

**Chemistry  
for a Blue Planet**  
AGC Chemicals



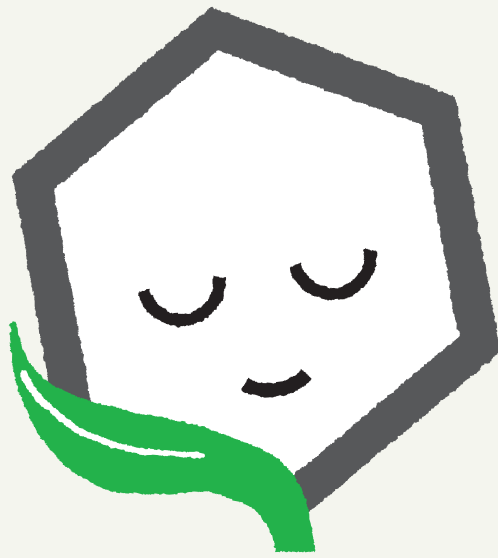


*Chemistry for a Blue Planet*

is our company slogan, summing up our vision  
and serving as a beacon to lead us  
in the right direction.

This pamphlet introduces the philosophy behind this slogan  
and how we are putting it into practice  
in our manufacturing processes  
and chemical products.

Think of it as a guidebook to the future –  
of AGC Chemicals,  
humankind and the planet we live on.

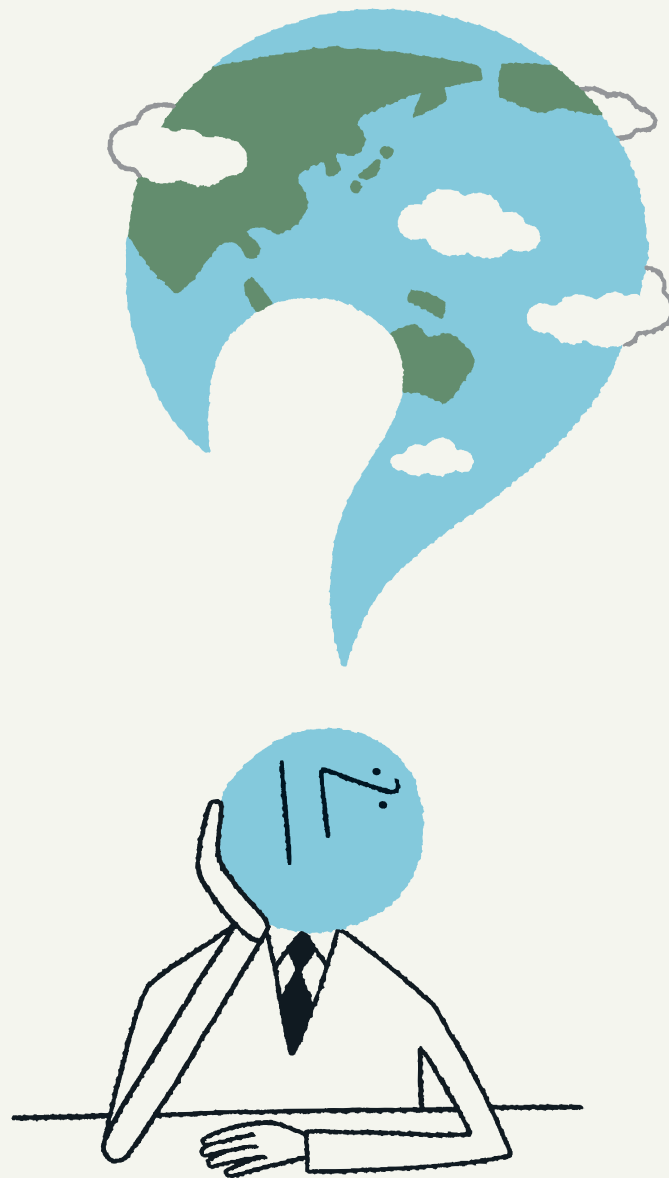


— **vision**

Where are we headed ?



If the Earth had its say, it would want to turn back the clock. But humanity wants to keep moving ahead.



Protecting our planet's environment is essential for sustainability. Everyone agrees on that.

But are people willing to give up the comforts and conveniences of modern civilization? Not likely.

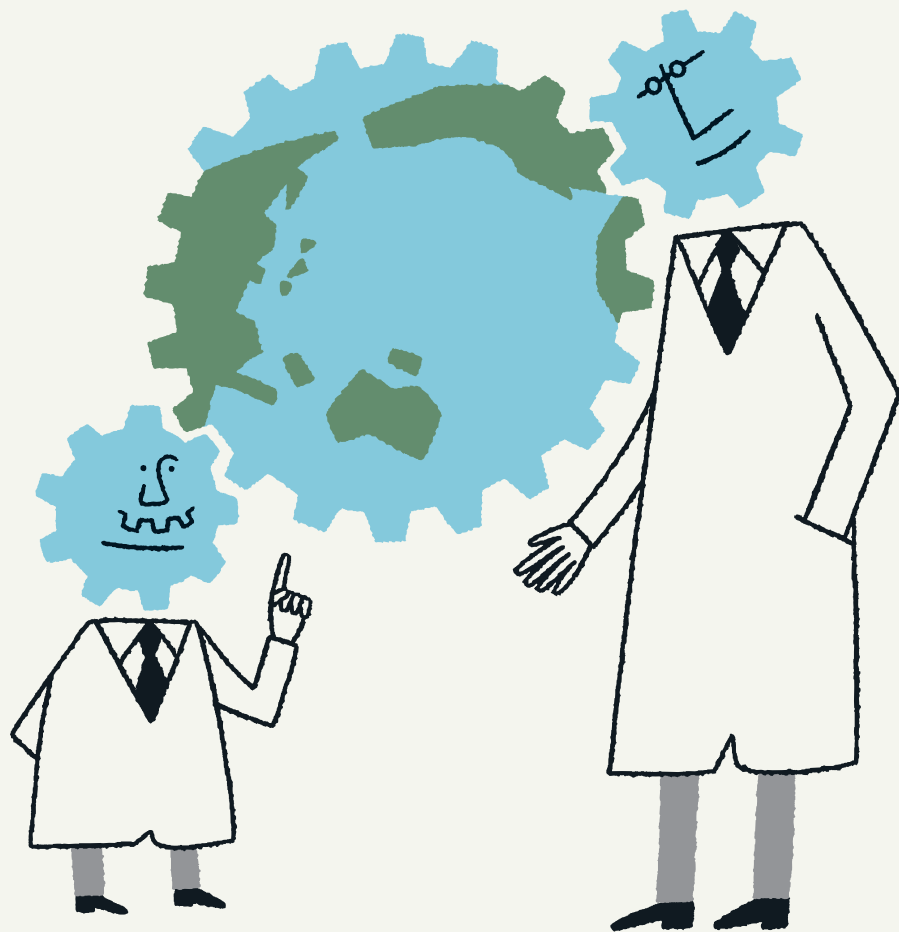
Does this mean it's impossible to do what's best for the Earth and keep people happy at the same time?

We say, 'no', there must be a solution.

Finding it is our greatest mission today, if we are to create a better tomorrow.

It is also how we will realize the vision of AGC Chemicals.

Chemistry and the Earth  
are not incompatible.



Chemistry has contributed greatly to the affluence of modern civilization. But no one would deny that material progress has come at the price of environmental impact. We must reduce this burden on the planet.

That is why pioneering environmentally friendly solutions is central to the way we work. It is a mission we have been pursuing for some time.

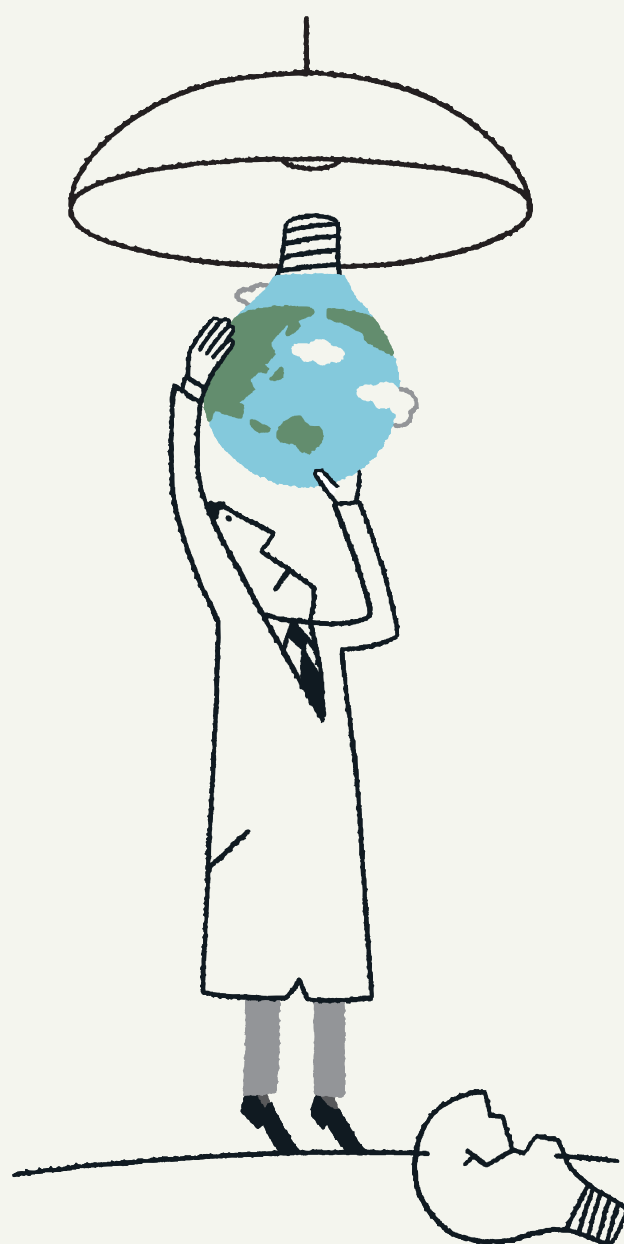
Take the fluoropolymer ion exchange membrane, for example.

This membrane technology allows caustic soda to be manufactured more efficiently and with less environmental impact than traditional production methods. Not only does it save energy, but it also ends dependence on mercury.

We created the fluoropolymer ion exchange membrane by applying our expertise in polymer synthesis and processing technology.

This example illustrates the importance of our commitment to *Chemistry for a Blue Planet*.

As a crystallization of human knowledge and wisdom, chemistry can be the salvation of our natural environment.





We are deeply concerned about the future of the Earth and humanity. The burden on our natural environment only continues to grow. Food and energy shortages loom on the horizon. Global warming and pollution are carrying us toward an unsustainable future, accompanied by frequent natural disasters.

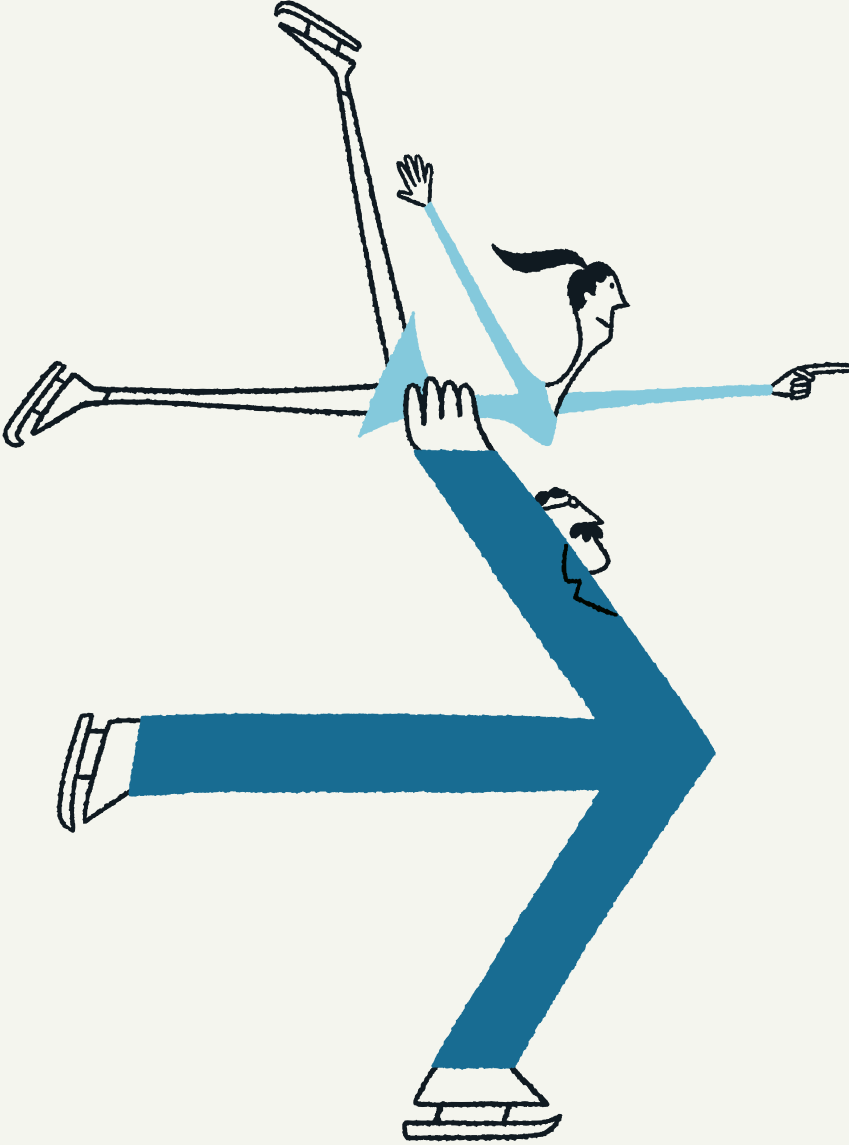
Chemistry has supported the development of modern civilization. But going forward, we must dedicate more support to our environment. For without safety, security and comfort, human happiness cannot flourish.

It is precisely because we face this impending crisis that we must accelerate progress in chemical technology. This means leveraging the potential of our existing products, while considering what technological advances human civilization will need tomorrow. By innovating in fresh directions we will create the new substances and applications that our customers seek.

Looking ahead to the next decade, we see many new challenges. We hope AGC Chemicals will be our customers' first choice when discussing solutions for the future.

Through the power of chemistry, we are dedicated to making the world safe, secure, and comfortable, while reducing environmental impact.

Our vision is supported  
by four pillars.



## Benefiting the Earth



We are working to reduce environmental impact in two ways. First, by supplying the chemicals needed to make products that contribute to sustainability. Second, by developing and continually improving processes that save energy and prevent environmental pollution.

## And its People



To support safety, we again take a dual approach. First is the safety of our customers. This includes both the end users of products made using our chemicals and the people working at the firms to which we supply chemical intermediates and feedstocks. Second is the safety of worldwide AGC Chemicals employees and local communities. 'Safety first' is the byword at every AGC Chemicals workplace.

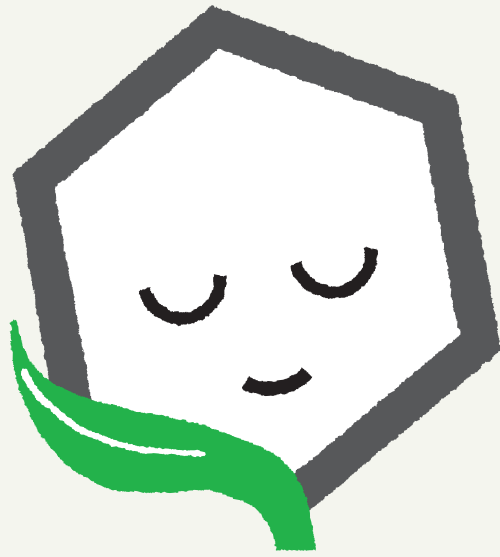


We insist that the products and chemicals we manufacture serve society and give people a sense of security. As a manufacturer of basic chemicals and intermediates that are, in most cases, several steps removed from the final products used by consumers, we feel all the more obligated to always act in a socially responsible manner and earn the public's highest trust.



Putting environmental concerns ahead of human comfort is not our intention. Rather, we believe these aims are mutually compatible. We are confident that chemistry has the potential to deliver solutions that can satisfy the demands of our planet and its people at the same time.

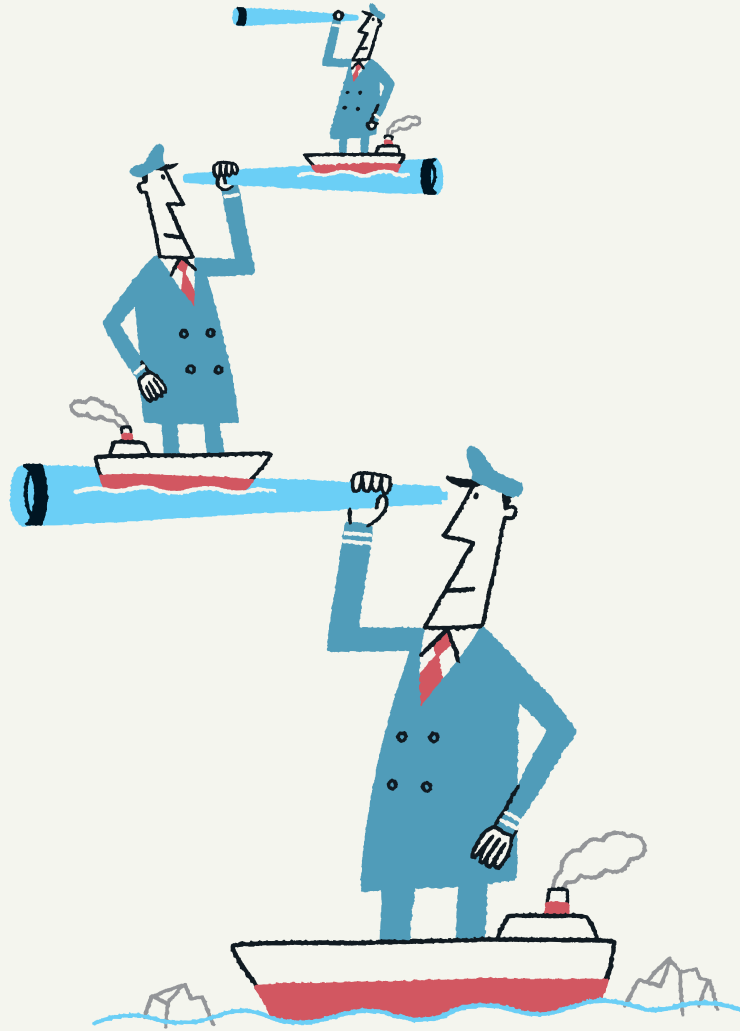
Introducing products that benefit  
the Earth *and* humankind...



— **action**

Making things with  
our vision in mind.





Ahead of its time.  
But none too soon.

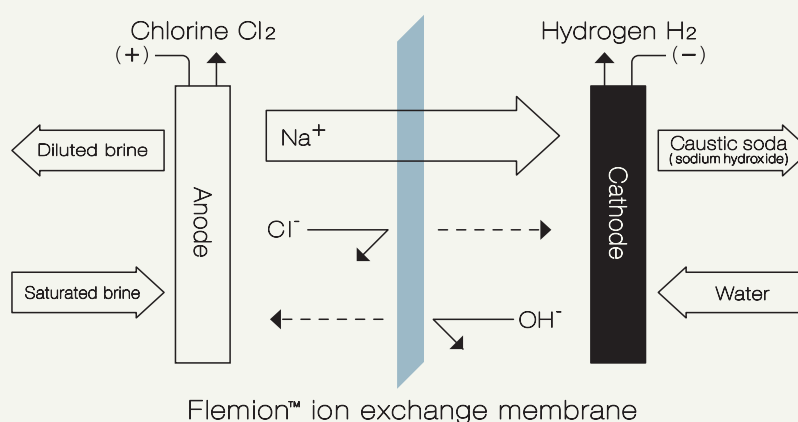
To make caustic soda in a more environmentally friendly way, we developed the ion exchange membrane process. This pioneering technology is being embraced around the world.



Caustic soda (sodium hydroxide) and chlorine are two chemicals important to many industries. They are made by the electrolysis of brine, which traditionally relied on mercury or diaphragm processes. In the 1970s, AGC Chemicals developed an alternative method of electrolysis, employing an ion-exchange membrane.

Our innovative Flemion™ fluoropolymer ion-exchange membrane serves as the partition between the anode and cathode, where it selectively passes sodium ions. Not only is this electrolytic manufacturing method more energy efficient, but it also reduces environmental impact. By 2005, all AGC Group caustic soda manufacturing plants around the world had switched to the ion exchange membrane process. Electrolysis consumes vast amounts of electric power, a fact brought home by high electricity costs following Japan's 2011 Tohoku Earthquake. To better meet today's needs, we are striving to further improve the energy efficiency of our ion-exchange membrane technology.

■ Ion exchange membrane chlor-alkali process



Worldwide, we see increasing demand for our ion-exchange method, which helps chemical industries shrink their environmental footprint. While supplying our Flemion™-based solution to satisfy this demand, we have met with a wide variety of chlor-alkali plant configurations. Each plant's brine has distinctive characteristics, with impurities reflecting the brine's sources of water and salt. Such impurities reduce process efficiency. Based on customer feedback from around the world, we are developing next-generation ion-exchange membrane technology to withstand the most challenging brine profiles. We are also innovating total system solutions that incorporate advances in cell chamber and electrode technology to comply with projected industry requirements going forward.



It cleans your home,  
and the air you breathe.



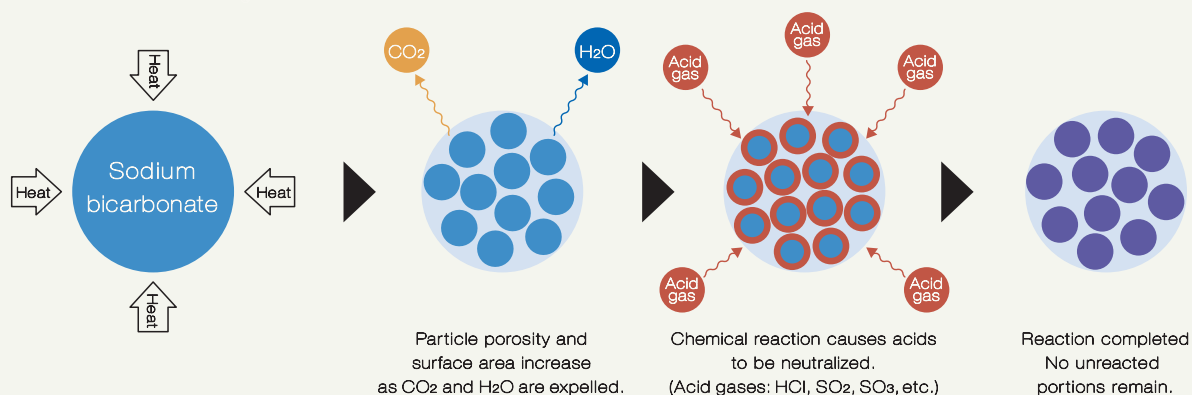
'It' is sodium bicarbonate, also known as baking soda. This common chemical has many uses – from cleaning and deodorizing in the home to neutralizing emissions at factories.



AGC Chemicals is one of the major world's producers of high-purity sodium bicarbonate. We devote so much effort to this common chemical because sodium bicarbonate is such a useful substance for human beings and has many beneficial applications for our planet. It's an inorganic material that can be eaten or washed down the drain without ecological concern.

That's why sodium bicarbonate is widely used as an ingredient in foods and medicines, and is so safe for household cleaning chores. Besides producing sodium bicarbonate for consumer use, we also formulate it for industrial applications.

■ How sodium bicarbonate neutralizes flue gas emissions



In industrial applications, one of the most important roles of sodium bicarbonate is as a cleaner. A prime example is neutralizing the acids in flue gases emitted from factories and incinerators. Our high reactivity fine sodium bicarbonate, ACLESYA, effectively removes pollutants such as HCl and SO<sub>2</sub> that cause smog and acid rain. This form of sodium bicarbonate requires only small amounts to achieve benefits in improved air quality. Our ECOBLAST cleaner is another all-sodium-bicarbonate product, which is safe, gentle to metal surfaces, and can be washed away after cleaning residue has been decomposed. For pharmaceutical and food processing applications, we supply food-grade sodium bicarbonate powder, which we manufacture under hygienic clean-room conditions.



Cushioning human bodies...  
and environmental impact.

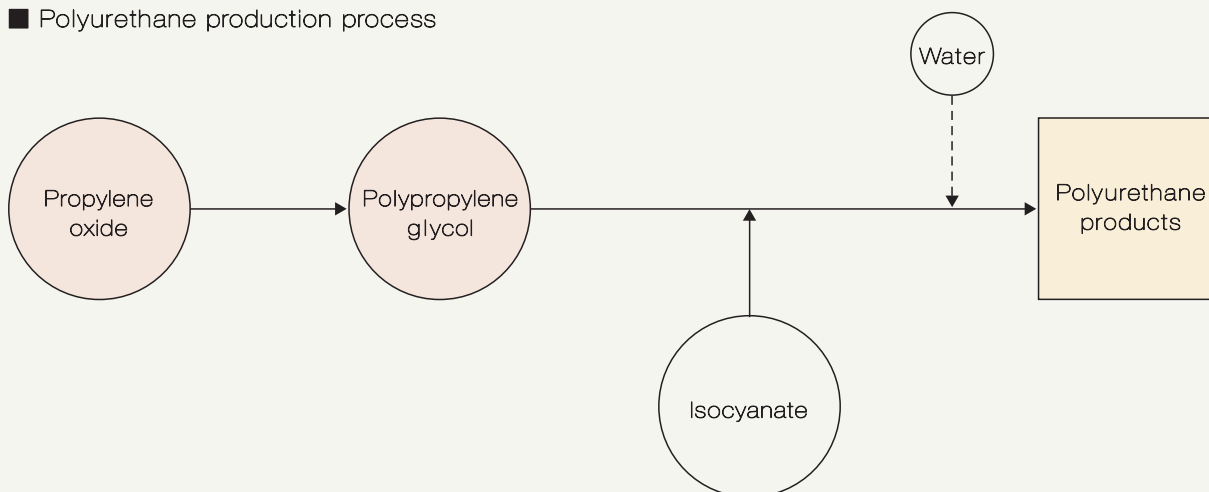
From car seats to home insulation,  
we produce customized polyurethane products  
that meet strict environmental standards.



Motor vehicles such as hybrids require thinner, lighter materials to raise fuel efficiency and maximize cabin space. Our PREMINOL™ polyurethane material helps achieve these goals.

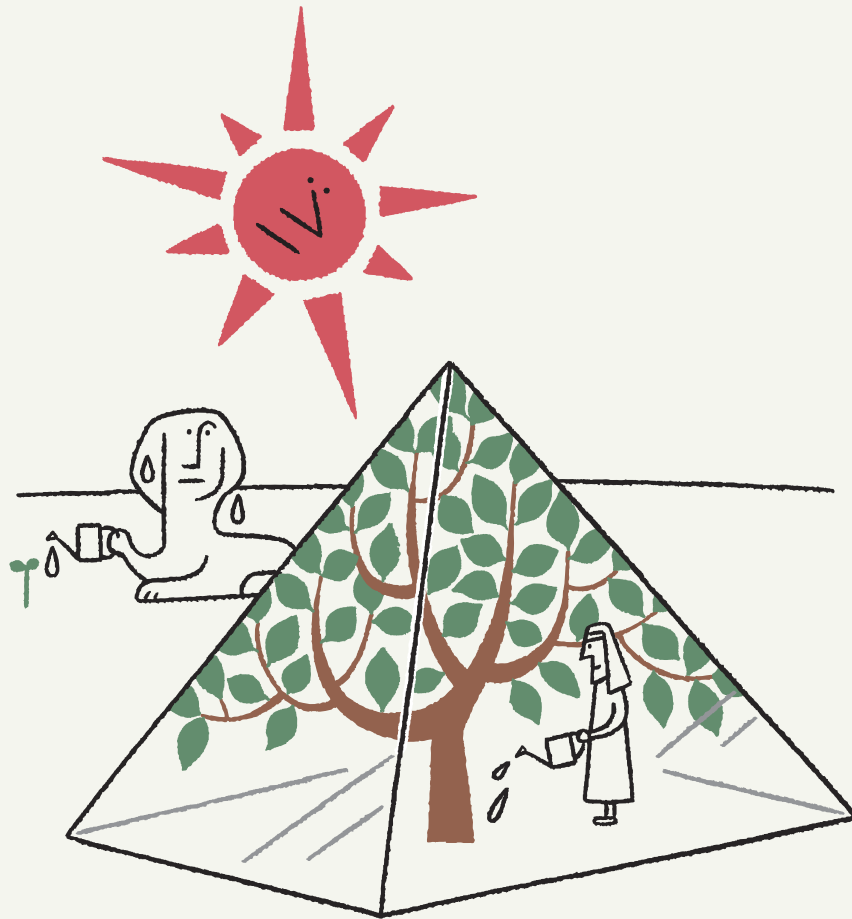
We developed PREMINOL™ to absorb impact in a thinner and lighter form. Used as cushioning in car seats, this contributes to higher fuel efficiency while simultaneously giving comfort and support.

■ Polyurethane production process



Japan's Revised Energy Saving Law of 2013 called for all new house construction to meet the new standards by 2020. The entire structure – walls, floor and roof – must demonstrate high thermal insulation. Polyurethane's light weight and outstanding thermal insulation characteristics make it ideal for such applications. Long-lasting building construction is aided by durable, weather-resistant sealants and adhesives, waterproof paints and coatings, as well as other products based on our chemicals.

Polyurethane plays an increasing role in construction of public works, too. In tunnels, for example, polyurethane filler in the space between concrete and surrounding earth or rock can arrest slippage over time. This not only extends long-term durability but also helps mitigate disaster risk, thereby upholding safety and environmental quality.



Neither rain, nor wind, nor snow,  
nor the heat of the sun can  
beat this film's durability.

Outstanding light transmittance and weather resistance combine in our Fluon® ETFE FILM. Long-lasting durability makes it ideal for greenhouse applications and architectural coverings. Fluon® ETFE FILM also offers low environmental impact.



The all-powerful performance of Fluon® ETFE FILM reflects the functional characteristics of our Fluon® fluoropolymer, which is readily mouldable, weather-resistant, heat-resistant, chemical-resistant, and non-adhesive, while displaying excellent electrical insulation and light transmittance properties. As a greenhouse covering in agricultural applications, Fluon® ETFE FILM is marketed as F-CLEAN™. Whereas conventional transparent greenhouse films had to be replaced every few years, F-CLEAN™ retains nearly full functionality after 20 years. Such long service life reduces environmental impact, since it generates so little industrial waste. By minimizing maintenance F-CLEAN™ also reduces the farmer's workload.

Two layers of F-CLEAN™ can be used to trap air between the sheets, creating a thermal insulation effect that helps economize on heating and cooling costs.

With 95% full-spectrum light transmittance, F-CLEAN™ lets farmers grow plants in light nearly as intense as open-air conditions. As humanity faces the prospect of food shortages, we are honored to help raise agricultural yields while easing environmental burdens around the world.



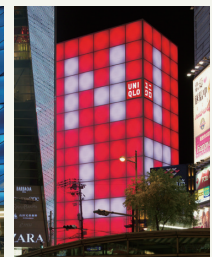
Greenhouse (Shizuoka, Japan)



Greenhouse (Saitama, Japan)



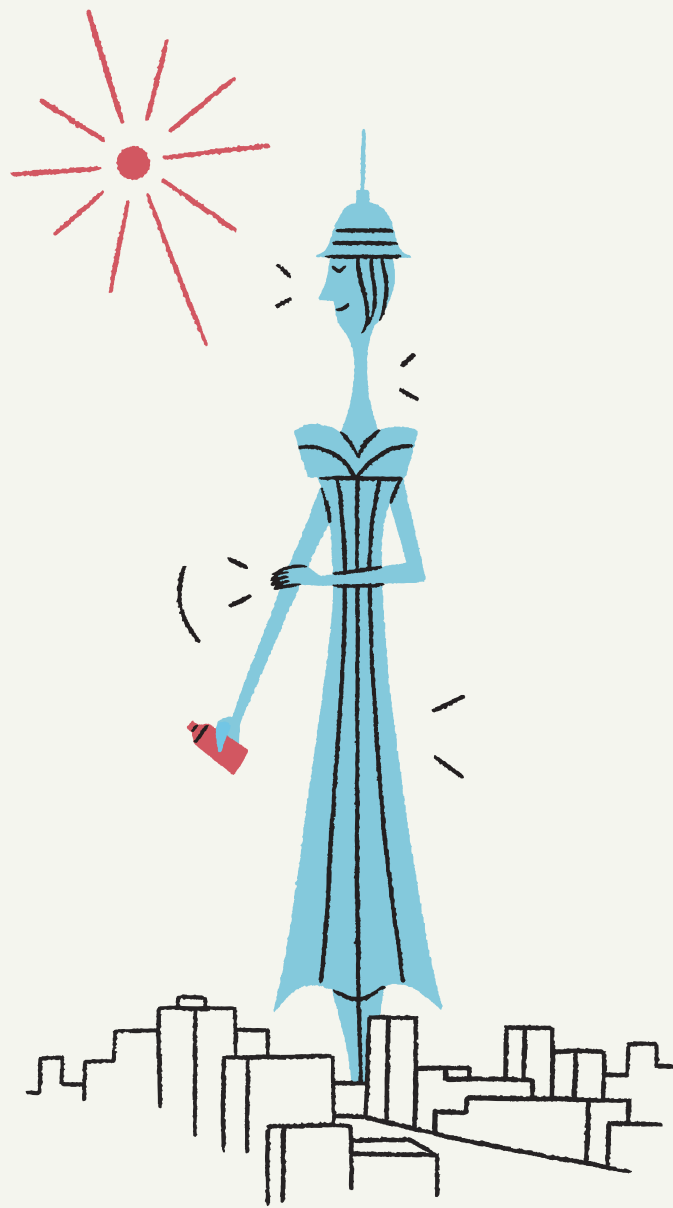
Allianz Arena (Munich, Germany)



UNIQLO Store (Shinsaibashi, Japan)

In recent years, Fluon® ETFE FILM has become popular as a membrane-structure building material in large-scale, creative architectural designs, such as stadiums, railway stations and department stores. The apparel brand UNIQLO has used Fluon® ETFE FILM for retail facades, taking advantage of the membrane's transparency to create colorful, eye-catching displays of LED patterns.

In manufacturing electronic circuit components and printed circuits, Fluon® serves as a mould release film, thanks to its low adhesion and high 200°C heat resistance.



Even high-rise buildings  
need protection  
against blistering UV rays.

Lumiflon® fluoropolymer-based coatings give buildings, bridges and aircraft outstanding weather resistance that lasts for decades.



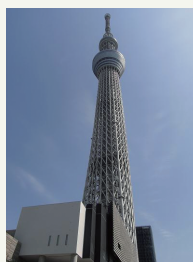
AGC Chemicals first developed its solvent-soluble fluoropolymer Lumiflon® in 1982. Since Lumiflon® based coatings can be applied to virtually any solid material, they are widely used to protect architectural structures and transportation vehicles from UV rays and other corrosive factors. Thanks to the weather resistance of fluoropolymer resins, AGC Lumiflon® based coatings far outlast conventional coatings in accelerated weathering tests. In actual use Lumiflon® has protected some structures for over three decades.

Such long-lasting durability is particularly valuable for sea-spanning bridges in environmentally harsh conditions, where maintenance is a severe challenge. Examples include the Akashi Kaikyo Bridge, one of the longest suspension bridges in the world; Tokyo's Rainbow Bridge and Tokyo Gate Bridge; Tokyo Skytree; Singapore's Marina Bay Sands, and many more high-rise buildings. Even historical structures such as Japan's Okayama Castle demonstrate the long-term durability of AGC Lumiflon® based coatings.

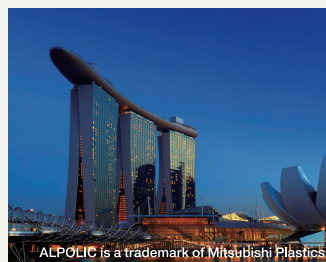
Another major application of Lumiflon® is in the transportation field, where it protects high-speed trains, aircraft and ocean-going ships from UV and other causes of corrosion.



Tokyo Gate Bridge



TOKYO SKYTREE®



Marina Bay Sands



Okayama Castle

Going forward, we are expanding the range of fluorochemical coating applications to include offshore wind power installations and other alternative energy structures.

Lumiflon® is used as the top coat of ALPOLIC aluminum composite material panels. ALPOLIC is a registered trademark of Mitsubishi Plastics, Inc.



Environmentally friendly refrigerants.  
Because who wants to live without  
air conditioners and refrigerators?

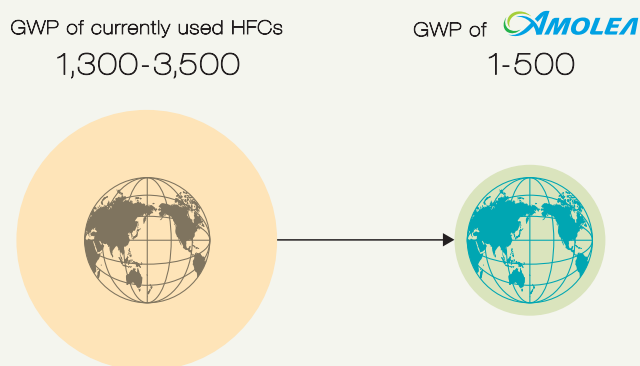


Dramatically reduced global warming potential (GWP) in a new refrigerant first proven in vehicular HVAC units and now expanding to residential applications.



Although HFCs (hydrofluorocarbons) have replaced CFCs and HCFCs as refrigerants, these chemicals are now known to have a global warming potential (GWP) hundreds of times greater than CO<sub>2</sub>. At AGC Chemicals we have been researching and developing low-GWP refrigerants that are steadily being adopted by appliance makers.

For car HVAC units, we developed a manufacturing method for HFO-1234yf, a refrigerant having one-thousandth the GWP of conventional substances, incorporating a hydrofluoroolefin (HFO) as its main ingredient. To meet increasing demand from the auto industry, we began production at our new plant in Chiba prefecture, Japan, in 2015.



Government regulations in Europe and North America call for motor vehicles to transition to low-GWP refrigerants like HFO-1234yf, a trend that is expected to expand worldwide. Since announcing our development of AMOLEA™ low-GWP mixed refrigerant in 2014, we project demand to grow in other regions where motor vehicles are made and sold, as well as in residential and other applications.

Industrialized economies in Europe, North America, and Asia have an obligation to develop low-GWP refrigerants and promote their widespread use. By developing next-generation environmentally friendly refrigerants, we are joining forces against global warming.



Innovation is essential.  
But recycling existing substances  
is even more important.

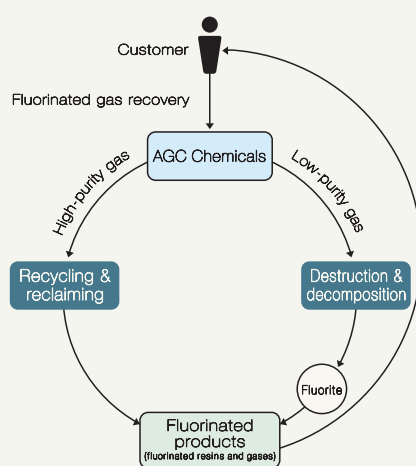
To counter global warming,  
we recover and recycle high-GWP  
refrigerants – HCFCs and HFCs –  
while innovating low-GWP replacements.



Following the Kyoto Protocol of 1997, international restrictions have increasingly regulated high-GWP refrigerants, such as HFCs. Japan began enforcement of its Fluorocarbons Recovery and Destruction Law in 2015. All involved in the manufacture, use and end-of-life processing of fluorocarbon refrigerants are now duty-bound to take appropriate measures that protect the Earth's environment.

As a manufacturer and marketer of ozone depleting fluorocarbon substitutes, AGC is legally obligated to, or takes voluntary action to, recover and recycle these substances in cooperation with manufacturers of automobile air conditioners and other appliances that incorporate these chemicals.

Within AGC Chemicals, this task has been performed as a voluntary responsibility since 1997 at our Chiba factory. In fiscal 2014, this plant recovered, destroyed, purified and recycled fluorinated gases equivalent to 1.8 million tons of CO<sub>2</sub>. In recognition of these efforts, we were honored to receive the Minister of Economy Trade and Industry Award, the highest of the 'Awards for Resource Recycling Technologies and Systems' in Japan.



#### Fluorinated gas recovery and processing

Recovery: Gas is captured from products, transported to the processing plant and transferred to large containers.

Processing: Recovered gases are sorted by purity. High-purity gases are fractionated to obtain fluororesin feedstock.

Low-purity gases are decomposed to obtain fluorite.



A ray of hope for the eyes  
of glaucoma sufferers.

Since receiving regulatory approval in 2008, Tafluprost has brought relief to glaucoma patients worldwide.

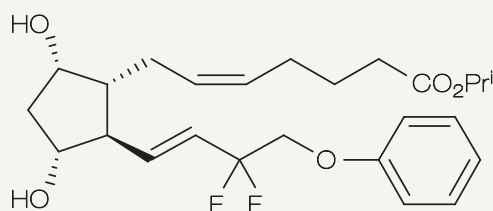


The leading cause of permanent blindness in Japan is glaucoma, which is also the second leading cause worldwide. Glaucoma results from increased pressure in the eye, causing damage to the ocular nerve.

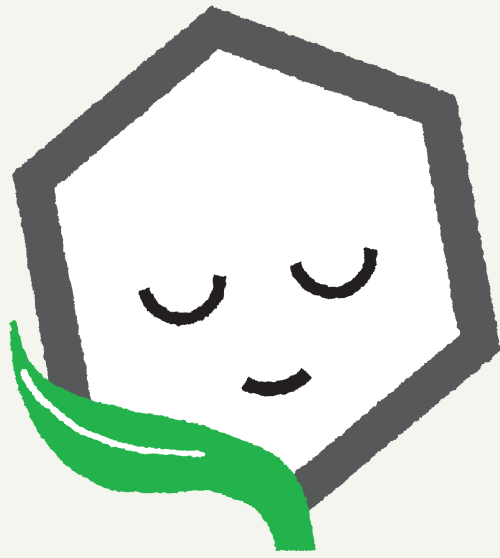
A recent survey showed that in Japan, glaucoma appears in about one in 20 persons age 40 and over. Though the incidence of the disease rises greatly with age, glaucoma quite often goes untreated.

In 1995 we were commissioned by Santen Pharmaceuticals to find a new therapeutic compound for glaucoma. At the time we were already 10 years into development of synthetic analogues of prostaglandins, hormone-like substances that exhibit many physiological effects. We saw that combining such a compound with fluoride had the potential to reduce intraocular pressure. The result was Tafluprost, which readily proved its efficacy in clinical trials. In 2008 marketing began in Europe and Japan upon receiving regulatory approval. Today we license eye drops of Tafluprost to major pharmaceutical companies, making the drug available for glaucoma treatment in more than 60 countries worldwide.

#### ■ Molecular structure of Tafluprost



It is our wish that glaucoma patients will be able to lead quality lives and receive treatment that is safe and effective. This is our hope for Tafluprost.

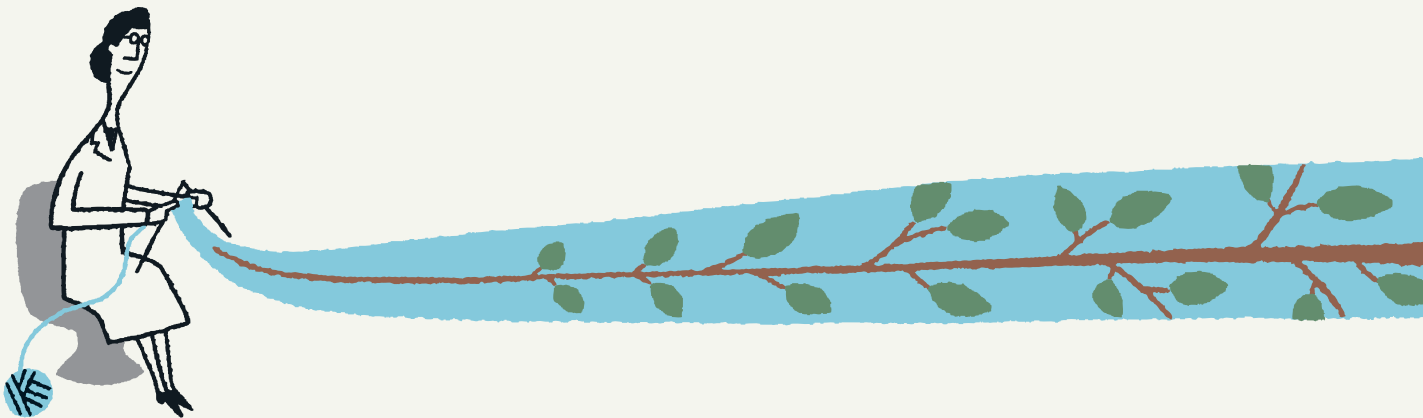
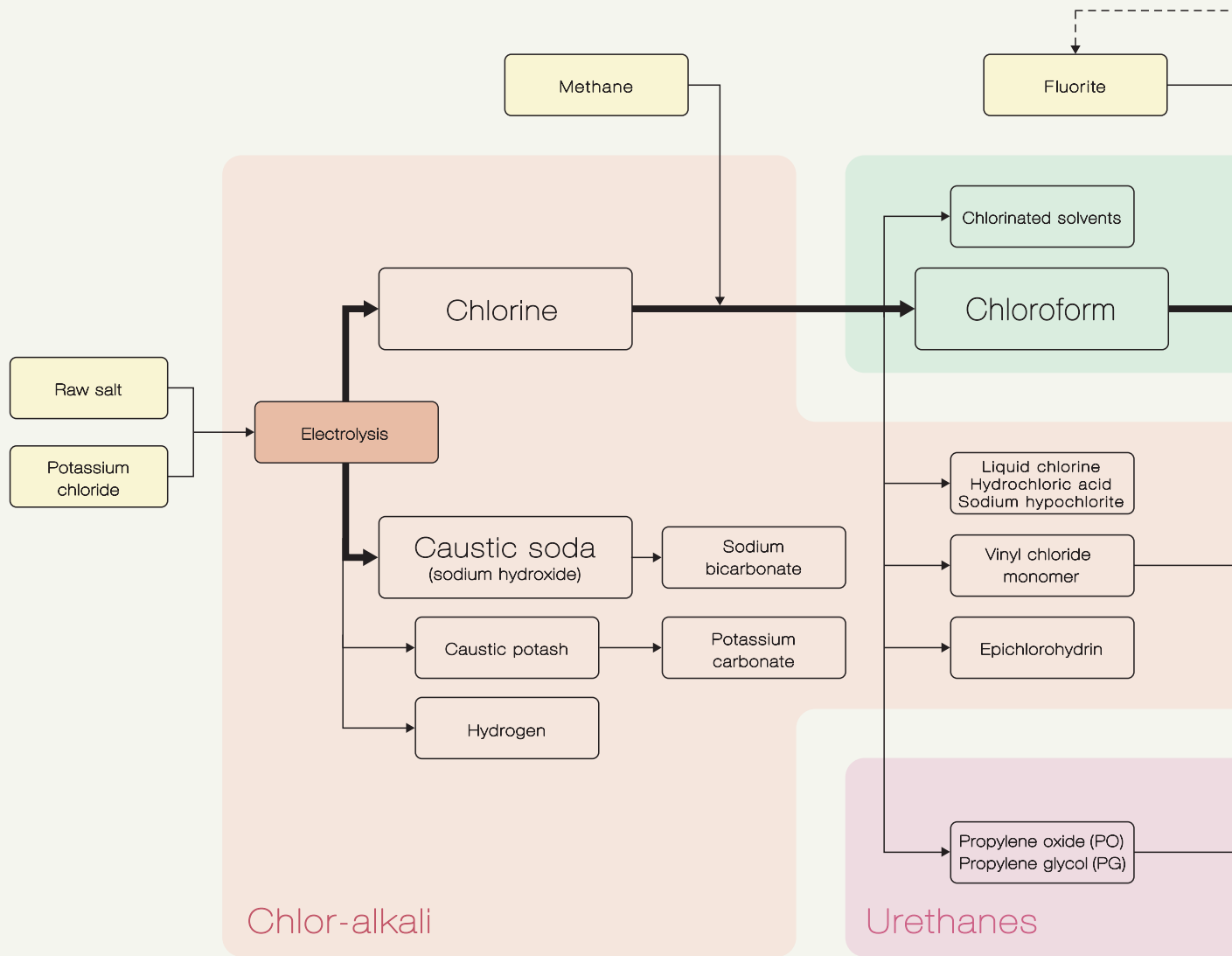


— **solution**



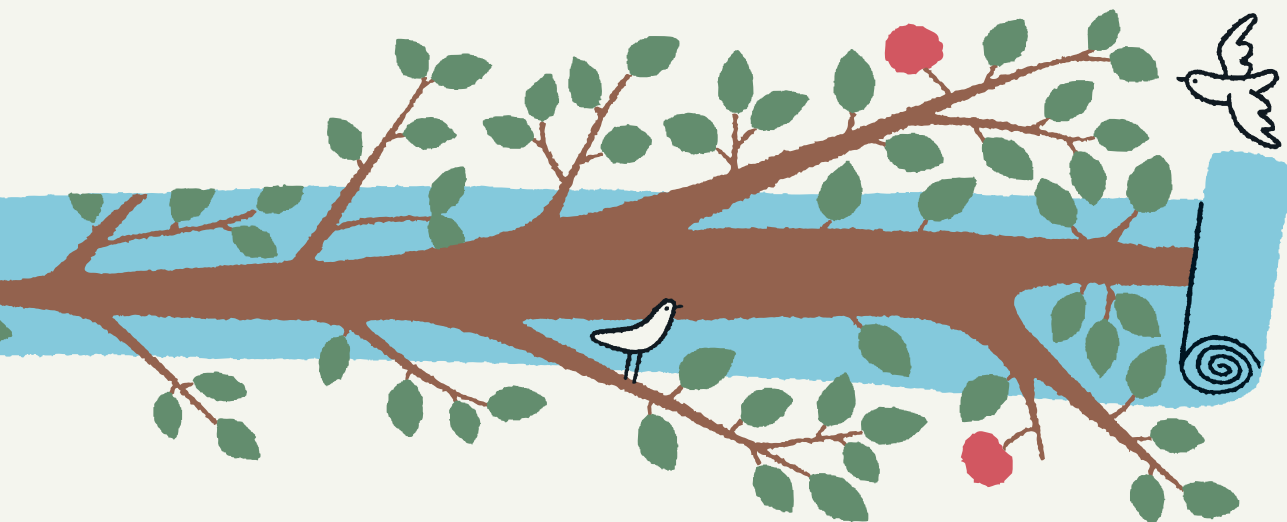
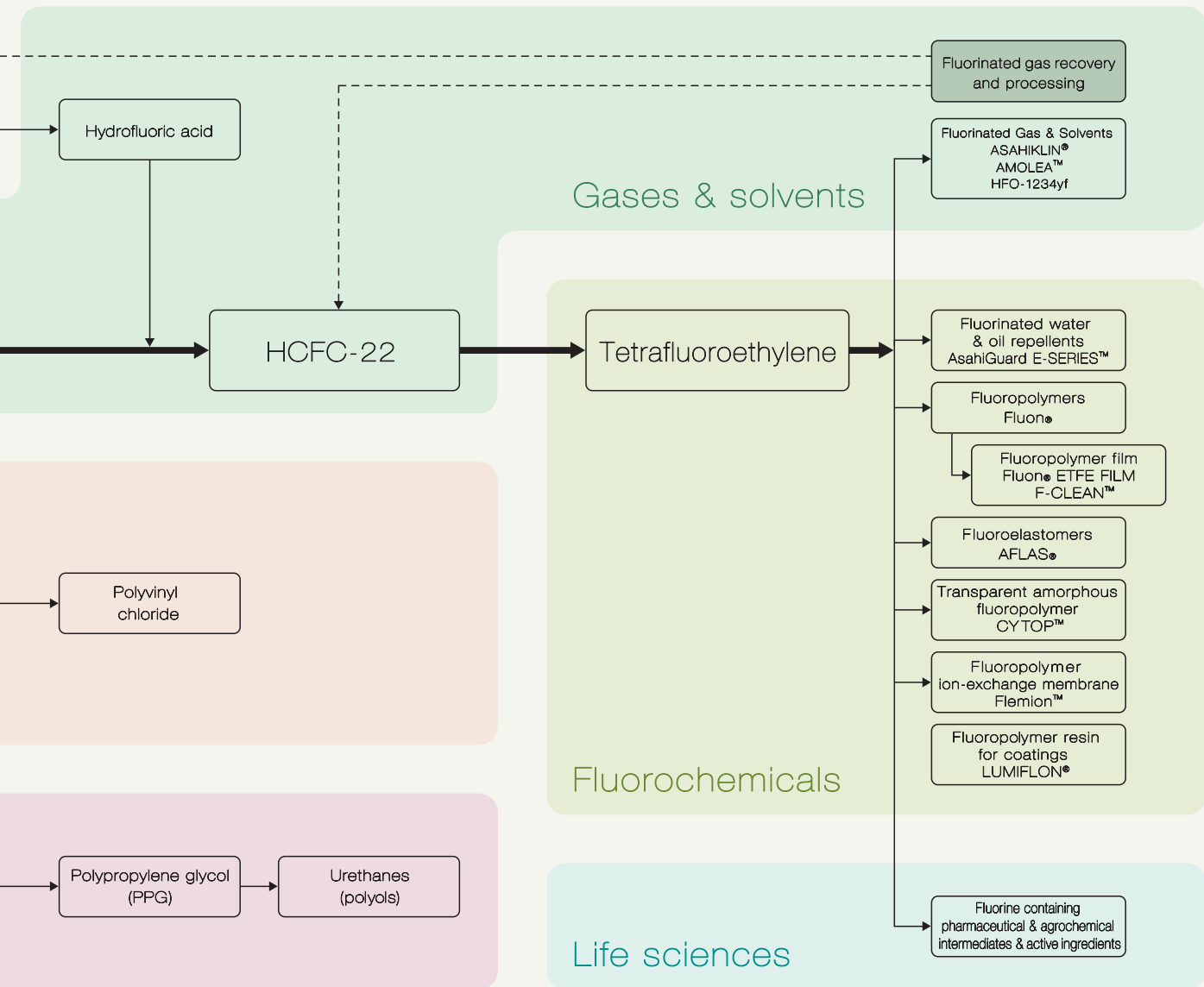
Our chemical product chain  
mirrors the history of our growth.

# AGC Chemical product chain





In 1917 we started with the production of soda ash for glassmaking. During the subsequent decades, we branched out in several directions, including fluorochemicals, and have become a major supplier of commodity and performance chemicals to international markets. The result is a remarkably integrated product chain, starting with basics obtained by electrolysis of brine and extending to a full array of fluorinated compounds. Our experience with all facets of manufacturing helps us assure thorough process safety and consistently high product quality, while taking comprehensive measures for environmental protection.



# Chlor-alkali business

Our chlor-alkali business centers on commodity chemicals, which are essential to a wide range of industrial processes and products, and which have common household uses.

For example, using chlorine generated by electrolysis of brine, we make primary chlorinated products such as hydrochloric acid and sodium hypochlorite used as a disinfectant of drinking water. Combined with petrochemicals, chlorine also serves as an organic chemical feedstock to make polyvinyl chloride products, fluorochemical products, urethane products, epoxy resins and more.

AGC Chemicals is one of the few companies to have steadily extended its electrogenerated product variety in this way. Today our chlor-alkali derived product line is among the most diverse in the world.

Growth of our chlor-alkali business closely follows Japan's GDP and reflects the close relationship between these chemicals and activity across most industries. Furthermore, Southeast Asia's rapidly growing economies are investing in new infrastructure where our products are needed – polyvinyl chloride pipes for water supply and waste water drainage, for example. To meet this rising demand, AGC Chemicals is bolstering its product supply capacity through centers in Indonesia, Thailand and Vietnam.

Recognizing the amount of electric power consumed in the chlor-alkali electrolysis process, we are taking measures to raise energy efficiency. We are also converting to self-generated electric power, thereby amplifying our competitive advantage. In consideration of Indonesia's natural environment, we plan to operate a high-efficiency electric power generator for chlor-alkali production. All our manufacturing centers employ advanced equipment and follow strict measures for processing liquid waste and waste water to minimize environmental impact.

Naturally, we aim to be our customers' first choice for chlor-alkali basic chemicals. To do this we strive to assure the highest product quality and an uninterrupted supply. Safety and security are also part of the equation that builds a long-term relationship of trust between AGC Chemicals and our worldwide customers as we aim for mutual growth and contribution to communities.

On a larger scale, the alkalis and chlorine that we make from the salt of the sea play essential roles in myriad chemical compounds that serve civilization's needs. The process comes full circle when neutralization of acid with alkali again forms salt that returns to the sea. In this sense, our chlor-alkali business plays a key role in this great cycle.



# Urethane business

AGC Chemicals makes a variety of polyurethane products, building on a core of propylene oxide (PO), which, in turn, is produced in a process that exploits our supply of chlorine.

As shown in the Chemical Chain diagram, AGC Chemicals' integrated manufacturing system uses chlorine from the upstream chlor-alkali stage to make Propylene oxide(PO), followed by propylene glycol (PG), polypropylene glycol (PPG) and other urethane-based products downstream. AGC Chemicals is the only company in Japan to make all these chemicals – from PO to polyurethane-based end-products – in such a fully integrated chain. In contrast, our competitors seek profitability by narrowing their focus on a particular section of the chain.

Our distinctive approach lets us grow our business without interrupting the chain. Since we can secure a steady low-cost feedstock supply from upstream, we amplify the rewards we reap from our downstream products. Our customers also benefit from our ability to fine-tune our production, creating customized high-value-added products to match their unique needs.

Our customers are increasingly seeking polyurethane-based products that exhibit low environmental impact. To meet this demand, we are investing in sustainable, safe and secure product development that offers light weight, durability and thermal insulating properties for a range of specific applications.



# Fluorochemical business

AGC Chemicals is one of the world's leading fluorochemical manufacturers. Fluorochemicals are at the downstream end of our product chain. Fluorochemical products have a wide range of applications, thanks to their many useful properties, including weather resistance, heat resistance, corrosion resistance, non-adhesive, low friction and electrical insulation. These characteristics drive the expanding use of fluoropolymers in electronic components at the heart of so many devices.

Fluorochemicals are also key to making the eco-products that our era requires. Solar cells use fluoropolymer protective coatings front and back to extend useful service life. Making solar cells in a film format will further expand the range of potential application sites.

AGC Chemicals' high-performance fluorochemical technology is also forging the next generation of materials for the fuel cells and batteries at the heart of hybrid, electric and fuel-cell vehicles. Closer to home, fluorochemical products take many forms in our daily lives. The touch panel display of smartphones, tablets and PCs, for example, use a fluoropolymer coating to resist fingerprints. This coating not only minimizes the adherence of fingerprints, but also makes the surface easier to wipe clean.

Our AsahiGuard E-SERIES™ is a water- and oil-repellent. It provides a durable coating that protects against water and grease, with wide ranging applications as a sustainable alternative to previous coatings for outdoor apparel, workwear, and carpets, for example. In food packaging, AsahiGuard™ adds waterproof and greaseproof performance to paper, making it ideal for fast food boxes and beverage containers.

AGC fluorochemicals come full circle to the first upstream process in the AGC Chemical Chain as the fluoropolymer ion-exchange membrane Flemion™. Our Lumiflon® fluoropolymer resin is the key ingredient in UV and weather-resistant coatings for bridges, buildings and other large structures. Our durable F-CLEAN™ fluoropolymer film covers commercial greenhouses. Fluon® fluorochemical resins insulate electrical cables while reducing weight and adding strength.

As part of the Asahi Glass Group, AGC Chemicals can create a wide variety of fluorochemical combinations with other materials – such as glass – to meet customer needs.

In our fluorochemical business, we seek to develop new applications for these versatile substances while assuring a steady supply of products that can ease environmental impact.

We are always looking for and suggesting new markets for fluorochemical-based products. As opportunities grow in Asia, China in particular, the Americas, EU and Russia, we are fortifying our presence to serve customers in these markets.



# Gases and solvents business

AGC Chemicals is a pioneering developer and producer of fluorinated gas refrigerants essential to refrigeration appliances and to air conditioners for motor vehicles, homes and commercial structures. To support environmentally responsible use of these substances, we follow strict policies not only in manufacturing, but also in recovery, destruction, refining and recycling. We also develop and manufacture solvents for cleaning precision parts and lenses.

The history of our gases and solvents business closely parallels the history of environmental measures. In the 1970s scientists discovered a strong link between ozone depletion and the use of liquid gases called CFCs, used as refrigerants, solvents and aerosol propellants, the best-known being Freon. Following the 1987 Montreal Protocol, the industrialized nations completely phased out these substances by year-end 1995. HCFCs developed in the 1980s as an alternative to CFCs were also found to significantly deplete the ozone layer. The industrialized nations have agreed in principle to completely phase out HCFCs by year-end 2019.

HCFCs gave way to HFCs (hydrofluorocarbons) developed in the 1990s, which are still the mainstream choice. HFCs do not deplete ozone. Unfortunately, the GWP (global warming potential) of these ozone-sparing HFCs is several 100 to about 10,000 times that of CO<sub>2</sub>.

Seeing that HFCs would face increasing restrictions, we innovated low GWP alternatives – the environmentally sustainable refrigerants and solvents we began supplying in 2015.

As described above, developing new environmentally considerate refrigerants and solvents is a major pillar of this business category. Another pillar is our recovery, processing and recycling of used refrigerants.

Fluorinated gases and solvents benefit humankind in many ways.

But such benefits must also be considerate of our planet.

This is why AGC Chemicals is committed to making fluorinated gases and solvents designed to advance both these aims.



# Life Sciences business

In our life sciences business, we supply many intermediates and active ingredients used by pharmaceutical and agrochemical companies to manufacture finished products.

Fine chemicals are one example. We synthesize low molecular weight organic compounds that serve as the building blocks – intermediates – of more complex chemicals.

This made-to-order chemical service is a strong component of our business model.

We also collaborate with pharmaceutical companies to discover new treatments, such as Tafluprost, a drug for glaucoma.

A second major area is biomedicine, where we have three decades of experience.

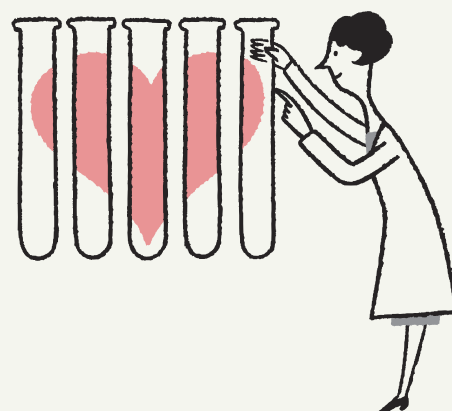
In contrast to the relatively simple molecules of our fine chemical sector, in biomedicine we create huge macromolecular structures – like proteins, which link thousands of atoms to create a medically useful compound.

Instead of attempting to synthesize such complex structures, we use microorganisms such as E. coli bacteria to produce therapeutic proteins.

The third area is fine silica products, the specialty of our subsidiary AGC Si-Tech.

The high sphericity and micro-porous structure of our functional silica particles improve the texture of cosmetics. This environmentally benign product is replacing recently banned plastic microbeads. It serves as a packing agent for liquid chromatography columns used in pharmaceutical analysis and purification. We also offer scaly silica particles that improve adhesion, coating performance and moisture retention of cosmetics products.

Safety and peace of mind are especially important in the life sciences because life itself is at stake. Our long record of professional safety in chemical production has gained the valued trust of our clients. This serves as a foundation of confidence as we expand into new markets and seek partnerships with multinational pharmaceutical makers.



# Main products

## ■ Chlor-alkali products

General name	Product usage
Caustic soda (sodium hydroxide)	Wastewater treatment, flue gas desulfurization, bleaching, food processing, chemical fiber, pulp & paper, soap, etc.
Caustic potash	Manufacturing potassium salts, soft soaps, petrochemicals, optical glass
Potassium carbonate	Glass (cathode ray tubes, optical glass, etc.), soap, lye water, potassium salts for photographic processing, etc.
Hydrochloric acid	Chemicals, preprocessing of metal plating, etching, etc.
Sodium hypochlorite	Disinfecting tap water and sewage, mold remover, bleaching of pulp, paper and textiles
Liquid chlorine	Bleaching of pulp & paper, disinfecting tap water and sewage, chemical feedstock
Vinyl chloride monomer & polymer	VCM and PVC products
Epichlorohydrin	Epoxy resin
Sodium bicarbonate (ACLESYA finely crushed sodium bicarbonate, ECOKIDS small package sodium bicarbonate, ECOLAST cleaner)	Pharmaceuticals (dialysis, antacid), food additive (baking powder, drink additive), bath salts, home cleanser, chemical feedstock, animal feeds, water soluble blast cleaning media, flue gas neutralization, fire extinguishers, etc.

## ■ Polyurethane products

General name	Product usage
Propylene oxide (PO)	Feedstock for propylene glycol, dipropylene glycol and polyols; non-ionic surfactant feedstock
Propylene glycol (PG)	Unsaturated polyester resin, humectant, antifreeze, brine for cooling, food additive, fragrances, cosmetics, medical and pharmaceutical products
Dipropylene glycol (DPG)	Unsaturated polyester feedstock, moisturizer, solvent, hydraulic fluid, antifreeze, printing ink
Polyol Excenol™	Rigid polyurethane foam (insulation for construction, refrigerators, etc.), flexible polyurethane foam (furniture, bedding, vehicle seats, etc.), CASE (coating, adhesive, sealant, elastomer)
Polymer polyol Excenol™	High resilience flexible polyurethane foam, lingerie material
High-purity, high-molecular-weight polyol Preminol™	Body-weight-distributing polyurethane foam, vibration damping foam, elastic adhesive, sealant
Thermoplastic urethane U-Fine™P	Hot-melt adhesive, outdoor clothing seam treatment, etc.
Urethane prepolymer U-Fine™L	Adhesive, sealant, outdoor wear material
Silane modified polyether ExceStar™	Elastic adhesive (construction, automotive, etc.)
High-performance lubricant Excenol™	Surfactant (textile processing, etc.), toner binder, biodegradable lubricant, freezer compressor lubricant, etc.

## ■ Fluorochemical products

General name	Product usage
Fluoropolymer Fluon® ETFE, Fluon® PTFE, Fluon® PFA	Wire insulation, films, tubing, filaments, lining & sealing materials, etc.
Fluoroelastomers AFLAS®	Wire insulation, sealing, etc.
Fluoropolymer film Fluon® ETFE FILM	Mould releasing films, roofing and architectural exteriors, wallpaper, covering for photovoltaic modules, etc.
Greenhouse film F-CLEAN™	Greenhouse covering
Transparent amorphous fluoropolymer CYTOP™	Antireflection coating, materials for photomask pellicle film, insulator, materials for semiconductors & optoelectronics
Afluid®	Fingerprint-resistant, wipe-clean coating for touch panels and other glass and plastic substrates
Fluoropolymer for coatings LUMIFLON®	High-durability coating for architectural structures, bridges, manufacturing plants, aircraft, etc.
Fluorinated water & oil repellents AsahiGuard E-SERIES™	Textiles including clothing & interior furnishings, paper products
Fluoropolymer ion-exchange membrane Flemion™	Chlor-alkali production
Hydrocarbon type polymer ion-exchange membrane Selemion™	Acid recovery, desalination, concentration and purification by electrodialysis and diffusion dialysis

## ■ Gases and solvents

General name	Product usage
Chlorinated solvents	Fluorinated refrigerant feedstock, solvent, metal cleaner, dry cleaning chemical, silicone resin, surfactant, paint/coating remover
Fluorinated gas and solvent ASAHIKLIN®	Refrigerants for air conditioning and refrigeration equipment, cleaning agents for precision equipment, defluxing, cleaning plastic parts, dewatering, drying, brine for cooling, carrier solvent
Low-GWP refrigerant and solvent AMOLEA™	Refrigerants for air conditioning and refrigeration equipment, solvents
HFO-1234yf	Automotive air conditioner refrigerants

## ■ Life sciences

General name	Product usage
Intermediates & active ingredients	Pharmaceuticals and agricultural chemicals

## ■ Specialty products

General name	Product usage
Fine silica M.S.Gel Sunsphere® Sunlovely™ SUNSPERA™	Liquid chromatography packing, cosmetic materials, functional filler
FRP (fibre-reinforced plastic) products	Water-resistant tubing, corrosion-resistant tanks, gratings, precision mould parts
Fluorosurfactant SURFLON	Leveling material, agricultural film anti-fogging agent
Fluorocoating SFCOAT	Oil barrier, surface treating agent
Chloromethyl styrene (CMS)	Silane coupling agent, ion-exchange membrane

All product names listed in the above chart are trademarks, registered trademarks or copyright of AGC Chemicals (applicability dependent upon local market regulations and restrictions).



Introducing Kemmy,  
the company mascot of AGC Chemicals.  
The Kemmy character is drawn with a benzene ring,  
symbolizing chemistry, and a green leaf,  
signifying our natural environment.  
Kemmy inspires everyone at AGC Chemicals to join together  
in constantly considering  
how chemistry can contribute to environmental solutions.

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