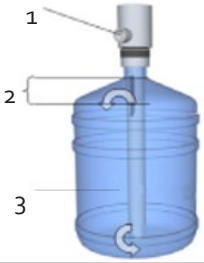
General principle of chlorine production

- The electrolysis units ACP system produces sodium hypochlorite (bleach) at low concentration from a salt-water solution using an electrode and an electric current.
- This current is generated by the adequately exposed solar panel. The installation is autonomous and participates in the preservation of natural resources through the promotion of renewable energy.
- The ACP is an **ideal alternative** to conventional systems that use pellets (ex. HTH) involving logistical and / or financial issues for the communities. The **disinfectant is produced on site and only kitchen salt (NaCl)** is required.

Circulation of brine during electrolysis by «air lift»



1. Clearance of hydrogen gas into the atmosphere
2. Water level required
3. Electrode block

In pratice

- **Standard theoretical production capacity from 30 to 80 grams of chlorine per day, depending on the number of solar panels and sunlight.**
- For the electrolysis, 750 g of sodium chloride are placed in a barrel of 30 liters of water to produce a brine of a concentration of about 25 g / l.
- The current generated by electrodes that are immersed in the brine causes the formation of active chlorine in the form of sodium hypochlorite, according to the following reaction:

$$NaCl + H_2O \rightarrow NaOCl + H_2\uparrow$$

- During the reaction, some hydrogen gas is produced contributing to the circulation of the brine in the carboy.

Improving access to drinking water

The CAP units are **easy** solutions that use a **simple and autonomous energy technology.**

Currently, Altech is present in many countries with PACs but also Hydropur and Chloropur. The Chloropur **disinfects water, adapting to distribution networks**. Hydropur stations are units of **surface water purification**. With over 100 stations installed throughout the world, there are **thousands of people who now have access to clean water.**

Work together

We endorse your **project from A to Z,** in **close collaboration** with local partners and funding agencies. Thus, from, the pre-field study to the monitoring of the project after its completion, we are committed to putting our **skills** and knowledge at your service.

In addition, we ensure **the transfer of skills** through training with local partners in order to empower them.

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Altech

Autonomous Production of Chlorine

Drinking water: source of life, factor of development

EMERGENCY UNITS TO FIGHT AGAINST WATERBORNE DISEASES

http://www.altech-safs.be

10 PEOPLE DIE EACH MINUTE

Over one billion people do not have sustainable **access to safe drinking water**.

Every day around the world, this causes to **the deaths of thousands of people because of waterborne diseases**.

Access to safe drinking water should be **a right for all**. Therefore, our company has over 20 years of experience in **the development of simple, robust and technologically appropriate systems**.

The ACP units are used to disinfect water and preserve health. They are ideal to fight against epidemics in crisis or emergency situation.

General operating principle

- The ACP is a **mobile disinfectant production device** that can be installed in a few hours to prevent or fight against the spread of waterborne diseases.
- It is **energetically autonomous. The system includes a solar panel** to produce sodium hypochlorite (chlorine) without using external power, often absent in crisis situations.

- After production, it is sufficient **to inject the chlorine in the water** respecting the **adequate chlorination rate** (dose may vary depending on the waterquality).
- This system can potentially provide **drinking water to nearly 10,000 people** on the basis of an average daily consumption of 20l / person, assuming the availability of logistics necessary to distribute doses.

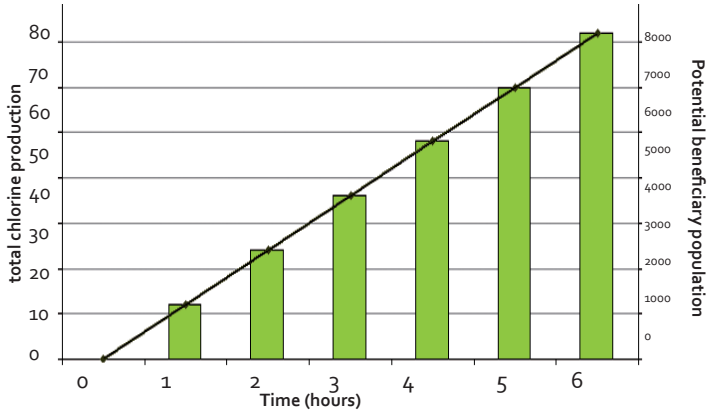
Safety

The quality of water is controlled using two parameters:

- **Chlorination rate:** amount of chlorine injected per volume of raw water at the chlorinator to ensure adequate chlorination.
- **Residual chlorine**: remaining amount of chlorine in the water at the time of distribution. This parameter is measured by colorimetry and must be associated to contact time, as it is universally used to determine if water is safe or not at a bacteriological point of view.

Efficiency of electrolysis

Example a disinfectant production and the potential for treatment with a monopolar electrode 4 plates, two solar panels 95 Wc, a 3V voltage electrode, a drum of 30 liters and a salt concentration of 25 g / l.



Autonomous production of chlorine

Polarity reversal of electrode

To ensure the sustainability of the chlorine production system, the APC units possess a button to invert the polarity of the electrodes. As an option this can also be done automatically. The electrode is thus self-cleaning, the totality of scaling that occurs during the reaction product settles to the bottom of the barrel.

Illustration of an electrode pattern used