CLARA WATER AG
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PRODUCT MASTER REPORT

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SUMMARY

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1 Objective

The purpose of this document is to compile all relevant information about the design, manufacturing, and distribution of CLARA Water AG's chlorination systems, which use table salt and solar energy to produce safe drinking water for underserved regions worldwide.

2 Introduction

CLARA Water AG is a social enterprise committed to addressing global water safety challenges by offering scalable and sustainable solutions. CLARA's systems utilize locally available table salt and renewable solar energy to generate sodium hypochlorite for water disinfection. The systems are particularly suited for rural and remote areas where traditional water treatment options are economically or logistically impractical. The company focuses on affordability, ease of maintenance, and remote monitoring to reach remote communities and meet diverse stakeholder needs. Through strategic partnerships and research-driven innovation, CLARA Water AG seeks to provide long-term, scalable solutions for improving water quality and public health.

The CLARA systems address key challenges faced by communities in Ethiopia, Kenya, Madagascar, and other regions, such as:

- High costs and logistical difficulties of importing chlorine powder.
- Recontamination risks due to the use of dirty containers.
- Lack of consistent access to energy and chemicals.
- Limited technical expertise for water disinfection and management.

CLARA's systems provide a sustainable, cost-effective, and energy-independent solution for continuous water disinfection. By eliminating reliance on external chlorine supplies and integrating smart monitoring, CLARA enhances community resilience in water safety.

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3 Product Design

3.1 Product Functionality

CLARA offers two system models:

	Clara Standard	Clara Plus
Volume of Disinfectant Produced	28 LPD	60 LPD
FAC	4500 mg/L	4500 mg/L
Water Treatment (12h)	60’000 LPD at 1.5mg/L	180’000 LPD at 1.5mg/L
Salt Usage (12h)	600g/day	1320 g/day
Nominal Water Treatment (24h)	120’000 LPD at 1.5mg/L	360’000 LPD at 1.5mg/L
Inlet Water pressure	2bar (max)	2bar (max)

Water pipe	2” DN50	3” DN80
Max Flow rate	300 L/min	500 L/min
Turbidity	<5NTU	<5NTU
Power Input	110/220VAC, 1A/0.5A or 12VDC at 15A	110/220VAC, 2A/1A or 12VDC at 30A
Solar Panel/Battery ratings	1X200 Wp/1 x 12V, 100Ah	2x200 Wp/2 x 12v, 200Ah
Remote Monitoring	Cellular GSM, LTE, 3G, 4G	Cellular GSM, LTE, 3G, 4G
Dimensions	0.8m x 1.2m x 0.4m	0.8m x 1.2m x 0.4m
Weight	65 kg (143 lbs)	75 kg (165 lbs)

Both systems operate using solar energy and table salt, producing a sodium hypochlorite solution as the active disinfectant. This solution ensures continuous protection against pathogens and maintains water safety during storage and transportation.

3.2 Core Technology

The electrolysis process involves converting salt (NaCl) and water (H2O) into sodium hypochlorite (NaOCl) using the WATA™ technology and solar energy. This eliminates dependency on imported chlorine powder, enhances sustainability, and reduces costs.

The WATA® device needs to be immersed in a brine solution (NaCl + H2O) and connected to a source of energy.

The electrolysis process takes place for 2 (two) hours and converts the salt-water solution into a sodium hypochlorite (NaOCl) solution concentrated at 5 g/L [0.5%] of active chlorine – see Figure 3 below.

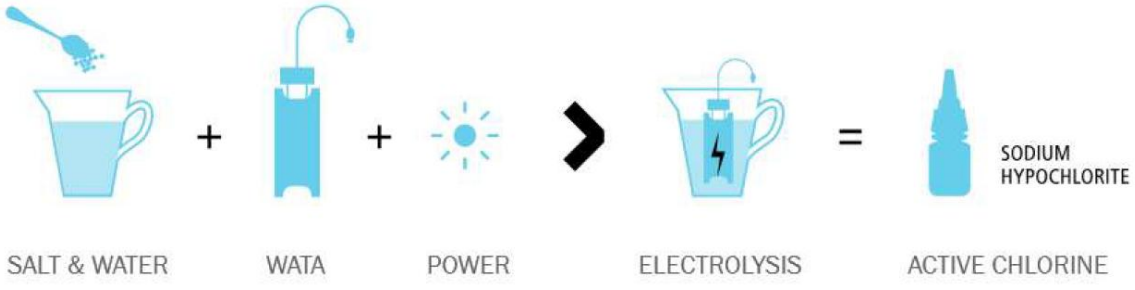

Figure 3: Active chlorite production steps

During an electrolysis process, an electrical current is generated through a substance to effect a chemical change (loss or gain of electron) and achieve chemical reactions (oxidation or reduction). This process converts electrical energy into chemical energy. The electrolysis is

carried out in an electrolytic cell, a device composed of positive (cathode) and negative (anode) electrodes held apart and immersed into a solution containing positively and negatively charged ions.

WATA devices act as the electrolytic cell in the production of sodium hypochlorite. When salt (NaCl) is dissolved into water (H2O), a salt solution is formed – the salt elements sodium (Na) and chlorine (Cl) are in their ionic forms (Na+ and Cl-).

The sequence of chemical reactions occurring during an electrolysis process with a WATATM device are the following:

1. At the anode, chlorine ions (Cl-) lose an electron and combine to form dichlorine (Cl2)

$$2\ Cl- \rightarrow Cl2 + 2e-$$

2. At the cathode, water molecules (H2O) gain an electron and dissociate, forming hydrogen molecules

(H2) and hydroxide ions (HO-)

$$2\ H2O + 2e- \rightarrow 2OH- + H2$$

3. The hydroxide ions (HO-) produced react with sodium ions (Na+) to form caustic soda (NaOH)

$$2\ Na+ + 2\ OH- \rightarrow 2\ NaOH$$

4. The free dichlorine (Cl2) generated at the anode reacts with the caustic soda (NaOH) generated at the cathode to form sodium hypochlorite (NaOCl), salt (NaCl) and water (H2O)

$$Cl2 + 2\ NaOH \rightarrow NaOCl + NaCl + HO2$$

5. Sodium hypochlorite decomposes in water into hypochlorous acid (HClO) and caustic soda (NaOH)

$$NaOCl + H2O \rightarrow \boldsymbol{HClO} + NaOH$$

Hypochlorous acid (**HClO**) is the active disinfectant ingredient in the final active chlorine solution produced

with WATA™ devices. This chemical compound disrupts the metabolism of bacteria and virus, ultimately killing the pathogens. It is widely used for water purification and disinfection.

3.3 Features

- **Energy and Chemical Independence**: Uses only solar energy and table salt.
- **Ease of Installation and Maintenance**: Simple setup and minimal upkeep requirements.
- **Remote Monitoring**: Tracks water quality and quantity in real-time, enabling efficient resource allocation.
- **Scalability**: Adaptable to community sizes and specific needs.

4 Product Applications

CLARA systems are tailored for diverse environments, including:

- **Rural Communities**: Providing safe water to remote areas.
- **Healthcare Facilities**: Ensuring hygiene and infection control.
- **Schools**: Supporting WASH (Water, Sanitation, and Hygiene) initiatives.
- **Refugee Camps & Small Cities:** Serving large populations with high water demands.
- **Humanitarian Emergency Response:** Rapid deployment for disaster relief operations.

4.1 Successful Implementations:

As of February 2025, CLARA has installed 19 systems in 3 countries, serving safe water to 47,878 people across multiple locations:

- **South West Region**: 3 Systems Installed (1,400 people served)
- **Sidama Region**: 6 Systems Installed (13,900 people served)
- **Amhara Region**: 6 Systems Installed (24,878 people served)
- **Oromia Region**: 1 System Installed (3,000 people served)
- **Isiolo County, Kenya**: 1 System Installed (1,200 people served)
- **Boeny, Madagascar**: 1 System Installed (1,500 people served)
- **Menabe, Madagascar**: 1 System Installed (2,000 people served)

Between June 2023 and August 2024, a research project between the Ethiopian Public Health Institute (EPHI) and Eawag validated the efficiency of CLARA technology and the effectiveness in water disinfection. This study evaluated the system's ability to inactivate pathogens, maintain chlorine stability, and improve overall water safety in real-world conditions. The research aimed to generate scientific data that will support regulatory approval and optimize system performance.

Key aspects of the research include:

- **Pathogen Inactivation**: Measuring the effectiveness of CLARA in eliminating harmful microorganisms.
- **Chlorine Stability**: Ensuring that the generated chlorine remains effective over time and during water storage.
- **Operational Performance**: Assessing ease of use, reliability, and long-term sustainability.
- **Field Deployment Data**: Collecting real-world insights from implementations across Ethiopia to refine and enhance system functionality.
- **Public Health Impact**: Studying the reduction in waterborne diseases and improvements in community health outcomes.

The results that will be published in a scientific publication showed a 55% increase in negative *E. coli* samples at distribution points and a 35% increase at the point of consumption.

4.2 Product Certifications

CLARA systems adhere to international standards for water safety and environmental impact.

Certifications and evaluations include:

- Ethiopian Conformity Assessment Enterprise: the results showed full compliance of Clara with Ethiopian Drinking Water Regulations showing no forming unit of E.coli, faecal and total coliforms at the point of sample collection.

- WHO performance classification: Effective against bacteria and viruses for the WATA™ device.

  The World Health Organization (WHO) has established the WHO International Scheme to Evaluate Household Water Treatment Technologies (also called “Scheme”) to evaluate the microbial performance of household water treatment (HWT) technologies, used as point-of-use or point-of-collection disinfectants, against a set of WHO health-based criteria set in 2011. The results of the Scheme assessment are used to guide national governments and global procuring agencies in the selection of HWT products and are listed in the WHO website catalogue.

  The WATA-Standard device, commercialized by WATALUX and producing 2L of active chlorine solution in 2h, was evaluated in 2019 under Round II of the WHO Scheme, following the WHO protocol requirements for chlorine generator disinfection technologies. The assessment methodology included bacterial inactivation testing, measurement of chlorine dose delivered and post-treatment concentrations of free available chlorine. Results of the evaluation have shown that the WATA-Standard device meets WHO performance criteria and is classified as providing Targeted Protection against bacteria and viruses

- ISO 9001 and 13485: Quality management system certification of WATALUX and Antrimon (suppliers).

- ISO 14001: Environmental management certification WATALUX and Antrimon (suppliers).

- Solar Impulse Efficient Solution Label: Recognized for sustainability and cost-efficiency for WATALUX SA (supplier).

  Solar Impulse Foundation (SIF) has launched the Solar Impulse Efficient Solution Label, designed to highlight existing solutions that are both clean and profitable. The Label is based on stringent selection criteria and is internationally recognized and endorsed by several institutions, states and cities worldwide. Since its creation,1000+ clean and profitable solutions have been identified, giving political and economic decisions-makers tools to select innovative and sustainable solutions, and adopt ambitious energy and environmental policies.

In 2018, the WATA™ technology was awarded the Solar Impulse Efficient Solution Label as efficient and affordable device to enable local treatment and disinfection of water.

- B Corporation Certification: Meeting high social and environmental performance standards WATALUX SA (supplier).

  The B Corporation Certification was introduced in 2006 by B Lab, a nonprofit network transforming the global economy to benefit all people, communities and planet. B Lab units certify worldwide B Corporations, companies meeting high standards of social ad environmental performance, accountability and transparency.

  The B Corporation Certification measure the entire company's social and environmental impacts. WATALUX has been B Corp certified since 2020, with an overall B Impact Score of 109.9 renewed in 2023, classifying the WATALUX in the Outstanding company category

4.3 Manufacturing and Assembly

CLARA systems are manufactured by Antrimon Group AG, a trusted partner specializing in high-quality assembly and engineering solutions located in Muri (Switzerland).

The CLARA systems are commercialized since 2023 and distributed in several regions of the world under the HS classification 8421.21. The country of origin of the devices is SWITZERLAND.

The company's management system is certified to both ISO 9001 and ISO 13485 standards. This dual certification demonstrates Antrimon's commitment to comprehensive quality management, particularly in the manufacture of medical devices. The ISO 13485 standard, recognized as a benchmark in the healthcare sector, addresses stringent requirements for devices and systems used in diagnosing and treating patients, ensuring the highest levels of safety and reliability. This foundation reinforces the production process's focus on sustainability and long-term functionality in demanding environments. The management system is ISO 9001 and ISO 13485 certified. With the successful ISO 13485 certification, we have proven that we apply a comprehensive quality management system for the manufacture of medical devices. ISO 13485 contains detailed requirements on topics relating to the manufacture and marketing of medical devices.

This standard, which is groundbreaking in the healthcare sector, takes into account the high requirements for devices and systems used in the diagnosis and treatment of patients. The production process prioritizes sustainability and affordability, ensuring long-term functionality in challenging environments.

4.4 Product Supply and Maintenance

4.4.1 Distribution

CLARA Water AG collaborates with NGOs, governments, and local organizations to distribute systems efficiently to underserved areas. CLARA can deliver the devices in countries all over the world, with express delivery to the final destination available (delivery time may vary according to the order size). International trusted carriers are contracted for all order deliveries, including transport insurance according to the Incoterm selected by the end-users.

4.4.2 ii. After-Sale Services

Customer satisfaction is a pillar of CLARA mission. CLARA provides technical support and product replacement, when necessary, all after-sales activities being coordinated from the central team in Switzerland.

CLARA can also rely on a strong partner's network built over the years through local projects implementation and technical meetings, present in Ethiopia, Madagascar and Kenya. The network is composed of technical and/or commercial representatives, trained by CLARA to ensure an efficient and qualitative installation of CLARA systems, formation of the end-users and after-sale maintenance of the devices (device and power supply are warrantied for 2 years after purchase).

- Technical support is provided for installation and maintenance.
- Remote monitoring ensures continuous operation.
- Training programs empower local communities to operate and maintain the systems.
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- Continuous improvements based on user feedback and performance data.