Arkema Inside

Indispensable chemistry

ARKEMA

INNOVATIVE CHEMISTRY

Chemistry has the distinction of being both a science and an industry. Nobody escapes the science side! Right from school, we learn that "everything is chemistry," from the air we breathe to the elements of nature that reveal a smart combination of molecules. We study the structure of matter and how it is transformed to give rise to new compounds.

What about the industry side? That's easy: chemistry is the "mother" of all industries because it produces an infinite number of materials – for vehicles and cosmetics, as well as for aeronautics, packaging, electronics and sporting goods! Arkema's chemistry is the basis for countless products and solutions that are subtly present everywhere, improving your daily life and helping develop a more sustainable world. They help meet the challenge of reducing pollution from transportation, as well as creating odorless, more resistant paints; building better-insulated, more comfortable homes; producing stronger, autonomous electric batteries; and even enhancing athletic performance. But, although our chemistry is indispensable, it remains all too often unrecognized, discretely hidden inside thousands of finished products. Our materials and innovations definitely deserve a bit of attention. With this brochure – Arkema Inside – take a journey to discover our chemistry at the heart of your daily life.

"Chemistry has the distinction of being both a science and an industry."

Indispensable chemistry – at the heart of your daily life!

Contents

Arkema – a company that is recruiting!

Every year, the Arkema group recruits nearly 2,000 employees worldwide, including 400 in France, in fields that include R&D, manufacturing, analysis, maintenance, regulations, marketing, sales, finance, etc. With more than 200 job categories, Arkema offers a wide variety of career paths accessible through all levels of education, such as on-the-job training, academic or technical high school, university, engineering school, or co-op programs. Everything's possible!

Arkema at a glance

International group and No. 1 French chemical company

Nearly 9 billion euros in turnover

20,000 employees

140 industrial sites in 55 countries

2.7% of turnover devoted to R&D
1,600 researchers in 15 research centers
Over 60 R&D partnerships worldwide

In the Top 100 Global Innovators for the last 7 years running
(Clarivate Analytics Ranking)

Arkema: chemistry for sustainable development

Since fossil resources are not unlimited, Arkema – a pioneer of green chemistry – has long been committed to a responsible approach and is developing chemistry that is innovative and environmentally friendly. Our main challenge is to promote the use of environmental technologies and renewable plant-based raw materials such as castor oil (a non-food plant that consumes little water). Through our major efforts in innovation, and in close partnership with public researchers and industrial partners, Arkema is working worldwide to develop products and solutions that are ever safer for health and ever more environmentally friendly.

Innovation designed for the challenges of sustainable development

Chemistry provides very tangible answers to major global challenges such as global warming, inadequate access to drinking water, and increasing demand for energy. Chemists were originally manufacturers of molecules, but now they have to imagine and invent solutions and materials whose functions, from the design phase, are at the very heart of the matter. Moreover, these elements must be able to be integrated into increasingly complex systems. The materials developed by Arkema – which are often lighter, more resistant or simply more energy-efficient during manufacture – are helping meet the challenges of sustainable development.

To this end, Arkema is focusing its efforts on six areas of innovation linked to these challenges:

- Developing bio-sourced products.
- Supporting the development of new energy sources.
- Designing solutions that provide access to clean drinking water.
- Reducing the weight of materials used for transportation systems.
- Developing new materials for electronic products.
- Developing materials to improve home insulation and efficiency.

Arkema, a responsible corporate citizen

Arkema's commitment to sustainable development has three major objectives:

1. Continuously reduce the impact of its activities on the environment and conserve natural resources.

2. Develop innovative products, improve product manufacturing and usage throughout their lifecycle, improve the circular economy and create recycling channels.

3. Better integrate Arkema's activities and that of its plants in local life, prioritizing information exchange and collaboration with educators and local residents through a community-based communication initiative.

common ground®

An environmentally sustainable home

The housing sector consumes 43% of energy worldwide, so it represents a major source of energy savings. Arkema's chemistry is found in many materials and equipment that help reduce energy consumption and limit heat loss from buildings.

Gas for reversible air conditioning

There is a growing residential market for reversible air conditioning systems based on heat pumps. Easy to use, these systems generate only a third or a quarter of the CO_2 produced by fossil fuel boilers and maintain an optimum temperature throughout the year, heating in the winter and cooling in the summer. Our fluid Forane® 410A, a refrigerant, is recognized as one of the most efficient for reversible air-conditioning.

Power cables of rock-solid strength

Electrical cable manufacturers face strict standards for safety (fire resistance), strength and durability (mechanical resistance). Our Evatane®, Lotryl®, Orevac® and Lotader® resins – also known as functional polyolefins – are used in the manufacture of low, medium and high voltage electrical cables. When combined with the organic peroxide Luperox® (a curing agent), they provide a solution tailored to meet the requirements of industry standards. Another product, Rilsan® polyamide, is 100% bio-sourced from the castor oil plant and is among the few materials that resist termites, and is thus particularly sought after by the underground cable industry.

"Smart" glazing

Our Siliporite® molecular sieves are tiny beads that adsorb about 1/3 of their mass in water. Window manufacturers use them in double-pane windows to prevent condensation and preserve the window's qualities for decades. Another product, particularly valuable in cold countries, is Certincoat® low-emissivity coating, which makes windows more efficient by letting in sunlight and preventing heat loss. The result is a 30% savings in heating.

More solid PVC profiles

PVC is an excellent thermal and acoustic insulator for windows and shutters. Our Durastrength® impact modifier additives improve the impact resistance of PVC window profiles, while maintaining perfect UV resistance and helping extend their life. Our Plastistrength® processing aids are essential for facilitating the extrusion of profiles during manufacture by improving PVC viscosity.

White paint: an alternative to air conditioning

In countries with lots of sunlight, white walls and roofs reflect light, making it possible to reduce the use of air conditioning. White paint protected by a transparent coating of our Kynar Aquatec® PVDF, an extremely resistant resin, offers a higher quality of solar reflectivity than traditional paints. Treated in this way, the coating retains its whiteness for nearly 20 years and enables a 15% reduction in energy costs for air conditioning.

Concrete that uses less water

New challenges for the construction industry include building cast concrete pillars and walls, producing higher performance concrete at lower cost and optimizing processes to consume fewer raw materials and less energy. The additives Ethacryl™ (for conventional concrete) and Rhealis™ (for dry concrete) from Coatex, a subsidiary of Arkema, are superplasticizers that, when added to concrete, require less water and dry more quickly.

Long-lasting putty

Our putty from Bostik (a subsidiary of Arkema specialized in adhesives) is used to stabilize and isolate window frames in homes. It is formulated from simple molecules, Arkema's acrylic monomers, which allow the putty to adhere better to surfaces and retain its elasticity for a long time.

In the kitchen

Detecting a gas leak, preserving food better, providing hermetic and aseptic packaging, ensuring safe drinking water from the tap — all this is possible thanks to Arkema's chemistry.

Fluids that make things cold

Forane® refrigerants are found everywhere that cooling mechanisms are needed: in domestic appliances – such as refrigerators and freezers – and in industrial refrigeration, as well as in shops, supermarkets and refrigerated transport. These fluids are also used for air conditioning in buildings and vehicles.

Food cartons and bottles that are perfectly sanitized

Before assembly, cardboard panels for soup, fruit juice and milk cartons are sterilized in a Valsterane® hydrogen peroxide bath. PET* plastic bottles with screw caps are enjoying increasing success on supermarket shelves. They are made aseptic through a spraying process using fine spray nozzles for which Arkema has developed an ultra-pure grade of Valsterane® hydrogen peroxide.

* PET: polyethylene terephthalate

A gas that's safer because of its odor

Gas doesn't naturally have any odor, but thanks to our Spotleak® odorizing product – which is derived from sulfur chemistry and added by gas companies – gas can be transported safely. This very particular odor makes it possible to immediately detect any leaks. The odor disappears when the gas burns.

Perfectly filtered drinking water

Arkema has developed a new, highly durable Kynar® fluoropolymer to produce filter fibers for the production of drinking water. This material enables more than 99% of bacteria and viruses to be filtered out. In water treatment plants, Kynar® PVDF filtration modules increase treated water volumes by 20%, and double the life of the filtration module, with constant energy consumption.

Transparent plastic for food processors

Rilsan® Clear, a bio-sourced transparent polyamide already well known in optics and electronics, is also used in kitchen appliances and food processors. The polyamide is free of Bisphenol A, more transparent than glass, lighter and more flexible than polycarbonate, and resistant to heat and cleaning products. It is used in coffee machines, food mixers and steam cookers.

Glues for flexible bags and food trays

In snack or chip bags, Lotader® resins combine printed or metallized films to create modern packaging designs that feature long-term preservation of food. For ready-made meal trays, Lotater® and Lotryl® resins resist temperature variations from -20°C to +250°C. Bostik Reseal M-Resin binders are used for resealable lids that allow cheese and deli packaging to be opened and closed a dozen times. All this means longer-lasting food and less waste!

Longer-lasting bottles

Certincoat® and Tegoglas® are two solutions for glass surface treatment that are applied during bottle making, guaranteeing stronger glass and preventing scratches. Applying the Kercoat® protective coating on bottles delays scuffing and white streaks on the glass, and the Opticoat® coating masks them when they do appear. This way, the lifespan of returnable bottles can be extended up to 50 cycles!

In the bathroom

What subtle chemistry! Our materials can be found in furniture, diapers and medication – and also in cosmetics, which particularly benefit from our materials to gently beautify and moisturize.

A scented shower

For an invigorating shower, nothing is better than a soap based on Oleris®, a castor oil derivative that is essential for enhancing scents, aromas and fragrances. In shower gels and shampoos, Rheostyl™ additives from Coatex enable the rheology of the formulations to be adjusted, i.e., the properties of homogeneity, viscosity and flow.

Curly or straight hair?

Arkema thioglycolic acid is an active component of cold perms and hair straighteners. It's also used in depilatories, and for many other applications for pharmacies and agrochemistry.

Baby stays dry

Bostik's ZeroCreep Avancé™ adhesive is used for fasteners and elastics in disposable diapers. It provides maximum elongation of the elastic and perfect adhesion to follow movement, thereby avoiding leaks. Just 2 to 3 g of this adhesive connect the twenty or so components in a diaper. Other efficient products for diapers are superabsorbent polymers (SAPs) made with Arkema's acrylic acid. Less than 10 g of this superabsorbent polymer gel is enough to absorb up to 100 times its mass in liquid!

There is no medication without synthesis intermediates

Medications in the medicine cabinet are used by the whole family. Some active ingredients are manufactured using a hydrazine hydrate synthesis intermediate produced by Arkema.

Flawless nails

Our Synolac® and Synocryl® resins are the main texturing components of this nail polish. Long-lasting shine guaranteed!

Beautiful and watertight bathroom furnishings

In the bathroom, Altuglas® "acrylic glass" provides a sleek design for washbasins, bathtubs and shower enclosures. The acrylic glass is light, heat-resistant and resistant to cleaning products. Washbasin seals made with Bostik *Bain Cuisine* ensure a watertight seal.

For clean, healthy skin

Acne is not inevitable! The Luperox® A75FP additive is an active ingredient in the composition of certain acne treatments. Thanks to the benzoyl peroxide from which it is derived, it penetrates easily into the follicle and prevents pores in the skin from becoming blocked. It acts as an oxidant and antiseptic, reducing the number of blackheads. Its powder consistency means it can be formulated for gels, creams and make-up removers.

Soft creams and powders

Liquid and compact foundations, pressed and loose powders, lipsticks, eyeshadows, moisturizers and sunscreens – all these skincare and makeup products contain ultrafine Orgasol® powders, texturizing agents that give them a soft, smooth consistency and improve the gliding, fluid effect on the skin. For natural-looking makeup with consistent coverage and no shine.

In the living room

Imagine a cozy interior with sophisticated decor where you feel truly at home, with designer furniture that invites you to relax and read. But where is the chemistry hidden? It's everywhere, but remains discreet, improving your daily life to make it more comfortable and enjoyable.

A beautiful, silent wood floor

What's more pleasing than a wood floor that's always matt or shiny, with no scratches? The secret is to install parquet flooring that has already been varnished with Sartomer® UV-cured resins, providing protection that resists scratches and stains for a long time. When it comes to installation, the Bostik Axios™ Tri-Linking™ solution is more than just a glue. The membrane it forms when dry prevents the wood from splitting, acts as a barrier to ground moisture and dampens noise to 38 decibels. It's all for your comfort – and the benefit of your ears!

Oh, my beautiful bag!

Encor® resins are used in paints, but they are also essential to unify and enhance the appearance of the leather of this handbag. With the Encor® solution, leather grains are more flexible and do not peel off. This bag's metal buckle contains another discrete product of Arkema's chemistry: the Foranext® fluorinated compound, which is used in precision metallurgy as a degreasing agent for metals (steel, stainless steel, bronze, copper and aluminum). With this product, the metal can be cleaned, rinsed and dried to eliminate any impurities.

A floor that's always clean

Bleach (the generic name for sodium hypochlorite) is the ideal product to disinfect everything in the kitchen and the bathroom, as well as the living room's parquet and floor tiles. Highly pure, Arkema's Bactivel® bleach is also used in industrial detergent applications (especially in the food industry) and in the production of drinking water.

A plastic material that's popular with designers

The main qualities of PMMA Altuglas® acrylic glass are its transparency, its smooth and glossy surface and its resistance to yellowing. It's an inspiring material for designers: the interior design sector has seized upon it to design transparent or colored chairs, tables, lamps and furniture. It is also found in the form of thin sheets in LED TV screens, where it ensures a uniform distribution of light and of the image.

* PMMA: polymethyl methacrylate

High-quality paper

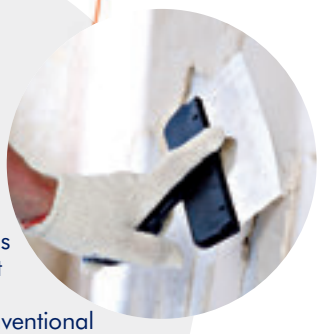
Without Arkema's chemistry, the pages of these books wouldn't be white, and the pages of magazines wouldn't be glossy. Albone® hydrogen peroxide and Alpure® sodium chlorate, two essential products for pulp bleaching, achieve stable, exceptional whiteness without damaging the fibers. To improve the paper's "coating" (i.e., its surface aspect), Coatex, an Arkema subsidiary, deploys its unique skill to control the viscosity of coatings applied to the paper's surface. Its Rheocoat™ and Rheocarb™ additives provide printability and give the surface a smooth matt or glossy finish.

Solvent-free paint that is odor-free, too

Beautiful decoration is based on choosing quality paint. Synaqua® resin enables the formulation of what are called "solvent-free" water-based paints that are as glossy, cover as well and are as resistant as traditional solvent-based paints. Made with 97% raw materials of plant origin, this resin makes it possible to manufacture paints with very low levels of volatile organic compounds (VOCs). Meanwhile, Coapur™ thickening additives provide paint with optimal texture and viscosity, for uniform coverage that does not run.

A coating that warms up walls

Bostik has developed the first thermal insulation leveling coating for interior wall preparation that reduces heat loss by 15%. It contains glass microbeads that capture heat while offering the same quality of preparation before painting as conventional coatings. It's an ideal coating to improve the thermal insulation of the walls of old or new buildings.



In the city

Contrary to the conventional idea that "chemistry pollutes," our solutions help make the urban environment greener, reduce transport emissions and make factories less polluting.

Transparent anti-noise walls that are better integrated into the landscape

Known for its acoustic insulation qualities, PMMA Altuglas® (or acrylic glass) can be used as an acoustic barrier on highways, beltways and other high-traffic roads. What's the added benefit of these noise barriers? Their transparency, of course! They let in light and blend in perfectly with the landscape.

* PMMA: polymethyl methacrylate

Skyscrapers and buildings stay beautiful for at least 40 years!

Finishing coatings based on our Kynar 500® PVDF resin provide durable protection for metal panels and profiles for the facades and roofs of buildings and structures. This is the case for the Grande Arche de la Défense, the Louvre Pyramid and the Stade de France soccer stadium. Thanks to the resistance of Kynar 500® resins, facades and metal roofs are better protected against pollution, UV rays and bad weather. Architects from major firms around the world appreciate these high-end finishes that guarantee color retention for at least 40 years.

Industrial water without sulfur residues

The effluents from refining, petrochemical and agribusiness plants contain sulfur compounds which, because they accumulate in wastewater treatment plants, cause odor pollution. Arkema has developed a process based on Albone® hydrogen peroxide, which eliminates these residues, without generating sewage sludge or toxic byproducts. The byproducts of oxygenated water are super-clean reagents: water and oxygen!

Low consumption illuminated signs

For backlit signs, Arkema has developed high luminosity transmission sheets made from PMMA Altuglas® (or acrylic glass), which can reduce lighting intensity by 20%. They can also be used with low consumption LED lighting. An effective way to reduce the electricity bill!

* PMMA: polymethyl methacrylate

"Greener" roads

Recycling products from road stripping helps reduce the quantity of new aggregates used to build or renovate roads. Adding our Cecabase RT® additive to the bitumen helps increase the proportion of recycled aggregate – up to 70% – by making it easier to blend into the bitumen. This additive also lowers the heating temperature needed for laying the bitumen, thus reducing energy consumption by up to 50%.

Sulfur-free gasoline

In an irony of chemistry, Arkema makes products derived from thiochemistry (i.e., the chemistry of sulfur) which are used to remove sulfur from fuels. Naturally present in gasoline, sulfur is the source of acid rain, which is harmful to the environment. Its content in fuel is now highly regulated. Arkema, the world's leading producer of thiochemicals, manufactures a derivative, DMDS*, which it supplies to refineries worldwide. This product is essential for activating catalysts used for hydrosulphurization, the last step in refining, which consists of removing sulfur from the fuel. A team of Arkema specialists – our Carelflex® service – travels to refineries around the world to handle DMDS implementation for our customers.

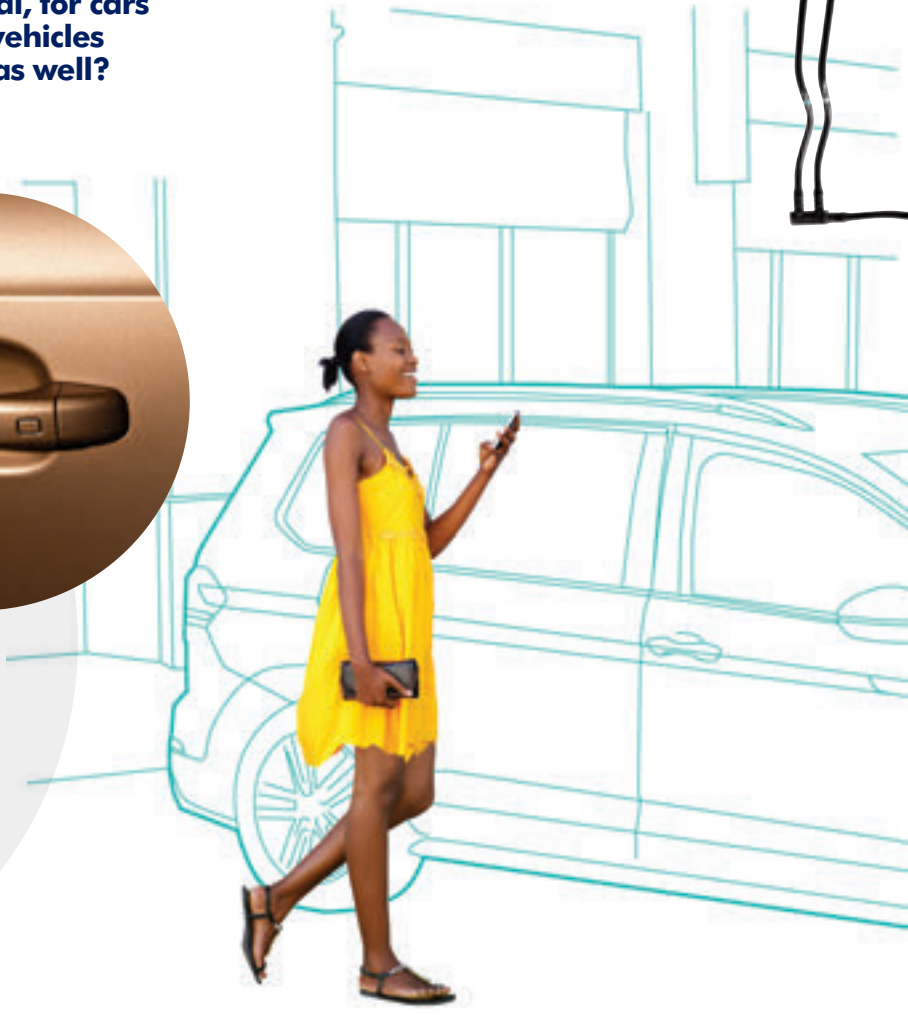
*DMDS: dimethyl disulfide

Sustainable water pipes

As an alternative to stainless steel, Rilsan® high performance polyamide coating is used to protect steel water pipes, pumps and valves from abrasion and corrosion. The coating is produced from renewable resources, so its manufacture requires less energy and emits less CO_2 than metallic coatings. It features very long durability, enabling maintenance costs for the pipes to be reduced.

On the road

What's the secret behind plastics that are more resistant and lighter than metal, for cars that consume less fuel? How about vehicles that emit less CO_2 and perform just as well? There's chemistry behind all that!



A light, recyclable car

Thermoset composites are widely used in the aeronautics, automotive and wind power sectors: they are light and have excellent mechanical properties, so they meet the challenge of minimizing weight, but are hard to recycle. The end of life of materials is becoming a major challenge for society, so Arkema developed the Elium® solution, the only liquid thermoplastic resin used like a conventional thermoset resin, and which enables the manufacture of fully recyclable composite parts. Used for car interiors, hoods and even wind turbine blades, this new resin will revolutionize the composites industry!

Panoramic roof or glazing that is lighter than glass

The Altuglas® ShieldUp acrylic glass is an even stronger version of the classic PMMA. It contains tiny particles of an elastomer that strengthens the PMMA at the nanoscale. The result is perfect transparency coupled with very high mechanical and chemical resistance. This material is half the weight of glass and is already used by many manufacturers of motorcycles and cars for glazing and for transparent roofs.

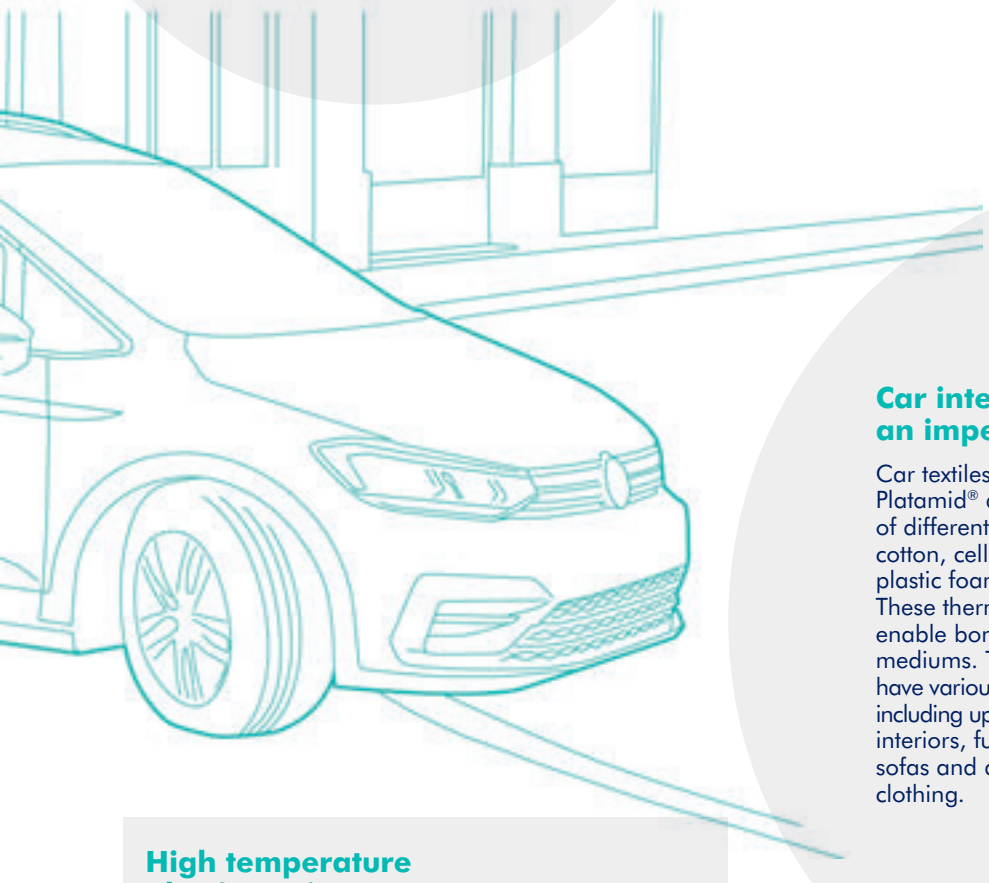
* PMMA: polymethyl methacrylate

Fuel lines resistant to high temperatures

The development of renewable fuels and changing environmental regulations are generating additional technical constraints and posing new challenges for materials used in fuel systems. Rilperm® multilayer fuel lines combine several polymers, one of which is entirely of plant origin. These fuel lines meet the requirements for using biofuels at higher temperatures.

Spotlight on PMMA

The PMMA polymer or Altuglas® acrylic glass has exceptional properties of resilience and transparency, superior to those of mineral glass. One of its flagship applications: the car tail light. PMMA Altuglas® lets through 92% of light beams, allowing for maximum distant visibility. It is also used for the manufacture of airplane windows and helicopter cockpits.



Car interiors with an impeccable finish

Car textiles are fixed in place by our special Platamid® adhesives, which can bond materials of different types and shapes: silk, wool, cotton, cellulose, synthetic fibers, leather, plastic foams, paper, wood, metal, etc. These thermofusible hot melt adhesives enable bonding between different mediums. The solvent-free adhesives have various industrial applications, including upholstery for automotive interiors, furniture (such as sofas and armchairs) and clothing.

High temperature plastic engine parts

A high-performance polyamide, Rilsan® HT (high temperature) is one-sixth the weight of steel and withstands high temperatures of up to 220°C. Thanks to its exceptional characteristics, it replaces steel or aluminum in the manufacture of complex engine parts; it enables reduced weight and therefore lower fuel consumption. This is a "green" plastic, as it is 70% made of castor oil.

On vacation

Landscapes featuring fields of crops, wind turbines or solar panels, pleasure boats, lighter planes for flying across the world – at first, these sights appear to have nothing in common. But they do! Chemistry is at the heart of all these things, which you have seen or used while on holiday.

High-performance adhesives for composites

Bostik's Skin to Core™ laminating adhesives ensure bonding between the different layers of composite panels in an aircraft cabin. Applied in a thin layer (14 to 72 g/m^2), their ease of use enables manufacturers to save on materials and reduce waste.

Lighter airplanes that consume less fuel

The Kepstan® PEKK (polyether ketone ketone) polymer has unusual characteristics that are adapted to the extreme constraints of the aircraft engine environment. It has excellent resistance to chemical irritants, abrasion and very high temperatures, with continuous resistance above 200°C. It is widely used to replace metal parts that are twice as heavy. Reinforced with carbon fiber, it can be used to obtain lightweight, rigid composites that replace steel and aluminum in structural and fuselage parts, with considerable savings in weight.

A recyclable boat is now possible!

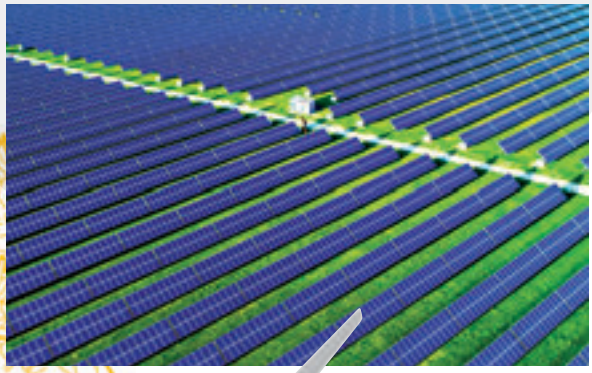
This monohull sailboat is at the forefront of innovation: its hull and deck are entirely made of Elium® thermoplastic resin, by carbon fiber infusion. The composite is recyclable, as Elium® resin is thermoplastic in nature and can be heated and reused. Bostik bonding solutions are used for the structural assembly of the boat, including bulkheads, deck and structural foams. Another innovative material is Altuglas® ShieldUp acrylic glass. More transparent and lighter than glass – and resistant to the most extreme conditions – it is used to make cockpit windows and cabin roofs.

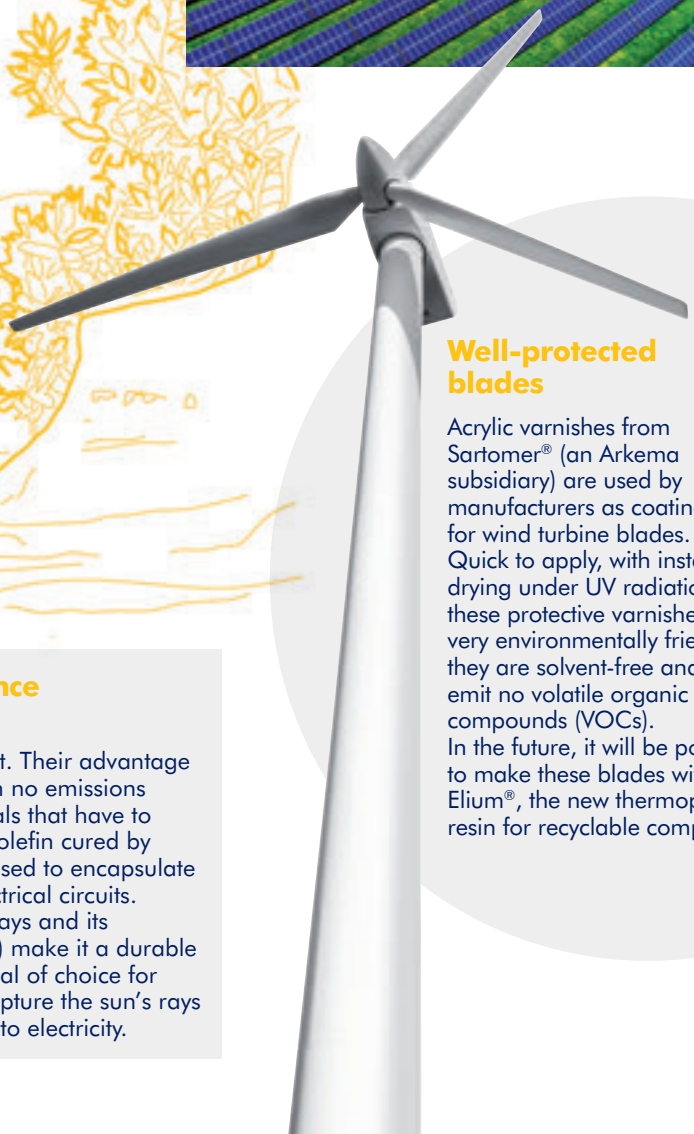
Protecting fruit and vegetable crops

For fumigating soils prior to planting vegetable and horticultural crops, the Paladin® fumigant has proven to be effective against soil pests and weeds. It is based on a sulfur derivative, a substance naturally present in the environment, so it breaks down very quickly in the atmosphere.

Sustainable solar panel farms

Altuglas® acrylic glass (or PMMA) is used as a substitute for tempered glass on the front of the solar panel. Its crystalline transparency and excellent UV resistance foster the concentration of rays directly on the thin strips of silicon, so increasing the panel's efficiency. On the backsheet, our Kynar® fluoropolymer is applied as a white film, and durably protects the panel against high temperatures and abrasive dust, increasing its service life. In addition, its white color reflects UV rays onto other panels, helping optimize yields from solar farms.





Well-protected blades

Acrylic varnishes from Sartomer® (an Arkema subsidiary) are used by manufacturers as coatings for wind turbine blades. Quick to apply, with instant drying under UV radiation, these protective varnishes are very environmentally friendly: they are solvent-free and emit no volatile organic compounds (VOCs).
In the future, it will be possible to make these blades with Elium®, the new thermoplastic resin for recyclable composites.

No solar panels without high-performance silicon cells!

Photovoltaic panels are undergoing rapid development. Their advantage is that they offer an inexhaustible source of energy with no emissions of greenhouse gases. Solar panels incorporate materials that have to durably withstand UV rays. Our Evatane® resin, a polyolefin cured by Luperox® organic peroxide, is used to encapsulate silicon cells and protect electrical circuits. Its high resistance to UV rays and its transparency (over 92%) make it a durable and economical material of choice for protecting cells that capture the sun's rays and transform them into electricity.

Leisure time

Enjoy your favorite sport using high-performance, comfortable equipment; surf the Internet without worrying about your smartphone's battery life; fix everything at home with a glue that helps you give free rein to your creativity – these are just a few activities where Arkema materials and Bostik glues add real value to your lifestyle!

An effective, good-looking ski helmet

This ski helmet is protected by a varnish based on UV-cured Sartomer® resins. The result: an elegant satin-effect material that stands up to any punishment!

Bright screens and well protected casings

Sartomer® acrylate resins are used to manufacture transparent adhesives for the touch screens of smartphones and tablets, helping ensure optimal image quality. The resins confer key characteristics, including durability, prevention of yellowing and excellent flexibility. These same resins are also used to formulate protective varnishes for the device's back and casing. They give the coating its scratch resistance and a unique matt or glossy finish.

Shoes "energized" by Pebax®

Pebax® elastomer has won over the leading sports brands with its unique combination of strength, lightness and flexibility. It is used to create high-performance, lightweight insoles for sport shoes. Pebax® soles absorb impacts and give back maximum energy, like a spring, where most plastics tend to dissipate it. This remarkable energy return provides excellent propulsion for running. You want proof? Two-thirds of the goals scored during the 2018 World Cup were scored by players wearing shoes with Pebax® soles! In its stiffer form, this material is also used to make lightweight ski boot shells that do not become stiff at low temperatures. It is available in a biosourced version that is equally high performance, and sold under the Pebax® Rnew brand.

Lightweight designer glasses and smartphones

Rilsan® Clear is one of the rare polymers to combine chemical and impact resistance, slim components, lightness, softness to the touch, transparency and glossiness. These qualities make it a popular material for eyewear manufacturers to develop frames with a creative design. 20% lighter than polycarbonate and 40% lighter than aluminum, this polymer was recently adopted by tablet and smartphone manufacturers to produce particularly lightweight and sleek casings and internal frames. It is also considered a "green" plastic, as it is derived from the castor oil plant.

Lightweight, super-resilient sporting goods

Many bicycle frames and hockey sticks made of epoxy resin (a very strong and light plastic resin) contain our Nanostrength® additives. They act at the nanometric level on the molecular structure of the plastic resin, reinforcing its solidity and resistance to impact.

The pleasure of fixing everything!

Fix & Flash by Bostik is a new generation of ultra-efficient light-curing glue. Totally innovative and suitable for all types of materials, it dries in a few seconds on contact with LED light rays emitted by a mini-lamp provided in the kit. Re-gluing broken wood, plastic, porcelain and metal objects has never been so quick and easy! In a few seconds, the object will be as good as new, and ultra-strong. Good for everyday repairs, Fix & Flash glue lets you give free rein to your creativity and opens the door to all sorts of fun activities. It's perfect for today's DIY craze!

A more powerful, longer-lasting battery

Temperature variations and repeated charging and discharging cycles have a negative impact on lithium-ion batteries. The result on the electrodes is a loss of adhesion of the active particles – the very basis for battery power. This causes a decrease in battery life or battery failure. To deal with this problem, smartphone battery manufacturers use the Kynar® fluoropolymer as a binder to make the active particles stick to the aluminum (cathode) and copper (anode) electrodes. Its exceptional adhesion and resilience help improve battery life for smartphones and electric cars.

Chemistry quiz

Test your knowledge of the properties of our materials and what they do. If you have questions, scan the flash code on the back of the brochure to find the answers in our video!

1. To prevent heat loss, a transparent Certincoat® coating is applied to interior glazing. It enables savings in heating costs on the order of:

A: 10% **B:** 30%

2. White roofs and walls protected by Kynar Aquatec® transparent resin reflect light rays and reduce energy consumption from air conditioning. Thanks to Kynar Aquatec®, the paint's whiteness and reflectivity last longer than:

A: 10 years **B:** 20 years

3. Glass bottles whose surfaces are treated with Certincoat® and Tegoglas® coatings are stronger. The lifespan of returnable bottles can therefore be extended by up to:

A: 20 cycles **B:** 50 cycles

4. The Kynar® fluorinated polymer is used to make filtration membranes to produce drinking water. These membranes have the ability to filter:

A: 99% of bacteria and viruses

B: Seawater

5. In a diaper, superabsorbent polymers (SAP) – gel polymers made from Arkema's acrylic acid – can absorb:

A: 10 times their mass in liquid **B:** 100 times their mass in liquid

6. A plastic can be transparent or tinted, is resistant to heat, scratches and cleaning products and is used in bathrooms to make shower enclosures, bathtubs and washbasins. Which plastic is it?

A: Altuglas® acrylic glass (or PMMA) **B:** Kepstan® PEKK

7. Bostik, Arkema's subsidiary, has developed an insulating interior coating that reduces heat loss by 15%. It contains:

A: Glass microbeads that capture heat **B:** Tiny particles of straw that form an insulating layer after drying

8. Arkema manufactures solvent-free, water-based paints. The resins in this paint are made from what percentage of plant-based raw materials:

A: 50% **B:** 97%

9. The Cecabase RT® additive is used to fluidize road bitumen when it is laid. It is therefore heated to a lower temperature, reducing energy consumption by:

A: 10% **B:** 50%

10. The metal panels and profiles of skyscrapers are protected by a Kynar 500® PVDF resin coating. This coating provides protection against corrosion, pollution and UV rays for at least:

A: 20 years **B:** 40 years

11. To replace metal, engine parts can be engineered from Rilsan® HT, a polyamide that is resistant to high temperatures and reduces engine weight. It is:

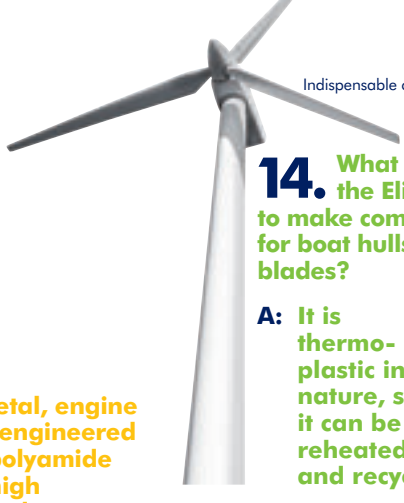
A: Half the weight of steel **B:** One-sixth the weight of steel

12. Altuglas® ShieldUp acrylic glass (PMMA) replaces glass in motorcycle windshields and cars' panoramic roofs. This material is:

A: Half the weight of glass **B:** 20% lighter than glass

13. Which plastic that is very resistant to heat and impact can replace steel or aluminum in the structural and fuselage parts of planes to reduce weight?

A: Kepstan® PEKK **B:** Levoc® PVC



14. What is special about the Elium® resin used to make composites, particularly for boat hulls and wind turbine blades?

A: It is thermo-plastic in nature, so it can be reheated and recycled **B:** It is thermoset, so it is very strong

15. What raw material is used to produce Rilsan® Clear plastic, which is used to make eyeglass frames and cellphone casings?

A: Castor oil **B:** Palm oil

16. Which elastomer brand is popular with manufacturers of soccer shoes and ski boots?

A: Pebax® **B:** Sportbax®

Answers:

1. B / 2. B / 3. B / 4. A / 5. B / 6. A / 7. A / 8. B / 9. B / 10. B / 11. B / 12. A / 13. A / 14. A / 15. A / 16. A

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