



*A fresh look  
at chemical intermediates*

SOLVAY  
Chemicals





## Overview

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Solvay Chemicals effectively meets the needs of the chemical intermediates industry, with a variety of versatile products used in epoxy resins, artificial flavors and everything in between.

Backed by more than 140 years of expertise, we are helping to build and maintain a cleaner, healthier world. Regarding specific applications, please go to [www.solvaychemicals.us](http://www.solvaychemicals.us) for more information.



## Allyl chloride

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Allyl chloride is an intermediate in the production of epichlorohydrin, which is produced captively and has many applications. The largest allyl chloride application in the open market is the manufacture of quaternary ammonium compounds used as flocculants for raw and potable water clarification.

Other key chemicals made from allyl chloride include a variety of allylamines which are used for the production of ion exchange resins, polymers, and specialty products. Silane derivatives are incorporated as rubber crosslinking agents for the production of green tires.

Allyl chloride is also used in the manufacture of other specialty products such as:

- Allyl and glycidyl ether derivatives, used for the production of many resins;
- Crosslinking agents such as diallyl phthalate and allyl sucrose;
- Brominated intermediates for the production of pharmaceuticals and agrochemicals;
- Allyl substituted barbiturates as sedatives; and
- Fragrance and flavor chemicals such as allyl isothiocyanate (synthetic mustard oil)

## Barium and strontium products

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Barium and strontium carbonates are used in the manufacture of radiation-absorbent glass for television and computer display screens. The combined use of both compounds can be used to achieve comprehensive radiation protection. Moreover, barium and strontium carbonates provide a wide range of improvements to the properties of many types of glass products, including increased strength and scratch resistance, enhanced optical properties, and improved finishing properties.



Barium and strontium carbonates are also used in combination with other materials for the production of certain grades of glazes and enamels. These glazing frits are remarkable in their excellent resistance to weathering and corrosion. Other uses for barium and strontium carbonates include the manufacture of heavy clay ceramic products, the removal of lead impurities in the production of zinc, and in the chemical and pharmaceutical industries to remove sulfates.

High purity barium and strontium products are used to synthesize barium titanium, a key component in the manufacturing of many passive electronic components such as multi-layer capacitors and thermistors. These compounds are also used as intermediates to produce high temperature superconductors.

## *Epichlorohydrin*

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Epichlorohydrin is used primarily in the manufacture of epoxy resins. These are versatile polymers used in the production of adhesives, coatings, and structural parts needed by the automotive, aerospace, aircraft, construction, and electronics industries. Storage tanks, pipes, appliances, and food and drink cans all benefit from durable coatings made from epoxy resins.

Epichlorohydrin elastomers are mainly used in the automotive industry, and polyamide-epichlorohydrin resins improve the wet strength of paper. Another major application is the production of polyamines and polyquaternary ammonium salts used as flocculants in water and wastewater treatment. A variety of glycidyl derivatives are also made from epichlorohydrin.





## Hydrogen peroxide

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INTEROX® Hydrogen Peroxide is used either directly or is converted in-situ to a peracid. It is widely used for various oxidation reactions in the chemical industry, such as:

- Epoxidation for the production of epoxidized soybean oil used as a stabilizer in PVC;
- Hydroxylation reactions such as the generation of catechol and hydroquinone from phenol;
- Oxidative cleavage reactions;
- Oxidation of ketones, aldehydes, and alcohols;
- Oxidation of organic nitrogen compounds such as the conversion of amines to amine oxides used as surfactants;
- Oxidation of organic sulfur compounds such as the production of sulfides, sulfoxides and sulfones; and
- Production of organic peroxides used as polymerization initiators.

## Glycerol monochlorohydrin

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Glycerol monochlorohydrin (GMC) is made by the hydrolysis of epichlorohydrin and is mainly converted to guaifenesin, an expectorant added to cough syrups. It is also used for the production of aminopropanediol derivatives used as X-ray contrasting agents, and glycidol used as a stabilizer in vinyl polymers and an intermediate for the manufacture of other chemicals. Some quaternary ammonium compounds and polyhydroxy esters are also made from GMC.



## Organic and inorganic fluorides

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Organic and inorganic fluorides are components/precursors for:

- Chemical intermediates for herbicides, pesticides and pharmaceuticals where their unique properties transform the end product, improving its selectivity and effectiveness compared to existing products;
- Etched and frosted glass for decorative and industrial applications;
- Ozone-friendly pharmaceutical grade propellants for medical device inhalers (MDI);
- High performance liquids and gases for wet and dry plasma etching, CMP, cleaning and silicon purifying, as well as wafer production used by the semiconductor industry;

- Pickling baths as well as pickling paste in metallurgy;
- SF6, an important and progressive material in the field of electrical engineering;
- NOCOLOK® Flux, used by the automotive industry in the production of radiators, condensers and heater cores; and
- The production of fluoropolymers, fluorofluids, and fluoroelastomers.

Inorganic fluorides are also used in multiple different metallurgical processes, from brazing to melting, casting to smelting, and coating to welding.

## Polyglycerols

Polyglycerol-3 and Diglycerol can be converted to fatty acid esters, which are used as emulsifiers, dispersants, thickeners and solubilizers in a variety of applications, including baked goods, chocolate, plastic films, and cosmetic formulations. They are also used as antifogging agents in food packaging and greenhouse films.

Polyglycerols can be used as crosslinking agents for the production of a variety of products, such as polymers and ethers.

## Precipitated calcium carbonate

Precipitated calcium carbonate is a functional filler that adds rheology, strength, flow and optical properties to adhesives and sealants, plastics, paint and coatings, rubber, ink, pharmaceuticals, paper, agriculture and cosmetics products.

## Soda ash

Chemical producers use soda ash as an intermediate to manufacture products that sweeten soft drinks (corn sweeteners), relieve physical discomfort (sodium bicarbonate) and improve detergents (phosphates).

## Sodium bicarbonate

Chemical processes use BICAR™ Sodium Bicarbonate as a buffer or reactive compound. As a mild base, it provides buffering capability to maintain pH. As a reactive raw material, BICAR Sodium Bicarbonate readily donates a sodium or carbonate moiety.



## Global Resources

As part of the Solvay Group, we are a member of an international chemical and pharmaceutical group whose companies employ 29,000 people in 50 countries. The Solvay Group is the world's leading producer of hydrogen peroxide, soda ash, sodium percarbonate and barium and strontium products.

## North American Sites

Solvay Chemicals and its affiliates ship product from seven North American plant sites and a number of strategically located distribution terminals. Our hydrogen peroxide and sodium percarbonate plants are located in Deer Park, Texas and Longview, Washington. Green River, Wyoming is home to our soda ash and sulfite production facility and our trona facilities. Inorganic fluorides are produced at Catoosa, Oklahoma and Alorton, Illinois, and our sodium bicarbonate is produced in Parachute, Colorado. Solvay Fluor in Ciudad Juarez, Mexico, manufactures ammonium bifluoride and anhydrous hydrofluoric acid. We also offer the North American market many imported products from our affiliates' plants around the world.

## The Responsible Care® Initiative

We are committed to sustainable development through the Responsible Care® initiative, a policy adhered to by all Solvay companies, in every country in which Solvay has a presence. The Responsible Care® initiative underscores our focus on continuous improvement in the health, safety and environment of our planet.



Solvay Chemicals, Inc.

1.800.SOLVAY C (800.765.8292)

[www.solvaychemicals.us](http://www.solvaychemicals.us)

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