

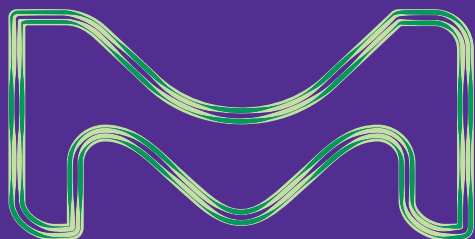
**Millipore
Sigma**

SAFEGUARD

WITH ENVIRONMENTAL TESTING

**Let's Create a Greener World.
Together.**

Solutions for organics,
inorganics and
microbiological analysis



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

The Life Science business of MilliporeSigma brings together the world-class products and services, innovative capabilities, and exceptional talent of EMD Millipore and Sigma-Aldrich, to create a global leader in the life science industry. We operate as “MilliporeSigma”.

350TH ANNIVERSARY IN 2018

Life Science Facts & Figures

~**18M**

orders shipped
annually

2x

more unique web
visitors than nearest
competitor

More than
300,000
life science products

19,000

global life science employees

Founded in

1668

world's oldest
chemical &
pharmaceutical
company

Our core strengths:



Comprehensive portfolio and
customer-focused innovation

A LEADER IN LIFE SCIENCE A PARTNER FOR QUALITY

- We solve the toughest problems in the industry by collaborating with the global scientific community
- We provide scientists with best-in-class lab materials, technologies, and services
- We make research and production simpler, faster, and more successful

We fully support your work in environmental testing

- Products and services follow the latest regulations to ensure method compliance
- Substantial resources available for customer-specific solutions
- Warehouse and supply chain management for prompt delivery and local support
- Expert advice in routine or advanced applications and methods

More
than



1M
life science
customers globally

65

manufacturing
sites worldwide

130



life science
distribution centers

Present in



66
countries

We deliver confidence

- We are not just distributors, but also inventors, producers and partners
- We manufacture the majority of our products in-house
- Quality and service are as important to us as they are to you

This brochure is arranged by focus areas so you can quickly find the products you need.



Balanced geographic reach



Well-differentiated,
industry-leading capabilities

For further product details,
applications, real-time availability, and
ordering information, please visit:
SigmaAldrich.com/enviro



GO beyond



Enabling Sustainability

Our Design for Sustainability (DfS) program aims to reduce the environmental impact of our products across their entire lifecycle—from production, through use, to recycling. It is also intended to enhance the performance and convenience of our products. These principles were applied in the design of our EZ-Fit® Manifold, which is used for microbiological water testing. Compared to its predecessor, the new model helps customers reduce autoclave-associated carbon emissions by 91%. Packaging was also optimized so that 47% less raw material is needed.

There are key issues related to water sample quality that can make testing specimens from the field a bigger challenge than lab testing. That is why, when it comes to confidence and accuracy in on-site testing for nitrates, nitrites, phosphates, pH, and more, there's nothing like using the right tools to do the job on the spot. The focus of any testing protocol should be getting timely, reliable results in the most cost-effective manner. Our Mobile Laboratory portable testing options from Supelco® offer cost-effective options to meet a progression of qualitative and quantitative field test needs.

Respecting the Environment

Climate protection is an integral part of our culture, products, and processes. Since 2009, we have installed photovoltaic plants at production sites around the world: Billerica and Bedford, Massachusetts, USA (155 kW each); Molsheim, France (55 kW); Tel Aviv, Israel (50 kW); Rome, Italy (two plants at 96 kW and 88 kW); and Guatemala City, Guatemala (40 kW). In 2015, we commissioned a 400 kW plant in Shanghai, China, reducing the site's annual CO₂ emissions by 300 metric tons.

Living our Commitment

We also use our expertise to help solve the world's problems through initiatives like the Global Pharma Health Fund (GPHF). The charitable organization is currently working to eradicate counterfeit pharmaceuticals in developing and emerging countries. According to Interpol estimates, up to 30% of medicines in these regions are counterfeit or substandard. Besides providing financial support, we developed the GPHF-Minilab™ to test whether medicines contain correct concentrations of active pharmaceutical ingredients (APIs). The compact, portable lab fits into a tropics-resistant suitcase, and does not rely on external power sources—it only requires clean water.



Environmental Testing Workflow

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sample collection

Air Samples

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Millipore® | Whatman® | ORBO™ | Supelpak™ | Amberlite® | XAD® | Tenax® | FLM™ | Tedlar®

Water and Solid Samples

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MQuant® | EMSURE® | Millipore®

Laboratory Focus Areas

Extraction and Analysis of Organic Compounds

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Whatman® | Millipore® | Pyrex® | Supelclean™ | Empore™ | ENVI-Florisil® | Visiprep™ | Diazald®
Millex® | Ascentis® | TraceCERT®

Digestion and Analysis of Metals

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Ultrapur™ | Suprapur® | OmniTrace Ultra™ | OmniTrace® | EMSURE® | EMPARTA® | Certipur®
TraceCERT®

Wet (Conventional) Chemistry Techniques

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Certipur® | Titripur® | Titripac® | Millex® | Whatman® | Spartan® | Coors™ | Spectroquant®

Mobile Analysis

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products used across focus areas

Water Purification Systems

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Milli-Q® | Elix® | VOC-Pak® | EDS-Pak® | LC-Pak®

Lab Essentials

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Pyrex® | Extran® | Chemizorb®



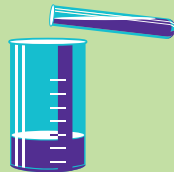
Environmental Testing Workflow



Sample Collection

Preserve sample integrity during transport to the laboratory, and storage prior to sample preparation.

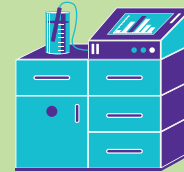
- Vials, Bottles and Jars
>>> [page 10](#)
- Chlorine Test Strips
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- Preservatives
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- Particulate Matter (PM) Filters
>>> [page 8](#)
- Active Air Sampling Devices
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- Passive Air Sampling Devices
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- Gas Sampling Bags and Glass Bulbs
>>> [page 9](#)



Sample Preparation

Isolate analytes from the matrix; deliver in a configuration compatible with the sample analysis technique.

- Organic Solvents
>>> [page 11](#)
- Sodium Sulfate, Magnesium Sulfate
>>> [page 13](#)
- Filter Discs
>>> [pages 13, 18](#)
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- Inorganic Acids and Bases
>>> [pages 14, 16](#)
- Solid Phase Extraction (SPE) Tubes and Vacuum Manifolds
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- Solid Phase Microextraction (SPME) Fibers and Accessories
>>> [page 15](#)
- Purge Traps and Glassware
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Sample Analysis

Obtain qualitative and quantitative results for environmental pollutants using various instrumentation.

- CRMs, RMs, and Analytical Standards
>>> [pages 12, 16, 17, 22, 24](#)
- GC and GC/MS Columns, Accessories, and Gas Purifiers
>>> [page 9](#)
- HPLC and LC-MS Columns and Accessories
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- HPLC Mobile Phases
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- Autosampler Vials, Caps, Inserts, and Syringes
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- Mobile Analysis: Reflectometry, Turbidimetry and Test Strips
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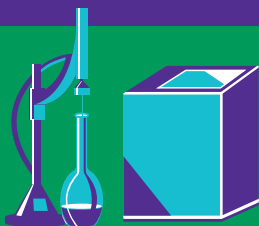
A complete overview of our portfolio for environmental testing is available at:
SigmaAldrich.com/enviro



Quality Assurance

Safeguard data integrity across the environmental testing workflow.

- Matrix Material Standards
>>> [page 24](#)
- Proficiency Testing
>>> [page 25](#)



Water Purification

On-site generation (preparation of blanks, reagents, mobile phases, sample preparation).

- Water Purification Systems
>>> [page 26](#)



Lab Essentials

Supply chain solutions for products utilized across many areas in the laboratory.

- Glassware
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- Plasticware
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- Tools
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- Supplies
>>> [page 27](#)
- Equipment
>>> [page 27](#)
- Safety Products
>>> [page 27](#)
- Cleaning Reagents
>>> [page 27](#)
- Spill Kits
>>> [page 27](#)



GO higher

Products for the
Collection of Air Samples



SigmaAldrich.com/
enviro-collect

Need to collect airborne particulate matter and chemical pollutants? Get the height of quality with our sampling devices and media. They fully comply with international methods for optimal compatibility with target analytes and compound classes.

active sampling

Active sampling devices use a pump to draw air through adsorbent media such as an ORBO™ tube, thermal tube, filter or impinger. Choose from our broad range of products for physical and chemical pollutants.

Particulates in the air adversely affect human respiratory function. Many methods developed to monitor particulate levels in ambient air involve gravimetric analysis of a membrane filter. We offer a variety of **particulate matter (PM) filters** that support PM2.5 and PM10 methods.

Our **LpDNPH cartridges** are specially developed for capturing carbonyls. They contain high purity silica coated with 2,4-dinitrophenylhydrazine (2,4-DNPH), which converts carbonyls to stable hydrazone derivatives. They are produced in a low-carbonyl environment, and packaged in low-background material.



For sample collection of toxic organic compounds, such as dioxins, pesticides, PCBs, and semi-volatiles, many methods require **polyurethane foam (PUF) cartridges**. We offer several versions with polymeric adsorbent sandwiched between two PUF layers. Our Supelpak™-2 and Supelpak™-2SV adsorbents, made of purified Amberlite® XAD®-2, are specially cleaned and tested for optimal performance.

US EPA Method 0030 specifies the use of **volatile organic sampling train (VOST)** tubes to collect stack gas effluent from hazardous waste incinerators. We offer 1-bed (Tenax®) and 2-bed (Tenax® and charcoal) varieties. Each VOST tube is individually numbered and pre-conditioned. Many of our **thermal desorption tubes** contain our innovative carbon adsorbents. All **solvent desorption tubes** are packed with method-specified adsorbents.



passive sampling

Passive sampling devices allow sample collection without a pump. We offer several compact, economical, and easy-to-use options.

Our FLM™ **fenceline monitoring tubes** are designed specifically for US EPA Method 325. They are intended for the collection and analysis of benzene and other volatile organic compounds (VOCs) at multiple locations around the perimeter, or fenceline, of refineries. The tubes fit PerkinElmer®, Markes, DANI, Shimadzu™, and O-I Analytical thermal desorbers.

Innovative radiello™ **passive/diffusive samplers** have a radial design, which offers a higher capacity and faster sampling rates than traditional passive monitors. Various samplers are offered for different chemical pollutants. The DSD-DNPH sampling device is designed for the collection of carbonyls. SPME Diffusive Sampling Fiber Holders are used to determine the time-weighted average (TWA) concentration of volatile organic compounds (VOCs) in air.

gas sampling

Gas sampling bags and glass bulbs are used to collect whole air samples. Because no media is used, there is no selectivity towards specific analytes or compound classes. Hence, the sample is truly representative of the sampling environment. We offer bags and bulbs in several configurations and sizes.



Key Products	Cat. No.
FLM™ Carbopack™ X Deactivated Stainless Steel Thermal Desorption Tube , preconditioned, pack of 10	28686-U
Tedlar® Gas Sampling Bag , 1 L capacity, push/pull lock valve (PLV), pack of 10	24633



Key Products	Cat. No.
Millipore® Filter Disc , PTFE membrane discs for PM2.5 monitoring (PTFE with ring), 2 µm, 47 mm, sequential serial numbers, pack of 50	PM2547050
Whatman® Filter Disc , PM2.5 air monitoring membrane	WHA7592104
Millipore® Filter Disc , quartz fiber disc filter (Type AQFA) for PM10, 47 mm, pack of 100	AQFA04700
Millipore® Aerosol Monitor , carbon-filled polypropylene, mixed cellulose esters, 0.8 µm, 25 mm, white with pad, pack of 50	MAWP025AC
LpDNPH S10 , 3 mL/350 mg, pack of 50	21014
ORBO™ 2500 , pre-cleaned large PUF/Amberlite® XAD®-2/PUF media pre-assembled in glass cartridge	21235-U
VOST 100 Stack Sampling Tube , contains Tenax®	20074-U
VOST 200 Stack Sampling Tube , contains Tenax® TA:petroleum charcoal, (2:1)	20075-U

GO further

Products for the Collection
of Water and Solid Samples



SigmaAldrich.com/
enviro-collect

Collect water or solid samples wherever you need to. Our application-specific containers and preservatives will keep them perfectly stable throughout transport and storage – in accordance with environmental methods.

Our 40 mL **VOA vials** are built to protect water samples collected for analyzing volatile organic compounds (VOCs). When filled and capped properly, the containers prevent the formation of headspace. You have a choice of clear or amber glass, both pre-cleaned according to US EPA 40 CFR 136 guidelines.

To collect water samples for analyzing non-volatile organic analytes, we offer 32 oz. or 1 L **amber glass bottles**. For metal or wet chemistry analyses, we supply 250 mL to 1 L **high density polyethylene (HDPE) bottles**.

perfectly
packed



Collecting soil samples? Our 125 to 250 mL **clear glass jars** are designed with a straight mouth to allow complete removal of contents.

If your water samples require **preservatives**, protect them with our EMSURE® reagents

Our MQuant® **chlorine test strips** are ideal for field measurements of chlorine, allowing you to quickly determine the right preservative to use in your water sample.

Key Products

	Cat. No.
Clear Glass VOA vial , 40 mL, pre-cleaned, white polypropylene screw cap, pack of 72	23188
Amber Glass Bottle , wide mouth, 32 oz., white polypropylene cap, PTFE flat liner, pack of 12	Z250228
High Density Polyethylene (HDPE) Bottle , wide mouth, 500 mL	Z187879
High Density Polyethylene (HDPE) Bottle , wide mouth, 1 L	Z187887
Millipore® Fluid Contamination Monitor , 0.8 µm, 37 mm, white, matched weight with pad, for gravimetric particle analysis, pack of 50	MAWP037PM
Clear Glass Jars , straight mouth, 250 mL, white polypropylene cap, PTFE flat liner, pack of 12	Z263451
Hydrochloric Acid, EMSURE® , 37%	100317
Sodium Thiosulfate Pentahydrate , ACS reagent, >99.5%	217247
L-Ascorbic Acid , ACS reagent, >99%	255564
MQuant® Chlorine Test Strips , for 0- 20 mg/L chlorine, box of 75	117925
MQuant® Chlorine Test Strips , for 0- 500 mg/L chlorine, box of 100	117924

GO organic

Extraction and Analysis
of Organic Compounds



SigmaAldrich.com/
enviro-organics

Sample preparation typically involves partitioning organic pollutants into headspace using a purge process, or into an organic solvent through extraction. You may need a cleanup step to remove interferences and/or a concentration step to increase method sensitivity. The sample is then analyzed using gas chromatography (GC) or high performance liquid chromatography (HPLC).

exceptional purity

Choose from four exceptional series of **organic solvents**—specially made for GC and HPLC. They are all offered in various pack sizes, including returnable containers to reduce your carbon footprint.



- SupraSolv® solvents: ideal for extraction and GC analysis using MS, FID, or ECD detection; recovered from special distillation cuts, and tested for specific detectors to ensure high application security
- OmniSolv® solvents: offered in different grades for GC, high resolution GC (HR-GC), purge and trap, gradient HPLC, and LC-MS; outstanding purity and batch-to-batch consistency for unparalleled reliability in trace environmental analyses; only available in North America
- EMSURE® solvents: meet or exceed ACS requirements; may be used as extraction solvents, depending on sensitivity needs
- LiChrosolv® solvents: suitable for HPLC or LC-MS, either as an extraction solvent or as a mobile phase

Key Products	Cat. No.
MS SupraSolv® Dichloromethane	100668
OmniSolv® HR-GC Dichloromethane	DX0837
MS SupraSolv® Acetone,	100012
OmniSolv® HR-GC Acetone	AX0110
ECD and FID SupraSolv® n-Hexane	104371
OmniSolv® HR-GC Hexanes	HX0297
EMSURE® n-Hexane	104367
OmniSolv® Methanol for purge & trap	MX0482
Gradient grade LiChrosolv® Acetonitrile	100030
Gradient grade OmniSolv® Acetonitrile	AX0142
LC-MS LiChrosolv® Acetonitrile	100029
OmniSolv® LC-MS Acetonitrile	AX0156

Supelco® analytical products: Our high standards match yours

Accredited to both ISO/IEC 17025 and ISO 17034 / ISO Guide 34, our manufacturing sites produce a multitude of **organic standards** (volatiles, semivolatiles, pesticides, PCBs, PAHs, flame retardants, etc.) as Certified Reference Materials (CRMs), Reference Materials (RMs), and analytical standards, for use as calibration standards, internal standards, surrogate standards, spiking solutions, and laboratory control samples (LCSs). You have the option of single-component solutions, multi-component mixtures, and highly characterized neat standards, plus separate source standards for many methods and analytes.

Key Products	Cat. No.
Fipronil Certified Reference Material, TraceCERT®, 50mg	16785
EPA 8270 Semi-volatile Internal Standard Mix, 6 analytes, each at 2000 µg/mL in dichloromethane, 5 x 1 mL	CRM5M07296
Pesticide Surrogate Mix, 2 analytes, each at 200 µg/mL in acetone, 2 mL	861284



extensive choice

We offer a wide range of **vials and syringes** suitable for most autosampler models, preparing standards or samples, and short-term or long-term storage. Our portfolio includes clear and amber glass vials, inserts, screw caps, crimp caps, and various septa material. We also supply convenient vial racks for different vial sizes.



Looking for the perfect **GC columns and accessories** for your method? We give you a choice of more than 80 different chemistries and numerous related products. Whether for use with MS, ECD, FID, PID, or ELCD, our GC columns deliver top performance. For optimum results, discover our complete range of GC accessories (molded GC septa, deactivated inlet liners) and gas purification/management products (purifiers, gas generators, tubing, fittings, pressure regulators).

Key Products	Cat. No.
Certified Low Adsorption (LA) Autosampler Vials, 2 mL clear glass with marking spot, screw cap, natural PTFE/silicone septa, pack of 100	29651-U
Autosampler Vials, 2 mL clear glass, crimp top, PTFE/red rubber septa, pack of 100	27239
VOCOL® Capillary GC Column, 30 m x 0.25 mm I.D., 1.5 µm	24205-U
SLB®-5ms Capillary GC Column, 30 m x 0.25 mm I.D., 0.25 µm	28471-U
SLB®-35ms Capillary GC Column, 30 m x 0.25 mm I.D., 0.25 µm	29804-U
Molded Thermogreen® LB-2 Septa, with injection hole, 11 mm, pack of 50	28336-U
Split/Splitless Inlet Liner, 4 mm I.D., single taper wool packed FocusLiner™ design, for Agilent, pack of 5	2879905-U

strictly controlled

Inorganic salts, such as sodium sulfate and magnesium sulfate, are used as drying agents. Soil samples are either mixed with the salts before extraction, or extracts are passed through the material prior to cleanup and concentration. EMSURE® inorganic salts are produced under strictly controlled conditions to ensure outstanding analytical purity. This makes them ideal for both qualitative and quantitative analyses. They meet or exceed international standards such as ISO, ACS, and Reag. Ph. Eur., and come with an extensive Certificate of Analysis.



Filtration is commonly performed in environmental laboratories using **filter discs**. To serve a wide variety of applications, our portfolio includes filter discs made from glass fiber, quartz fiber, mixed cellulose esters (MCE), nylon, polypropylene, polyvinyl chloride, or polytetrafluoroethylene (PTFE) materials.

We also provide **filtration hardware** for gravity or vacuum driven applications. Glass powder funnels and drying columns are used to securely hold filter discs and inorganic salts when transferring extraction solvents to the Kuderna-Danish concentration apparatus. Large, two-piece polypropylene Buchner funnels and Zero Headspace Extractor (ZHE) devices are designed for the preparation of Toxicity Characteristic Leaching Procedure (TCLP) samples.

Key Products	Cat. No.
EMSURE® Sodium Sulfate, anhydrous, granular , for organic trace analysis, >99%	106639
EMSURE® Magnesium Sulfate, anhydrous , for analysis, >98.0%	106067
Whatman® Filter Disc , quantitative filter paper, ashless, Grade 41, 150 mm diameter, pack of 100	WHA1441150
MF-Millipore™ Filter Disc , membrane filter, mixed cellulose ester, 0.45 µm, 47 mm diameter, pack of 100	HAWP04700
Millipore® Filter Disc , glass fiber filter without binder (AP40), 0.7 µm, 90 mm, for TCLP filtration, pack of 100	AP4009000
Pyrex® Powder Funnel , glass, pack of 24	CLS622075
Sample Cleanup Columns , glass, 30 mL champagne design reservoir, pack of 6	58099
Buchner Funnel , two-piece polypropylene, 315 mL capacity, 90 mm	Z178152
Zero Headspace Extractor (ZHE)	YT30090HW

Method-specific

Supelco® analytical products: Our high standards match yours

The indicators on our MQuant® pH test strips are chemically bonded to the cellulose backing, so they do not bleed and contaminate samples. They can remain in the sample indefinitely, ensuring highly accurate measurements—even in weakly buffered solutions. Our innovative transparent pH test strips allow accurate pH readings from cloudy or turbid samples. Simply wipe the back of the strip, and assess the color through the transparent film.

SigmaAldrich.com/mobile-lab

Inorganic acids and bases are used to modify the pH of water samples prior to extraction. This method-specified adjustment helps partition the analytes of interest into the organic solvent during liquid-liquid extraction. EMSURE® reagents are ideal for this purpose as they offer the outstanding purity needed for qualitative and quantitative analysis. Each EMSURE® product meets or exceeds international standards such as ISO, ACS, and Reag. Ph. Eur., and comes with an extensive Certificate of Analysis.



Key Products	Cat. No.
MQuant® pH Test Strips, for pH 0-14, box of 100	109535
MQuant® pH Test Strips, for pH 0-6.0, box of 100	109531
MQuant® pH Test Strips, for pH 5.0-10.0, box of 100	109533
MQuant® Transparent pH Test Strips, for turbid solutions, for pH 2-9, box of 100	109502
EMSURE® Hydrochloric Acid, 37%	100317
EMSURE® Sodium Hydroxide, pellets, ISO reagent, 99%	106498

our Multitaskers!

See pages 24-27 for **products used across lab focus areas**, such as matrix material standards, proficiency testing programs, water purification systems, and lab essentials.

reliable results

The right **SPE (solid phase extraction) products and accessories** are essential for precise extraction and cleanup. Our method-specified tubes and disks ensure reliable analyte recovery, and removal of matrix interferences. We also support you with vacuum manifolds and elution racks.

SigmaAldrich.com/spe

Solid phase microextraction (SPME) is a solvent-free extraction technique suitable for many environmental methods. As the market leader and key driver of this technique, we offer the most complete line of **SPME fibers and accessories**, as well as applications.

SigmaAldrich.com/spme



Our complete solution also includes **purge traps and glassware, derivatization reagents**, and **HPLC columns and accessories** needed for extraction, cleanup, and analysis of organic pollutants.

SigmaAldrich.com/brighter

Key Products	Cat. No.
Supelclean™ ENVI™-18 DSK SPE Disks , porous glass fiber filter embedded with C18 modified silica particles, 47 mm, pack of 24	57171
Supelco® Purge Trap K for Tekmar® 3000	24940-U
Supelclean™ ENVI™-Florisorb® SPE Tubes , 6 mL glass tube, PTFE frit, 1 g bed, pack of 30	54095-U
Supelclean™ ENVI™-Florisorb® SPE Tubes , 6 mL polypropylene tube, stainless steel frit, 1 g bed, pack of 30	57053
Millipore® Classic Glass Filter Holder , 47 mm, SS screen, perforated silicone stopper, anodized aluminum spring clamp	XX1004730
Millipore® Glass Vacuum Filtering Flask , with sidearm, 1 L	XX1004705
Visiprep™ DL Vacuum Manifold , disposable liner, 12 port	57044
Diazald® , 99%, 25 g	D28000
Whatman® Extraction Thimble , standard glass microfiber, 603G glass fiber, 33 x 94 mm, thickness 1.5 mm, pack of 25	WHA10371042
SPME Overcoated Fiber Assembly , PDMS/DVB/OC, 65 µm, pack of 3	57439-U
SPME Fiber Assembly , DVB/CAR/PDMS, 50/30 µm, pack of 3	57298-U
Ascentis® Express C18 , 15 cm x 4.6 mm I.D., 2.7 µm	53829-U

GO Digestion and Analysis of Metals elemental

SigmaAldrich.com/
enviro-metals



In sample preparation, pollutants are released into an inorganic acid through a digestion process. This dissolves or strips away the sample matrix, leaving the metal content in a solution that is compatible with instrumentation.

The extract may also require a concentration step to increase method sensitivity. Subsequent analysis is performed using inductively coupled plasma (ICP), atomic adsorption spectroscopy (AAS), or elemental analyzer instrumentation.



Impurities in reagents used for trace metal analysis can compromise measurement accuracy. That's why all our **inorganic reagents** for wet digestion are carefully tested for purity.

- Ultrapur™ acids: meet the highest demands for ultra-trace analysis in the ppt range
- Suprapur® acids: extremely low impurities for high-precision analysis in the ppb range
- OmniTrace Ultra™ and OmniTrace® acids: suitable for ppt and ppb levels, respectively (only available in North America)
- EMSURE® and EMPARTA® acids: ideal for analyses in the ppm and percent ranges, respectively

Produced and analyzed according to ISO/IEC 17025 and ISO 17034 / ISO Guide 34, our **TraceCERT®** and **Certipur® inorganic elemental standards** are high accuracy solutions for instrument calibration and process validation. We provide a broad portfolio of single and multi-element solutions for ICP and AAS.



Key Products	Cat. No.
Ultrapur™ Nitric Acid, 60%	101518
OmniTrace Ultra™ Nitric Acid	NX0408
Suprapur® Nitric Acid, 65%	100441
OmniTrace® Nitric Acid	NX0407
EMSURE® Nitric Acid, 65%	100456
Suprapur® Hydrochloric Acid, 30%	100318
EMSURE® Hydrochloric Acid, 37%	100317
Suprapur® Sulfuric Acid, 96%	100714
Certipur® Multi-Element ICP Standard Solution, 24 elements, each at 100 mg/L in dilute nitric acid	109492
TraceCERT® Periodic table mix 1 for ICP, 33 elements, each at 10 mg/L in dilute nitric acid	92091
TraceCERT® Copper Standard for ICP-MS, 1 mg/L in dilute nitric acid	41621
TraceCERT® Arsenic Standard for AAS, 1000 mg/L in dilute nitric acid	39436

our Multitaskers!

We also supply **accessories**, such as nebulizers, spray chambers, and torches, for many ICP/OES and ICP/MS instrument models.

See pages 24-27 for **products used across lab focus areas**, such as matrix material standards, proficiency testing programs, water purification systems, and lab essentials.

GO classical

Wet (Conventional)
Chemistry Techniques

SigmaAldrich.com/
enviro-wetchem



Also known as bench chemistry, this field covers a wide variety of techniques, including ion chromatography (IC), spectrophotometry (UV/Vis/IR), colorimetry, titration, distillation, direct read with electrodes, filtration, drying, and weighing. Since automation cannot be applied to some of these procedures, they may be more labor-intensive than other methods.

highest standards

With Supelco® analytical products, Consistency is our Standard

Our ISO/IEC 17025 and ISO Guide 34 accredited sites produce high-quality **wet chemistry standards**, as Certified Reference Materials (CRMs), Reference Materials (RMs), and analytical standards, for most organic and inorganic assays in wet chemistry. We also offer a variety of certified **pH buffer solutions**.

Ion chromatography (IC) is an analytical technique used for separation and quantitation of anions and cations in aqueous samples. We support you in this method with highly pure **IC eluents** that are ideal for achieving the low-ppm levels needed for trace analysis.



Key Products	Cat. No.
Anion Standard Solution , for IC, 6 anions, each at 10.0 mg/Kg	89886
Cation Standard Solution , for IC, 5 cations, each at 10.0 mg/Kg	89316
COD Standard Solution , CRM, traceable to NIST, 100 mg/L in water	125029
Certipur® Potassium Hydrogen Phthalate Standard	102400
Total Kjeldahl Nitrogen (TKN) Standard , 1000 mg/L	TKN1000
Certipur® Certified pH Buffer Solutions , 30 mL sachets, 10 each level (4.01, 7.00, 10.00), 30 sachets total	199006
Certipur® Certified pH 7.00 Buffer Solution	109407

unique stability



Titripur® certified **volumetric titration solutions** offer outstanding purity, quality, and reliability. These ready-to-use solutions are traceable to standard reference materials from the National Institute of Standards and Technology (NIST). Many are packaged in our unique Titripac® system. Constructed from a 4 or 10 L hermetically sealed plastic liner in a recyclable box, the design minimizes waste while keeping the solution stable from the first to the last drop.



Key Products	Cat. No.
Hydrochloric Acid , 0.1 N Titripur® volumetric solution, Titripac® packaging	109060
Silver Nitrate , 0.1 N Titripur® volumetric solution, Titripac® packaging	109081
Sodium Hydroxide , 0.1 N Titripur® volumetric solution, Titripac® packaging	109141

simple security



Our **syringe filters** help you filter samples and extracts quickly, easily, and securely. One great example is our range of Millex® filters for ion chromatography. Their low-binding, low-extractable polytetrafluoroethylene (PTFE) membrane removes particulates from aqueous and mild organic solvents to ensure cleaner IC spectra.

We offer optimal **filter discs** and **crucibles** for the determination of solids (dissolved, settleable, suspended, and total) in water samples. Our **vacuum filtration hardware** includes glass or stainless steel filter holders for 13, 25, 47, or 90 mm discs, glass reservoirs, glass filtration flasks, and vacuum pumps.

Key Products	Cat. No.
Sodium Bicarbonate Concentrate , 0.1 M NaHCO ₃ in water, eluent for IC	36486
Sodium Carbonate Concentrate , 0.1 M Na ₂ CO ₃ in water, eluent for IC	56169
Millex®-LCR Syringe Filter , hydrophilic PTFE, 0.45 µm, 25 mm, pack of 1000	SLCR025NK
Whatman® Spartan® Syringe Filter , regenerated cellulose, 0.2 µm, 13 mm, pack of 100	WHA10463100
MF-Millipore™ Filter Disc , hydrophilic mixed cellulose esters, 0.8 µm, 47 mm, pack of 100	AAWG04700
Millipore® Filter Disc , glass fiber without binder, for TDS/TSS, AP40, 0.7 µm, 47 mm, pack of 100	AP4004700
Matched-Weight Fluid Contamination Analysis Monitor	MAWP037PM
Coors™ Gooch Crucible , porcelain, 25 mL, with perforated bottom	Z247073
Whatman® Classic Glass Filter Holder , 47 mm, Stainless Steel	WHA1960054
Millipore® Glass Vacuum Filtering Flask , 1 L	XX1004705



just
prove it

Three key requirements of our Supelco® **spectrophotometry instruments and test kits** are accuracy, simplicity and durability. The Spectroquant® concept offers them all—in one convenient solution. High-quality instruments, over 200 test kits and methods for quantitative analysis of environmental parameters (many USEPA approved), customized applications, and start-to-finish quality assurance tools. Get all you need for water analysis. And just prove it.

SigmaAldrich.com/spectroquant
SigmaAldrich.com/USEPA

Thermoreactors, such as our versatile Spectroquant® TR 420 thermo-reactor, which allows digestion of up to 24 samples at once, are needed for sample preparation prior to determination of a range of important water quality measures. These parameters include COD, TOC, cadmium, chromium, cyanide, iron, lead, nickel, nitrogen, phosphorus, silver, and zinc, and can be measured using our validated, standard-compliant Spectroquant® test kits. All Spectroquant® test kits at a glance: SigmaAldrich.com/test-kits

Applications

Our photometric application notes offer a broad range of methods to support your production and analysis. Whether you need to determine COD in wastewater, the level of nitrate in soils, or the concentration of bromate in drinking water—over 200 application notes support your sample preparation and analysis. Get the right application for all your analytical needs from SigmaAldrich.com/wfa-applications



Key Products	Cat. No.
Spectroquant® Prove 300 UV/VIS Spectrophotometer , 190-320 nm UV, 320-1100 nm VIS, xenon flash lamp, 4 nm spectral bandwidth	173017
Spectroquant® Thermoreactor TR 420	171201
Chromate Spectroquant® Test Kit , for CrO ₄ (0.11-4.46 mg/L) and Cr(VI) (0.05-2.00 mg/L), 25 tests	114552
COD Spectroquant® Test Kit , 4.0-40.0 mg/L, 25 tests	114560
Sulfate Spectroquant® Test Kit , 5-250 mg/L, 25 tests	114548

GO Mobile

A comprehensive portfolio of Supelco® analytical products for accurate mobile testing



Accuracy on the go. Our portable, dust-tight and waterproofed **colorimeters** are made for reliable on-site analysis. Our Spectroquant® Move 100 instrument performs over 100 pre-programmed methods for water analysis. The Spectroquant® Move DC colorimeter provides fast and accurate results for the five important parameters in disinfection control: $\text{Cl}_2/\text{O}_3/\text{ClO}_2/\text{CyA}/\text{pH}$. Both models have an IP 68 classification.

SigmaAldrich.com/move

MQuant® StripScan App

Use the smartphone-based test strip readout for accurate analysis and data management. A quick, easy, and reliable app for superior precision and finer gradation of results, and convenient graphical analysis.

Share and save your measurements with the MQuant® StripScan App, MQuant® Test Strips, and MQuant® StripScan Reference Cards. Download your free app:

SigmaAldrich.com/mquant-stripscan



Strip – Dip – Read

Take your lab to the sample with the compact and easy-to use RQflex® 20 **reflectometer** from Supelco® analytical products. Find out how our Reflectoquant® tests, along with our extensive application note collection can support your mobile analyses.

SigmaAldrich.com/reflectoquant



Find accuracy in turbid solutions.

Our Turbiquant™ 1100 **turbidimeter** provides clarity and reliable results in any water solution or sample. The portable instrument can be combined with our non-toxic calibration standards for analysis according to EN ISO 7027 or USEPA 180.1.

Key Products	Cat. No.
Reflectoquant® RQflex® 20, Reflectometer	117246
Turbiquant™ 1100 IR portable Turbidimeter, 0.02–1,100 NTU	118324 (IR LED)
Turbiquant™ 1100 T portable Turbidimeter, 0.02–1,100 NTU	118325 (white light tungsten lamp)
Spectroquant® Move 100 Colorimeter	173632
Spectroquant® Move DC Colorimeter	173635
MQuant® StripScan Reference Card for the measurement of MQuant® pH-indicator strips pH 0 – 14	103736
MQuant® StripScan Reference Card for the measurement of MQuant® Nitrate Test	103733
MQuant® pH-indicator strips pH 0 – 14	109535
MQuant® Nitrate Test Strips, 10 - 25 - 50 - 100 - 250 - 500 mg/l NO_3	110020

GO

Preparation and Analysis of Microbial Organisms

Micro



SigmaAldrich.com/
enviro-micro

To protect human health, government agencies have developed special methods for collecting, detecting, and quantifying various microorganisms in drinking water. The most common tests are for coliforms (total and/or fecal) and *Escherichia coli*.

great performance

Our **microbiological water filtration devices** deliver optimal performance while streamlining your membrane filtration workflow for optimal microbial recovery.

- EZ-Fit® Filtration Unit: disposable, all-in-one, sterilized device with filter holder, membrane filter disc, and funnel
- EZ-Fit® Manifold: quick-fit connections and filtration head options
- EZ-Fit® Filtration Units; internal areas accessible without tools for easy cleaning
- EZ-Stream® Vacuum Pump: fluid flows directly through the pump to waste, eliminating need for intermediate waste containers



Key Products

EZ-Fit® Filtration Unit, sterile, white gridded MCE, 0.45 µm, with adsorbent pad, 250 mL funnel, individual packaged, pack of 48

Cat. No.

EFHAW250I

EZ-Fit® Filtration Unit, sterile, white gridded MCE, 0.45 µm, 100 mL funnel, multipacks, total of 48 units

EFHAW10MS

EZ-Fit® Manifold, 6-place, for EZ-Fit® Filtration Units

EZFITEFUN6

EZ-Stream® Vacuum Pump, for liquid transfer, 3.8 to 4.0 L/min

EZSTREAM1



rich in culture

We offer a wide range of **coliform test solutions**, enabling you to choose the correct method for your analysis. Choose from our ISO compliant products such as our Chromocult® coliform agar (CCA), or classical Lauryl Sulfate Broth, to our EPA accredited ReadyCult® media and m-ColiBlue24® media.

Chromogenic and fluorogenic media, such as our Chromocult® and ReadyCult® media, which incorporate special substrates that can be cleaved by some bacterial enzymes. This releases a chromogen or fluorogen, causing a distinct color change around the colony, or fluorescence under UV light. We offer a choice of broth and agar formats.

Other options for **culture media** include a complete portfolio of ready-to-use culture media, dehydrated culture media based on our unique granulation technology, and ready-to-use liquid media in convenient single-test 2 mL ampoules.

Vitroids™ and LENTICULE® discs are **microorganism standards** with a certified CFU count. Produced in ISO/IEC 17025 and ISO Guide 34 accredited facilities, these Certified Reference Materials (CRMs) are traceable to validated culture collection strains. Each product consists of pure bacteria or fungi culture in a solid, water soluble matrix that can be rehydrated in just 10 minutes. Our unique preservation technology ensures stability for up to 3 years.

Key Products	Cat. No.
mColibblue 24™ , Total coliform and <i>E. coli</i> Test Kit, 150 tests	HAWGPDMCB
M-FC™ , Fecal Coliform Test Kit, 150 tests	HAWGPD2F
Chromocult® coliform agar , Chromogenic coliform agar, 500 g	1104260500
ReadyCult® coliforms 100 , Fluorogenic media, 20 snap-packs	1012980001
ReadyPlate™ 55 CCA ISO 9308 , 20 pcs x 55 mm plates	1467570020
ReadyPlate™ 55 Kit CCA ISO 9308 , sterile pre-filled plates and sterile membrane filter discs, 150 tests	1467580150
Vitroids™ certified reference material , <i>Escherichia coli</i> , WDCM 00012, 50-80 CFU mean value range	VT000122

big selection

Gridded membrane filters of mixed cellulose esters (MCE) are perfect for collecting microbial organisms in water samples. Our EZ-Pak® Membrane Dispenser Curve provides high-speed, sterile dispensing with no-touch operation.

We offer several **Petri dishes** to suit different needs, as well as **adsorbent pads** that can be loaded into any Petri dish and saturated with media.

- ReadyPlate™ 55 CCA ISO 9308: sterile 55 mm plates pre-filled with Chromocult® coliform agar for enumeration of *E. coli* and coliforms
- Petri-Pad™: sterile Petri dishes pre-loaded with adsorbent pads, ready for liquid broth
- PetriSlides™: one-piece dish/base design for easy mounting onto a microscope stage; novel alternative to classic Petri dishes
- R2A agar: for the recovery of stressed heterotrophic bacteria found in various types of water.



Our selection of commonly-used **equipment** includes: single- and dual-chamber lab incubators, blunt end stainless steel filter forceps, stereo microscopes, and lab-scale UV sterilizers for decontaminating 47 mm filter holders between samples.

Key Products	Cat. No.
EZ-Pak® Membrane Dispenser Curve , rechargeable battery pack	EZCURVE01
EZ-Pak® Membrane Filter Disc , sterile, white gridded MCE, 0.45 µm, 47 mm, 4 cartridges of 150 discs each	EZHAWG474
MF-Millipore® Membrane Filter Disc , white gridded MCE, 0.45 µm, 47 mm, pack of 100	HAWG04700
S-Pak® Membrane Filter Disc , sterile, white gridded MCE, 0.45 µm, 47 mm, individually sealed, pack of 600	HAWG047S6
m-HPC Broth, 2mL plastic ampoules , pack of 50	MHA000P2S
Petri-Pad™ Petri Dish , sterile, preloaded with 47 mm adsorbent pad discs, pack of 150	PD20047S0
PetriSlides™ Dish , sterile, dish preloaded with 47 mm adsorbent pad discs, pack of 100	PDMA04700
Absorbent Pad , 47 mm disc, pack of 100	AP1004700
Jenco™ GL series Stereo Microscope , 115 V, binocular, 7:1 zoom ratio, 6.5-45X, halogen/fluorescent	Z736511

our multitaskers!

See pages 24-27 for **products used across lab focus areas**, such as matrix material standards, proficiency testing programs, water purification systems, and lab essentials.

GO natural

Matrix Material Standards



[SigmaAldrich.com/
enviro-quality](http://SigmaAldrich.com/enviro-quality)

Our high standards match yours.

Be sure of your quality assurance results with our Supelco® **matrix material standards**. Produced in our ISO/IEC 17025 and ISO 17034 accredited facility, every standard is a Certified Reference Material (CRM) consisting of a matrix pre-spiked with certified levels of target analyte(s). We offer various matrices to suit your needs: drinking water, wastewater, seawater, soils, paints, plastic, oil, and transformer oil.

Our **soil matrices** are complex mixtures of the main components of natural soils: soil, clay, loam, sand, and sediment. Each is engineered to replicate the natural conditions of soil maturation. Then we add target analytes in multiple stages before grinding. This proprietary production process results in high-quality soil CRMs that closely resemble real field samples.



certified quality

No Dilution. No Doubts. No Delays.

Our Supelco® certified standard solutions (CRMs) are perfect for quality control for photometric methods, standards and our Spectroquant® Test Kits. Whether you are analyzing drinking water, process water or wastewater, you'll have no doubts, no dilution, and no delays. Just open a bottle of our certified reference materials and experience the highest standard in accuracy.

SigmaAldrich.com/wfa-crm-standards



Key Products	Cat. No.
BTEX/GRO in Sandy Loam, CRM, 30 g	CRM500
BNAs in Sandy Soil, CRM, 100 g	CRM122
Chlorinated Pesticides in Real Soil Analog, CRM, 50 g	SQC009
TPH in Sand, CRM, 100 g	CRM372
Trace Metals in Loamy Clay, CRM, 50 g	CRM052
Metals in Sewage Sludge, CRM, 30 g	SQC001S
Chromium VI in Sandy Loam, CRM, 30 g	CRM061
Anions in Loamy Sand, CRM, 50 g	CRM702
Nutrients in Real Soil Analog, CRM, 100 g	SQC014

Proficiency Testing

GO pro



SigmaAldrich.com/pt

Reference materials from the Supelco® portfolio for accurate results

With over 20 years' experience in proficiency testing (PT), we offer proven products and services from Supelco® to help you demonstrate your lab's expertise. Our **PT studies** cover all major environmental parameters in organic compounds, metals, wet chemistry, and microorganisms.

For each study, you will receive a high-quality PT sample, produced at our ISO/IEC 17025 and ISO/IEC 17043 accredited facility in Laramie, Wyoming (USA). We deliver over 20,000 samples every year to more than 2,500 participants around the world.

Choose from a broad range of US EPA/global PT schemes for:

- WS (Water Supply/Drinking Water)
- WP (Water Pollution/Waste Water)
- LPTP (Solids/Soils/Hazardous Waste)
- AIR (Air)
- PEP (Pharmaceutical)
- MIC (Microbiology)

WS WP
LPTP
AIR
PEP
MIC

We also offer several country-specific PTs (DMRQA/WETT), and state-specific Underground Storage Tank (UST) PTs.

Quick-turn studies are similar to scheduled PT schemes, but are available on demand whenever you need them. Laboratory QA departments use these for corrective action, to train new personnel, to validate new methods, or as blind samples for demonstrating analytical competence.

Visit SigmaAldrich.com/pt to learn more about:

- PT schemes (parameters, matrices and methodologies)
- PT testing schedules
- Quick-turn studies
- Requesting quotations (RFQ)
- Our new online reporting system
- Training videos
- ISO certificates



Get your Proficiency Testing evaluation report at
MilliporeSigma-pt.com

GO

Water Purification Systems

pure



SigmaAldrich.com/
water-purification

We supply a broad range of ultrapure (Type 1) and pure (Type 2) **water purification systems** suitable for environmental analysis. For utmost precision, our Milli-Q® systems combine optimized water purification with unique monitoring technologies. Patented features include: advanced RO, time-saving Elix® EDI technology, A10® TOC monitoring, mercury-free ech₂o® UV lamps, and high-efficiency IPAK purification cartridges.

Q-POD® and E-POD® water dispensers greatly simplify water delivery, providing essential data and easy operation in compact formats.

- **Get the right water quality for your analysis:** Each POD dispenser can be fitted with a range of Application-Pak polishers that provide final purification to match water quality to your application needs.
- **Streamline your work:** Convenient and adaptable handling enables intuitive and precise dispensing. Set the volume and flow rate you need by either twisting the dispense wheel or programming the touchscreen interface.
- **Free up space on your bench:** As only the POD is needed for daily work, the system can be conveniently stored under the bench or on the wall.

Several **Application-Paks** are available for removing targeted contaminants at the water dispenser. Examples include: VOC-Pak® Polisher for water free of volatile organic contaminants; EDS-Pak® Polisher for water free of endocrine disrupting chemicals; and LC-Pak® Polisher for HPLC and LC-MS analyses.



our ultimate Lab water solution

Introducing the NEW Milli-Q® IQ 7003/7005
Integrated Ultrapure & Pure Water System

Key Products

Milli-Q® IQ 7000 Water Purification System,
Feed: Type 2 water, output 2 L/min Type 1 water

Cat. No.
ZIQ7000WW

Milli-Q® IQ 7003 and 7005 Water Purification Systems,
Feed: potable tap water, output: 3 or 5 L/hr Type 2 water; 2 L/min Type 1 water

ZIQ7003T0
ZIQ7005T0

Elix® Advantage 10 Water Purification System,
Feed: potable tap water, output: 10 L/hr Type 2 water

ZRXV010WW

VOC-Pak® Polisher, for Milli-Q® IQ Systems

V0CPAK0A1

EDS-Pak® Polisher, for Milli-Q® IQ Systems

EDSPAK0A1

LC-Pak® Polisher, for Milli-Q® IQ Systems

LCPAK00A1

Contact your Account Manager or Lab Water Specialist for more details on this, or any other system, to ensure you get the proper system and accessories for your specific application.

Lab Essentials

GO easy



SigmaAldrich.com/
labware

Our high-quality lab essentials are designed to simplify your work, and are suitable for numerous environmental applications, such as extraction, digestion, sample preparation, and extract cleanup.

Find all your lab essentials in our comprehensive portfolio:

- **Glassware and plasticware:** separatory funnels, liquid-liquid concentrators, Soxhlet extractors, condensers, beakers, Kuderna-Danish concentrators, titration or distillation equipment
- **Lab tools:** stainless steel spatulas or scoops, Class A pipettes
- **General supplies:** Pasteur pipettes, boiling chips
- **Equipment:** balances, ovens, furnaces, hot plates, stirrers, heating mantles
- **Safety products:** Gloves, glasses, lab coats

it's that simple

With Extran® **cleaning reagents**, you have no residues, no impurities, no harsh chemicals, and no scents. Just pure biodegradable cleaning power. Choose from formulations for manual or automated use.

Quickly cleanup accidental spills of harmful, aggressive, or unpleasant liquids with safe, eco-friendly Chemizorb® **spill kits**. The range includes powder and granule absorbents for general use, and specific formulations for acids, alkalis and mercury.



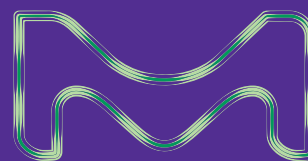
Key Products	Cat. No.
Pyrex® Economy Squibb Separatory Funnel , 2 L, polyethylene stopper, PTFE stopcock	CLS64062L
Lab Spoon , stainless steel, 7.5 inch, one spoon end, one blade end, pack of 6	Z511455
Pasteur Pipettes , non-sterile, 5.75 inch (146 mm), standard tip, soda lime	CLS7095B5X
Cleaning Reagent, Extran® MA 02 , neutral, concentrate, for manual cleaning	107553
Cleaning Reagent, Extran® MA 01 , alkaline, concentrate, for manual cleaning	107555
Safety Carrier for 2.5L glass bottles	963533
Spill Kit, Chemizorb® Granules , for general use	101568

To learn more about our high-quality solutions
for environmental testing, please visit:

SigmaAldrich.com/enviro

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