BIG SCIENCE SMALLER FOOTPRINT

Sustainable lab products,
solutions & services
for responsible science

Click to start

Sigma-Aldrich®
Lab & Production Materials

Supelco®
Analytical Products

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Milli-Q®
Lab Water Solutions

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

Sigma-Aldrich®

Lab & Production Materials

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.

Supelco®

Analytical Products

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

Millipore®

Preparation, Separation, Filtration & Monitoring Products

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.

Milli-Q®

Lab Water Solutions

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, assist with your compliance needs, and work seamlessly together, letting you focus on your vital work.

Our Goals

Our Progress

Your Opportunities

BIG SCIENCE SMALLER FOOTPRINT

Greener Products

DOZN™ 2.0 Tool

Contact

BIG SCIENCE SMALLER FOOTPRINT

Our Goals

Our Progress

Your Opportunities

- Chemistry R&D Lab
- Biology Lab
- Testing / QC Lab
- Procurement

Greener Products

DOZN™ 2.0 Tool

Contact

Sustainability

Rooted in Responsibility

BIG SCIENCE SMALLER FOOTPRINT

Our mission is to **impact life and health with science.**
We believe that scientific progress and responsible research go hand in hand, enabling us to tackle global challenges and create a more **sustainable future for everyone** – our customers, our company, and society at large.

To ensure that we're always faithful to our mission, we developed the **Merck Sustainability Strategy: three goals and seven focus areas** that make sustainability a key indicator of our success across all our business sectors.

At Merck, we are continuously looking for ways to reduce the footprint of our products but also of our customers' labs and the related processes.

This interactive document highlights our goals, progress and achievements, and presents you with numerous **opportunities to reduce your environmental footprint.**

Sustainability Strategy

Corporate Sustainability Report

Merck’s Sustainability Strategy

Our 3 Goals and 7 Focus Areas

01

Dedicated to human progress

In 2030, we will achieve human progress for more than one billion people through sustainable science and technology.

Our focus areas

- Sustainable innovations and technology for our customers
- Impact of our technologies and products on health and well-being

Focus SDGs 3 8 9 17

02

Creating sustainable value chains

By 2030, we will integrate sustainability into all our value chains.

Our focus areas

- Sustainability culture and values
- Sustainable and transparent supply chain
- Securing our social license to operate in all regions

Focus SDGs 8 12 17

03

Reducing our ecological footprint

By 2040, we will achieve climate neutrality and reduce our resource consumption.

Our focus areas

- Climate change and emissons
- Water and resource intensity

Focus SDGs 9 12 17

Smaller Footprints

From Product Development to Disposal

We aim to reduce the impact of our products on health and the environment. Discover some examples of what makes our product value chain more sustainable: from development and a responsible supply chain, to production and storage, to packaging and disposal recommendations.

Product Development
Design for Sustainability (DfS)

Procurement
Responsible Supply Chain

Production
Environmental Stewardship

Packaging
SMASH Packaging Plan

Storage
Small Steps – Big Impact

Distribution
Together for Sustainability (TfS)

Disposal
Single Use Products

Certificates
Certification

Quality Control
Smaller Sample Sizes for Testing

Marketing & Sales
Virtual Meetings and Seminars

Ratings & Rankings
External ratings

Product Safety
Smart, Quick, Easy

Certification

Working to the Highest International Standards

CERTIFICATE

This is to certify that

Merck KGaA
Frankfurter Strasse 250
64293 Darmstadt
Germany

with the organizational units/sites as listed in the annex

has implemented and maintains an **Environmental Management System**.

Scope:
Development, production and distribution of pharmaceuticals, chemical products and analytical systems.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 14001 : 2015

Certificate registration no.	005356 UM15
Date of revision	2022-04-28
Valid from	2020-12-17
Valid until	2023-12-16
Date of certification	2022-04-28

DQS GmbH

Markus Bieher
Managing Director

Accredited Body: DQS GmbH, August-Schanz-Straße 21, 60433 Frankfurt am Main, Germany 1 / 21

CERTIFICATE

This is to certify that

Merck KGaA
Frankfurter Strasse 250
64293 Darmstadt
Germany

with the organizational units/sites as listed in the annex

has implemented and maintains an **Energy Management System**.

Scope:
Development, production and distribution of pharmaceuticals, chemicals and analytical systems as well as operation of infrastructure facilities (including energy supply and measurements)

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 50001 : 2018

Certificate registration no.	005356 EMSt18
Date of revision	2021-03-15
Valid from	2020-12-18
Valid until	2023-12-17
Date of certification	2021-03-15

DQS GmbH

Markus Bieher
Managing Director

Accredited Body: DQS GmbH, August-Schanz-Straße 21, 60433 Frankfurt am Main, Germany 1 / 2

Website ISO Certificates

ISO 14001 Certification

ISO 50001 Certification

81 of our global sites have ISO 14001 certification: an **environmental management** system with predefined indicators for greenhouse gas emissions, water use and other factors

13 of our sites are pursuing ISO 50001 certification: the international standard for **energy management**, which plays a major role in climate action

Product Development

Design for Sustainability (DfS)

Goals

Design for Sustainability (DfS) is a comprehensive approach to environmental stewardship of our products, made up of **development, consulting and reengineering.**
It is incorporated at an early stage to ensure products have sustainability at their core.

Stericup® E and **Steritop® E filtration systems** and **EZ-Fit® vacuum manifold** are examples of product redesigns using DfS principles to reduce environmental impacts.

- **Stericup® E:** up to 26% less plastic, 20% less packaging
- **Steritop® E:** up to 48% less plastic, 69% less packaging

(Compared to traditional Stericup® & Steritop® filters)

Link to our Website

LEARN MORE: **DfS Criteria**

Product Development

Design for Sustainability (DfS)

Product Sustainability Criteria

Our **key targets** for developing greener alternative products.

MATERIALS
- Dematerialization
- Materials selection
- Substances of concern
- Greener chemicals (DOZN)
- Animal-derived substances

ENERGY & EMISSIONS
- Manufacturing
- Distribution
- Product use

USABILITY & INNOVATION
- Product usability
- Packaging usability
- Innovation

WATER
- Manufacturing
- Product Use

SUPPLIERS & MANUFACTURING
- Operational excellence
- Supply chain sustainability

PACKAGING
- Resource optimization
- Zero deforestation
- Plastic sustainability
- Recyclability

CIRCULAR ECONOMY
- Material efficiency
- Product longevity
- Recyclability via design
- Recyclability via infrastructure

Procurement

Our Responsible Supply Chain

To develop, manufacture and commercialize our products, we need raw materials, packaging, technologies, components, and services. Regardless of our requirements, **responsible procurement is essential** to our supply chain. We hold ourselves to the highest **environmental, ethical, social and legal standards.** And expect our suppliers to do so, too.

That’s why our Procurement organization works with comprehensive databases, **evaluating more than 50,000 suppliers** – not only on their quality, supply reliability and competitive pricing, but also on various **aspects of sustainability,** such as **mineral conflicts, human rights, dangerous processes,** and many more.

Sustainable supply chain management

Quality Control

Smaller Sample Sizes for Testing

Our QC teams work according to **validated or verified processes,** using qualified equipment and analytical systems to ensure that our methods and products not only offer an **outstanding customer experience every time,** but also **fulfill Merck's EHS policy** and sustainability guidelines.

As part of this effort, we are **shrinking our sample sizes to minimize waste and maximize the safety of our QC staff.**

Quality Mission Statement

Production

Environmental Stewardship

All our production sites follow **strict environmental protocols,** and continually adapt their processes to new regulations. Due to the growing scarcity of natural resources, each site is also committed to using energy, water and raw materials as efficiently as possible. Below are a few of our goals and achievements.

50% less greenhouse gas emissions

by 2030, we intend to lower our direct (Scope 1) and indirect (Scope 2) greenhouse gas emissions by 50% compared with 2020

5% lower Waste Score

by 2025 (2016 baseline) to reduce raw material loss & environmental impact of waste disposal

Continually minimize EHS incidence rate

by avoiding production hazards, accidents, outages and chemical leaks.

Assess wastewater management practices

at all sites to identify areas for improvement.

10% lower water intensity score

by 2025 compared with 2020

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Despite operational growth, our greenhouse gas emissions were 9% lower in 2021 compared to 2020

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Our EHS Incident Rate in 2021 was 3.9.

Assess wastewater management practices

at all sites to identify areas for improvement.

10% lower water intensity score

by 2025 compared with 2020

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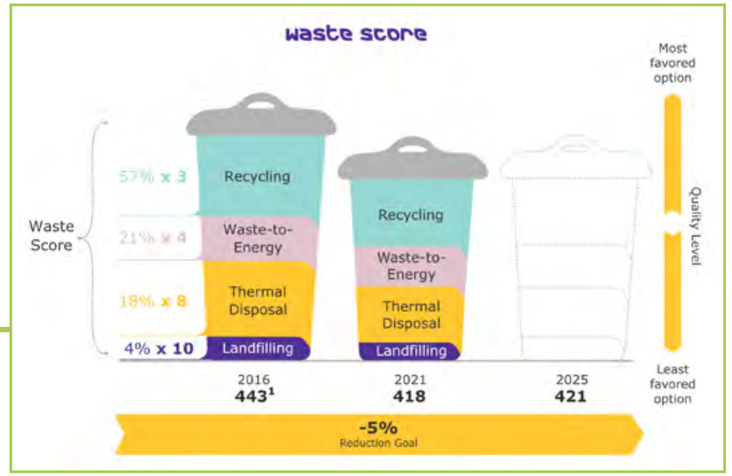

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Assess wastewater management practices

at all sites to identify areas for improvement.

Continually minimize EHS incidence rate

by avoiding production hazards, accidents, outages and chemical leaks.

10% lower water intensity score

by 2025 compared with 2020

In 2021, we recycled a total of 23.5 million cubic meters of water

Production

Environmental Stewardship

All our production sites follow **strict environmental protocols,** and continually adapt their processes to new regulations. Due to the growing scarcity of natural resources, each site is also committed to using energy, water and raw materials as efficiently as possible. Below are a few of our goals and achievements.

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by 2030, we intend to lower our direct (Scope 1) and indirect (Scope 2) greenhouse gas emissions by 50% compared with 2020

5% lower Waste Score

by 2025 (2016 baseline) to reduce raw material loss & environmental impact of waste disposal

We consistently meet increasingly stringent water quality standards.

Assess wastewater management practices

at all sites to identify areas for improvement.

Continually minimize EHS incidence rate

by avoiding production hazards, accidents, outages and chemical leaks.

10% lower water intensity score

by 2025 compared with 2020

Packaging

SMASH Packaging Plan

PILLAR	OPTIMIZE RESOURCES	MORE SUSTAINABLE MATERIALS		DESIGN FOR CIRCULAR ECONOMY
GOAL	**Shrink** Reduce amount of packaging	**Secure** Achieve zero deforestation	**Switch** Improve plastic sustainability	**Save** Maximize recycling
OUR 2022 TARGETS	• New product packaging aligned with our standards for weight and volume • 20 key improvement projects for existing packaging • 20% reduction of air space in distribution boxes	• New product packaging aligned with our zero deforestation standards • 90% of existing packaging aligned with our zero deforestation standards • 100% of packaging from deforestation-risk countries certified sustainably sourced	• New product packaging aligned with our plastic sustainability standards • 20 improvement projects to replace existing plastic packaging by more sustainable solutions • 20% reduction of expanded polystyrene (EPS) use	• New product packaging aligned with our standards for recyclability • 100% of fiber-based packaging not compatible with recycling, replaced • 100% of products with packaging recycling / disposal guidance

We continuously enhance the packaging of more than 300,000 products in our Life Science portfolio to help reduce our customers' and our company's environmental impact. Our **4-year SMASH Packaging Plan** sets new standards to shrink, secure, switch and save packaging – while still meeting performance requirements and safety regulations. Our **new and improved SMASH Packaging Plan** will kickoff in 2023.

Download Brochure

Packaging

SMASHing Results in 2021

PILLAR	OPTIMIZE RESOURCES		MORE SUSTAINABLE MATERIALS		DESIGN FOR CIRCULAR ECONOMY
GOAL	**Shrink** Reduce amount of packaging		**Secure** Achieve zero deforestation	**Switch** Improve plastic sustainability	**Save** Maximize recycling
2022 TARGETS & 2021 PROGRESS	New product packaging aligned with our standards and transit regulations for weight and volume		New product packaging aligned with our zero deforestation standards	New product packaging aligned with our plastic sustainability standards	New product packaging aligned with our standards for recyclability
	Enhanced Design for Sustainability framework including our new packaging sustainability standards and created resources to help our development teams to design more sustainable product packaging solutions. Packaging of recently launched greener alternatives products aligned with our new packaging sustainability standards.				
	20 key improvement projects for existing packaging 15 product and distribution packaging improvement projects resulting in a total annual reduction of 250+ metric tons.		90% of existing packaging aligned with our zero deforestation standards 100% of packaging from deforestation-risk countries certified sustainably sourced 71.5% of packaging (sourced directly) aligned with our zero deforestation standards. This represents an 8% increase from 2019. Sustainable forestry certification added to 800+ metric tons of corrugated and paperboard materials.	20 improvement projects to replace existing plastic packaging by more sustainable solutions 10 product packaging improvement projects and distribution packaging improvement initiatives with projects at multiple locations.	Replace 100% of fiber-based packaging not compatible with recycling 70 metric tons of non-recyclable edge protectors replaced by 100% paper-based alternative. New process implemented for the reuse of wood pallets, resulting in the avoidance of 1,000 metric tons of wood pallets sourced annually.
	20% reduction of air space in distribution boxes Global improvement plan development in progress. "Packaging for smalls" projects completed at several distribution centers which will result in an annual reduction of 65+ metric tons of packaging.			Reduce Expanded Polystyrene (EPS) use by 20% Three million molded pulp inserts used annually in replacement of EPS for glass bottle inserts. Validation plan for our new greener coolers developed. Rollout in US expected by end of 2022, resulting in annual EPS reduction of 5,000+ m^3.	Clear recycling / disposal communications for 100% of products Global packaging recycling guidance approach in development. Rollout of the first version of this solution by end of 2022.

Not Started *On track* *Focus required* *Off track* *Achieved*

EXAMPLE: Weight reduction HDPE-bottles

Packaging

Weight Reduction of PE Bottles

Losing weight, gaining sustainability

We reduced the weight and improved the shape of our **2.5 L HDPE bottle for liquids to save 65 g of PE** material per bottle. The new design also saves storage space and transport costs, while optimizing pallet usage (from 96 to 144 bottles) and increasing pressure stability (from 0.5 to 2.5 bar).

Through enhanced production process, we also reduced the weight of our **HDPE wide-necked bottles for solids.** They are now around **38 g lighter,** depending on bottle size.

60
Tons of PE
saved per year

60
Tons of PE
saved per year

Storage

Small Steps – Big Impact

Optimization through resource reduction

- **Merck PRE Packing System** calculates minimal amount of cardboard box needed per order
- **Pulp and paper** instead of polystyrene
- **Reusable, air-filled PE bags** for load security
- **Collection and reuse** of used cardboard boxes which are still in good shape
- **Recycle cardboard**
- **Recycle shrink-wrap**

Distribution

Together for Sustainability (TfS)

TOGETHER FOR SUSTAINABILITY

Merck is an **active member of Together for Sustainability,** a joint initiative and global network of 29 chemical companies, which delivers the **gold standard for environmental, social and governance performance of chemical supply chains.**

Marketing & Sales

Virtual Meetings and Seminars

Virtual meetings and online seminars on SigmaAldrich.com allow us to connect with customers, and help solve their toughest challenges in Life Science – **without the environmental impacts of travel.**

Request Virtual Seminar (WE only)

Join our Webinars

Product Safety

Smart, Quick, Easy

Due to our ever-growing portfolio and a desire to be responsible stewards, we use innovative tools and big data to catalog our chemical substances so we can **provide fast, accurate safety information to our customers.**

Our latest tools

- **My M Safety app:** access the latest product safety information any time, from anywhere in the world
- **Smart label with 2D data matrix barcode:** get digitalized, up-to-date product data with just one touch

These digital tools also reduces the usage of paper.

Discover My M Safety App

Disposal

Single-Use Products

We are committed to assisting customers with their waste reduction goals and **develop reuse and recycling programs** for many of our products and packaging.

Biopharma Recycling Program (US)

This first-of-its-kind Biopharma Recycling Program recycles single-use product waste into industrial-grade plastic lumber products. Even when classified as biohazardous, plastic biopharma waste can be safely recycled into traceable plastic products.

One commercially operating biopharma facility is estimated to produce more than 150 tons of used product material per year. That’s enough material to fill seven 45-foot tractor trailers. Since the program’s inception in 2015, we have recycled over 8,000 metric tons of biopharma waste.

We are continually working to evolve recycling for the industry and will be expanding our offerings as new technologies emerge.

Link to our Website

Ratings & Rankings

External ratings recognize our sustainability efforts

ESG Rating from MSCI

In 2022, we again received a rating of "AAA" (on a scale of AAA-CCC) in the MSCI ESG Ratings assessment.

EcoVadis Rating

The independent rating agency EcoVadis assesses suppliers from 160 countries across the categories of environment, social affairs, ethics, and sustainable procurement. **In 2022** we were awarded the **Gold recognition level** and were thus among the **top 3%** of all participating companies.

Indices and Rating

Chemistry R&D Lab

Your opportunities for more sustainable lab work

Greener Alternative Products **A-L**

Greener Alternative Products **M-Z**

Waste Reduction

More Sustainable Alternatives

- Bio-Based Solvents
- Cyrene™ & Cyrene™ Blends
- Designer Surfactants for Micellar Catalysis
- ElectroGreen™ Blends
- Energy Generation – OPV and Perovskite solar cells
- Greener Alternative Solvents
- Greener Electronic Inks
- Greener manufacturing by 3D printing
- Greener manufacturing with R&D 100 awarded Inks
- Liquid organic battery electrolyte

Greener Alternative Products **M-Z**

Chemistry R&D Lab

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Greener Alternative Products **A-L**

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Waste Reduction

More Sustainable Alternatives

- Milli-Q® Lab Water Solutions
- Nanomaterials – bio-sourced
- Non-Precious Metal Catalysts
- Organic battery electrode materials
- Polyethylene Glycol (PEGs)
- Polymerization Tools
- Polymers – bio-sourced
- Synthetic-Based Solvents

Greener Alternative Products **A-L**

Greener Alternative Products

Bio-Based Solvents

Supelco®
Analytical Products

Made of renewable raw materials, our high-quality bio-based solvents easily **replace synthetic chemical solvents,** and **reduce environmental impact,** but **preserve functional efficacy.**

Their **production is also safer** for the environment than with fossil-based solvents.

Bio-Based Ethanol
Alternative to synthetic ethanol, made from grain or sugar cane

Ethyl(-)-L-Lactate
Alternative to ethyl acetate & acetone, made by fermenting sugar

Bio-Based Glycerol
Alternative to petroleum-based glycerol, made from rapeseed and is a by-product of biodiesel production

2-Methyltetrahydrofuran (Methyl THF)
Alternative to dichloromethane & tetrahydrofuran, made from corncobs and sugarcane bagasse

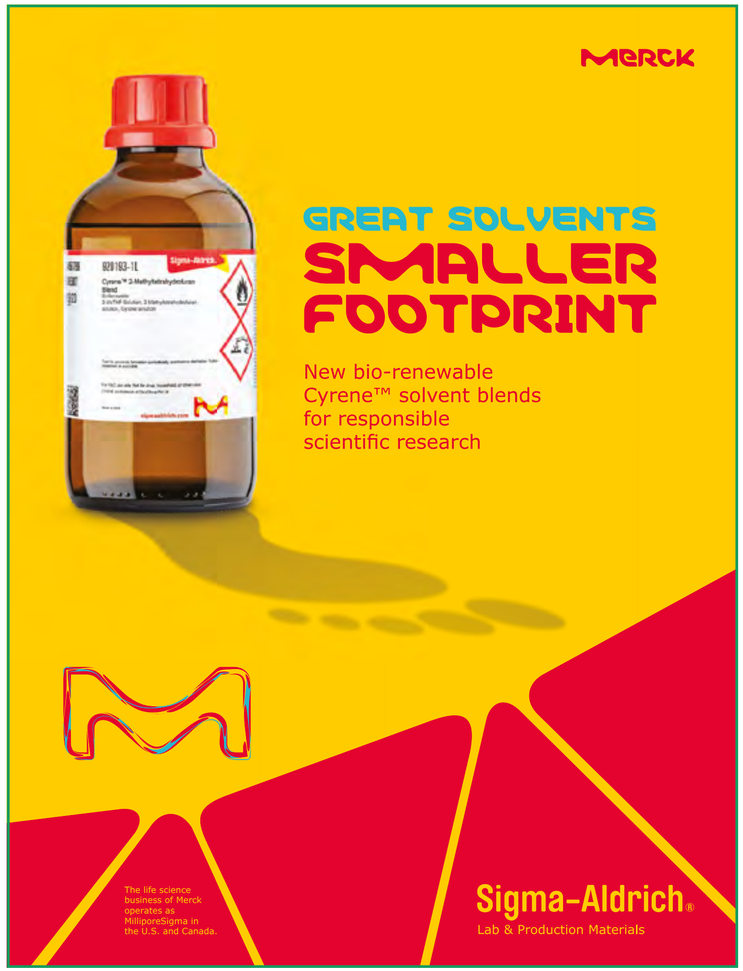
Download Brochure

Link to our Website

Greener Alternative Products

Cyrene™ & Cyrene™ Blends

Sigma-Aldrich®
Lab & Production Materials



Cyrene is a trademark of Circa Group Pvt Ltd.

Experience greater performance with lower environmental impact by switching from NMP and DMF to Cyrene™ and Cyrene™ Blends.

Cyrene™ is a dipolar aprotic alternative to common REACH-restricted solvents, such as N-methyl-2-pyrrolidone (NMP). One of the first true greener solvents, Cyrene™ is produced from renewable resources, and safe for end-of-life disposal, decomposing into CO_2 and H_2O.

Cyrene™ 2-Methyltetrahydrofuran Blend and **Cyrene™ γ-Valerolactone Blend** combine the benefits of Cyrene™ with those of two bio-renewable solvents. While they maintain the excellent efficacy of Cyrene™, the new blends offer considerably lower viscosity.

100%
bio-renewable carbon

Petroleum-free

Low
toxicity

Download Cyrene™ Blends Flyer

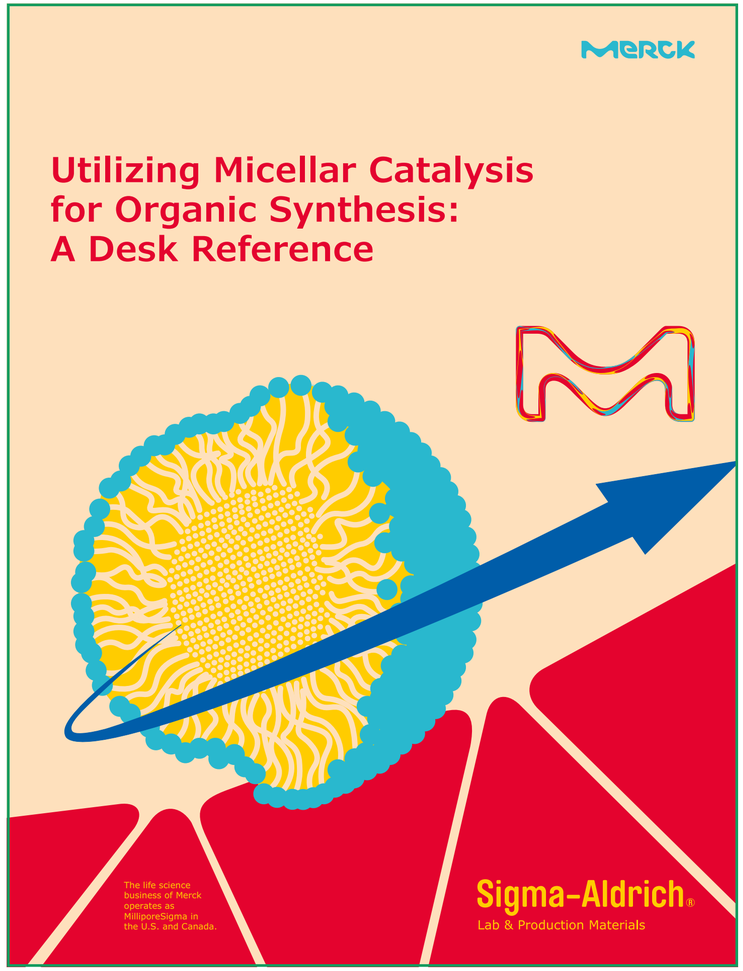
Download Application Note

Link to our Website

Greener Alternative Products

Micellar catalysis

allows you to switch from organic solvents to water, a more sustainable solvent …



Micellar catalysis allows you to **switch from organic solvents** to **water,** a sustainable solvent that creates less harmful waste and could provide better yields. Our **designer surfactants** allow a wide range of chemical reactions, such as C-C coupling, C-N coupling, metathesis, and more, to be performed in water.

For further success and simplicity with our surfactants, we also offer **kits with everything needed** for your reaction.

Focus product

- Coolade (Cat.No. **907014**)
- Coolade solution (Cat.No. **909793**)
- DL-α-Tocopherol methoxypolyethylene glycol succinate (Cat.No. **763896**)
- DL-α-Tocopherol methoxypolyethylene glycol succinate solution (Cat.No. **733857** & **763918**)

Less
hazardous waste

12 Principles
aligned products

Download User Guide

Link to our Website

Greener Alternative Products

ElectroGreen™ Blends

Greener Solvents for Electronics & Energy Applications

Sigma-Aldrich®
Lab & Production Materials

Our **ElectroGreen™ blends** are made of bio-based safer alternatives to replace synthetic fossil-based solvents with specifications tailored for electronics and energy applications. **A safer switch from harmful solvents without compromising your device performance.**

- **GC purity ≥ 99%**
- **Low residue in evaporation**
- **Metal content by ICP**
- **Water content (KF)**
- **Low acidity**
- **Low toxicity and VOC** (enabling solution-processable techniques outside of fumehood)
- **Accessible cost** (to help you with the switch!)

100%
renewable carbon

Sustainably
produced

Low
toxicity

Examples of featured Electrogreen™ Blends:

- ElectroGreen™ NMP substitute for electronics, bio-sourced (Cat.No. **929662** & **929719**)
- ElectroGreen™ Toluene substitute for electronics, bio-sourced (Cat.No. **929689**)
- ElectroGreen™ Cyclohexanone substitute for electronics, bio-sourced (Cat.No. **929735**)

ElectroGreen™ Blends product list

Greener Alternative Products

Energy Generation

Organic Photovoltaics (OPV) and Perovskite solar cells

The Sigma-Aldrich® portfolio of Materials Science products enables **alternative energy generation technologies** with an extensive portfolio of materials to help researchers grow their seeds of knowledge.

Our featured products include:

- **Vapor and solution deposition precursors**
- **Donor and acceptor materials**
- **Silanes and metallocene compounds**
- **Perovskite materials**
- **Transparent conducting electrode materials**
- **Special substrates**

Design for

Energy efficiency

Smart manufacturing

Link to our Website

Greener Alternative Products

Greener Alternative Solvents

Sigma-Aldrich®
Lab & Production Materials

Our **greener alternative solvents** conform to one or more of the 12 principles of green chemistry. Many of these solvents are bio-based and come from renewable sources, reducing their reliance on petroleum and non-renewable resources. These solvents are carbon tested (ASTM D6866) for their bio-based content and results are reported on the CoAs.

Focus products

- Acetone
- 1-Butanol
- 2-Propanol
- Glycerol
- Cyrene™ γ-Valerolactone Blend
- Cyrene™ 2-Methyltetrahydrofuran Blend
- γ-Valerolactone
- Dimethyl isosorbide
- 2-Methyltetrahydrofuran

100%
REACH compliant

Lower
carbon impact

Link to our Website

Greener Alternative Products

Greener Electronic Inks

Sigma-Aldrich®
Lab & Production Materials

Maximize performance with our Electronic Inks while minimizing your environmental footprint with printable materials workflow.

The development of organic-based electronic materials has garnered great interest in **flexible electronics** applications due to their **energy efficiency, small size, low cost, and sustainability.**

Our featured products include:

- **conductive inks (eg: metallic, polymeric and carbon nanomaterial-based)** example products: (Cat.No. **923575** & **912573** & **900960**)
- **semiconductive inks** example products: (Cat.No. **923230** & **923192**)
- **dielectric polymer solutions** example products: (Cat.No. **902497** & **901974**)
- **cleaning solutions** example products: (Cat.No. **923540** & **929670**)

Design for

Energy efficiency

Smart manufacturing

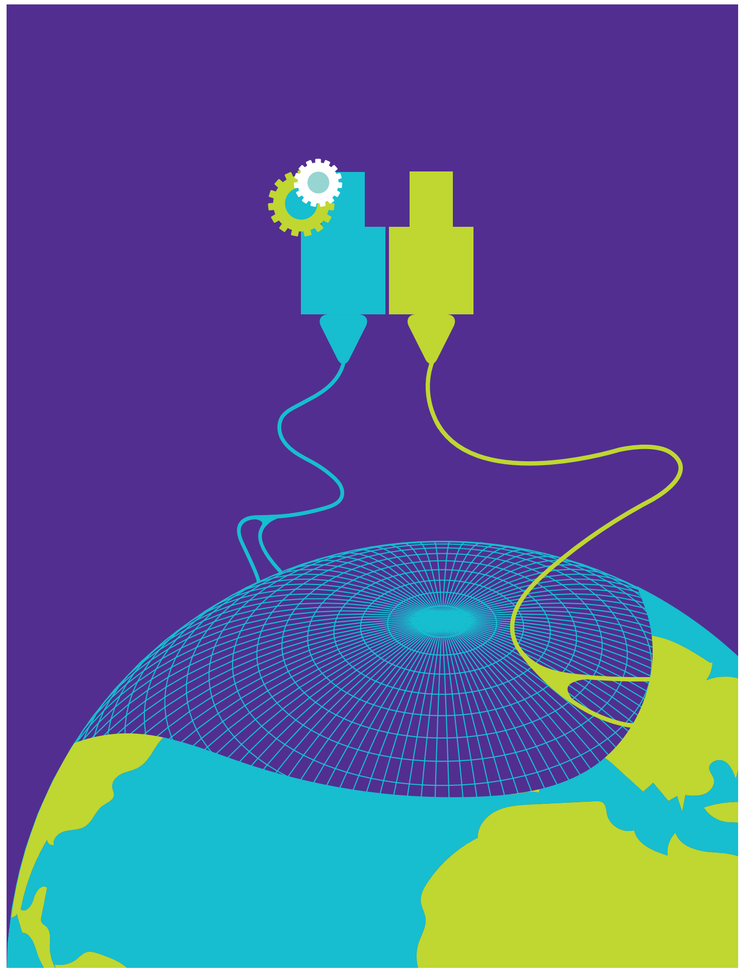
Download Brochure

Explore Greener Electronic Inks

Greener Alternative Products

Greener manufacturing by 3D printing

Sigma-Aldrich®
Lab & Production Materials



Design your next engineering project with our latest Additive Manufacturing (AM) solutions.

Select from a wide range of formats (resin, filament and powder options) demonstrating exceptional mechanical properties suitable for diverse engineering applications.

Our featured products include:

- **Liquid crystal elastomers (4D printing enablers)**
- **UV-curable resins**
- **Polymeric and composite filaments**
- **Inorganic-based inks**

Design for

Energy efficiency

Smart manufacturing

Liquid crystal elastomers

3D printing filaments

UV-curable resins

Greener Alternative Products

Greener manufacturing

with R&D 100 awarded Inks

Sigma-Aldrich®
Lab & Production Materials

Illustration of 3D printed materials generated using Graphene Oxide Ink (Cat.No. 916579).

Design your next engineering project with our latest Additive Manufacturing (AM) solutions.

Award-winning inorganic-based direct-ink write solutions for 3D printabe applications in 1. **energy storage,** 2. **energy conversion, sensing, and catalysis,** and 3. **filtration and separation under extreme conditions.**

Our featured products include:

- **3D Printable Yttria-stabilized Zirconium(IV) Oxide Ink** (Cat.No. **918571**)
- **3D Printable Ultra-High Temperature Boron Carbide Ink** (Cat.No. **921912**)
- **3D Printable Graphene Oxide Ink** (Cat.No. **916579**)

Design for

Energy efficiency

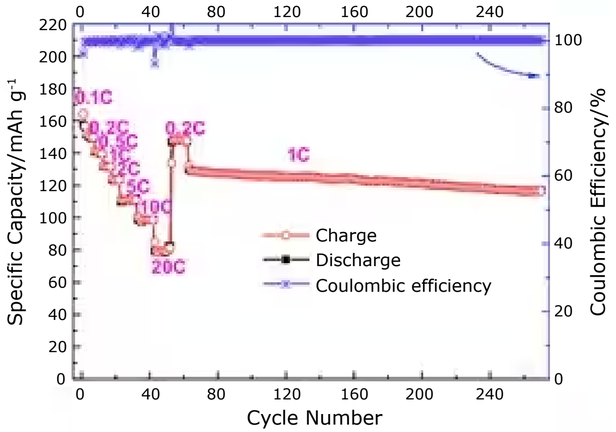
Smart manufacturing

Link to our Website

Greener Alternative Products

Liquid organic battery electrolytes

Sigma-Aldrich®
Lab & Production Materials



Accelerate your battery experimentation with our preformulated battery grade electrolytes. With tightly controlled concentration and trace impurities specifications, our **battery grade electrolyte solutions** improve your batch-to-batch consistency, minimize your handling of toxic compounds, and reduce your time spent in the glovebox. To provide you with a more sustainable solution, we reengineered this product to utilize **less energy in the manufacturing process.**

Choose from our extensive range of dozens of preformulated battery grade electrolytes to facilitate all your battery experimentation.

See three of our featured liquid organic electrolytes for batteries:

- **Lithium hexafluorophosphate solution,** in ethylene carbonate and dimethyl carbonate, 1.0 M LiPF6 in EC/DMC=50/50 (v/v), battery grade (Cat.No. **746711**)
- **Lithium hexafluorophosphate solution,** in ethylene carbonate and diethyl carbonate, 1.0 M LiPF6 in EC/DEC=50/50 (v/v), battery grade (Cat.No. **746746**)
- **Lithium hexafluorophosphate solution,** in ethylene carbonate, dimethyl carbonate and diethyl carbonate, LiPF6 in EC/DMC/DEC=1:1:1 (v/v/v) 1.0 M, battery grade (Cat.No. **901685**)

Design for
Energy efficiency

Link to our Website

Greener Alternative Products

Milli-Q® Lab Water Solutions

Milli-Q®
Lab Water Solutions

To reduce the environmental impact of water purification in the lab, our engineers and product developers are actively working to make Milli-Q® systems and processes more sustainable.
As a result of these efforts, our most recent generation of water systems were developed to have a reduced environmental impact in key areas such as **energy, waste and water.**

Today, Milli-Q® IQ and Milli-Q® IX water systems are officially labeled Greener Alternative Products due to their outstanding sustainability characteristics that can reduce your lab's environmental footprint by:

Saving water*

Saving energy*

Reducing plastic use*

Reducing chemical waste*

Eliminating mercury

* Compared to our previous water systems

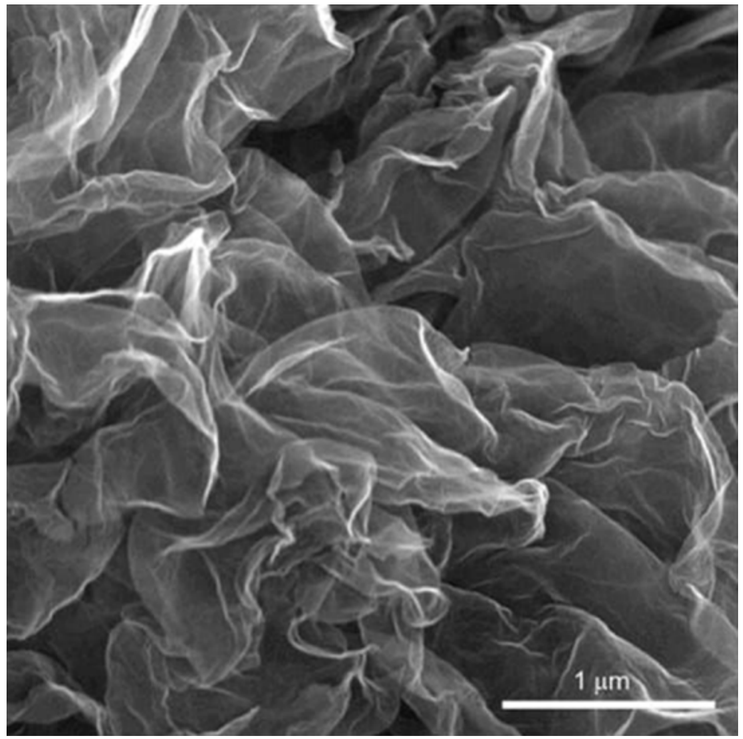
Download Brochure

Link to our Website

Greener Alternative Products

Nanomaterials – bio-sourced

Sigma-Aldrich®
Lab & Production Materials



Our new **bio-sourced nanomaterials** take advantage of graphene's excellent electronic conductivity and high surface area to improve the charging/discharging rates and battery performance. These electrode materials are suitable for rechargeable battery- and super-capacitor applications.

Our new bio-sourced nanomaterial products include:

- **Single-layer graphene sheets for battery, bio-sourced** (Cat.No. **924458**)
- **Nitrogen/Sulfur co-doped graphene oxide powder, bio-sourced** (Cat.No. **926817**)
- **Nitrogen doped graphene oxide powder, bio-sourced** (Cat.No. **926868**)

Design for
Energy efficiency

Use of
Renewable feedstock

Link to our Website

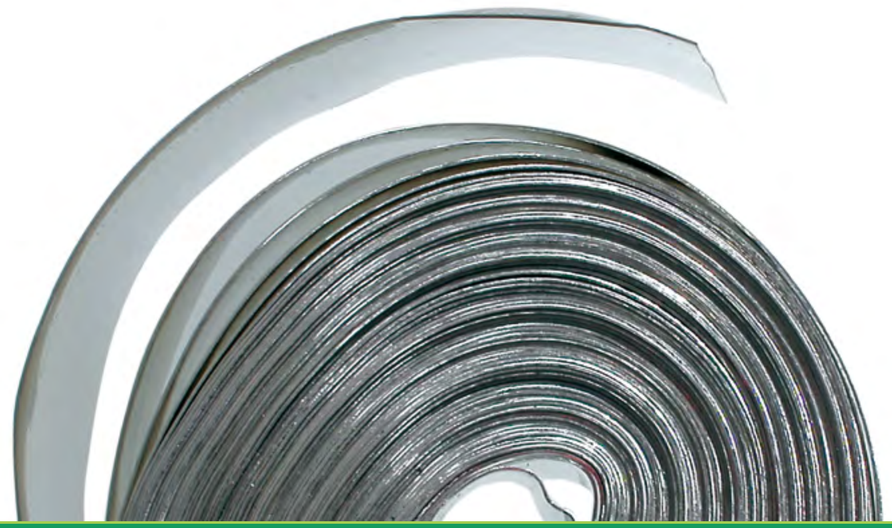
Greener Alternative Products

Non-Precious Metal Catalysts

Sigma-Aldrich®
Lab & Production Materials

Although powerful, precious **metal catalysts are scarce,** subject to price fluctuations, and often difficult to handle and scale. Our R&D teams partner with academic labs and industrial groups to **reduce chemistry's dependency on precious metals.**

Our forays into **non-precious metal catalysis** have introduced a suite of **earth-abundant metal catalysts** capable of a variety of **exciting bond transformations.** They are often as effective (or more) than their precious metal counterparts.



Focus products

- Fe(R,R-PDP)
- Dicarbonylcyclopentadienyliron dimer
- Ferric chloride

Greater
catalyst efficiency
than precious metals

Higher
cost efficiency

0%
scarce precious metals

Scientific Article

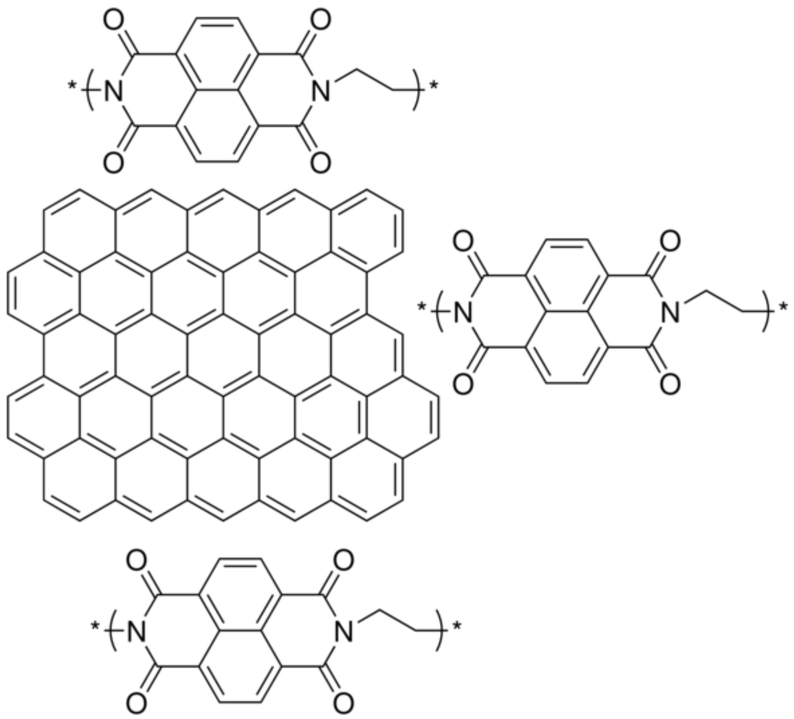
Greener Alternative Products

Organic battery electrode materials

Sigma-Aldrich®
Lab & Production Materials

Looking for a more sustainable counter electrode or benchmark?

Our **organic battery electrode materials** are ready-to-use active materials for battery research and development. The nanocomposites, consisting of reduced graphene oxide and electroactive organic polymers, are a result of our reengineered manufacturing process, utilizing less energy and providing a more environmentally friendly solution. These materials are suitable for a range of applications, including rechargeable battery and super-capacitor use, due to their high safety, flexibility, and easy processability.



Our new products include:

- **Reduced graphene oxide enhanced NTCDA** composite for battery (Cat.No. **921386**)
- **Reduced graphene oxide enhanced PMDA** composite for battery (Cat.No. **921378**)
- **Reduced graphene oxide enhanced PAQS** composite for battery (Cat.No. **921351**)

Design for
Energy efficiency

Link to our Website

Greener Alternative Products

Polyethylene Glycol (PEGs)

Sigma-Aldrich®
Lab & Production Materials

Poly(ethylene) glycol (PEG) is a synthetic, hydrophilic, and biocompatible polymer with widespread use in drug delivery, bioconjugation, surface functionalization among other applications.

Our greener PEGs can be used as a safer solvent alternative for **catalyst-free** fluorination of acetoacetamides as well as other **biomedical or industrial applications.**

Featured product

- **Poly(ethylene glycol), average M_n 400**
  (Cat.No. **202398**)

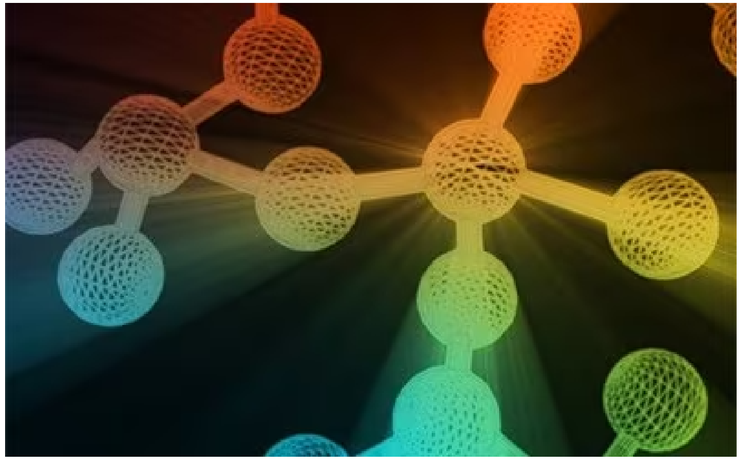
Design for
Energy efficiency
Safer
solvents & auxiliaries

Link to our Website

Greener Alternative Products

Polymerization Tools

Sigma-Aldrich®
Lab & Production Materials



Advancements in **polymerization technologies** has propelled the development of polymers and enabled novel research in **biomedical, energy, and electronic fields,** and the polymer properties and applications are highly dependent on the polymerization tools used.

By providing **greener alternative monomers, catalysts,** and other **polymerization tools,** we offer **safer,** and more **energy efficient** synthesis mechanisms to further **advance innovation.**

Featured products

- **2-Vinylnaphthalene** (Cat.No. **V2909**)
- **Terephthalic acid** (Cat.No. **185361**)
- **4-Vinylanisole** (Cat.No. **141003**)

Design for
Energy efficiency
Safer
solvents & auxiliaries

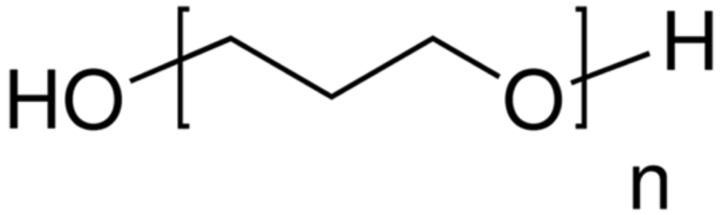
Link to our Website

Greener Alternative Products

Polymers – bio-sourced

Sigma-Aldrich®
Lab & Production Materials

Bio-based polypropanediol (USDA 100% certified bio-based product) is **low toxic, low volatile and bio-degradable.** Compared to petrochemical alternatives, polypropanediol has a significantly lower environmental footprint, saving 40 % in nonrenewable energy consumption and reducing greenhouse gas emissions by 42 % as proved by an ISO 14000-compliant life cycle analysis.



It is hydrolysis resistant, has a high oxidative stability and a high thermal capacity, which offers a long durability in end use applications. Potential applications include high-performance elastomers, coatings, ink-jet inks, functional fluids and footwear and performance textile.

Our new bio-sourced polymers include:

- **Bio-based Polyether Polyol, MW = 1900 – 2100 Dalton** (Cat.No. **923966**)
- **Bio-based Polyether Polyol, MW = 900 – 1100 Dalton** (Cat.No. **923974**)
- **Bio-based Polyether Polyol, MW = 2600 – 2800 Dalton** (Cat.No. **923982**)
- **Bio-based Polyether Polyol, MW = 400 – 600 Dalton** (Cat.No. **923990**)

Design for
Energy efficiency

Use of
Renewable feedstock

Link to our Website

Greener Alternative Products

Synthetic-Based Solvents

Supelco®
Analytical Products

Certain synthetic chemical solvents are still essential for scientific work but pose health and environmental risks. In such cases, we're developing **greener substitutes with reduced toxicity,** so they are **safer for use and disposal.** While these products are **more sustainable,** they maintain the **high quality and reliability** you expect from our company.

1-Butylpyrrolidin-2-one safer alternative to N-Methyl-2-pyrrolidone (NMP), N,N-Dimethylacetamide (DMA), Dimethyl sulfoxide (DMSO) and N,N-Dimethylformamide (DMF), it is not classified as developmentally reprotoxic

Cyclopentyl Methyl Ether (CPME) safer substitute for tetrahydrofuran, tert-butyl methyl ether, 1,4 dioxane and other ether solvents, it is produced by a 100% atomic catalytic reaction without formation of by-products

Download Brochure

Chemistry R&D Lab

Your opportunities for more sustainable lab work

Greener Alternative Products **A-L**

Greener Alternative Products **M-Z**

Waste Reduction

More Sustainable Alternatives

- Custom Screening Compounds with Aldrich Market Select (AMS)
- Greener HPLC
- DNA-Encoded Library (DEL)
- SMASH Packaging Plan
- Returnable Solvent Container (WEU)
- SYNTHIA™ Retrosynthesis Software for Digital Screening
- LANEXO® Inventory Manager
- Customized Solutions
- SMASH – Results in 2021

Waste Reduction

Custom Screening Compounds

with Aldrich Market Select (AMS)

Our small molecule design service provides you with a **customized library of building blocks and screening compounds.** You can choose from over **14 million products,** and receive them in **tailor-made formats** to suit your quantity and packaging requirements. This way, you'll have **less waste from excess chemicals and packaging**.

The service includes a library portal for instant access to our **database of more than 8 million unique chemical structures.**

We also support you with comprehensive management of international **compliance documentation and shipping logistics** to avoid delays and fees.

Sigma-Aldrich®
Lab & Production Materials

100%
customized

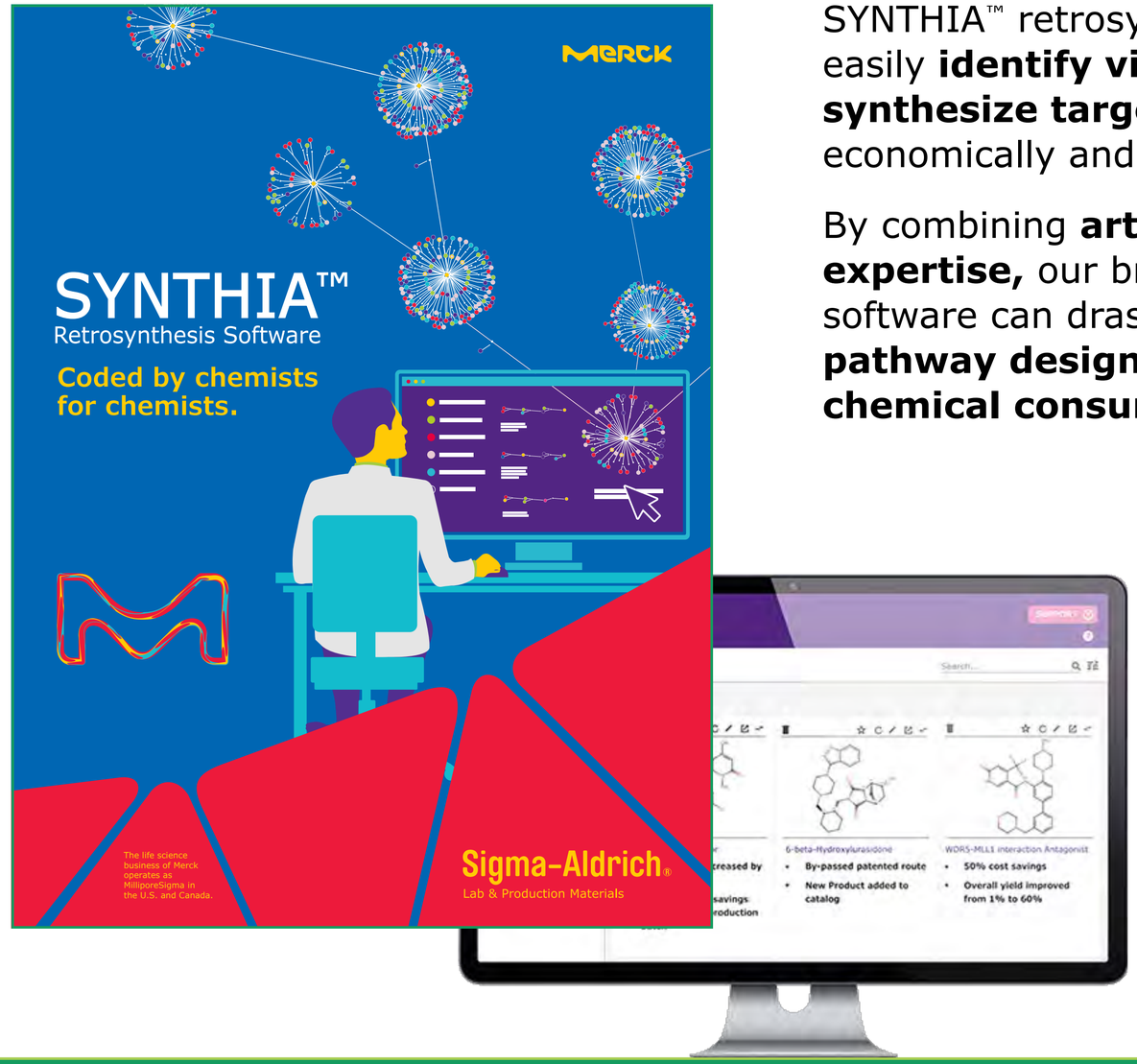
Less
chemicals & packaging

Link to our Website

Waste Reduction

SYNTHIA™ Retrosynthesis Software for Digital Screening

Sigma-Aldrich®
Lab & Production Materials



SYNTHIA™ retrosynthesis software helps you easily **identify viable pathways** and successfully **synthesize target molecules** – quickly, economically and sustainably.

By combining **artificial intelligence with your expertise,** our breakthrough drug discovery software can drastically enhance and **accelerate pathway design,** while significantly **reducing chemical consumption** and costs.

The software is directly linked to our online catalog, so you can quickly **access product and safety information,** and easily **find greener alternatives** to regulated and hazardous substances in your pathways.

Access to **safer** chemical alternatives

Enables **faster** drug discovery

Download Brochure

Link to our Website

Waste Reduction

Greener HPLC

Supelco®
Analytical Products

We provide the tools that help transfer your HPLC methods to use less solvent. Using HPLC columns with smaller inner diameter (I.D.) will **dramatically reduce solvent consumption and waste creation** in HPLC applications.

Further reduction in solvent use can be achieved by UHPLC and the even smaller capillary columns.

- E.g., switching from 4.6 mm I.D. to 2.1 mm I.D. column can **save up to 92% of mobile phase.**

Reduced
solvent use

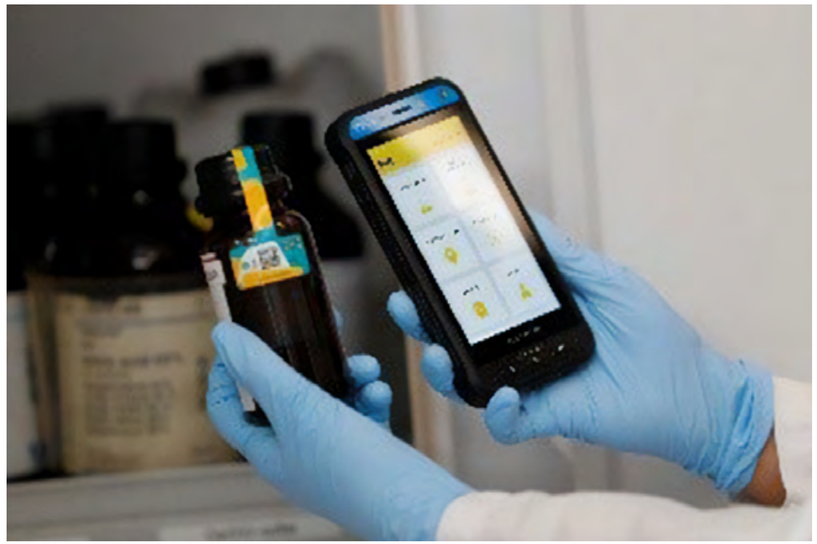
Less
waste

Link to HPLC Method Transfer Calculator

Link to all calculators and Apps

Waste Reduction

LANEXO® Inventory Manager



A challenging aspect of managing lab resources is the expiration or unnecessary ordering of chemicals, that are both toxic and environmentally hazardous. **LANEXO® Inventory Manager** is an easy-to-implement digital solution for efficient resource management and waste reduction.

The application includes special labels for reagents – or consumables – with **radio frequency identified (RFID) "Smart Seals"** to detect when bottles are opened and automatically update expiry dates.

The application **captures digital data from RFID labels** on reagent bottles, providing real-time info on storage locations and stock/usage levels. **It helps to manage the stock**, based on "first-in/first-out" principle, so that fewer chemicals expire or go unused.

Efficient tracking of reagents, especially with respect to expiry dates, means that labs are able to reduce waste and associated disposal costs, and, ultimately, make fewer purchases – **making your lab more sustainable.**

Less
spoilage

Less
waste

Explore LANEXO® Inventory Manager

Waste Reduction

DNA-Encoded Library (DEL)

Sigma-Aldrich®
Lab & Production Materials

DNA-encoded library (DEL) is an alternative approach to high-throughput screening (HTS) for effective hit and lead discovery. The technology provides an **entire screening library in a single tube.** This not only makes your drug discovery process **faster and simpler,** but also **more sustainable** as it reduces chemical packaging and waste.

You can **access DEL in your lab** without building in-house capabilities or using external services. Just screen the kit, sequence, and check your hits. DELs come **ready to use off the shelf** as a lab consumable.

Less
packaging & waste

0
equipment needed

1
vial with entire library

Link to Webinar

Link to our Website

Waste Reduction

Customized Solutions

Supelco®
Analytical Products

Customized packaging is a great way to shrink your environmental footprint, particularly when using **larger amounts of one chemical**. Content and containers can be tailored to your exact needs, so you **reduce packaging and chemical waste.**

Less
chemical waste

Less
packaging waste

Options include

- Dedicated containers for solvents
- 20 x 25 kg Double PE bag for salts
- Customized pack size for individual use

Each inquiry will be checked carefully and individually on a case by case basis. If a required option can be fulfilled depends upon several factors like the **chemical substance, quantity and other parameters.**

Please contact your sales representative for further support.

Waste Reduction

SMASH Packaging Plan

PILLAR	OPTIMIZE RESOURCES	MORE SUSTAINABLE MATERIALS		DESIGN FOR CIRCULAR ECONOMY
GOAL	**Shrink** Reduce amount of packaging	**Secure** Achieve zero deforestation	**Switch** Improve plastic sustainability	**Save** Maximize recycling
OUR 2022 TARGETS	• New product packaging aligned with our standards for weight and volume • 20 key improvement projects for existing packaging • 20% reduction of air space in distribution boxes	• New product packaging aligned with our zero deforestation standards • 90% of existing packaging aligned with our zero deforestation standards • 100% of packaging from deforestation-risk countries certified sustainably sourced	• New product packaging aligned with our plastic sustainability standards • 20 improvement projects to replace existing plastic packaging by more sustainable solutions • 20% reduction of expanded polystyrene (EPS) use	• New product packaging aligned with our standards for recyclability • 100% of fiber-based packaging not compatible with recycling, replaced • 100% of products with packaging recycling / disposal guidance

We continuously enhance the packaging of more than 300,000 products in our Life Science portfolio to help reduce our customers' and our company's environmental impact. Our **4-year SMASH Packaging Plan** sets new standards to shrink, secure, switch and save packaging – while still meeting performance requirements and safety regulations. Our **new and improved SMASH Packaging Plan** will kickoff in 2023.

Download Brochure

Waste Reduction

SMASHing Results in 2021

PILLAR	OPTIMIZE RESOURCES	MORE SUSTAINABLE MATERIALS		DESIGN FOR CIRCULAR ECONOMY
GOAL	**Shrink** Reduce amount of packaging 	**Secure** Achieve zero deforestation 	**Switch** Improve plastic sustainability 	**Save** Maximize recycling 
2022 TARGETS & 2021 PROGRESS	● New product packaging aligned with our standards and transit regulations for weight and volume	● New product packaging aligned with our zero deforestation standards	● New product packaging aligned with our plastic sustainability standards	● New product packaging aligned with our standards for recyclability
	Enhanced Design for Sustainability framework including our new packaging sustainability standards and created resources to help our development teams to design more sustainable product packaging solutions. Packaging of recently launched greener alternatives products aligned with our new packaging sustainability standards.			
	● 20 key improvement projects for existing packaging 15 product and distribution packaging improvement projects resulting in a total annual reduction of 250+ metric tons.	● 90% of existing packaging aligned with our zero deforestation standards ● 100% of packaging from deforestation-risk countries certified sustainably sourced 71.5% of packaging (sourced directly) aligned with our zero deforestation standards. This represents an 8% increase from 2019. Sustainable forestry certification added to 800+ metric tons of corrugated and paperboard materials.	● 20 improvement projects to replace existing plastic packaging by more sustainable solutions 10 product packaging improvement projects and distribution packaging improvement initiatives with projects at multiple locations.	● Replace 100% of fiber-based packaging not compatible with recycling 70 metric tons of non-recyclable edge protectors replaced by 100% paper-based alternative. New process implemented for the reuse of wood pallets, resulting in the avoidance of 1,000 metric tons of wood pallets sourced annually.
	● 20% reduction of air space in distribution boxes Global improvement plan development in progress. "Packaging for smalls" projects completed at several distribution centers which will result in an annual reduction of 65+ metric tons of packaging.		● Reduce Expanded Polystyrene (EPS) use by 20% Three million molded pulp inserts used annually in replacement of EPS for glass bottle inserts. Validation plan for our new greener coolers developed. Rollout in US expected by end of 2022, resulting in annual EPS reduction of 5,000+ m^3.	● Clear recycling / disposal communications for 100% of products Global packaging recycling guidance approach in development. Rollout of the first version of this solution by end of 2022.

○ *Not Started* ● *On track* ● *Focus required* ● *Off track* ● *Achieved*

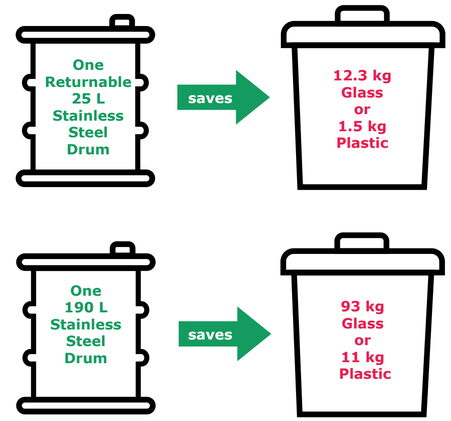
Waste Reduction

Returnable Solvent Container (WEU)

Supelco®
Analytical Products

“Reuse” is one of the fundamental three R’s of sustainability.

That’s why we also offer our **solvents in returnable stainless steel drums and barrels,** wherever possible. The containers are returned to our Darmstadt site, carefully **cleaned in a validated process** that leaves no residues, and reused to **minimize glass and plastic waste.** Our service also includes optional **withdrawal systems** for safe, convenient and contamination-free solvent handling.



Download Brochure

Chemistry R&D Lab

Your opportunities for more sustainable lab work

Greener Alternative Products **A-L**

Greener Alternative Products **M-Z**

Waste Reduction

More Sustainable Alternatives

H-Genie® Lite

Synple 2 Automated Synthesizer

More Sustainable Alternatives

H-Genie® Lite

Sigma-Aldrich®
Lab & Production Materials

On-Demand Hydrogen Generator
Replace cylinders and reduce risks with the **H-Genie® Lite**, a high-pressure smart hydrogen generator. The **H-Genie® Lite** can generate hydrogen from water up to 50 bar (725 psi) on demand; offering a safe, simple, compact alternative to cylinders.

- Hydrogen generation from deionized water – no cylinders needed!
- High pressure to expand your chemistry capabilities
- Compatible with any reactors and balloons
- Simple setup and use: Click & go
- Run multiple reactors with one **H-Genie® Lite**
- Compact footprint to save space
- Internal hydrogen detector for improved safety

Enhanced safety
built-in internal H_2 leak detectors

Download User Guide

Link to our Website

H-Genie is a registered trademark of ThalesNano Energy.

More Sustainable Alternatives

Synple 2 Automated Synthesizer

Sigma-Aldrich®
Lab & Production Materials

The **Synple 2 Automated Synthesizer** is a fully automated organic chemical synthesizer that uses pre-filled reagent cartridges to generate, isolate, and purify your research products for you!

5 x more efficient

- Fully automated organic synthesis
- 5 minutes to set up
- Frees your time to focus on more important experiments

70% cost savings

- Considerably more economical than manual chemical synthesis due to lower personnel and reagent costs

Enhanced safety

- Fully closed reaction
- User never exposed to chemicals
- Complies with latest safety standards

90% less waste

- Fully optimized reaction sequence
- Uses minimum reagents and solvents

90%
less waste

Enhanced safety
no chemical exposure

Download Brochure

Link to our Website

Biology Lab

Your opportunities for more sustainable lab work

Greener Alternative Products

Waste Reduction

More Sustainable Alternatives

- Greener surfactants
- Greener alternatives for Histology & Hematology
- Milli-Q® Lab Water Solutions
- ZooMAb® Antibodies
- High-Throughput Kits for Cholesterol, Lipid & Antibiotic Extractions
- ColorWheel® Antibodies and Dyes
- Stericup® E & Steritop® E sterile filter systems
- GenElute™-E Nucleic Acid Purification Kits

Greener Alternative Products

Greener surfactants

Sigma-Aldrich®
Lab & Production Materials

TERGITOL & ECOSURF are trademarks of The Dow Chemical Company (Dow) or an affiliated company of Dow. TWEEN & Brij are registered trademarks of Croda International PLC.

To help you reduce the environmental footprint of your research and production we offer a variety of greener alternative surfactants for a range of applications.

Our **TERGITOL™** and **ECOSURF™** series of nonionic surfactants are chemically stable and readily biodegrade into innocuous waste products that don't persist in the environment. They may serve as alternatives to REACH-listed alkylphenol ethoxylates (APEs), including several that are suitable for cell lysis and downstream DNA/protein Quantification.

The **ECO Tween®** and **ECO Brij®** surfactants give you the performance benefits of traditional petroleum-based products but without the environmental hazards. That's because they are made using bio-based ethylene oxide from biomass ethanol, so they are completely renewable.

0%
petroleum content

12 Principles
aligned products

Download Brochure

Biodegradable Surfactants

Greener Alternative Products

Sigma-Aldrich®
Lab & Production Materials

High-Throughput Kits

for Cholesterol, Lipid & Antibiotic Extractions

Our high-throughput kits are designed for **fast, easy sample prep** using a syringe filter. Each kit contains everything you need: an extraction column, buffer, and solvent with internal standards. Compared to traditional methods, the kits significantly **reduce solvent consumption**, yet they are proven to **deliver comparable recovery.**

Focus products

- **Enrofloxacin Extraction Kit** (Cat.No. **MAK226-1KT**)
- **Chloramphenicol Extraction Kit** (Cat.No. **MAK227-1KT**)
- **Cholesterol Extraction Kit** (Cat.No. **MAK175-1KT**)
- **Fatty Acid Extraction Kit, Low Standard** (Cat.No. **MAK174-1KT**)
- **Fatty Acid Extraction Kit, High Standard** (Cat.No. **MAK338-1KT**)
- **Fatty Acid Extraction Kit for Pet Food** (Cat.No. **MAK372-1KT**)

30
seconds per sample

0
centrifugation step

Less
solvent than traditional methods

Greener Alternative Products

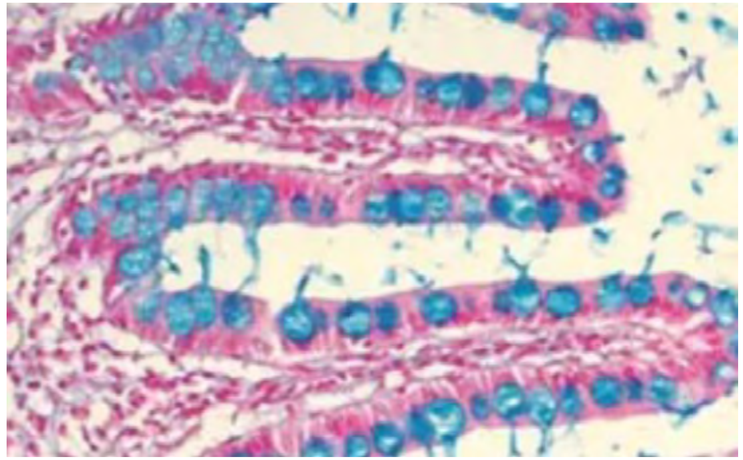
Greener alternatives

for Histology & Hematology

Sigma-Aldrich®
Lab & Production Materials

We are committed to bringing greener alternatives to our customers.

Low
toxicity



Novec™ Engineered fluids are non-flammable, low toxicity fluids for freezing histology samples.

Formalin Free Tissue Fixative is a less toxic alternative to formalin, compatible with applications like PCR, IHC and in-situ hybridization.

HistoChoice® Clearing Agent is an alternative to toluene and xylene for dewaxing paraffin tissue sections.

HistoChoice® Tissue Fixative is designed for molecular biology and used for in-situ hybridization.

Xylene Substitute is a non-toxic xylene replacement compatible with all tissue processors.

- Novec™ Engineered fluids
- Formalin Free Tissue Fixative
- HistoChoice® Clearing Agent
- HistoChoice® Tissue Fixative
- Xylene Substitute

Greener Alternative Products

ColorWheel® Antibodies and Dyes

Sigma-Aldrich®
Lab & Production Materials

ColorWheel® antibodies and dyes are lyophilized and provide 5+ years of shelf life. These products maintain high performance longer than traditional pre-labeled antibodies, making them ideal for reagent storage at core facilities. Targets will change per researcher and experiment, but the configuration of the flow cytometers within the facility, and thus the compatible dyes, remain constant. With a steady supply of dye reagent always in stock, simply choose the ColorWheel® antibody of interest, mix and match as needed, and run your assay.

Experience greater flexibility with lower environment impact by switching from traditional pre-labeled antibodies to ColorWheel® mix-and-match antibodies and dyes.

Low
toxicity

Reduced
environmental footprint

Increased
energy efficiency

Link to our Website

Link to Protocol

Link to FAQs

Greener Alternative Products

Milli-Q® Lab Water Solutions

Milli-Q®
Lab Water Solutions

To reduce the environmental impact of water purification in the lab, our engineers and product developers are actively working to make Milli-Q® systems and processes more sustainable.
As a result of these efforts, our most recent generation of water systems were developed to have a reduced environmental impact in key areas such as **energy, waste and water.**

Today, Milli-Q® IQ and Milli-Q® IX water systems are officially labeled Greener Alternative Products due to their outstanding sustainability characteristics that can reduce your lab's environmental footprint by:

Saving water*

Saving energy*

Reducing plastic use*

Reducing chemical waste*

Eliminating mercury

* Compared to our previous water systems

Download Brochure

Link to our Website

Greener Alternative Products

Stericup® E & Steritop® E sterile filter systems

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Our progressive filters offer **high-performance** reduction of bioburden in media and buffers – but significantly lower your lab's environmental impact **by eliminating the need for disposable plastic** receiver funnels or bottles.

- **Less packaging & biohazardous waste,** thus lower cost of treatment & disposal
- **Enhanced, measurable lab compliance** with institutional sustainability requirements
- Compatible with virtually **any commercial media and glass bottle**

Stericup® E and Steritop® E filters have the **Accountability, Consistency, and Transparency (ACT) Environmental Impact Factor Label**, published by My Green Lab®, providing a score based around manufacturing processes, energy and water use, packaging and end-of-life. **The ACT labeled products help labs choose greener life science products.**

My Green Lab is a registered trademark of My Green Lab, San Diego, CA, USA.

Stericup® E:
Reduced packaging
by up to **20%**

Reduced plastic
by up to **26%**

Steritop® E:
Reduced packaging
by up to **48%**

Reduced plastic
by up to **69%**

Download Brochure

Request free sample

Greener Alternative Products

ZooMAb® Antibodies

Sigma-Aldrich®
Lab & Production Materials

ZooMAb® antibodies are finished as a **lyophilized product** which makes them **shippable at ambient temperature** and eliminates the use of polystyrene coolers and ice bricks, resulting in dramatic reduction in the volume and weight of packaging. They can also be **stored for multiple years,** reducing unnecessary product waste.

2020 AWARDS
CiteAb

Produced from immortalized B cells, this recombinant antibody technology **reduces the use of animals in research** and offers exceptional batch-to-batch consistency.

To date, **ZooMAb® antibodies** have the best Accountability, Consistency and Transparency (ACT) Label score in the Chemicals & Reagents category from My Green Lab®, a non-profit organization dedicated to creating a culture of sustainability in science.

Preservative **free**
Animal-free
Reduced
packaging

Link to our Website

Greener Alternative Products

GenElute™-E Nucleic Acid Purification Kits

Sigma-Aldrich®
Lab & Production Materials

Using negative chromatography, GenElute™-E Single Spin columns **efficiently absorb and retain sample contaminants** while allowing nucleic acids to flow through the column. This reduces the number of steps and **minimizes toxic chemicals and plastic materials** required for purification.

Key advantages over silica

- Simplified workflow
- Fewer impurities
- Superior performance
- Reduced waste

No
hazardous liquid waste:
ethanol and chaotropic salts

55%
less plastic waste than
common silica workflows

Link to our Website

Biology Lab

Your opportunities for more sustainable lab work

Greener Alternative Products

Waste Reduction

More Sustainable Alternatives

- Immobilon®-E & Immobilon®-NOW Transfer Membranes
- Recyclable Plant-Based Cooler (US)
- Polystyrene Cooler Return Program (US)
- Returnable Solvent Container (WEU)

Waste Reduction

Immobilon®-E & Immobilon®-NOW

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Immobilon®-E transfer membrane is the **only PVDF membrane for western blotting** that requires **no alcohol pre-wet step** prior to blotting.
Yet it retains **all benefits of PVDF material** when compared to nitrocellulose:

- Improved handling and staining, increased solvent resistance, and higher signal-to-noise ratio.
- For further convenience, optional **Immobilon®-NOW Dispenser** offers a complete solution to measure, cut and store the transfer membrane, also **reducing waste.**

0%
alcohol

Less
waste

Link to our Website

Waste Reduction

Polystyrene Cooler Return Program (US)

For our customers in the United States, we offer a **polystyrene cooler return program** to help **reduce waste** sent to landfills.

The box will be **returned** to the company to be **inspected, cleaned and returned to service for another order.**

To use this program, you just need to follow three simple steps.

1. After you receive your order, remove the product from the cooler, making sure to leave the empty cooler in the box.
2. Put the cooler lid back on the container, then flip the flaps of the box so the pre-paid postage stamp is on the outside of the container. Seal the container using shipping tape.
3. Drop off the box at any location where the US Postal Service picks up mail.

Link to our Website

Waste Reduction

Recyclable Plant-Based Cooler (US)

For our customers in the United States, we are introducing our first-ever **recyclable insulated shipping container.**

It is a **plant-based alternative to expanded polystyrene (EPS) coolers.** Our Greener Cooler is **made of paper and starch,** making it certified curbside **recyclable alongside other paper-based and corrugated cardboard products.**

0%
polystyrene

100%
paper & starch

100%
recyclable in paper recycling

Link to our Website

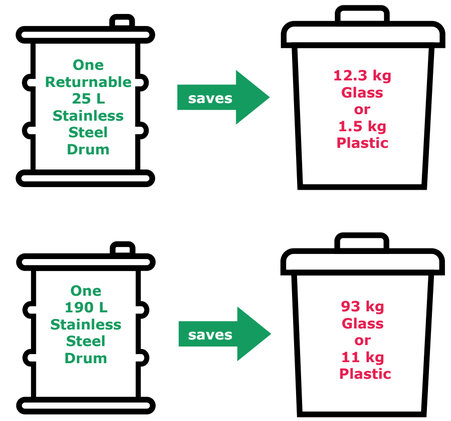
Waste Reduction

Returnable Solvent Container (WEU)

Supelco®
Analytical Products

“Reuse” is one of the fundamental three R’s of sustainability.

That’s why we also offer our **solvents in returnable stainless steel drums and barrels,** wherever possible. The containers are returned to our Darmstadt site, carefully **cleaned in a validated process** that leaves no residues, and reused to **minimize glass and plastic waste.** Our service also includes optional **withdrawal systems** for safe, convenient and contamination-free solvent handling.



Download Brochure

Biology Lab

Your opportunities for more sustainable lab work

Greener Alternative Products

Waste Reduction

More Sustainable Alternatives

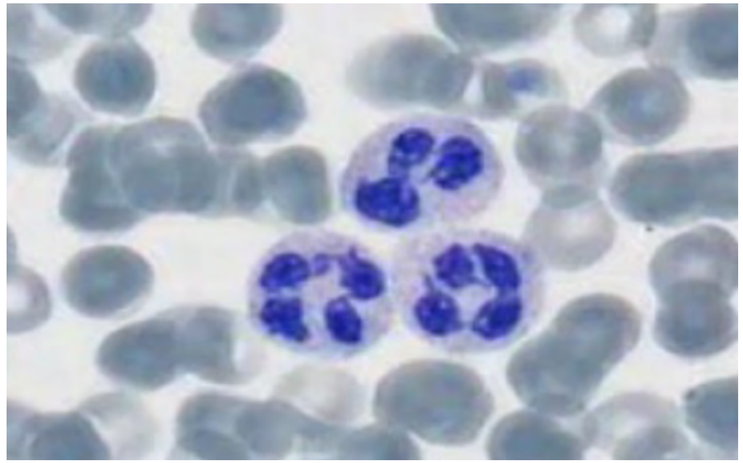
Neo-Clear™, Neo-Mount™ & DPX new

More Sustainable Alternatives

Neo-Clear™, Neo-Mount™ & DPX new

Sigma-Aldrich®
Lab & Production Materials

To reduce environmental impact and user contact with hazardous solvents,
we offer the xylene substitute Neo-Clear™, its corresponding mounting medium Neo-Mount™ and dibutyl phthalate free DPX new.



Neo-Clear™ is an aliphatic hydrocarbon mixture that can substitute the same applications as xylene in the histo-medical lab – histoprocessing, deparaffination and clearing after dehydration in staining process.

Neo-Mount™ is a non-aqueous, user-friendly mounting medium that contains a non-aromatic solvent.

DPX new is a water-free mounting medium for microscopy, in which the teratogenic ingredient Dibutyl phthalate (DBP) has been avoided.

Less
hazardous

Explore Neo-Clear™

Explore Neo-Mount™

Explore DPX new

Testing / Quality Control Lab

Your opportunities for more sustainable lab work

Greener Alternative Products

Waste Reduction

More Sustainable Alternatives

- Bio-Based Solvents
- Synthetic-Based Sustainable & Safer Alternatives
- Greener Chromatography Solvents
- Milli-Q® Lab Water Solutions
- Extran® Detergents

Greener Alternative Products

Bio-Based Solvents

Supelco®
Analytical Products

Made of renewable raw materials, our high-quality bio-based solvents easily **replace synthetic chemical solvents,** and **reduce environmental impact,** but **preserve functional efficacy.**

Their **production is also safer** for the environment than with fossil-based solvents.

Bio-Based Ethanol
Alternative to synthetic ethanol, made from grain or sugar cane

Ethyl(-)-L-Lactate
Alternative to ethyl acetate & acetone, made by fermenting sugar

Bio-Based Glycerol
Alternative to petroleum-based glycerol, made from rapeseed and is a by-product of biodiesel production

2-Methyltetrahydrofuran (Methyl THF)
Alternative to dichloromethane & tetrahydrofuran, made from corncobs and sugarcane bagasse

Download Brochure

Link to our Website

Greener Alternative Products

Synthetic-Based Solvents

Supelco®
Analytical Products

Certain synthetic chemical solvents are still essential for scientific work but pose health and environmental risks. In such cases, we're developing **greener substitutes with reduced toxicity,** so they are **safer for use and disposal.** While these products are **more sustainable,** they maintain the **high quality and reliability** you expect from our company.

1-Butylpyrrolidin-2-one safer alternative to N-Methyl-2-pyrrolidone (NMP), N,N-Dimethylacetamide (DMA), Dimethyl sulfoxide (DMSO) and N,N-Dimethylformamide (DMF), it is not classified as developmentally reprotoxic

Cyclopentyl Methyl Ether (CPME) safer substitute for tetrahydrofuran, tert-butyl methyl ether, 1,4 dioxane and other ether solvents, it is produced by a 100% atomic catalytic reaction without formation of by-products

Download Brochure

Greener Alternative Products

Greener Chromatography Solvents

These greener alternative solvents replace more hazardous and environmentally damaging solvents that are commonly used in chromatography. Chromatography is one of the most prevalent uses of solvents in the lab, and can be a major contributor to solvent waste.

Focus products

- **Ethyl acetate/ethanol mixture:** green substitute for DCM in flash chromatography purification, TLC and HPLC
- **Heptane:** Less toxic alternative compared to the more traditional solvent hexane

Less
hazardous solvents and waste

Link to our Website

Greener Alternative Products

Milli-Q® Lab Water Solutions

Milli-Q®
Lab Water Solutions

To reduce the environmental impact of water purification in the lab, our engineers and product developers are actively working to make Milli-Q® systems and processes more sustainable.
As a result of these efforts, our most recent generation of water systems were developed to have a reduced environmental impact in key areas such as **energy, waste and water.**

Today, Milli-Q® IQ and Milli-Q® IX water systems are officially labeled Greener Alternative Products due to their outstanding sustainability characteristics that can reduce your lab's environmental footprint by:

Saving water*

Saving energy*

Reducing plastic use*

Reducing chemical waste*

Eliminating mercury

* Compared to our previous water systems

Download Brochure

Link to our Website

Greener Alternative Products

Extran® Detergents

Supelco®
Analytical Products

Our all-purpose Extran® detergents deliver **thorough, residue-free cleaning** of lab utensils. But they are made of **biodegradable, non-toxic** ingredients, and free of scents, dyestuff, oxidants, chlorine, enzymes and NTA. So they pose **no health or environmental risks.**

To ensure an **easy switch from toxic detergents,** we offer a complete range of Extran® detergents for **manual or lab washer cleaning** processes in ties.

0%
toxins

100%
biodegradable

No
scents, dyestuff, oxidants, chlorine, enzymes or NTA

Download Brochure

Testing / Quality Control Lab

Your opportunities for more sustainable lab work

Greener Alternative Products

Waste Reduction

More Sustainable Alternatives

- Greener Sample Filtration with reusable filter holders
- Sustainable Packaging Solutions – Overview
- Titripac® packaging system
- Returnable Solvent Container (WEU)
- Customized Packaging
- Greener Sample Preparation with solvent-free SPME
- HDPE Bottle for Solvents, Acids and Bases
- 5L Extran® Canister
- Bulk Packages with Withdrawal Systems
- Greener HPLC
- Safebreak Bottle for Acids
- Returnable Solutions – Overview
- Customer-Aligned Delivery & Pickup

Waste Reduction

Greener Sample Filtration

with reusable filter holders

Millipore®
Preparation, Separation,
Filtration & Monitoring Products

Supelco®
Analytical Products

Make your own syringe filters

Stainless steel and polypropylene filter holders offer the flexibility to use different membrane types and diameters to meet the requirements of various applications.

Features & Benefits

- Available in three sizes for a range of sample volumes.
- Autoclavable with filter in place for sterile filtration.
- The 25 mm and 13 mm Swinnex® have been tested to be suitable for filtering samples for PFAS analysis by LC-MS/MS.

Swinny Filter Holders

Microsyringe Filter Holders

Swinnex® Filter Holders

Link to our Website

Waste Reduction

Greener Sample Preparation

with solvent-free SPME

Supelco®
Analytical Products

Solvent-free SPME

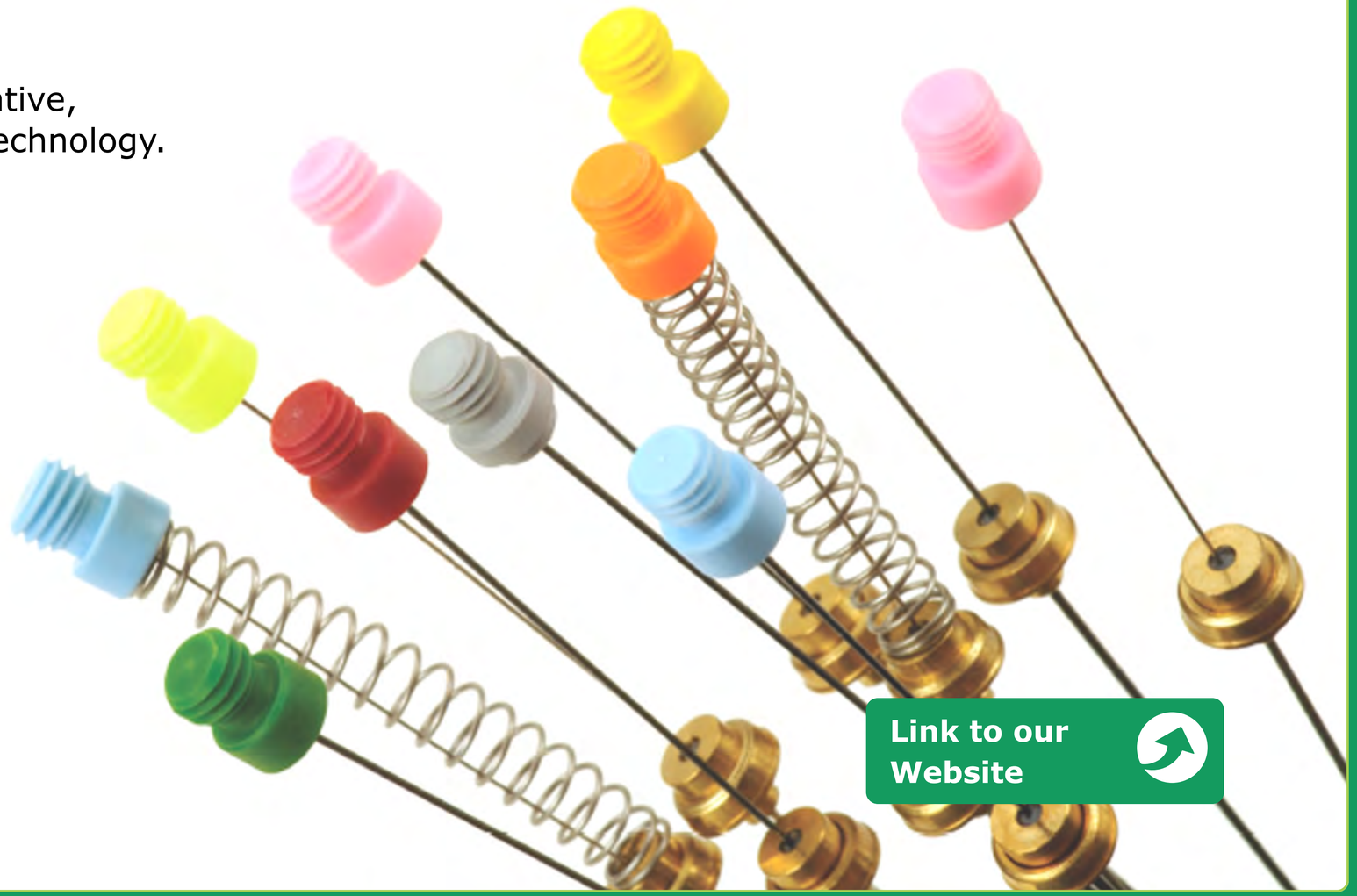
Solid Phase Microextraction (SPME) is an innovative, sensitive and solvent-free sample preparation technology.

Features & Benefits

- Solvent-free
- Easy to automate
- Non-destructive to samples
- Applicable for nearly any sample or matrix
- Fibers are reusable

Focus Products

- SPME Fibers for GC Analysis



Link to our Website

Waste Reduction

Greener HPLC

Supelco®
Analytical Products

We provide the tools that help transfer your HPLC methods to use less solvent. Using HPLC columns with smaller inner diameter (I.D.) will **dramatically reduce solvent consumption and waste creation** in HPLC applications.

Further reduction in solvent use can be achieved by UHPLC and the even smaller capillary columns.

- E.g., switching from 4.6 mm I.D. to 2.1 mm I.D. column can **save up to 92% of mobile phase.**

Reduced
solvent use

Less
waste

Link to HPLC Method Transfer Calculator

Link to all calculators and Apps

Waste Reduction

Sustainable Packaging Solutions – Overview

Supelco®
Analytical Products

We believe that packaging is more than just an empty vessel for products. It is a fundamental aspect of **safety, sustainability and reliability.** Hence, we pay as much attention to the **quality of our outer materials** as to their inner contents.

This commitment has led to an exceptional range of packaging options that ensure **safe transport, storage and handling,** while **minimizing environmental impact.**

Waste Reduction

HDPE Bottle for Solvents, Acids and Bases

Supelco®
Analytical Products

The ideal packaging for solvents, acids and bases: our **HDPE (high density polyethylene)** bottle. Developed and used exclusively by Merck, it incorporates **safety, environmental protection, and cost savings** along the entire process chain.

Due to their low weight, HDPE bottles **decrease transport costs and emissions.** And, unlike glass, they need no additional protection (like polystyrene) when packed inside cardboard boxes, thus **reducing packaging waste.**

Made of a specially treated, high-quality HDPE, the bottles are **extremely durable, inert and shock resistant.** Their unique shape and integrated handle further **increase user safety** by allowing optimal pouring, convenient handling and high pressure stability.

0
polystyrene packaging waste

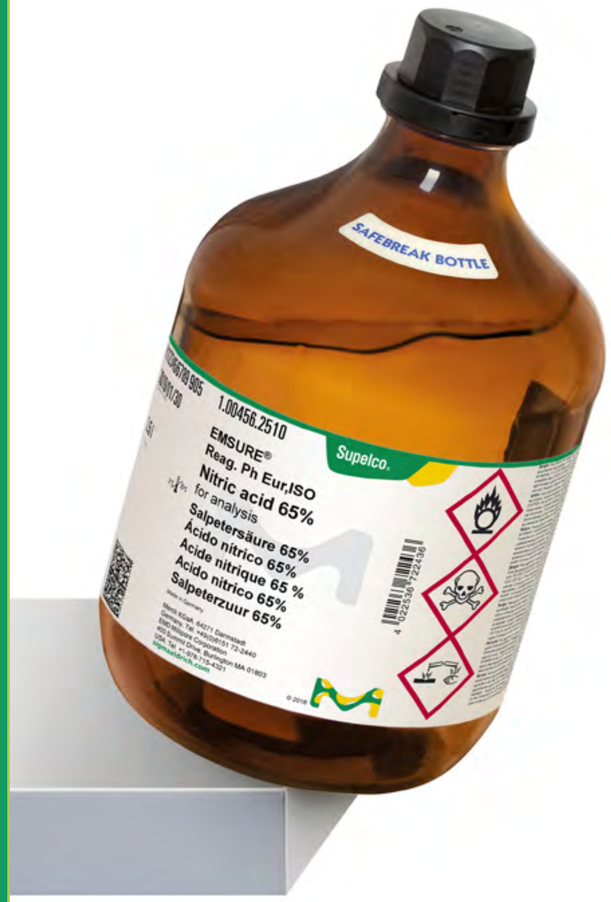
Less
transport emissions

Greater
user safety

Waste Reduction

Safebreak Bottle for Acids

Supelco®
Analytical Products



Safebreak is a unique glass bottle that is **coated with polyethylene** (PE), so it can withstand considerable impact force. Yet, in the unlikely event that it breaks, all liquid acid and glass splinters are reliably contained within the PE coating, thereby **protecting users** from cuts and chemical hazards.

Safebreak is also **safer for the environment,** as it can be recycled with conventional glass bottles to **reduce unnecessary waste.**

100%
recyclable

Download Brochure

Link to our Website

Waste Reduction

Titripac® packaging system

Good for the lab – good for the environment

Supelco®
Analytical Products

Titripac® is a **smart and safe packaging system** for our ready-to-use volumetric, buffer, and aqueous solutions. It offers both economical and ecological advantages and makes your titrations and pH measurements more convenient and reliable.

Titripac® Benefits

- **No contamination possible** – hermetically sealed pack
- Environmentally friendly disposal of packaging – **reduced packaging waste**, recyclable outer cardboard box and inner bag can be disposed separately
- **Saves cost and time** – less titer determinations and no risk of contaminated residual reagent
- **Easy to use** – integrated withdrawal tap or direct connection to a titrator

Less
packaging waste

Link to our Website

Waste Reduction

5L Extran® Canister

Supelco®
Analytical Products

Our 5 L Extran® canister is specially designed to fit in and **connect to most lab washers.** So you won't need to clean lab washer canisters or refill from smaller bottles. This makes cleaning much **easier and safer,** as it helps you **avoid contact with harmful acidic or alkaline cleaners**. For added security, the top label clearly displays product and safety information.

Besides safe, thorough, residue-free cleaning, all Extran® products also **excel in sustainability.** That's because they only contain non-toxic, **biodegradable active ingredients.**

100%
biodegradable

0%
toxins

Helps **avoid** contact with chemicals

Waste Reduction

Returnable Solutions – Overview

Supelco®
Analytical Products

Packaging and delivery have a **big impact on sustainability.**

That’s why we offer smart choices, like returnable containers, customer-aligned delivery and pickup, or even customized packaging to **reduce your chemical and packaging waste.** Such solutions can also help **minimize chemical hazards**, and support **process efficiency.** With our **extensive range** of packaging and delivery options and decades of expertise, we can easily **cater to your individual requirements.**

A typical lab using 2000 L of acetone/year, produces **116 kg plastic waste or 980 kg glass waste.** This can be **easily avoided by switching to stainless steel drums,** which are easily returned and reused (WEU).

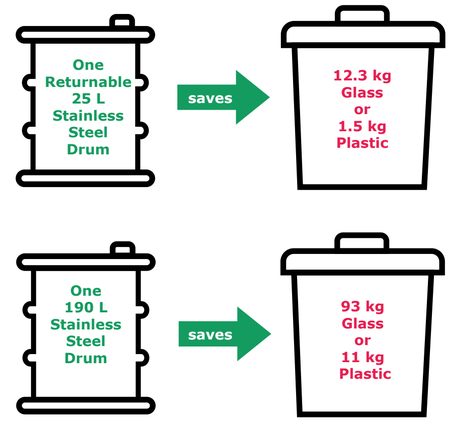
Waste Reduction

Returnable Solvent Container (WEU)

Supelco®
Analytical Products

“Reuse” is one of the fundamental three R’s of sustainability.

That’s why we also offer our **solvents in returnable stainless steel drums and barrels,** wherever possible. The containers are returned to our Darmstadt site, carefully **cleaned in a validated process** that leaves no residues, and reused to **minimize glass and plastic waste.** Our service also includes optional **withdrawal systems** for safe, convenient and contamination-free solvent handling.



Download Brochure

Waste Reduction

Bulk Packages with Withdrawal Systems

Supelco®
Analytical Products

Our **bulk packaging options** help you save resources by **reducing bottle and packaging waste** from numerous smaller vessels. Due to their unbreakable materials, they also **protect you and the environment** from chemical hazards.

For **maximum safety,** we also offer perfectly **compatible withdrawal systems** and safety tools, so you avoid contact with chemicals. The combination not only simplifies handling and pouring, but also **minimizes chemical vapor emissions,** such as during container cleaning or disposal.

Less
packaging waste

Fewer
chemical vapors

Avoid
contact with chemicals

Inorganics on tap

Safety Connects

Waste Reduction

Customer-Aligned Delivery & Pickup

Supelco®
Analytical Products

No
empty pickups

Less
fuel emissions

Less
waste

Solvents and other liquids can also be delivered in **intermediate bulk containers (IBC)** up to tank-truck quantities. In such cases, we work closely with customers to **align delivery and pickup schedules**.

This avoids empty runs and **prevents unnecessary environmental burdens.** Moreover, bulk pack sizes reduce waste and help minimize chemical hazards.

Please contact your sales representative for further support.

Intermediate bulk containers (IBC)

Waste Reduction

Customized Solutions

Supelco®
Analytical Products

Customized packaging is a great way to shrink your environmental footprint, particularly when using **larger amounts of one chemical**. Content and containers can be tailored to your exact needs, so you **reduce packaging and chemical waste.**

Less
chemical waste

Less
packaging waste

Options include

- Dedicated containers for solvents
- 20 x 25 kg Double PE bag for salts
- Customized pack size for individual use

Each inquiry will be checked carefully and individually on a case by case basis. If a required option can be fulfilled depends upon several factors like the **chemical substance, quantity and other parameters.**

Please contact your sales representative for further support.

Testing / Quality Control Lab

Your opportunities for more sustainable lab work

Greener Alternative Products

Waste Reduction

More Sustainable Alternatives

Silica Gel Orange

More Sustainable Alternatives

Silica Gel Orange

Supelco®
Analytical Products

Silica gel is a preferred drying agent thanks to its broad range of applications. However, many silica gels contain the **toxic and carcinogenic blue indicator** cobalt dichloride. Not ours.

Based on an iron salt, our high-quality **orange silica gels** give you **reliable drying results –** but **none of the health hazards** associated with blue silica gel.

We offer a range of orange silica gels for different applications, as well as **many other non-toxic drying agents.**

0%
blue indicator

No
toxins or carcinogens

Link to our Website

Procurement

Your opportunities for more sustainable lab work

Waste Reduction | Certification | Greener Services | Together for Sustainability (TfS)

- SMASH Packaging Plan
- SMASH – Results in 2021
- Polystyrene Cooler Return Program (US)
- Recyclable Plant-Based Cooler (US)
- Returnable Solvent Container (WEU)
- Customized Solutions

Waste Reduction

SMASH Packaging Plan

PILLAR	OPTIMIZE RESOURCES	MORE SUSTAINABLE MATERIALS		DESIGN FOR CIRCULAR ECONOMY
GOAL	**Shrink** Reduce amount of packaging	**Secure** Achieve zero deforestation	**Switch** Improve plastic sustainability	**Save** Maximize recycling
OUR 2022 TARGETS	• New product packaging aligned with our standards for weight and volume • 20 key improvement projects for existing packaging • 20% reduction of air space in distribution boxes	• New product packaging aligned with our zero deforestation standards • 90% of existing packaging aligned with our zero deforestation standards • 100% of packaging from deforestation-risk countries certified sustainably sourced	• New product packaging aligned with our plastic sustainability standards • 20 improvement projects to replace existing plastic packaging by more sustainable solutions • 20% reduction of expanded polystyrene (EPS) use	• New product packaging aligned with our standards for recyclability • 100% of fiber-based packaging not compatible with recycling, replaced • 100% of products with packaging recycling / disposal guidance

We continuously enhance the packaging of more than 300,000 products in our Life Science portfolio to help reduce our customers' and our company's environmental impact. Our **4-year SMASH Packaging Plan** sets new standards to shrink, secure, switch and save packaging – while still meeting performance requirements and safety regulations. Our **new and improved SMASH Packaging Plan** will kickoff in 2023.

Download Brochure

Waste Reduction

SMASHing Results in 2021

PILLAR	OPTIMIZE RESOURCES	MORE SUSTAINABLE MATERIALS		DESIGN FOR CIRCULAR ECONOMY
GOAL	**Shrink** Reduce amount of packaging 	**Secure** Achieve zero deforestation 	**Switch** Improve plastic sustainability 	**Save** Maximize recycling 
2022 TARGETS & 2021 PROGRESS	● New product packaging aligned with our standards and transit regulations for weight and volume	● New product packaging aligned with our zero deforestation standards	● New product packaging aligned with our plastic sustainability standards	● New product packaging aligned with our standards for recyclability
	Enhanced Design for Sustainability framework including our new packaging sustainability standards and created resources to help our development teams to design more sustainable product packaging solutions. Packaging of recently launched greener alternatives products aligned with our new packaging sustainability standards.			
	● 20 key improvement projects for existing packaging 15 product and distribution packaging improvement projects resulting in a total annual reduction of 250+ metric tons.	● 90% of existing packaging aligned with our zero deforestation standards ● 100% of packaging from deforestation-risk countries certified sustainably sourced 71.5% of packaging (sourced directly) aligned with our zero deforestation standards. This represents an 8% increase from 2019. Sustainable forestry certification added to 800+ metric tons of corrugated and paperboard materials.	● 20 improvement projects to replace existing plastic packaging by more sustainable solutions 10 product packaging improvement projects and distribution packaging improvement initiatives with projects at multiple locations.	● Replace 100% of fiber-based packaging not compatible with recycling 70 metric tons of non-recyclable edge protectors replaced by 100% paper-based alternative. New process implemented for the reuse of wood pallets, resulting in the avoidance of 1,000 metric tons of wood pallets sourced annually.
	● 20% reduction of air space in distribution boxes Global improvement plan development in progress. "Packaging for smalls" projects completed at several distribution centers which will result in an annual reduction of 65+ metric tons of packaging.		● Reduce Expanded Polystyrene (EPS) use by 20% Three million molded pulp inserts used annually in replacement of EPS for glass bottle inserts. Validation plan for our new greener coolers developed. Rollout in US expected by end of 2022, resulting in annual EPS reduction of 5,000+ m^3.	● Clear recycling / disposal communications for 100% of products Global packaging recycling guidance approach in development. Rollout of the first version of this solution by end of 2022.

○ *Not Started* ● *On track* ● *Focus required* ● *Off track* ● *Achieved*

Waste Reduction

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Link to our Website

Waste Reduction

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0%
polystyrene

100%
paper & starch

100%
recyclable in paper recycling

Link to our Website

Waste Reduction

Returnable Solvent Container (WEU)

Supelco®
Analytical Products

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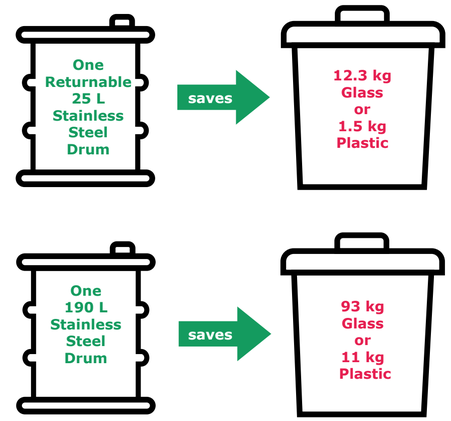

Download Brochure

Waste Reduction

Customized Solutions

Supelco®
Analytical Products

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Less
chemical waste

Less
packaging waste

Options include

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Please contact your sales representative for further support.

Procurement

Your opportunities for more sustainable lab work

Waste Reduction | Certification | Greener Services | Together for Sustainability (TfS)

Environmental Management

We hold **ISO 14001** certification mandating all productions sites to implement environmental management systems.

Sustainable Packaging

To reach our **zero-deforestation goal** we hold certifications from **FSC, PEFC** and **SFI.**

Life Cycle Management

We aim to reduce the impact of our products on health and the environment. This applies to **the entire life cycle,** from production and use to disposal.

Waste Management

Our goal is to **shrink the environmental footprint** of our waste disposal by 5% by 2025.

If your institution’s goal is to ensure and **enhance the sustainability of your products** and processes, you’ll find the perfect partner in Merck. We hold ourselves to the highest international standards of environmental and societal protection, and we have the **certificates and strategies to demonstrate our commitment.**

Corporate Sustainability Report

Procurement

Your opportunities for more sustainable lab work

Waste Reduction

Certification

Greener Services

Together for Sustainability (TfS)

Custom Screening Compounds with Aldrich Market Select (AMS)

Virtual Meetings and Seminars

eCommerce Procurement Solutions

Greener Services

Custom Screening Compounds

with Aldrich Market Select (AMS)

Our small molecule design service provides you with a **customized library of building blocks and screening compounds.** You can choose from over **14 million products,** and receive them in **tailor-made formats** to suit your quantity and packaging requirements. This way, you'll have **less waste from excess chemicals and packaging**.

The service includes a library portal for instant access to our **database of more than 8 million unique chemical structures.**

We also support you with comprehensive management of international **compliance documentation and shipping logistics** to avoid delays and fees.

Sigma-Aldrich®
Lab & Production Materials

100%
customized

Less
chemicals & packaging

Link to our Website

Greener Services

Virtual Meetings and Seminars

Virtual meetings and online seminars on SigmaAldrich.com allow us to connect with customers, and help solve their toughest challenges in Life Science – **without the environmental impacts of travel.**

Request Virtual Seminar (WE only)

Join our Webinars

Greener Services

eCommerce Procurement Solutions

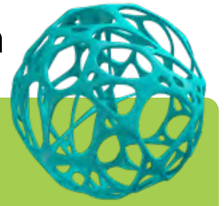
3

Streamline workflow and minimize paper waste with a full range of eCommerce procurement and delivery solutions

We offer a full range of E-Commerce tools designed to enable greater spend control for your procurement staff, providing your researchers with ease of access to the products they've come to rely on.

We have **three solutions** available to help you save time and cost in procurement management:

The One-to-One Solution



E-Procurement (B2B)

E-Procurement provides seamless system-to-system connectivity of your existing spend management system, such as Jaggaer, Ariba, SAP, Oracle, Coupa and others to our business systems.

The Customized Solution

PIPELINE

This customized service balances your organization's business needs and requirements with the product requirements of your researchers by supporting various levels of procurement authorizations and approvals.

The Simple Solution

E-Shop

Your procurement staff, researchers or any individual in your organization can access our high quality products simply, easily and securely through **sigmaaldrich.com**

Procurement

Your opportunities for more sustainable lab work

Waste Reduction | Certification | Greener Services | Together for Sustainability (TfS)

Overall Goals

The TfS program is based on the **UN Global Compact** and **Responsible Care®** principles.

Benefits of Membership in TfS

- Information about our positioning in all aspects of sustainability
- Benchmark supplier performance globally and across commodity & categories
- **Sustainability improvement opportunities for member companies and their suppliers**
- Improved quality of assessment and audit execution as well as follow up on results

Merck Targets

As a member of the Together for Sustainability network, we strive to work with **suppliers that have been audited for sustainable supply chain practices.**

TOGETHER FOR SUSTAINABILITY

Merck is an **active member of Together for Sustainability,** a joint initiative and global network of 29 chemical companies, which delivers the **gold standard for environmental, social and governance performance of chemical supply chains.**

Greener Alternative Products

Four Categories of Greener Alternatives

An icon has been added to **identify our Greener Alternative Products.** Products with this icon fulfill one of the four criteria.

4

Merck’s ”Greener Alternatives“ platform is segmented into 4 categories.

Click on each category to learn more.

Green Chemistry Aligned Products

follow one or more of the 12 Principles of Green Chemistry

Re-Engineered Products

significantly improve their environmental footprint

Greener Innovation Products

help make greener alternatives possible

Design for Sustainability (DfS) Developed Products

demonstrate signifi-cant sustainability characteristics

Green Chemistry Aligned Products

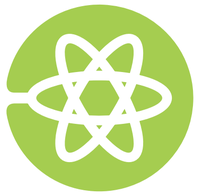
Greener Alternative Products

1

Prevention

It is better to prevent waste than to treat or clean up waste after it has been created.

2



Atom Economy

Synthetic methods should be designed to maximize the incorporation of all materials used in the process into the final product.

3

Less Hazardous Chemical Syntheses

Wherever practicable, synthetic methods should be designed to use and generate substances that possess little or no toxicity to human health and the environment.

4

Designing Safer Chemicals

Chemical products should be designed to affect their desired function while minimizing their toxicity.

The **12 Principles of Green Chemistry** were proposed in 1991 to encourage scientists to use more sustainable chemical processes and products that reduce chemical related impact on human health, and virtually eliminate contamination of the environment through dedicated prevention programs.

Learn more about Green Chemistry

Green Chemistry Aligned Products

Greener Alternative Products

5

Safer Solvents and Auxiliaries

The use of auxiliary substances (e.g., solvents, separation agents, etc.) should be made unnecessary wherever possible and innocuous when used.

6

Design for Energy Efficiency

Energy requirements of chemical processes should be recognized for their environmental and economic impacts and should be minimized. If possible, synthetic methods should be conducted at ambient temperature and pressure.

7

Use of Renewable Feedstocks

A raw material or feedstock should be renewable rather than depleting whenever technically and economically practicable.

8

Reduce Derivatives

Unnecessary derivatization (use of blocking groups, protection/ deprotection, temporary modification of physical/chemical processes) should be minimized or avoided if possible, because such steps require additional reagents and can generate waste.

Learn more about Green Chemistry

Green Chemistry Aligned Products

Greener Alternative Products

9

Catalysis

Catalytic reagents (as selective as possible) are superior to stoichiometric reagents.

10

Design for Degradation

Chemical products should be designed so that at the end of their function they break down into innocuous degradation products and do not persist in the environment.

11

Real-time analysis for Pollution Prevention

Analytical methodologies need to be further developed to allow for real-time, in-process monitoring and control prior to the formation of hazardous substances.

12

Inherently Safer Chemistry for Accident Prevention

Substances and the form of a substance used in a chemical process should be chosen to minimize the potential for chemical accidents, including releases, explosions, and fires.

Learn more about Green Chemistry

Green Chemistry Aligned Products

Greener Alternative Products

The products in this category demonstrate one or more characteristics that align with the **12 Principles of Greener Alternatives.**

Explore the product groups below to find green alternatives for your applications, and help protect the environment and human health.

- Antibodies (Greener)
- Bio-Based Greener Alternatives
- Lab Essentials (Safer)
- Greener Building Blocks
- Greener Organometallics
- Greener Synthetic Reagents
- Greener Life Science Products
- Greener Catalysts
- Greener Solvents
- Biodegradable Surfactants
- Miscellaneous Greener Products

Explore our 12 Principles Aligned Products

Re-Engineered Products

Greener Alternative Products

We use **DOZN™** to re-engineer existing products from our own portfolio to identify greener alternatives. **DOZN™** is an industry-first scoring system to quantify the improvement in environmental footprint.

Our scientists rely on data-driven improvement opportunities to **develop products that use fewer resources, are less hazardous and/or generate less waste.**

Explore our Re-Engineered Products

Greener Innovation Products

Greener Alternative Products

Greener Innovation products are those that **assist the research of alternative energy.** Products throughout our portfolios are used by scientists to unlock the power of nature, including a wide variety of novel and tested materials used for energy generation, storage, and efficiency.

In addition to our constantly evolving portfolio, we maintain several collaborations with leading universities to develop and test the latest in alternative energy materials, ensuring the **newest technology is always available to the research community.**

Reduced graphene oxide

Explore our Enabling Products

Design For Sustainability (DfS) Developed Products

Greener Alternative Products

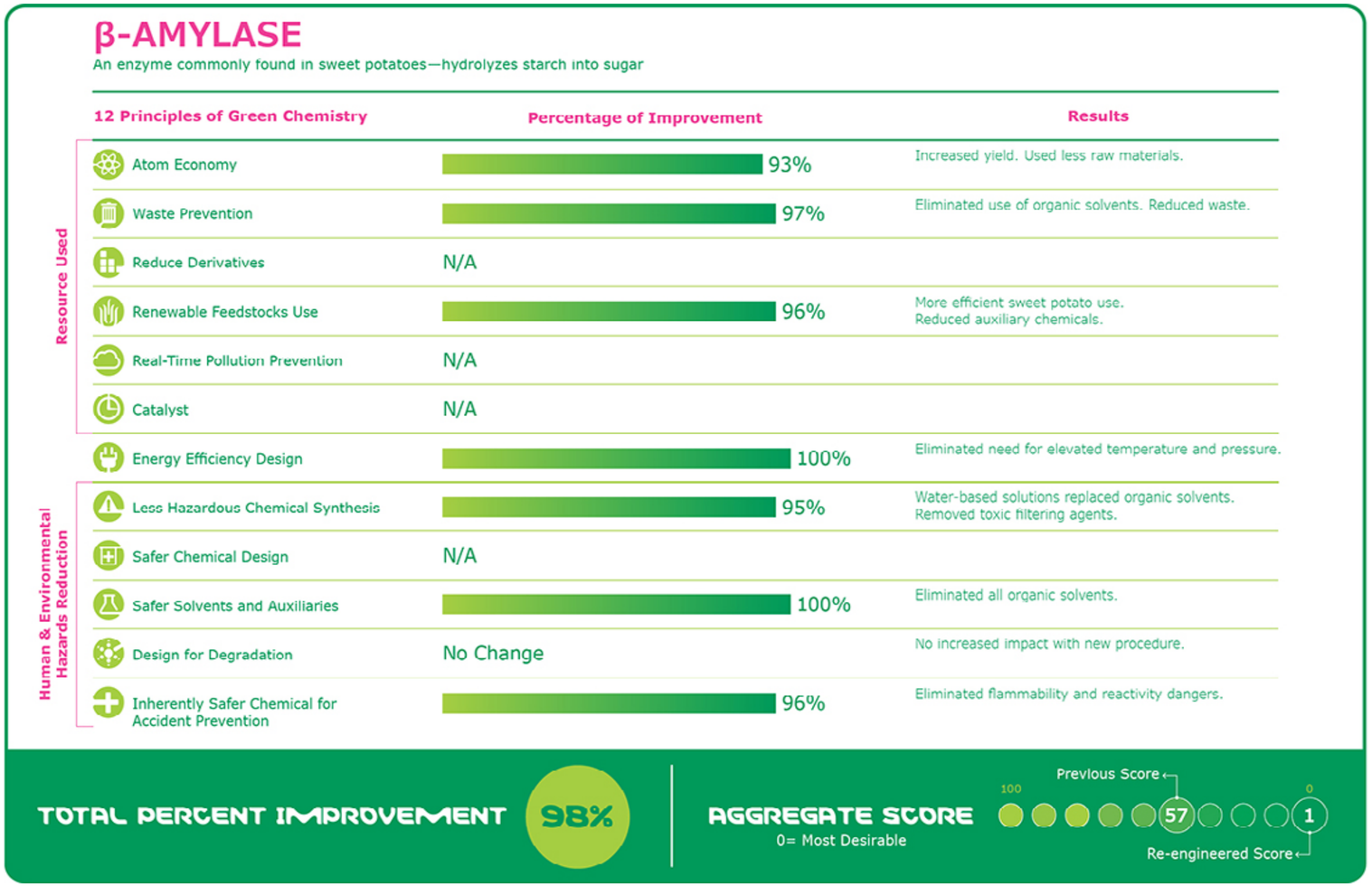
Our **Design for Sustainability (DfS) approach** is embedded throughout our product development process to ensure that we address and assess sustainability characteristics through each stage of a product's life cycle. The products in this category are new products that demonstrate significant sustainability characteristics, as evaluated with our DfS scorecard.

- **New Stericup® E and Steritop® E sterile filters:** Significantly reduce the amount of plastic and packaging that enter laboratories and waste streams, compared to conventional sterile filters.
- **Specific Milli-Q® lab water purification systems:** Developed to consume less electricity and water over their lifetime, use less plastic, and eliminate mercury handling, compared to previous generation systems.

Explore our DfS Products

DOZN™ 2.0 Tool

Quantitive Green Chemistry Evaluator



Evaluation of Greener Alternatives

DOZN™ 2.0 is a free, industry-first online tool we created to evaluate greener chemicals, products and processes based on the **12 Principles of Green Chemistry,** allowing us to share quantitative product sustainability performance with our customers.

This innovative tool shows how even small changes can have a big impact on the environment.

Learn more about DOZN™

Contact

Additional information about our more sustainable offerings

SigmaAldrich.com/sustainable-chemistry

Additional questions? Please contact:

Link to our Webform

For further information please contact:

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