clorEP

CHEMICAL DOSING AND DISINFECTION

SELCOPERM

Electrochlorination system

Reliable and easy generation of hypochlorite solution for disinfection applications

INTRODUCTION

Selcoperm electrolysis systems produce sodium hypochlorite using safe equipment.

Electrolytic chlorination systems Selcoperm produce a hypochlorite solution through a common thanks to the action of electricity salt solution, without significant by-products generated in the process. Generated hypochlorite solution presents a pH value between 8'5 and 9'5 and a maximum of 6-7 g/l concentration of equivalent chlorine. Thanks to its long shelf life, the ideal solution for this is to store it in a tank regulator.

ELEMENTS SYSTEM

Selcoperm units consist of the electrolysis cell, degassing column, brine dosing pump, exhaust fan with quantitative air flow monitor for air dilution of electrolysis chamber and a water softening system. In addition the following equipment is required: a salt saturator, product tank for storage of the generated solution and dosing pumps. The installation can be rounded off with a measuring and control unit for chlorine dosing, if required.

The Selcoperm system is supplied as a turn-key solution, only the tubing for the water connection, the connections for the salt and product storage tanks and the exhaust air tubing have to be installed. The size of the storage tank depends on the space available and the amount of NaClO buffer storage required.

Features and benefits:

- Only water, common salt and electricity is needed for the electrolysis.
- Low operating costs
- Salt is nontoxic, easy to store and to handle.
- Fresh hypochlorite is always on hand.
- The disinfectant solution does not dissociate like commercial hypochlorite solutions.
- Approved disinfection method complying with the DWI drinking water regulations.
- It's an alternative with less safety requirements to chlorine-gas-based systems.
- Robust and elementary components - low-maintenance and a long service life, compared with the membrane cell electrolysis.

PRINCIPLE OF ELECTROCHLORINATION

The following reactions take place in the electrolytic cell:

$$2NaCl + 2H_2O \rightarrow 2NaOH + Cl_2 + H_2$$

The chlorine produced reacts immediately with the caustic soda solution also formed, resulting in a hypochlorite solution:

$$Cl_2 + 2NaOH \leftrightarrow NaCl + NaClO + H_2O$$

The solution generated has a pH value between 8.5 and 9.5, and a maximum equivalent chlorine concentration in the range of 6-7 g/l. It has a half-life of several months, which makes it ideal for storage in a buffer tank.

After dosing the solution into the water flow, no pH value correction is necessary, as it is often required e.g. in electrolysis according to the membrane principle. The sodium hypochlorite solution reacts in a balance reaction, resulting in hypochlorous acid, the efficient disinfectant:

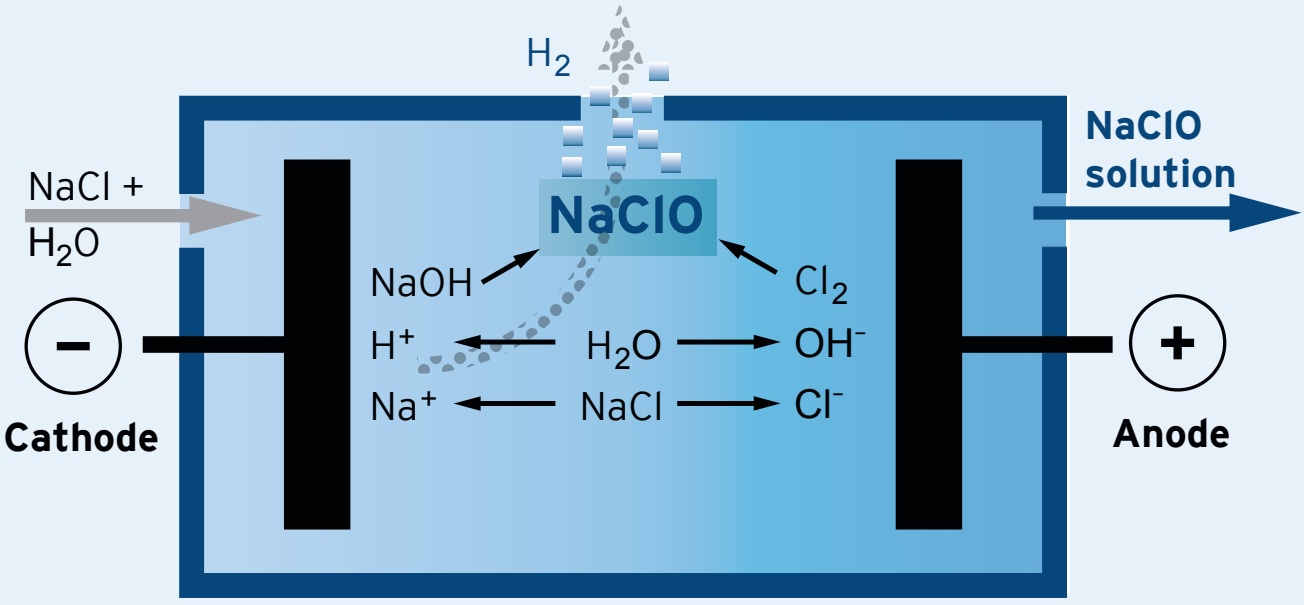
$$NaClO + H_2O \leftrightarrow NaOH + HClO$$

The dosing quantity depends on the application as well as the local regulations.

In general, the concentration after the injection unit is 0.3 to 2 ppm chlorine equivalent.

Functional scheme

Sodium hypochlorite is produced directly from a solution of common salt using electricity



SYSTEM COMPONENTS

Electrolysis cell and hydrogen degassing column

Electrolysis cell (1) is installed in a separate chamber with a quantitatively monitored air flow. It is in a vertical transparent PVC pipe for easy process monitoring and visual electrode check.

Electrodes are made of titanium carrier material with a very durable catalytic metallic oxide coating, also suitable for cold water applications of 5 °C and higher.

The hydrogen degassing column (2) removes the formed hydrogen via the vent hole and prevents it from penetrating the product storage tank.
The hydrogen is piped through the outlet (I) via a dual contained pipework into the ambient air. In the event of a blockage, an integrated sensor switches off the system.

Hydraulic chamber

• Grundfos dosing pump (3) with a wide adjustment range for precise dosing of the brine.

• Flowmeter (4) with switch for safe process interruption, if the value falls below its critical minimum.

• Water flow valve (5) for the reproducible adjustment of the dilution ratio.

• Adjustable pressure reducing valve (6) with pressure reading for the water supply.

• Continuously operating water softener system (7) for the reduction of the water hardness to below 20 mg/l (CaCO3).

• Sample valves for softened water (F), brine (G) and product solution (H).

Control system

• Lockable control cabinet (10) IP55 with integrated water cooling for the high-performance electronics.

• Display (11) with presentation of system status, amperage, voltage, service hours and air flow rate.

• Functions: automatic tank refilling, manual system shutdown or remote Off.

• Display of error messages: low voltage, high voltage, overtemperature electrolysis cell, leakage, overtemperature electronics, ventilation error, water flow error.

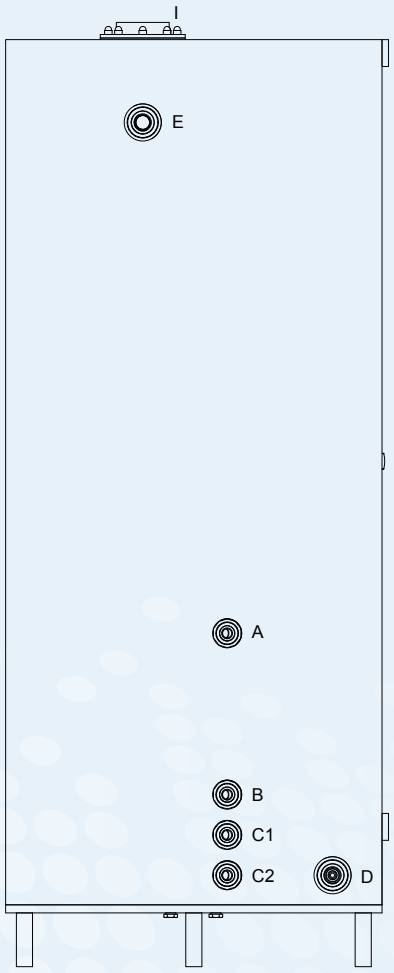
• Potential-free alarm contact.

Ventilation

• Air dilution fan (12) with airflow sensor (13).

• Forced ventilation in the electrolysis chamber at the vent discharge point outside the building dilution of the hydrogen produced.

1	Electrolysis cell	13	Airflow sensor
2	Hydrogen desgassing column	A	Inlet water supply
3	Brine dosing pump	B	Outlet soft water
4	Flowmeter	C1	Inlet brine backflush for water softener
5	Water flow adjustment valve	C2	Inlet brine for dosing pump
6	Pressure reducing valve	D	Outlet regeneration water
7	Water softener	E	Outlet product solution
8	Level sensor (h. d. c.)	F	Soft water sample valve
9	Non-return valve	G	Brine sample valve
10	Control panel	H	Product sample valve
11	Display	I	Outlet hydrogen gas
12	Air dilution fan		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C1
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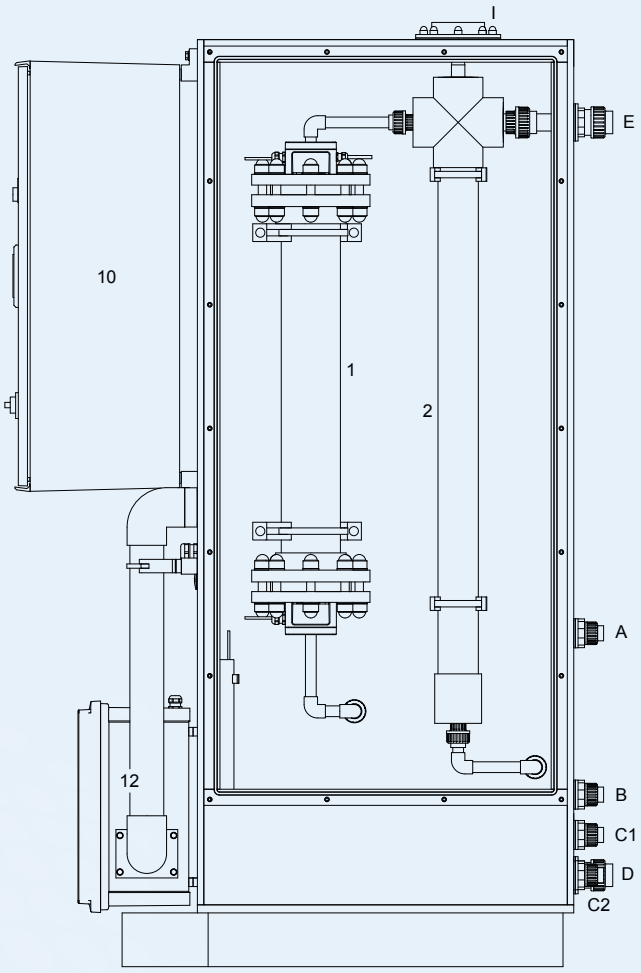
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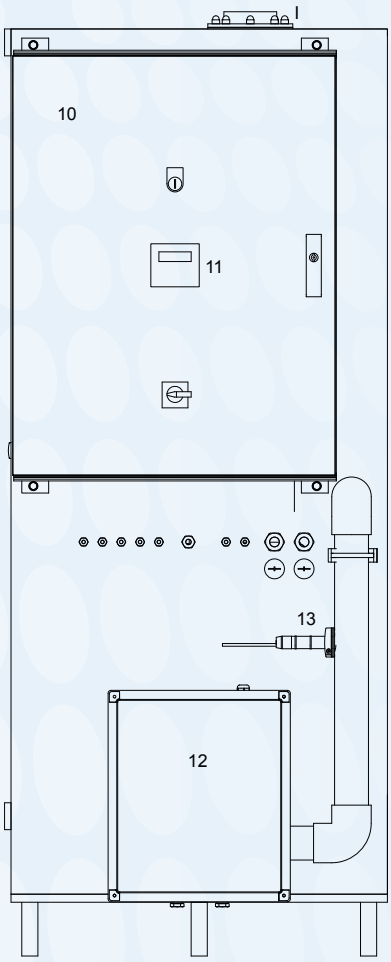
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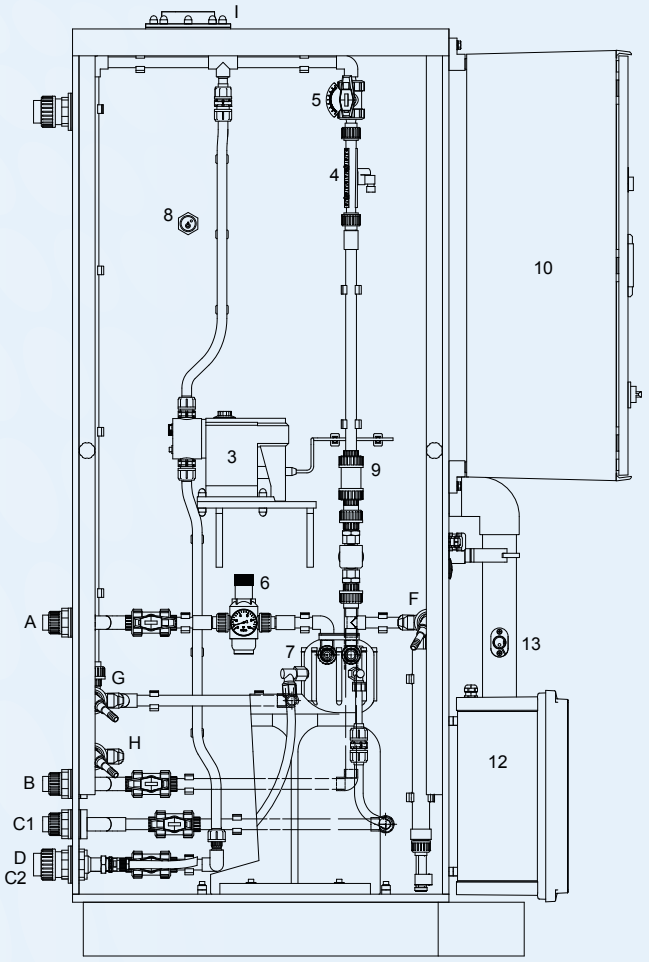
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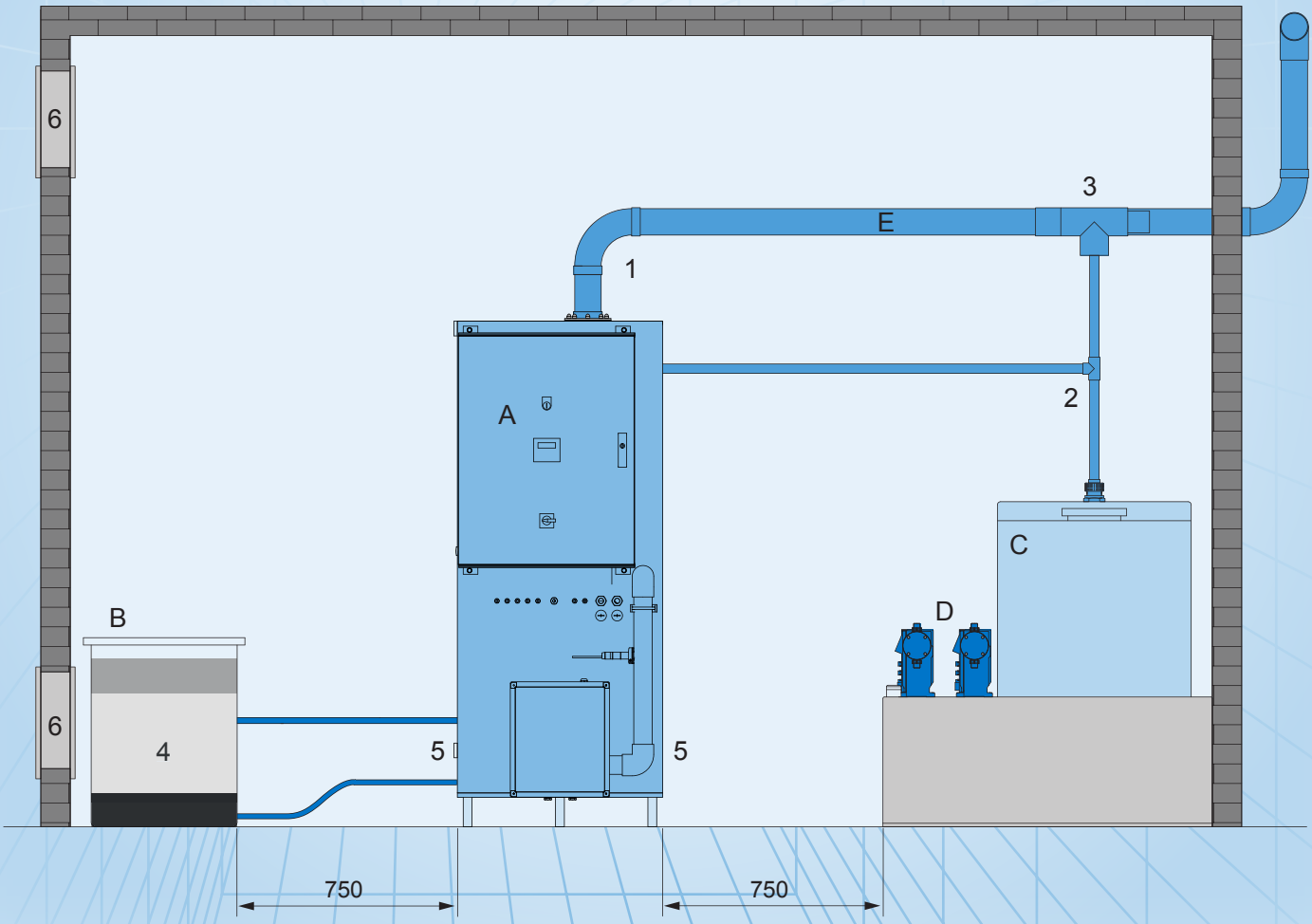
INSTALLATION SCHEME

Room installation with a Selcoperm system



1	The internal vent tube has to be piped to the exterior of the building. Minimum tube diameter 90 mm. Maximum length of the tubing 10 m. Must be installed without dips and adequately withoutinclination to the safe discharge point.
2	Minimum diameter 32 mm for tubing between the unit and the product tank. Tubing from the "T" above the product tank in an upward direction until the Venturi "T".
3	A Venturi "T" is supplied together with the system to assure the adequate dilution of the exhaust air. It should be mounted as close as possible to the vent discharge point.
4	The top edge of the brine has to be at least 100 mm above the brine outlet.
5	Around the electrolysing system, enough space should be left free for operation and maintenance work.
6	It is recommended that the room has high and low level natural ventilation.

A	Selcoperm electrolytic chlorination system
B	Brine tank
C	Product tank
D	Dosing pumps
E	Vent tubing

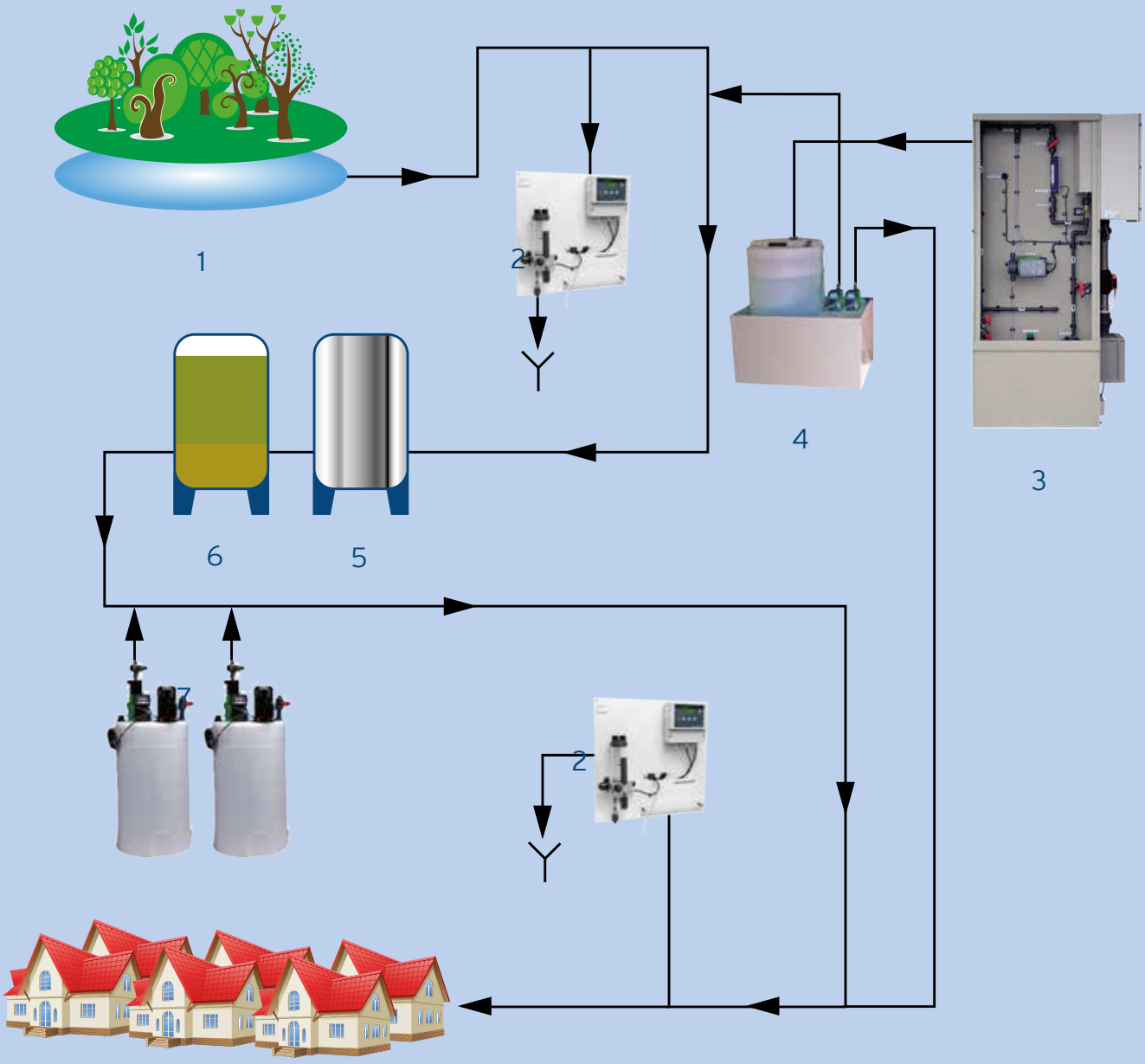
Production

50 g/h Cl_2
1200 g/dia Cl_2

SELCOPERM 50

Sant Sadurní d'Anoia (Barcelona)

DRINKING WATER TREATMENT WITH SELCOPERM



1	Groundwater
2	Measuring system
3	Selcoperm electrolytic chlorination system
4	Chemical tank
5	Oxidation
6	Filtration
7	Chemical conditioning

Turnkey installations

The complete solution for your projects

We offer complete solutions which ranging from preliminary SELCOPERM size study according to the needs of the water to be treated, to the development and project planning,implementation and comissioning of the installation.

The system can be installed inside a civil engineering building (current or new) that meets the system installation requirements.

Alternatively, it can be installed in a prefabricated house designed especially for the electrolysis systems and we will supply and install as close as possible to the dosing point.

Civil engineering installation

Prefabricated house

Post-sales service

Replace and repair service.

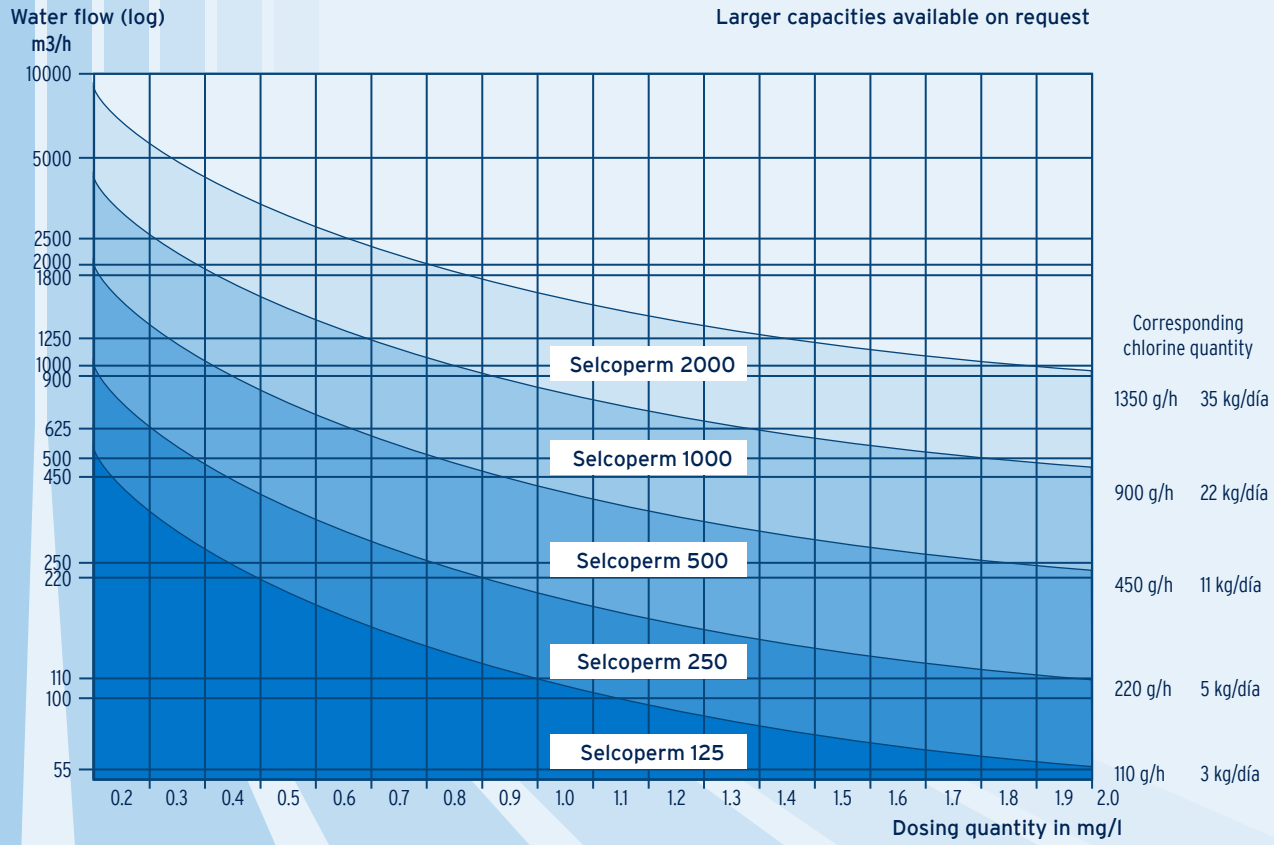
In addition to offering Trunkey Projects, from clorEP® gives you a professional and quality complete post-sales.

Our services include the replace service for installed equipment and the maintenance facilities. You also have a repair service for any need that arises in the equipment installation.

ClorEP® strives to offer the best solutions through customized projects like the highest quality equipment and always with the support of the best professionals at your service.

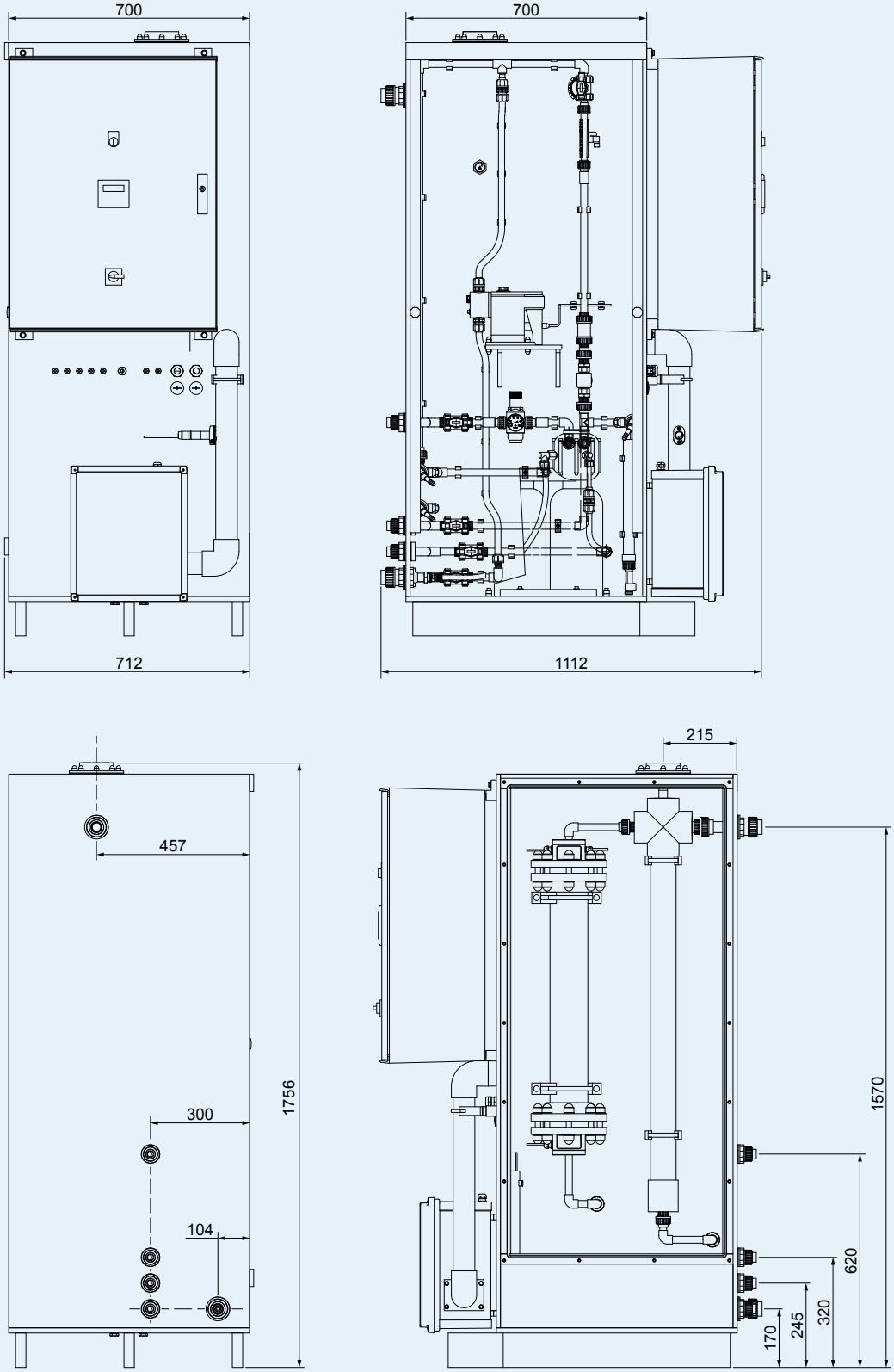
TECHNICAL DATA SELCOPERM

Preparation capacity	Type	Capacity/hour (g/Cl_2)	Capacity/day (kg Cl_2)
	Selcoperm 125	110	3
	Selcoperm 250	220	5
	Selcoperm 500	450	11
	Selcoperm 1000	900	22
	Selcoperm 2000	1800	43
Electrical connection	100 - 120 V, 220 - 240 V or 380 - 400 V, 50/60 Hz		
Sodium hypochlorite conc.	6-7 g/l		
Power consumption (AC)	Approx. 5.5 to 6.5 kWh per kg of prepared chlorine		
Water quality	Water quaility, preferably drinking water (particles < 100µm)		
Water demand	140-170 litres per kg of prepared chlorine		
Water pressure	Pressure range: 3-10 bar For lower water pressures, booster pumps are available		
Soft water temperature	Temperature range: for 5 ºC to 20 ºC		
Salt quality	Quality salt-food For drinking water disinfection, water must be used with low concentration of bromide		
Salt consumption	4 - 4.5 kg of salt per kg of prepared chlorine		
Drain	An on-site drain for the regeneration water of the water softener is necessary		
Exhaust air	The outlet of the exhaust air has to be as close as possible to the electrolysis system In addition, natural air supply via a ventilation hole in the room is required		



DIMENSIONAL SCHEME

The measurements can be variations depending on the model Selcoperm .



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