

# CHLORINE

*Understand how this  
product makes your life better.*



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## The role of chlorine in our everyday lives

### Understand how this product makes your life better

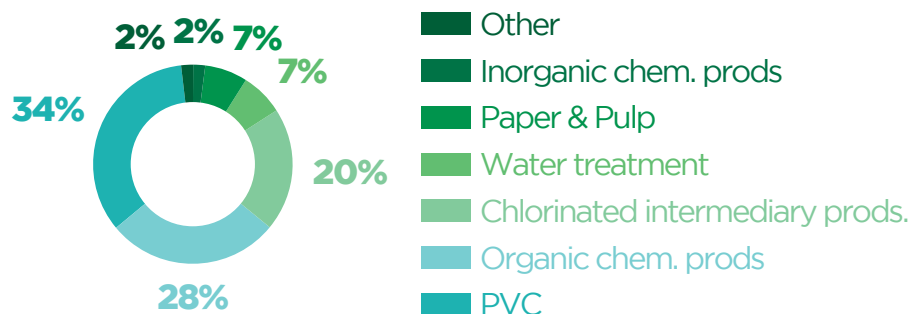
Chlorine is produced by passing an electric current through a brine solution (common salt dissolved in water). In this process, called electrolysis, besides chlorine, caustic soda (sodium hydroxide) and hydrogen are also produced.

### Global Demand Chlorine / Soda in 2014



Fundamental to human development, chlorine is very present in our daily lives. The most common association is with water. Because of its bactericide power, it is used in water treatment and basic sanitation since 1908, ensuring health and quality of life. Thanks to its disinfectant property, it is also used for cleaning swimming pools. Its uses, however, go far beyond this. Chlorine is used to make thousands of products that are essential to meet the needs of today's society, helping humanity to develop sustainably. For example, chlorine-based components are important for manufacturing pharmaceuticals, medical devices, security equipment, computers, cars, aircraft parts and chemical products to protect agriculture, among other, the list is virtually endless. It is present in over 50% of all commercial chemistry and its various applications are detailed inside this booklet.

### Chlorine Applications



### Water

Chlorine is used as a disinfectant and plays a key role in water treatment. When we drink a glass of water, chlorine chemistry helps us ensure that we will quench our thirst without getting sick. It also allows us to dive into a pool without worrying about waterborne diseases.

### Food Safety

Chlorine is also vital in reducing pathogens from improper handling of food. Chlorinated water solutions of various concentrations are routinely used to disinfect the storage of crops and facilities of livestock for slaughter or domestic animals. Processing and food preparation units use chlorinated solutions to disinfect the surfaces of the facilities. Global distribution models of food and consumers' demographic changes are new challenges in the effort to control diseases transmitted by improper handling of food and strengthen the important role played by chlorine in food safety.

### Health

Chlorine chemistry helps us to stay healthy and treat ourselves when we are sick. Chlorine is an essential element to make over 90% of the drugs that treat many illnesses from high cholesterol to allergies, besides helping to protect patients from infections in hospitals. Chlorine is also essential in the production of a wide variety of medical equipment ranging from blood bags, surgical stitches and membranes to artificial joints and respiration inhalers.

### Transport

Based on chlorine chemistry, car seat cushions are produced, helping to keep us comfortable during long trips, whereas as bumpers and airbags guarantee our safety. In addition to cars, airplanes, trains, ships and boats also use components derived from chlorine chemistry in their manufacturing processes.

### Power

Currently, a major concern in all countries is to guarantee the supply of power at a competitive cost and its conservation. New advances in alternative energies - including the production from solar panels, wind turbines and hybrid battery blades - depend on chlorine chemistry. Chlorine chemistry also helps to produce lightweight vehicles and aircraft materials that improve fuel economy.



### New technologies

Technology and digital communication move fast and chlorine chemistry helps to move it faster still. Tablets, laptops and even smartphones depend on chlorine chemistry to make faster and better processors, which allows for faster network access. Present in aerospace components, catalysts, high-speed communication cables, computers, mobile phones, among others, chlorine chemistry is driving the next generation of high-tech innovations.









## *PVC, an indispensable product in today's life*

A major product of the chlorine industry is polyvinyl chloride, known as PVC. Over 30% of the chlorine produced in the world goes to the PVC industry, which contains 57% chlorine in weight.

The life cycle of PVC products ranges from 2 to 100 years, with an average of over 60 years. Because PVC is a durable, resistant, versatile, waterproof, harmless and 100% recyclable plastic that does not corrode, is a thermal and acoustic insulator, does not propagate fire and can be produced in any color or hardness from transparent to opaque, hard to flexible, it is widely used in medicine, food, packaging, footwear, toys, wires and cables, coatings, automotive and construction industries, among others.

## *Water - a precious natural resource*

PVC piping is used to transport drinking water to thousands of homes and industries. Because it is light and flexible, its installation is easy and economical. Moreover, the constructive characteristics of the pipes allows a perfect fit between each other (tip and sleeve), avoiding losses and contamination risks, from the water treatment plant (WTP) to the end consumer.

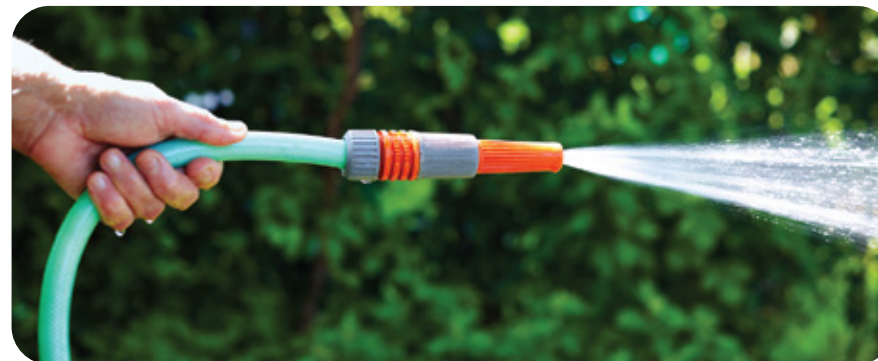
## *Basic Sanitation - contribution to public health and the environment*

PVC pipes and fittings are also widely used in basic sanitation in sewage treatment, which still shows a large deficit in developing countries.

Having basic sanitation is a key factor for a country to be considered developed. According to the World Health Organization (WHO), one in every three inhabitants of the world live without access to an adequate sanitation system and 10% of the diseases recorded worldwide could be prevented if governments invested more in treatment and distribution of water, hygiene and basic sanitation.

## *Civil construction and architecture: competitive, economic and long useful life products*

Frames for doors and windows, ceilings and floors, wires and cables, decks, railings and wallpapers are some of the PVC products used in civil construction and architecture, thanks to its weather resistance, acoustic and thermal insulation, easy maintenance, long durability and dispensing painting or other treatments, in addition to its good cost/benefit ratio.



## *PVC in health: equipment and medical supplies*

PVC products are essential to modern medicine, being present from packaging to medicines (blisters), blood bags, serum bags, endotracheal tubes, cardiovascular catheters and even the floors of operating rooms, where the highest level of hygiene is indispensable.

## *CPVC in industry*

Chlorinated Polyvinyl Chloride (CPVC) is a thermoplastic polymer produced by chlorination of PVC resin. The uses of CPVC include pipes for hot and cold water, handling industrial liquids, pipes and fittings, pumps and valves, filters, tower filling, and to manufacture plates for storage tanks, large diameter pipelines and lining tanks.

## *Other applications*

PVC is also used in toys, school supplies, decoration and design articles, fashion (synthetic leather, footwear), auto industry, pool coatings, agriculture sector (PVC geomembranes), packaging, sports equipment and clothing, gardening equipment, credit cards, among many other applications.

## *Sustainable development Recycling and Environmental Impact*

PVC is 100% recyclable and the product's recycling has increased yearly, turning post consumption PVC into various new products, generating jobs and income and contributing to environmental preservation.

These are some of the reasons why PVC has a long-lasting future, since given its different applications and presence in people's daily lives, it has become an indispensable product in today's everyday life.