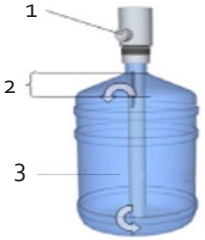
General principle of chlorine production

- The chlorOpur® electrolysis 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 solar panel located on the chlorOpur® roof. Production is then **independent** from external energy sources and thus contributes the **preservation of natural resources** through the promotion of renewable energy.
- The Chloropur is an **ideal alternative** to conventional systems using pellets (ex. HTH) involving logistical and / or financial issues for 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

Practically

- **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:

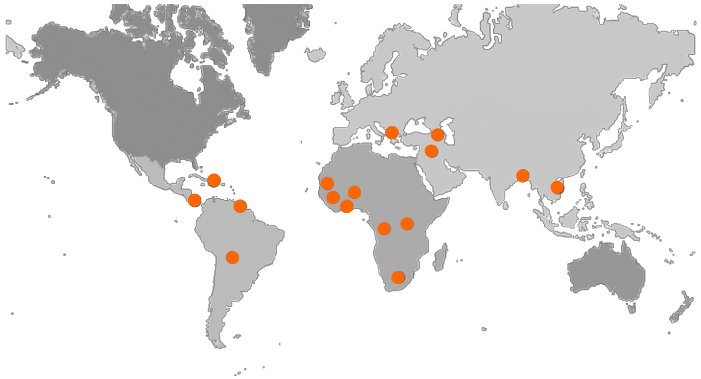
$$NaCl + H_2O \rightarrow NaOCl + H_2 \uparrow$$

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

Improving access to drinking water

Chlorination units are low cost systems whose design is deeply rooted in the principles of sustainable development: resistant materials in time, simple technology, autonomous systems ...

Currently, Altech operates in fifteen countries with Chloropur and Hydropur units. Hydropur stations are water purification units of surface water. ± 100 installed stations, the thousands of people who now thanks to have access to drinking 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

chlorOpur

Drinking water: source of life, factor of development

Autonomous production of chlorine and proportional chlorination

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**.

ChlorOpur® purifies water and preserves health.
It is the ideal solution to fight waterborne diseases.

General operating principe

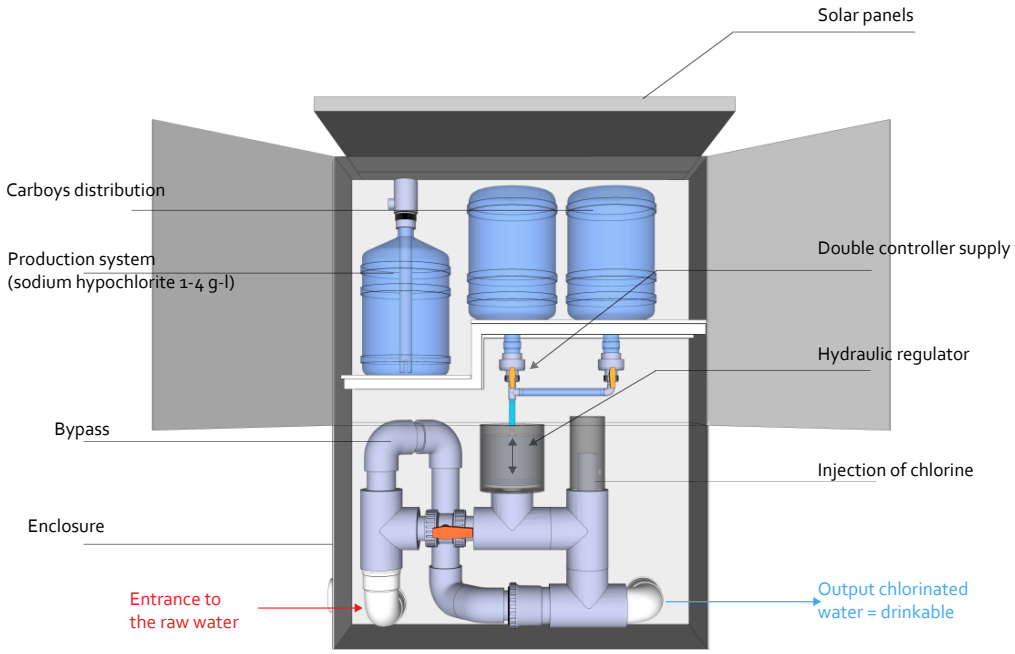
- The ChlorOpur® is a water purification tool that is placed upstream from the water tanks and consists of a chlorine production plant and a chlorinator.
- It disinfects the raw water before it is stored in community tanks.
- Chlorine dosing is proportional to the flow of raw water. Furthermore, the device fits all types of water and all types of tanks.
- It works without energy, without piston metering and at minimum supply pressure.
- Chlorinator accepts a wide range of dosage from 500 to 10,000 l / h, with the ability to easily adapt to most important flows via a bypass system.
- The chlorinator works on the principle of communicating flasks.
- It is the height difference between the floater containing the disinfectant and the chlorine outlet point which determines the rate of the latter. The higher the raw water flow, the higher the flow of chlorine.

Haiti

Nicaragua

Haiti

Proportional and autonomous chlorination



General diagram of a Chloropur

Safety

Chlorination and safety of water are controlled by the following 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 distribution point. This parameter, measured by colometry, associated with the contact time, is universally used to determine if water is safe or not from a bacteriological point of view.

... And adaptability

The residual chlorine concentration can be adjusted in a simple way so that produced water meets the drinking water standards in all circumstances (eg heavy rainfall).

To do this:

- The chlorination rate can be changed through **a micro control valve** located at the chlorine injection point.
- **The chlorine concentration** in carboys can be adapted by varying the duration of the electrolysis