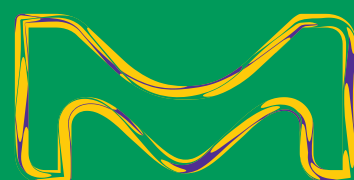
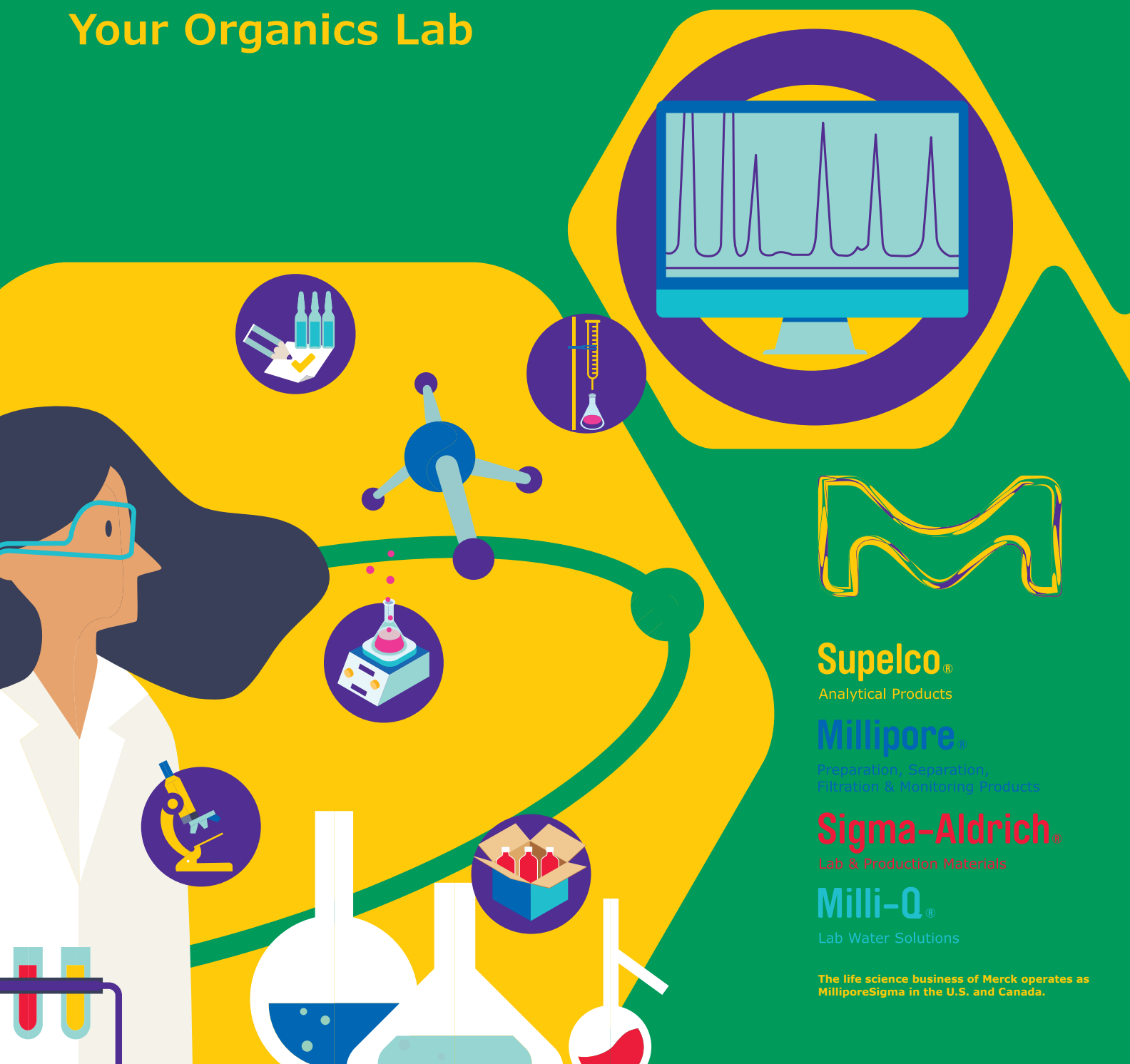


Chromatography Expertise

Solutions for
Your Organics Lab



Supelco®

Analytical Products

Millipore®

Preparation, Separation,
Filtration & Monitoring Products

Sigma-Aldrich®

Lab & Production Materials

Milli-Q®

Lab Water Solutions

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

We have brought together the world's leading Life Science brands, so whatever your life science problem, you can benefit from our expert products and services.

Supelco®

The Supelco® portfolio of analytical solutions of Merck is developed by analytical chemists for analytical chemists to ensure your results are accurate, precise and consistent. Every product is meticulously quality-controlled to maintain the integrity of your testing protocols and, with our dedicated scientists, the expertise you need is always on hand.

 Supelco® products

Millipore®

The Millipore® portfolio of Merck offers an ecosystem of industry-leading products and services, spanning preparation, separation, filtration and monitoring – all of which are deeply rooted in quality, reliability and timetested processes. Our proven products, regulatory and application expertise are a strong foundation you can rely on to consistently perform at the highest level.

 Millipore® products

Sigma-Aldrich®

The Sigma-Aldrich® portfolio of Merck offers a strong and ever-expanding offering of lab and production materials. Through our technical support and scientific partnerships, we help connect our customers with a whole world of progress.

 Sigma-Aldrich® products

Milli-Q®

The Milli-Q® portfolio of lab water solutions of Merck takes care of all your water quality and purity needs. Our solutions are backed by consistent quality and full compliance and work seamlessly together, letting you focus on your vital work.

 Milli-Q® products

Quick Navigation

[Extraction Methods](#)

[GC Methods](#)

[GC/MS Methods](#)

[LC/MS and HPLC Methods](#)

Organic Chemistry for Environmental Testing

Organics divisions within an environmental testing lab are known for extreme complexity, high throughput, and stringent accuracy requirements. With more and more public awareness focusing on persistent organic pollutants (POPs) or “forever chemicals” and new litigation happening all the time; organics labs must deal with an ever-increasing workload along with scrutiny of every result published. Organics labs are at the forefront of new technologies, new method development, responding to new contaminants of concern; and will always be an integral part of environmental testing labs.

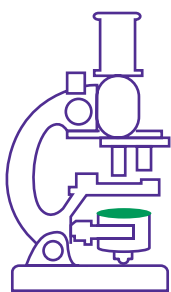
When it comes to providing results to regulatory bodies; accuracy, precision and reliability are paramount. But when running a successful lab; considerations such as material costs, labor, time to results, proper documentation and accreditation all influence which methods best fit the needs of the lab. We have products that can help with all of the above.

Products to help at every stage of analysis



Sample Preparation

- Labware (bottles, vials, tubes, lids, bags, syringes)
- Glassware
- Solvents for environmental analysis
- Inorganic salts
- Inorganic acids
- SPE tubes and SPME fibers
- Milli-Q® ultrapure water purification systems
- Air monitoring cassettes
- Membrane filters
- Air sampling devices



Analysis

- HPLC/UHPLC columns
- GC columns
- Volumetric titration solutions
- Ion chromatography elements
- Spectroquant® spectrophotometer
- Mobile Analysis: Test Strips, App Reader & Visual Tests



Result Interpretation

- Certified Reference Materials (CRMs) and analytical standards



QA Support

- Proficiency testing studies
- Proper supporting documentation with every audit
- Digitized product data with smart 2D barcode labels

Methods

We understand that there are often multiple methods that can be used for any given analyte and typically, the method used by a lab is determined by regulatory or accrediting agencies. The methods mentioned are used as examples based on our experience and what we perceive to be the most common methods used.

For comprehensive method lists, please visit

- [Clean Water Act Analytical Methods](#)
- [Safe Drinking Water Act Analytical Methods](#)
- [Hazardous Waste Test Methods website](#)
- [Standard Methods](#)

If you are using a method not mentioned in this paper, please contact your account representative to determine which products can help support your efforts. Our team of specialists can quickly review the method and identify products that we can provide.

The following sections have been organized according to these categories:

- [Extraction Methods](#)
- [GC Methods](#)
- [GC/MS Methods](#)
- [HPLC Methods](#)

WATER IS AT THE HEART OF ALL WET METHODS

We offer many lab water solutions from whole lab Milli-Q® lab water systems to bottled deionized water.



For more information

[Click Here](#)

Extraction Methods

Organic contaminants can be found in air, water and soil. Often these contaminants cannot be accurately measured without an extraction step that isolates and concentrates the contaminants of concern from the other compounds in the sample. Over the years, methods for performing extractions have evolved and advanced. We have been an integral part of this advancement, often pioneering new products to increase selectivity, reduce interferences, or simply improve accuracy. The combined experience of our legacy brands has been brought together to provide you with a comprehensive offering for extraction techniques and supplies.

EPA Method	Description
1311	Toxicity Characteristic Leaching Procedure
1664B	n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material
3510c	Separatory Funnel Liquid-Liquid Extraction
3520C	Continuous Liquid-Liquid Extraction
3540C	Soxhlet Extraction
3550C	Ultrasonic Extraction for Nonvolatile and Semi-volatile Organic Compounds
3580A	Waste Dilution
5021A	VOC in Various Sample Matrices Using Equilibrium Headspace Analysis
5030C	Purge-and-Trap for Aqueous Samples
5035A	Closed System Purge-and-trap and Extraction for Volatile Organics in Soil
9071B	n-Hexane Extractable Material for Sludge, Sediment and Solid Samples
9020B	Total Organic Halides; Extraction – Pyrolysis - Micro-Coulometric-titration



Products for Extraction Methods

- PreCleaned VOA Vials
- Headspace Vials
- Purge Traps
- Purge and Trap Glassware
- Reagent Water
- Methanol for Purge & Trap
- Solid Phase Microextraction
- Tedlar® Bags
- Mininert® Valves
- Syringes and Accessories
- Reference Materials for Spiking and Calibration

Extraction Glassware & Apparatus

- TCLP Waste Filtration Systems
- Zero Headspace Extractor
- Vacuum Pumps
- Solid Phase Extraction Cartridges and Accessories
- ACS Reagent Grade Chemicals
- Solvents
- pH Buffer Solutions
- pH Paper
- Separatory Funnel with PTFE Stopcock
- Soxhlet Apparatus
- Extraction Thimbles
- Liquid-Liquid Continuous Extractors
- Kuderna-Danish Apparatus
- Snyder Columns
- Flasks
- Drying Columns
- Glass Fiber Filters
- Filter Paper
- Evaporators & Supplies
- Dessicators
- Vials
- Glass Scintillation Vials
- Activated Carbon
- Pipettes

 Supelco® products

 Millipore® products

 Sigma-Aldrich® products

GC Methods

The humble GC has been the workhorse of the organics lab for many decades with some methods dating back to the 1970s. While advances have been made in GC systems, and new column chemistries have been developed; the core GC methods remain viable for the analysis of many regulated contaminants today. The list below is not intended to be a comprehensive list of all GC methods, but it does show that many of the GC methods in use today share similar products across methods. To find the specific products you need for your method, click on the links in the table of Products for GC Methods to visit the relevant web pages. If you are using a method not listed below, please contact your account manager and they can work with you to identify which products we can supply for your analysis.

EPA Method	Description
TO-4	Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air using HVPF followed by GC/MD
TO-10	Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air using LVPF followed by GC/MD
325b	Volatile Organic Compounds from Fugitive and Area Sources
502.2	Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series
507	Determination of Nitrogen- and Phosphorus-Containing Pesticides in Water by Gas Chromatography with a Nitrogen-Phosphorus Detector
508	Determination of Chlorinated Pesticides in Water by Gas Chromatography with an Electron Capture Detector
515	Determination of Chlorinated Herbicides in Drinking Water
551.1	Determination of Chlorination Disinfection Byproducts, Chlorinated Solvents, and Halogenated Pesticides / Herbicides in Drinking Water
552.2	Determination of Haloacetic Acids and Dalapon by Aqueous Derivatization, Liquid-Solid Extraction and GC+ECD
548	Determination of Endothall in Drinking Water by Aqueous Derivatization, Liquid-Solid Extraction and GC+ECD
602	Purgeable Aromatics by GC
608 / 8081	Organochlorine Pesticides and PCB's by GC
610	Polynuclear Aromatic Hydrocarbons
615	The Determination of Chlorinated Herbicides by GC
1671A	Volatile Organic Compounds Specific to the Pharmaceutical Manufacturing Industry; GC/FID
8015D	Nonhalogenated Organics; GC + FID
8021B	Aromatic and Halogenated Volatiles; GC + PID / HECD
8041A	Phenols by Gas Chromatography
8061A	Phthalate Esters by Gas Chromatography
8082A	Polychlorinated Biphenyls; GC +ECD / ELCD
8100	Polynuclear Aromatic Hydrocarbons
8141B	Organophosphorus Compounds; GC + FPD / NPD

Products for GC Methods:

- GC Columns
- Autosampler Vials
- Syringes
- GC accessories (septa, liners, etc.)
- Gas Purification
- GC Grade Solvents
- Hydrogen Generators

Sample Collection

- PUF Cartridges
- Precleaned VOA Vials

Extraction/Sample Preparation

- Reagent Water
- Preservation Reagents
- ACS Reagent Grade Chemicals
- Separatory Funnels
- Liquid-Liquid Continuous Extractors
- Soxhlet Apparatus
- Extraction Thimbles
- Kuderna-Danish Apparatus
- Snyder Columns
- Flasks
- Drying Columns
- Derivatization Reagents
- Solid Phase Extraction Disks, Cartridges, Accessories
- pH Buffer Solutions
- pH Paper
- Disposable Pipettes
- Drying Oven
- Analytical Balances
- Reference Materials for Surrogates, Spikes and Internal Standards
- Proficiency Test Samples
- Purge Traps
- Purge and Trap Glassware



Supelco® products



Milli-Q® products

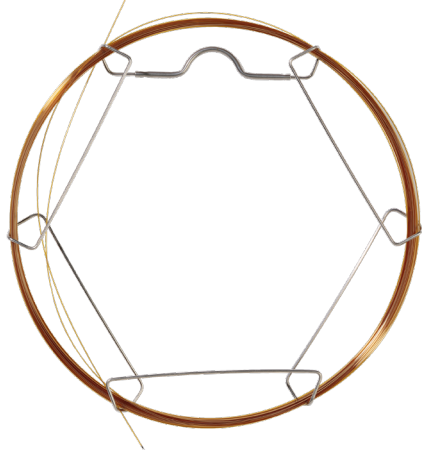


Sigma-Aldrich® products

GC/MS Methods

As our understanding of hazardous contaminants increases; so too does the need for simultaneous analysis of multiple organic compounds. Unfortunately, in many instances these compounds do not separate chromatographically. Fortunately many of the compounds have structural differences and therefore different mass spectra. By combining gas chromatography with mass spectrometry, labs increase their ability to accurately and precisely identify analytes within a given sample. We have products capable of helping at every step in the process for the methods listed below. If you are using a GC/MS method not listed below, please ask your account rep for additional information for your specific method.

EPA Method	Description
TO-1	Method for the Determination of Volatile Organic Compounds in Ambient Air Using Adsorption and GC/MS
TO-9	Determination of Polychlorinated, Polybrominated and Brominated/Chlorinated Dibenzo-p-Dioxins and Dibenzofurans in Ambient Air
TO-15	Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially Prepared Canisters and Analyzed Bb GC/MS
TO-17	Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling onto Sorbent Tubes
524.2	Measurement of Purgeable Organic Compounds in Water by GC/MS
525.3	Determination of Semi-volatile Organic Chemicals in Drinking Water by Solid Phase Extraction and Capillary Column GC/MS
614.1	The Determination of Organophosphorus Pesticides by GC or GC/MS
624	Purgeables by GC/MS
625.1	Base/Neutrals and Acids by GC/MS
1613	Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS
1668B	Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS
8260B	Volatile Organic Compounds; GC/MS
8270D	Semi-volatile Organic Compounds; GC/MS
8280B	Polychlorinated Dibenzo-p-Dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by HRGC/LRMS
8290A	Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by HRGC/HRMS



Products for GC/MS Methods:

- GC/MS Columns
- GC/MS Accessories (septa, liners, ferrules, etc.)
- Autosampler Vials for GC/MS
- Syringes
- Gas Purification
- GC/MS Grade Solvents
- Reference Materials for Calibration

Sample Collection

- Thermal Desorption Tubes
- Precleaned VOA Vials

Extraction/Sample Preparation

- Reagent Water
- Preservation Reagents
- ACS Reagent Grade Chemicals
- Separatory Funnels
- Liquid-Liquid Continuous Extractors
- Soxhlet Apparatus
- Extraction Thimbles
- Kuderna-Danish Apparatus
- Snyder Columns
- Flasks
- Drying Columns
- Derivatization Reagents
- Solid Phase Extraction Disks, Cartridges, Accessories
- pH Buffer Solutions
- pH Paper
- Disposable Pipettes
- Buchner Funnels
- Silanized Amber Vials
- Water Bath
- Analytical Balances
- Drying Oven
- Glass Wool
- Desiccators
- Reference Materials for Surrogates, Spikes and Internal Standards
- Proficiency Test Samples
- Purge Traps
- Purge and Trap Glassware



Supelco® products



Milli-Q® products



Sigma-Aldrich® products

LC/MS and HPLC Methods

For direct analysis of liquid phase samples, historically High-Performance Liquid Chromatography (HPLC) has been the method of preference within the environmental testing community. Many recently developed environmental methods utilize the selectivity of LC/MS/MS to help confirm analyte identities. PFAS/PFOAs, as analyzed by method **537.1**, are a perfect example of this. We supply a broad range of products for both HPLC and LC-MS methods, and expert technical resources to help develop new methods or trouble shoot your current methods.

EPA Method	Description
TO-5	Method for the Determination of Aldehydes and Ketones in Ambient Air Using HPLC
TO-11	Determination of Formaldehyde in Ambient Air Using Adsorbent Cartridge Followed by HPLC
532	Determination of Phenyl Urea Compounds in Drinking Water by Solid Phase Extraction and HPLC
537.1	Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and LC/MS/MS
547	Determination of Glyphosate in Drinking Water by Direct-Aqueous-Injection HPLC, Post Column Derivatization, and Fluorescence Detection
549.2	Determination of Diquat and Paraquat in Drinking Water by Liquid-Solid Extraction and HPLC
610	Polynuclear Aromatic Hydrocarbons
632	The Determination of Carbamate and Urea Pesticides - HPLC
632.1	Determination of Carbamate and Amide Pesticides in Municipal and Industrial Wastewater
8310	Polynuclear Aromatic Hydrocarbons; HPLC
8315	Determination of Carbonyl Compounds by HPLC
8330	Nitroaromatics, Nitrosamines and Nitrate Esters by HPLC



Products for HPLC and LC/MS Methods:

- HPLC/UHPLC Columns
- HPLC/UHPLC Solvents & Water
- HPLC Accessories
- Solvent Blends
- Mobile Phase Additives
- Reference Materials
- Autosampler vials
- Syringes and Accessories
- Syringe Tip Filters

Extraction

- Reagent Water
- ACS Reagent Grade Chemicals
- Proficiency Testing
- Analytical Balances
- pH Buffer Solutions
- Filtration Supplies
- SPE Cartridges and Accessories
- Vacuum Pump
- Vacuum Accessories
- Separatory Funnels
- Kuderna-Danish Apparatus
- Snyder Columns
- Drying Columns
- Evaporators & Supplies
- Water Bath
- Disposable Pipettes
- Vials
- Rotary Evaporator Supplies

Sample Collection

- Midget Impingers
- DNPH Sampling Supplies
- Preservation Reagents
- pH Meters



Supelco® products



Sigma-Aldrich® products



Millipore® products



Milli-Q® products

Greener Solvent Alternatives

Increase safety and reduce your carbon footprint

The products we create help our customers improve people's lives every day. But we realize that everything we make also has an environmental impact. That's why we are committed to continually enhancing the sustainability of our products, and adopting environmentally friendly chemical processes. Furthermore we strive to make your daily work with solvents safer by offering less toxic alternatives.

Learn more about our alternatives for:

- Glycerol
- THF
- Dichloromethane
- NMP
- DMA
- DMSO
- DMF
- 1,4-Dioxane
- tert-butyl Methyl ether
- Ethyl acetate
- Acetone



[Click Here](#)

About Us

With the combined history and expertise from our Supelco[®], Millipore[®], Sigma-Aldrich[®], and Milli-Q[®] brands, we are a world leader for life science materials and have an incredible history of supporting the development of environmental testing methods.

Corporate Responsibility



We can help you start on the path to more sustainable productivity as we work to provide you products that not only come in more environmentally friendly packaging, but products that also have a smaller environmental footprint. Minimize your footprint by taking advantage of our convenient programs that help minimize waste.



Polystyrene Cooler Recycling Program

When you purchase temperature controlled products from us you can simply return the cooler and box in which it was shipped. We have already paid the postage, all you have to do is simply fold the inner flaps on the outside and put the container at your shipping dock. We will reuse the cooler, helping to keep polystyrene out of landfills.



A Sustainability Leader

We share your concern about the environment and our communities. This is recognized by several major international organizations:

- Dow Jones Sustainability Index member 2015
- CDP Leadership Index 2012 – 2017
- Newsweek Green Rankings
- Global 100 2014 - 2015

Find out more about our commitment to Global Citizenship at SigmaAldrich.com/corporateresponsibility

Have suggestions for how we can help you? Email corporateresponsibility@sial.com

Support Services



Customer Service

Our Customer Service Teams are here for you and are committed to providing an effortless customer experience. Highly trained representatives are located at each of the three North American call centers to provide maximum service. Our representatives are experts and here to listen to your needs in order to deliver single call resolution.

For your convenience, various contact options are available:

- Online through SigmaAldrich.com with live assistance available through the Web Help Desk.
- e-Commerce Solutions enable control over spending for procurement staff and allow researchers to easily access products.
- Email and phone calls handled efficiently and effectively by customer service representatives.
- Click-to-Chat enriches the online experience by allowing you to get quick answers and resolution to order and service issues.
- Login to SigmaAldrich.com "Order Center" for instant access to Order Status, Shopping Cart, Tracking Information, Invoices, MSDS, CofA and Technical Information.



Technical Service

Our commitment to our customers includes unrivaled scientific knowledge and expertise to support more than 300,000 products in our ever-expanding portfolio. Our representatives have a wide range of experience in many areas, including: analytical chromatography, life science, chemistry, materials science, diagnostics and more. We are scientists assisting scientists.

For your convenience, various contact options are available:

- Email and phone calls handled efficiently and effectively by professional Technical Service Scientists.
- Online assistance available through "Ask a Scientist" and "Frequently Asked Questions" portals. More than 6,000 Frequently Asked Questions have been authored by Technical Service Scientists supporting more than 1,500 of the most popular products.
- Access to thousands of support and quality documents available through SigmaAldrich.com, including Product Bulletins, Specification Sheets, Certificates of Analysis, MSDS and Certificates of Origin.

Merck KGaA
Frankfurter Strasse 250
64293 Darmstadt, Germany

SigmaAldrich.com

To place an order or receive technical assistance:

Order/Customer Service: SigmaAldrich.com/order

Technical Service: SigmaAldrich.com/techservice

Safety-related Information: SigmaAldrich.com/safetycenter

© 2020 Merck KGaA, Darmstadt, Germany and/or its affiliates. All Rights Reserved. Merck, the vibrant M, Millipore, Supelco, Milli-Q, Sigma-Aldrich, Spectroquant, Aquastar, and ReCycler are trademarks of Merck KGaA, Darmstadt, Germany or its affiliates. All other trademarks are the property of their respective owners. Detailed information on trademarks is available via publicly accessible resources.

MK_BR5769EN
31331
06/2020

