenging. The TRACE 1600 Series Gas Chromatograph coupled with the Thermo Scientific™ TRACE™ 1610 Auxiliary Oven is the basis for highly-configurable GC analyzers that feature up to four GC detectors, optional methanizer, and multi-valve, multi-column configurations for oil and gas testing. Chromeleon CDS software provides full control of TRACE GC analyzers and enterprise solutions with LIMS connectivity.



## Food and beverage

### Ensure food safety and quality

The TRACE 1600 Series Gas Chromatograph can be combined with a wide range of mass spectrometers to provide the highest sensitivity and selectivity for food and beverage testing. A comprehensive suite of inlet systems, and integrated backflush that prevents column and mass spectrometer contamination, make the system well suited for analysis of food matrices. The TRACE 1600 Series Gas Chromatograph also integrates with the robotic TriPlus RSH SMART Autosampler for liquid, headspace, SPME and ITEX-DHS sampling techniques in an automated all-in-one workflow.



## Environmental

### Preserve a clean and safe environment

Air, water, and soil testing for volatile (VOC) and semivolatile (SVOC) organic contaminants preserves our environment. When coupled with a liquid autosampler or sampling solutions like P&T, TD, and pyrolysis, the TRACE 1600 Series Gas Chromatograph delivers improved robustness and uptime for increased sample throughput. Chromeleon CDS software streamlines workflows from sample to reports with full control of the system.



## Forensics / Toxicology

### Get defensible forensics and toxicology results

The TRACE 1600 Series Gas Chromatograph produces reliable and defensible analytical results for utmost confidence. When combined with the TriPlus 500 HS Autosampler, sample integrity and data quality is ensured with highly precise and accurate injections for volatile compounds in biological fluids, along with fast cycle time to help laboratories meet throughput demands. Chromeleon CDS software includes crucial data security and traceability features for full regulatory compliance and adherence to data-quality guidelines.

# Streamline workflows from sample to knowledge

Pressure to increase productivity and stay ahead of regulations challenge laboratories at every level, from the technician to management and IT. Chromeleon CDS offers ease of use, the required compliance tools, comprehensive instrument control, automation, data processing, and reporting in a scalable enterprise-wide solution designed to simplify workflows and deliver superior insights. In addition to the TRACE 1600 Series Gas Chromatograph, Chromeleon software can control more than 350 modules from Thermo Fisher Scientific, as well as from other vendors, and supports quantitative MS methods.

## Built for laboratories

**Single, intuitive software platform:** Easily move staff across projects and instruments by deploying one intuitive, familiar software platform across your entire laboratory.

**Increase productivity:** Achieve *right first-time* analyses using the built-in intelligent tool. Reduce time spent on data processing with dynamic updating.

**Simplified workflows, fewer tasks:** Thermo Scientific™ Chromeleon™ CDS eWorkflows™ procedures automatically set up your sequence complete with all the files and information needed to run, process and report, including external documents like SOPs, to quickly get from sample to results. Intelligent in-run and in-sequence automation ensures that QC checks are passed before acquisition continues.

**Audit trail:** All data-processing actions are recorded in audit trails to enhance compliance in accordance with GLP.

## Built for IT

**Security:** Manage users, global policies, and licenses from anywhere. Secure admin audit trails track all actions, even Microsoft® Windows® updates.

**Resilience:** Network failure protection safeguards data and local caching of licenses allows users to continue to work and access data generated by new sequences.

**Remote system maintenance:** Perform remote installation and updates.

## Built for business

**Scalable:** Single platform that scales from workstation to global network, including remote access, to grow with your business.

**Connected:** Easily interface with LIMS and other relevant business software for informed decision making.

**Cost-effective:** Single software to learn and maintain with concurrent user licenses to minimize cost.

**Proven:** Large satisfied customer base provides assurance in your investment.

## Chromeleon CDS software

Chromatography data acquisition and management



Instrument control and monitoring

Data acquisition

Data processing and review

Reporting

## AppsLab Library of analytical applications:

### Find methods, eWorkflows, and more

The Thermo Scientific™ AppsLab Library is a searchable online repository of applications with detailed methods, chromatograms, and related compound information. Download one-click eWorkflows, created and tested by our application scientists, to directly deploy your sequence. The library includes applications for LC, IC, GC, GC-MS, LC-MS, ICP-MS, ICP-OES, and DIA instruments.



Find a methods



Download 1-click-workflow



Run, process, report

# Everything you need at your fingertips

Easy, reliable and innovative, application-focused GC columns and consumables

Whether you are performing analysis in pharmaceutical, forensics/toxicology, environmental, food, petrochemical or general analytical industries, we offer a wide range of vials, septa, liners, capillary columns, and accessories designed to complement your GC and GC-MS systems and autosamplers in application-focused solutions.

Because time is valuable, the consumables you need for everyday workflows are available for easy online ordering and reordering, with pricing and stocking information, fast shipping, and status tracking.

- Low-bleed, high reproducibility Thermo Scientific™ TraceGOLD™ columns
- Consumables tested and certified on the TRACE 1600 Series Gas Chromatograph
- Syringes, vials and closures guaranteed for use with Thermo Scientific autosamplers
- Thermo Scientific™ GFM Pro Gas Flowmeter and Thermo Scientific™ GLD Pro Gas Leak Detector for system installation and maintenance
- Derivatization reagents and derivatization-grade solvents

Order at [thermofisher.com/chromatographyconsumables](https://thermofisher.com/chromatographyconsumables)

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Vials and closures

Syringes

Septa

Liners

Columns

Ferrules



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SCIENTIFIC