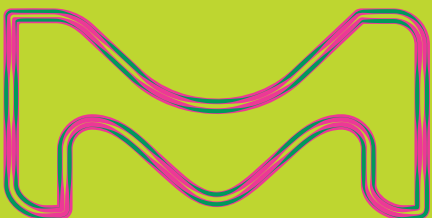


MILLIPORE
SIGMA

GREENER ALTERNATIVES

A better tomorrow starts
with better research today



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

Green Chemistry—a Key to a Better Tomorrow

With a growing portfolio of green alternatives, there are now more choices to reduce the environmental impact of your research while still delivering quality and efficacy so your results aren't compromised.

The aim of green chemistry is to reduce chemical related impact on human health and minimize contamination of the environment through dedicated, sustainable prevention programs. Green chemistry searches for alternative, environmentally friendly reaction media and at the same time strives to increase reaction rates and lower reaction temperatures.

Our Greener Standards

We hold our green products to the highest standard and they must meet at least one of the following requirements to be considered green. See a full list of greener chemistry products under each category.

3 Categories of Greener Chemistry

[Click on a category to view a list of products..](#)



Re-engineered Products

Products found in the re-engineered category have been manufactured by our scientists. Members of the Worldwide Green Chemistry Committee have developed new ways to manufacture the products that use fewer resources, are less hazardous and/or generate less waste. We've also introduced an industry first scoring system to quantify the improvement in environmental footprint. Learn more by visiting the Matrix Scoring explanation page on our website.

12 Principles Aligned Products

These products demonstrate one or more characteristics that align with the 12 Principles of Green Chemistry. Examples of these products include a new line of products from one of our supply chain partners – Biomatrixa®. The ambient storage technology of this company enables sample storage without the need for ultra-low-temperature freezers aligning with Green Chemistry Principle # 6 "Design for Energy Efficiency."

Enabling Products

Enabling products are those that enable 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 a number of 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.

12 principles of Green Chemistry

- 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.
- 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.
- 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.

*Paul T. Anastas, an organic chemist working in the Office of Pollution Prevention and Toxins at the EPA, and John C. Warner developed the Twelve Principles of Green Chemistry in 1991.

Green actions speak louder than words.

Going green shouldn't give you the blues, which is why we offer a series of simple, easy-to-implement programs and services designed to minimize your environmental impact, without compromising the quality of your work. There are several options to help your lab go greener.

To start making your lab greener, visit

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

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Reduce waste with reusable stainless steel Pure-Pac™ returnable containers – a smart alternative to disposable solvent packaging.



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Order the quantity you need, and avoid costly excess disposal expenses with AldrichCPR custom-quantity ordering. Our customized packaging allows you to receive chemicals in a ready to use format, making more efficient use of your time and research budgets while simultaneously reducing waste.

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Streamline workflow and minimize paper waste with a full range of eCommerce procurement and delivery solutions from Sigma-Aldrich®.

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To place an order or receive technical assistance:

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Technical Service: SigmaAldrich.com/techservice

Safety-related Information: SigmaAldrich.com/safetycenter



Polystyrene Cooler Return Program

Reduce your waste by returning your polystyrene cooler to Sigma-Aldrich® to help reduce waste sent to landfills free of charge.

SigmaAldrich.com/polystyrene

SMASH packaging

We're excited to announce the launch of our SMASH Packaging plan, a four-year approach to shrink, secure, switch and save waste for us and our customers. Learn more about our 2022 targets at SigmaAldrich.com/smash

To start making your lab greener, visit SigmaAldrich.com/Greener

