

# SAFE WATER DISINFECTION BY AN INNOVATIVE ION EXCHANGE MEMBRANE TECHNOLOGY

R. Sandín<sup>1</sup>, V. Monsalvo<sup>1</sup>, J. Vázquez<sup>1</sup>, D. García<sup>1</sup>, C. Westarp<sup>2</sup>, G. Charpy<sup>2</sup>, F. Rogalla<sup>1</sup>

<sup>1</sup>FCC Aqualia, Madrid, Spain  
<sup>2</sup>Ceram Hyd SA, Ecuellas, France  
 e-mail: ricardo.sandin@fcc.es

## CleanWater technology advantages

- Faster
- Safer
- More reliable
- Mitigates environmental impact
- Reduces energy consumption
- Reduces chlorine by-products
- Produces hypochlorous acid at a high concentration

## Objectives

- Validate the technology in three water treatment applications:
  - Wastewater
  - Desalination
  - Drinking water
- Evaluate the reduction of chlorination by-products generation

## CleanWater Prototypes

CERAPEM™ is a ceramic proton and ion exchange membrane manufactured by Ceram Hyd that is flat, flexible and chemically stable. The CERAPEM™ membranes are the core component of electrochemical cells assembled to form a stack. The CleanWater prototypes allow the stack to function and generate two chemicals: hypochlorous acid (active chlorine) and caustic soda. These two chemicals are widely used in water facilities, which can be now produced in situ, offering an economic, safe and environmental friendly alternative to conventional methods of active chlorine production from dangerous chlorine gas or sodium hypochlorite, which must be transported, stored at the place of use and prone to rapid storage deterioration. Aqualia and Ceram Hyd collaborate in the CLEANWATER project to demonstrate the feasibility of an innovative technology for water oxidation and disinfection as a cost-competitive, healthy and safe alternative to chlorine use. Thus, FCC Aqualia advances with its compromise to reinforce the technological capabilities and improve the quality of the operation and maintenance services of water facilities.



Figure 1. CleanWater system operated at the wastewater treatment and regeneration plant "El Toyo" (Almeria)

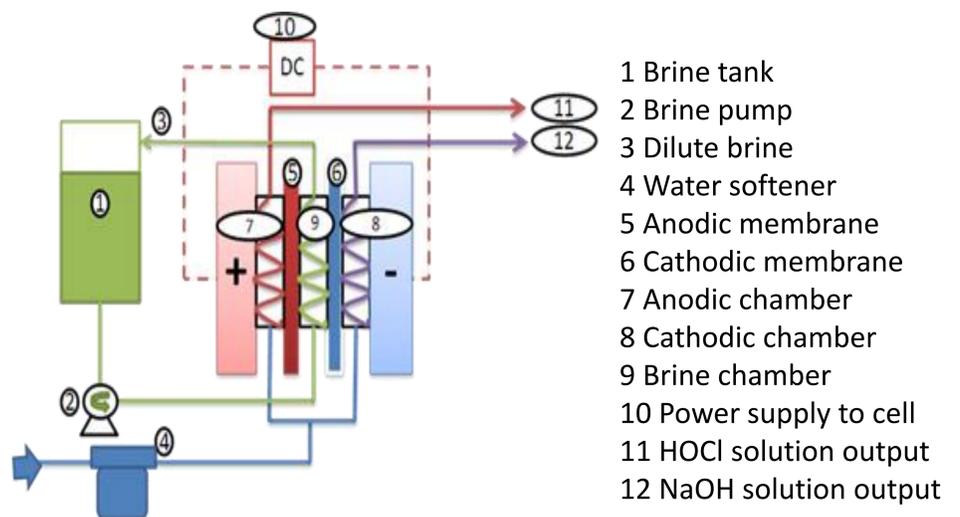


Figure 2. General configuration of CleanWater three-chamber electrolysis cell

## Results of the CleanWater Project



Figure 3. Location of CleanWater prototype demonstration sites

Water plant	Water production (m <sup>3</sup> /day)	CW System	Prototype Status	Commissioning Date	Chlorine Production (g/h)
WWTP El Toyo	10,000	3000	Operating	March 2016	400
BWTP Racons	16,200	1000	Operating	October 2016	200
DWTP Galicia	17,000	1000	Factory tests	January 2017	200

Table 1. Characteristics of CleanWater systems installed at water treatment plants operated by Aqualia.

Evaluation of the reduction of chlorination by-products (THMs) is currently underway at the test sites and, using the MiniCell, in the laboratory of an independent research institute



Figure 4. MiniCell electrolysis cell

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