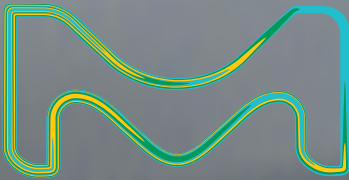


**MILLIPORE
SIGMA**

Gas chromatography Tools for your workflow



The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the U.S. and Canada.

Supelco®
Analytical Products

Discover our complete range of solutions for your entire gas chromatography workflow.

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Comprehensive solutions to support the evolution of GC Technology

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Gas Chromatography Workflow Tools

We provide a comprehensive range of high quality tools for each step of the GC workflow ensuring accuracy, precision and consistency of your analysis.

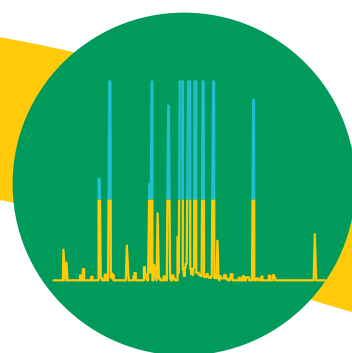
PROFICIENCY TESTING



SAMPLE PREPARATION AND COLLECTION



GC ANALYSIS



DETECTION AND CALIBRATION



Proficiency Testing

- Supelco® Proficiency Testing solutions represent over 20 years of experience and expertise in providing PT studies worldwide.
- Our PT samples are manufactured to CRM grade. More than 20,000 PT samples a year are sent to over 2,500 labs worldwide.
- Our quality and services allow you to work smarter, enabling us to live in a safer and healthier world.

SigmaAldrich.com/pt



Sample Preparation and Collection

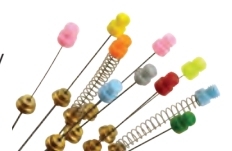
- **SPME** - Solid Phase Microextraction (Fibers, Holders, Accessories)
- **SPE** (Tubes, Manifolds, Accessories, QuEChERS, Bulk Adsorbents)
- **Purge & Traps** (Traps & Purge Vessels)
- **Solvents** (Suprasolv® FID/ECD, MS, HS, SupraSolv® hypergrade)
- **Milli-Q® water purification systems** and VOC-Pak® Polisher
- **Derivatization Reagents**



SPE Products



Solvents



SPME Products



Derivatization Reagents



SigmaAldrich.com/sampleprep

SigmaAldrich.com/derivatization

Air Sampling

- Thermal Desorption (Adsorbent Tubes & Accessories)
- Solvent Desorption (Adsorbent Tubes & Accessories)
- Whole Air (Sampling Bags & Bulbs, Sampler)



SigmaAldrich.com/air-monitoring

GC Analysis

- **GC Columns** for GC, GC/MS, Fast GC, GCxGC
- **General Purpose Columns** (e.g. SLB®-1ms, SLB®-5ms, SLB®-35ms, Equity®-1701, SUPELCO WAX®, Nukol™/FFAP)
- **Special Application Columns** (e.g. FAME, PAH, PCB, Dioxins, VOC, PLOT, Chiral)
- **Ionic Liquid Columns** (SLB®-IL i-Series, Watercol™)
- **Packed Columns** (SS & Glass)
- **Intuvo Columns** (SUPELCO WAX® 10, SPB®-624, SLB®-5ms, SLB®-PAH-MS, SLB®-IL60, Equity®-1701, β-DEX™ 120, Watercol™ 1910)



GC Columns (Packed)



GC Columns (Capillary)

Accessories

- Liners & Septa
- Fittings, Ferrules & Column Connectors
- Flow Measurement
- Vials & Syringes
- Gas Management & Purification
 - Gas Generators
 - Gas Purifiers
 - Plumbing (Valves, Fittings & Tubing)



Vials



Gas Generators



Liner



Septa

SigmaAldrich.com/gc

Detection and Calibration

- Certified Reference Materials (CRMs) & Reference Standards
- Neats & Solutions (for almost every application area)
- Matrix Standards
- Pharmacopoeia & Metrological Institute Standards

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Reference Standards & Certified Reference Materials



Proficiency Testing

We provide environmental, pharmaceutical and technology-based proficiency testing schemes in several types of matrices, including neat materials, wastewater, drinking water, soil/sediment and air.

We represent over 20 years of experience and expertise in providing proficiency testing (PT) studies worldwide.

Our PT samples are manufactured to certified reference material (CRM) grade according to ISO 17043.

More than 20,000 PT samples a year are sent to over 2,500 labs worldwide.

Our quality and services allow you to work smarter, enabling us to live in a safer and healthier world.

Proficiency Testing (PT) is the name used by the International Standards Organization (ISO) for a procedure also known as “interlaboratory comparison” or sometimes “external quality assessment”, “ring test” or “round robin”. In simple terms, Proficiency Testing comprises a sample sent to a group of laboratories for measurement. The labs know what might be in the sample, but they don’t know exactly the content or the concentration. Their results are compared with a known reference value or against the mean value of the study. A performance score is assigned to each laboratory to show how closely their result matches with the target value.

The most common use of proficiency testing is to demonstrate to a regulatory or accreditation body that a laboratory is capable and competent to perform a specific analytical test or to apply a specific technology. Another, and sometimes overlooked benefit of proficiency testing, is its use as a critical tool for quality assurance and continuous improvement since it can provide a true picture of a laboratory’s testing quality over time.

Our Laramie site holds an ISO/IEC 17043, ISO/IEC 17025 and ISO 17034 (formerly ISO Guide 34) triple accreditation as a provider of proficiency testing schemes, testing laboratory, and manufacturer of certified reference materials. In addition, several other sites within Merck KGaA, Darmstadt, Germany hold ISO/IEC 17025 and ISO 17034 double accreditation and can therefore produce certified reference materials of the highest quality which can also be employed in proficiency testing schemes.



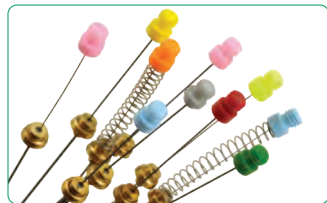
Experience the new PT portal
SigmaAldrich.com/pt



Sample Preparation & Collection

Our sample preparation portfolio has been developed to generate representative, reproducible, and homogeneous samples for accurate gas chromatography analysis.

SPME



Solid phase microextraction (SPME) is an innovative, solvent-free sample prep technology that is fast, economical, and versatile. SPME uses coated fibers to extract analytes of interest; the fibers are then directly inserted into a GC for desorption and analysis.

SPME plays a vital role in the analysis of flavors & fragrances as well as environmental matrices.

Discover SPME
[SigmaAldrich.com/spme](https://www.sigmaaldrich.com/spme)

SPE



Solid phase extraction (SPE) is a reliable and cost-effective technique for the selective isolation and concentration of a wide range of analytes and sample matrices prior to GC analysis. SPE has gained widespread acceptance as the sample preparation technique of preference for many applications, including persistent organic pollutant and pesticide analysis.

Discover SPE
[SigmaAldrich.com/spe](https://www.sigmaaldrich.com/spe)

Purge & Traps



The Purge and Trap technique is ideal for extracting and concentrating volatile organic compounds (VOCs) from water or soil. Purge & Trap instruments are specifically designed to deal with water vapor because both GC instruments and columns do not like water. The adsorbent filled traps (purge traps) allow the VOCs from the sample to be concentrated while managing the water vapor during the purge step or during desorb step (instrument dependent) to achieve low ppb detection limits.

Discover Purge & Traps
[SigmaAldrich.com/purgetraps](https://www.sigmaaldrich.com/purgetraps)

Milli-Q® Water Purification Solutions



When preparing your samples, standards and blanks for GC analyses by Purge-and-Trap, using freshly purified ultrapure water from a Milli-Q® IQ 7003/05/10/15 water purification system will help you obtain excellent accuracy and low background signal.

Simply attach the VOC-Pak® Polisher to the system's point of dispense for water ideally suited for the most demanding GC-MS analyses of volatile organic compounds.

Discover Milli-Q® water purification systems
[SigmaAldrich.com/milli-q-iq7003-05-10-15](https://www.sigmaaldrich.com/milli-q-iq7003-05-10-15)

Milli-Q®
Lab Water Solutions

Solvents



SupraSolv® solvents are developed specially for sample preparation in gas chromatography. Ideally suited for all GC applications including sensitive detection tasks in residue and environmental analysis, SupraSolv® solvents offer you the security and reliability needed for today's gas chromatography applications.

Solvents for GC Sample Prep
[SigmaAldrich.com/gc-suprasolv-solvents](https://www.sigmaaldrich.com/gc-suprasolv-solvents)

Derivatization Reagents



We offer a comprehensive range of derivatization reagents for GC applications. The GC derivatization portfolio includes reagents for silylation, acylation, alkylation and esterification. By derivatizing functional groups on target analyte molecules, they are rendered more volatile, greatly improving overall performance in GC analysis.

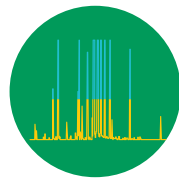
Discover our reagents
[SigmaAldrich.com/dr](https://www.sigmaaldrich.com/dr)

Air Sampling



The Supelco® portfolio includes sensitive and reliable air sampling devices for a wide range of applications for solvent desorption, thermal desorption, passive and whole air sampling. Our offering includes a wide range of solutions for sampling carbonyls, isocyanates and other VOCs.

Air Monitoring Solutions
[SigmaAldrich.com/air-sampling](https://www.sigmaaldrich.com/air-sampling)



GC Analysis

Whether you use ECD, FID, TCD, MS or another detector – our comprehensive portfolio of GC columns, solvents, standards & accessories offers a dedicated quality for your specific application and detection method.

GC Solvents

Our GC solvent qualities are ideal for all gas chromatography applications. These solvents are specially developed and tested for ECD, FID and MS detection to ensure a maximum signal-to-noise ratio in the largest specified retention time range.

Find your GC Solvent [SigmaAldrich.com/GC-solvents](https://www.sigmaaldrich.com/GC-solvents)

Headspace GC

Our solvents for headspace gas chromatography are developed specifically for the analysis of residual solvents in drug substances, excipients, and drug products according to Ph. Eur. and USP. Their high purity is provided by specially designed production processes - for accurate, reliable and reproducible analytical results.

Headspace GC [SigmaAldrich.com/GC-HS-solvents](https://www.sigmaaldrich.com/GC-HS-solvents)

GC Columns

We are dedicated to the development of cutting edge GC column technology to meet your ever changing needs. Our full line of GC columns, including our columns for the Agilent Intuvo, innovative ionic liquid, MS-grade, Fast GC, GCxGC, Chiral, SCOT, PLOT and packed columns, provide you the accuracy and consistency you need for your application.

Discover GC Columns [SigmaAldrich.com/GC-columns](https://www.sigmaaldrich.com/GC-columns)

GC Accessories

We provide all the accessories you need for high-quality GC and GC/MS analysis. Check out our reliable GC septa, inlet liners, inlet seals, ferrules, nuts, guard columns, connectors, flowmeters, hand tools, syringes, vials, and PID lamps for all common GC instruments.

Discover GC Accessories [SigmaAldrich.com/gc-accessories](https://www.sigmaaldrich.com/gc-accessories)

GC Gas Purification and Management

We know you need a gas delivery system that provides gas reliably at the proper purity level, and at the correct pressure. That's why we offer a full line of high-quality gas purification and generation products including gas generators, air compressors, purifiers, and plumbing and regulation products.

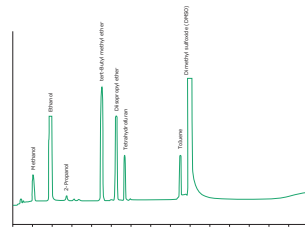
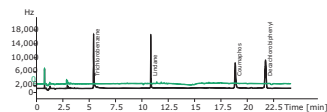
Gas Generation and Purification Portfolio [SigmaAldrich.com/gaspurifiers](https://www.sigmaaldrich.com/gaspurifiers)

Standards for GC

We offer the most comprehensive portfolio of standards and Certified Reference Materials for gas chromatography methods. Our products ensure accurate and reliable results while supporting laboratory regulatory requirements for the following analytical testing applications:

- Pharmaceutical
- Food & Beverage
- Environmental
- Clinical Diagnostic
- Toxicology & Forensic
- Veterinary
- Petrochemical
- Cosmetics

GC Reference Materials [SigmaAldrich.com/GC-standards](https://www.sigmaaldrich.com/GC-standards)



Detection & Calibration

Ensure accurate and reliable results while supporting laboratory regulatory requirements with our comprehensive portfolio of certified reference materials and standards and for gas chromatography.

Reference Standards & CRMs

We offer a comprehensive portfolio of over 20,000 reference materials, including environmental, petrochemical, pharmaceutical, clinical diagnostic and toxicology, forensic, food and beverage, GMO, cosmetic and veterinary standards, as well as OEM and custom products and services. All manufacturing sites of our standards are at a minimum double accredited to ISO/IEC 17025, and ISO 17034, which is the highest achievable quality level for Reference Standards

[SigmaAldrich.com/gc-standards](https://www.sigmaaldrich.com/gc-standards)

Neats & Solutions

Reference materials can be used in different formats in the testing laboratory, depending on product availability and method requirements. We offer three different formats to work with your specific application:

- Neat analyte (lyophilized, vials)
- In solution (ampoules, vials, bottles)
- In matrix (ampoules, vials, bottles)

Neats & Solutions [SigmaAldrich.com/reference-materials](https://www.sigmaaldrich.com/reference-materials)

Matrix Standards

Organic or inorganic compound matrix CRMs are most valuable in the validation of analytical methods.

We offer a variety of diverse matrices for:

- Air Monitoring and Occupational Hygiene
- Clinical Chemistry
- Environmental
- Food & Agriculture
- Physical Properties

Matrix Reference Materials [SigmaAldrich.com/ecrm](https://www.sigmaaldrich.com/ecrm)

Pharmacopoeia & Metrological Institute Standards

We distribute International Chemical Reference Substances and reference standards from the world's three leading pharmacopoeias:

- The United States Pharmacopoeia (USP)
- The European Pharmacopoeia (EP)
- The British Pharmacopoeia (BP)

Also available are the internationally recognized National Metrology Institute standards or other National Scientific Research Institutes CRMs:

- National Institute of Standards and Technology, USA (NIST)
- National Measurement Institute, Australia (NMIA)
- Joint Research Centre, Europe (JRC)
- Federal Institute for Materials Research and Testing, Germany (BAM)

[SigmaAldrich.com/reference-materials](https://www.sigmaaldrich.com/reference-materials)



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Analytical Products

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For Technical Service visit: [SigmaAldrich.com/techservice](https://www.sigmaaldrich.com/techservice)

[SigmaAldrich.com/supelco](https://www.sigmaaldrich.com/supelco)

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