

The Specialist in Sustainable Water & Air Disinfection

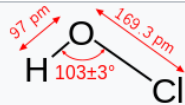


Verantwortung für Mensch und Umwelt
Social responsibility for the environment

- 1. Innovation in Electrolysis Disinfection**
- 2. nt-BlueBottle** (10~100mg Cl₂ each electrolysis)
- 3. nt-BlueFogger** (10~50L/h HOCl)
- 4. nt-BlueBox** Product Line (3~150g Cl₂/h)
- 5. nt-CLE** System for salt water electrolysis (0,2~60kg Cl₂/h)
- 6. nt-CLM** membrane electrolysis (10 ~ 200 kg Cl₂/h)
- 7. nt-CLE-S** System for Sea Water Electrolysis (1~120kg Cl₂/h)
- 8. About newtec**

1. Innovation in Electrolysis Disinfection

Hypochlorous acid



Utilizing the power of nature

- ✓ HOCl is made naturally by white blood cells in all mammals for healing and protection.
- ✓ newtec is able to industrially strengthen this process through controlled electrolysis
- ✓ More disinfection effect with less dosing of **nt-HOCl[©]**
- ✓ ECHA (European Chemical Agency) **Article 95 Compliance**
- ✓ 24 years of R&D, electrolysis products from 10mg to 120kg/h (active substances)

Well visited newtec website

Pos.1 in recent Google Search:

“Electrolysis Disinfection” – no advertising

Google search results for "electrolysis disinfection".

Search results include:

- Modern electrolysis systems , which [turn a harmless salt solution into a weak chlorine solution on site](#) offer an alternative to traditional chlorination. This chlorine solution contains less than 1% chlorine and does not therefore present any major potential dangers.
- ProMinent: <https://www.prominent.com> Company · News · using...
Using electrolysis to safely disinfect drinking water - ProMinent
- ScienceDirect.com: <https://www.sciencedirect.com> · pl · Diese Seite übersetzen
Electrolyzed water as a disinfectant: A systematic review of ...
von RE Ampaw · 2021 · Zitiert von: 60 — Electrolyzed water (EW) is widely accepted as a practical disinfectant because it does not make use of hazardous chemical substances and processes [2]...
- Wikipedia: <https://en.wikipedia.org> · wiki · Diese Seite übersetzen
Electrolysed water
The electrolysis of such salt solutions produces a solution of hypochlorous acid and sodium hydroxide. The resulting water can be used as a disinfectant.
- newtec Umwelttechnik GmbH: <https://www.newtec-berlin.de> · et... · Diese Seite übersetzen
Electrolysis Disinfection - Berlin
SAFETY and Security. The electrolysis system nt-CLE is our solution to replace the dangerous liquid chlorine disinfection. Transport, storage, handling and ...
- ResearchGate: <https://www.researchgate.net> · 2... · Diese Seite übersetzen
(PDF) Drinking Water Disinfection with Electrolysis



Effective Surface disinfection against Corona & Co.

HOCl, 180ppm, 5 min.

Table 1: Disinfection Efficacy

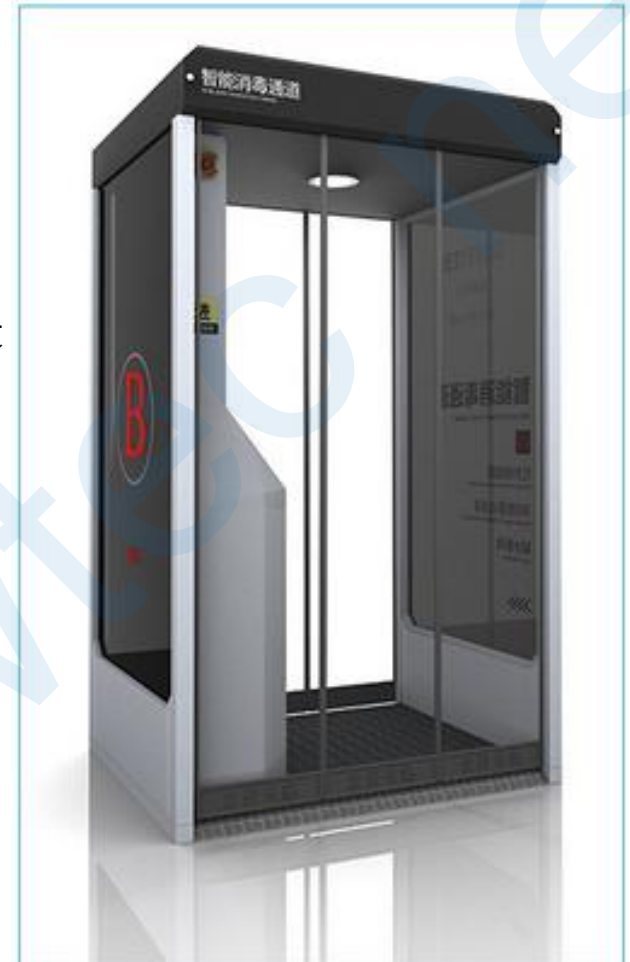
Pathogen	Log Reduction Value	Elimination %	Testing Date	Testing Site
<i>Acinetobacter baumannii</i>	6.07	>99.999%	02 Jun 2016	Northwest Regional Center of Excellence for Biodefense & Emerging Infectious Diseases Research, Univ of Washington
<i>Aspergillus niger</i>	6.41	>99.999%	03 Aug 2016	Pacific Northwest Microbiology Services
<i>Bacillus subtilis</i>	6.12	>99.999%	03 Aug 2016	Pacific Northwest Microbiology Services
<i>Candida albicans</i>	5.88	>99.999%	20 Nov 2015	Pacific Northwest Microbiology Services
<u>Coronavirus (Human, OC43)</u>	5.00	>99.999%	04 Mar 2016	School of Public Health, Univ of Washington (UW)
<i>Ebola virus</i>	5.27	>99.999%	21 June 2017	Rocky Mountain Laboratories, US National Institutes of Health
<i>Enterobacter cloacae</i>	> 6.89	>99.999%	15 Jun 2016	Pacific Northwest Microbiology Services
<i>Enterococcus faecalis (VRE)</i>	6.07	>99.999%	20 Nov 2015	Pacific Northwest Microbiology Services
<i>Escherichia coli</i>	7.98	>99.999%	03 Aug 2016	Pacific Northwest Microbiology Services



Safety First



- ✓ US FDA (Food & Drug Administration) approved the 200ppm HOCl application for eye, tooth, nasal and surgical incisions and for sprayed fog disinfection
- ✓ 60ppm HClO food disinfection for direct eating without flushing





Evaluation of sprayed hypochlorous acid solutions for their virucidal activity against avian influenza virus through *in vitro* experiments

High efficiency as sprayed fog

- ✓ 200ppm HClO indirect spray reduces avian viruses 3,2 log levels (NI > 3,2)
- ✓ No eye/face/skin/respiratory protection necessary
- ✓ No hazards determined
- ✓ No harsh chemicals, no alcohol, no irritation



Table 3. Inactivation of AIV with indirect spraying of hypochlorous acid solution for 10 sec and a contact time of 10 min

HOCl ^a (ppm)	Log10 TCID ₅₀ /ml		
	PC ^b	RV ^c	NI ^d
50	5.50 ± 0.29	4.50 ± 0.20	1.00 ± 0.2
100	5.96 ± 0.46	4.03 ± 0.60	1.94 ± 0.6
200	5.78 ± 0.26	≤ 2.50	≥ 3.28

a: HOCl=hypochlorous acid, b: PC=positive control: AIV was mixed with MM, but not HOCl solutions, c: RV=remaining virus after treatment with HOCl solutions, d: NI=neutralization index, e: CT=contact times.

Table 3 shows the indirect spray results. By spraying the hypochlorous acid solutions inside the spray box for 10 sec and leaving it there for 10 min of contact, the 50 ppm solution reduced the titer of AIV from $10^{5.5}$ TCID₅₀/ml to $10^{4.5}$ TCID₅₀/ml (NI=1), the 100 ppm solution reduced the titer from $10^{5.96}$ TCID₅₀/ml to $10^{4.03}$ TCID₅₀/ml (NI=1.94), and the 200 ppm solution reduced the titer from $10^{5.78}$ TCID₅₀/ml to $\leq 10^{2.5}$ TCID₅₀/ml (NI ≥ 3.2), respectively.

Portable self-maker of anti-virus disinfectant Virus protection anytime and anywhere!



Fresh made nt-HOCl[©] more effective!

- ✓ 10-100mg nt-HOCl[©] anywhere before disinfection (using rechargeable battery).
- ✓ Using tap water and special patented food-class nt-NaCl for better and safe electrolysis with long-term stability of nt-HOCl[©].
- ✓ > 3 log reduction of Corona and other germs and viruses at **surfaces** and **in the air** within few minutes.
- ✓ Safe and easy electrolysis.
- ✓ Safe, no skin and eye irritation.
- ✓ Reuse the only bottle.



Air and Environment Corona Protection
by all time spraying of nt-HOCl[®] (2-10g/h, for 10-50L/h H₂O)





Air and Environment Corona Protection by all time spraying of nt-HOCl[©]

- ✓ Spray robot ultrasonic producing extra fine fog (<10 μ m, so called **dry fog**) with long lasting disinfection in the droplets of fog, to whom viruses adhere.
- ✓ In vivo spraying of nt-HOCl[©] , no special eye, face or skin protection necessary
- ✓ So nt-BlueFoggers can be operated all time with instant disinfection against virus while people are in the near (**not possible with UV!**)



In hospitals



In airport / railway / subway stations



Air and Environment Corona Protection by all time spraying of nt-HOCl[©]

- ✓ 1000-2000m²/h all time disinfection against viruses
(for comparison: UV robot 400m²/h only for room **without** people)
- ✓ Radar navigation, WIFI setting/communication with laptop
- ✓ Moving speed 0,2-0,8m/s



In office buildings



In factories



Air and Environment Corona Protection by all time spraying nt-HOCl[©]

- ✓ Ultrasonic extra fine fog (<math><10\mu\text{m}</math>, so called **dry fog**)
- ✓ With fresh produced **nt-HOCl[©]**, concentration adjustable
- ✓ Not only the disinfection of air (as UV), but also **contact surfaces**.



Disinfection channel for trucks and buses



In halls

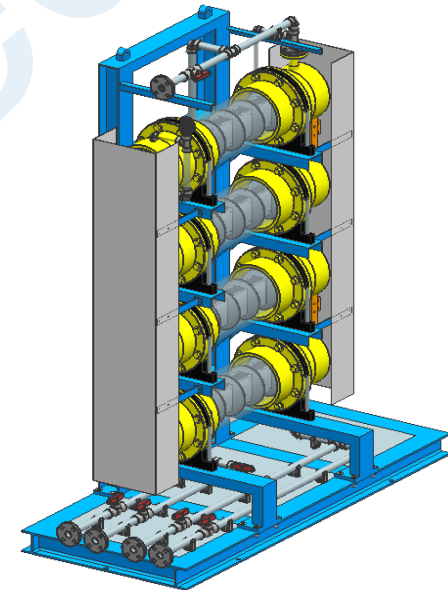
Unique features of nt-BlueBox

- ✓ Electrolytic on-site production up to 0,6% NaClO or **nt-HOCl[©]**, no decomposition through storage, no hazardous substance
- ✓ Capacity of the product line: 3g/h, 6g/h, 12g/h, 30g/h, 60g/h, 90g/h, 150g/h, ... of effective sub.
- ✓ low space requirement and easy installation (plug & play)
- ✓ Wall mounting units as lower cost version available
- ✓ with online monitoring of the disinfection and remote control
- ✓ Low consumption of 100 watt electrical energy
- ✓ no addition and handling of chemicals
- ✓ no risk from transport, storage and handling of dangerous chemicals
- ✓ no expensive safety precautions necessary



24 years of experience in electrolysis disinfection

- ✓ R&D, engineering & design, manufacturing, commissioning, training and service from one hand, turn-key for large projects/plants.
- ✓ Capacity range from **500g/h to 10kg/h** active substance per system.
- ✓ Customized solution and systems possible.
- ✓ On-site generated low concentrated (< 0,8%) NaOCl is the best replacement for hazardous biocides. The owner or operator is obliged to use the most harmless biocide to avoid his **personal liability** in the event of an accident with it.
<https://www.newtec-berlin.de/en/comparison-of-hazard-classes-of-different-disinfectants>
- ✓ Complete solution including salt and water pre-treatment and dosing of 0,8% NaOCl available .



Turn-key delivery of electrolysis plants

- ✓ Water Plant SUE "KMK" Kurgan-Tyube, Tajikistan, a project funded by EBRD, 1x nt-CLE3000

Water station: 37.000 m³ water per day,
 volume of production: 3 kg active chlorine per hour,
 start of production: 2012



- ✓ Water Plant SUE "Dushanbe Vodokanal", Tajikistan, a project funded by World Bank, 3x nt-CLE20000

Water plant "Samotetchnaja": 320.000 m³ water per day,
 volume of production: 60 kg active chlorine per hour,
 start of production: 2010



- ✓ Water Plant SUE "Vodokanal St. Petersburg", Russia 13x nt-CLE40000

Southern and North plant: 2,2 million m³ water per day,
 volume of production: 520 kg active chlorine per hour,
 start of production: 2007 and 2009



Turn-key delivery of electrolysis plant in Kazan, Russia



Production capacity: 120kg/h active chlorine

Including:

- ✓ Transformer station,
- ✓ Complete production process
incl. 3x nt-CLE40000
- ✓ Storage tanks,
- ✓ Dosing systems,
- ✓ Remote control and online monitoring
- ✓ German Industry 4.0 standard

Ceremonial opening of the plant in September 2017

Turn-key delivery of electrolysis plant in Kazan, Russia in 2017



newtec[®]
innovation in water treatment

Turn-key delivery of electrolysis plant in Ust Luga, Russia

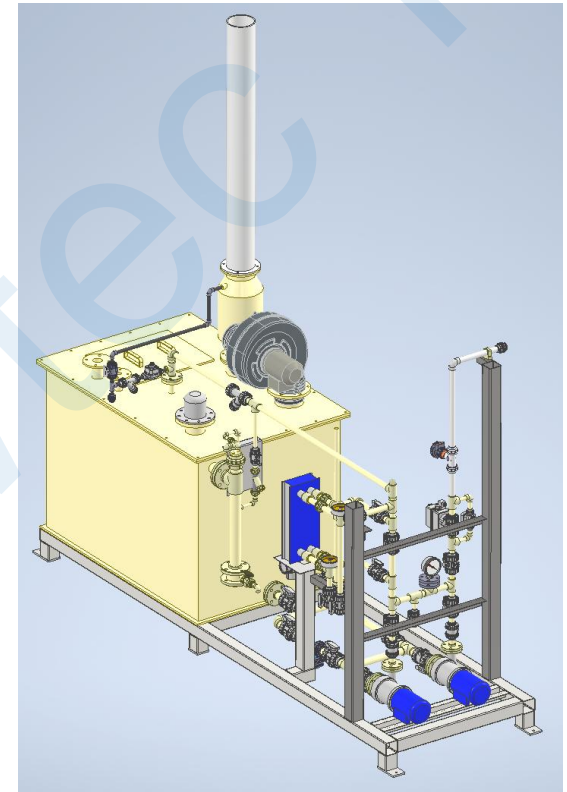
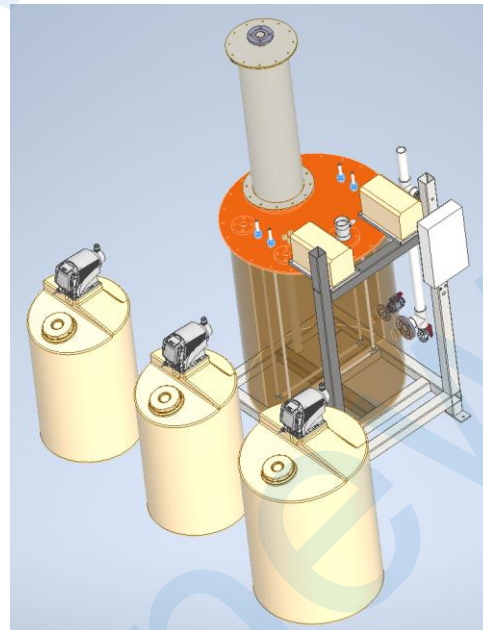
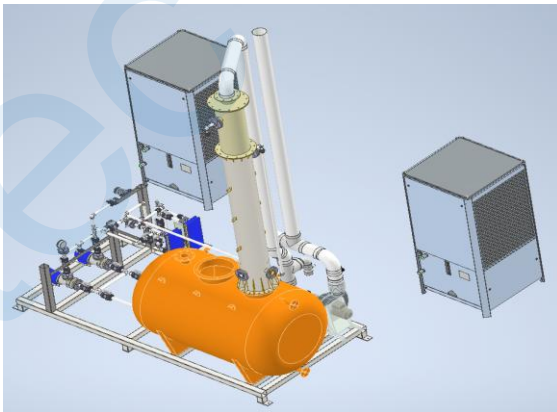
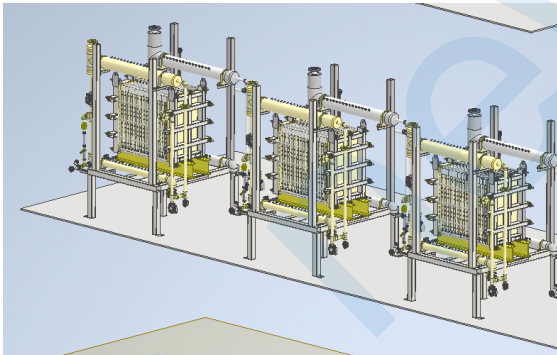


Production capacity: 80kg/h active chlorine

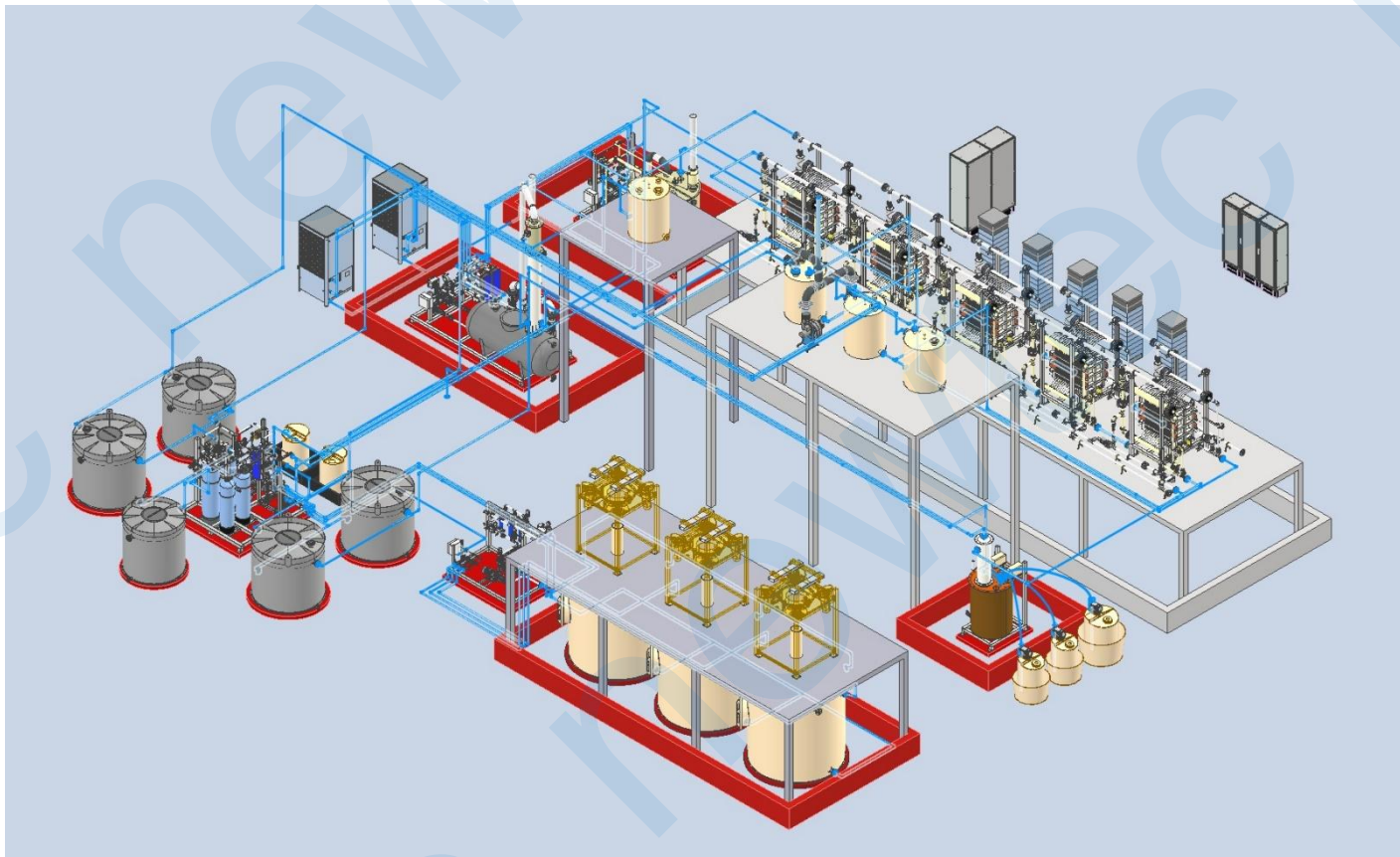
Including:

- ✓ Complete production process
incl. 2x nt-CLE40000
- ✓ Storage tanks,
- ✓ Dosing systems,
- ✓ Remote control and online monitoring
- ✓ Delivery 2024

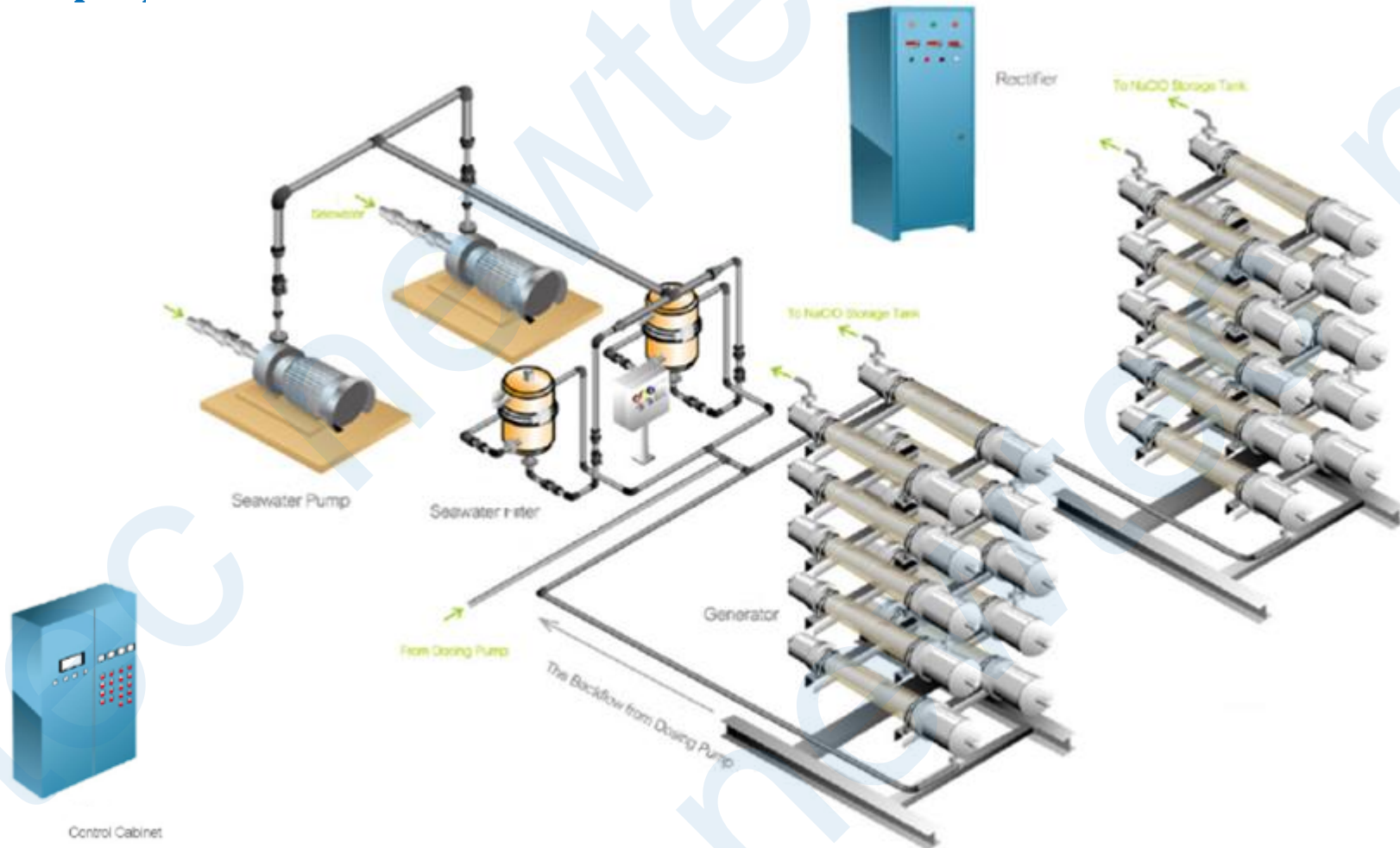
- For the on-site production of 10~15% NaOCl and NaOH
- Pre-mounted in Skids
- 10 ~ 200 kg Cl₂/h modular construction



- For the on-site production of 10~15% NaOCl and NaOH
- Pre-mounted in Skids
- 10 ~ 200 kg Cl₂/h modular construction



Simple process in sea water electro-chlorination



Key parameters in sea water electro-chlorination

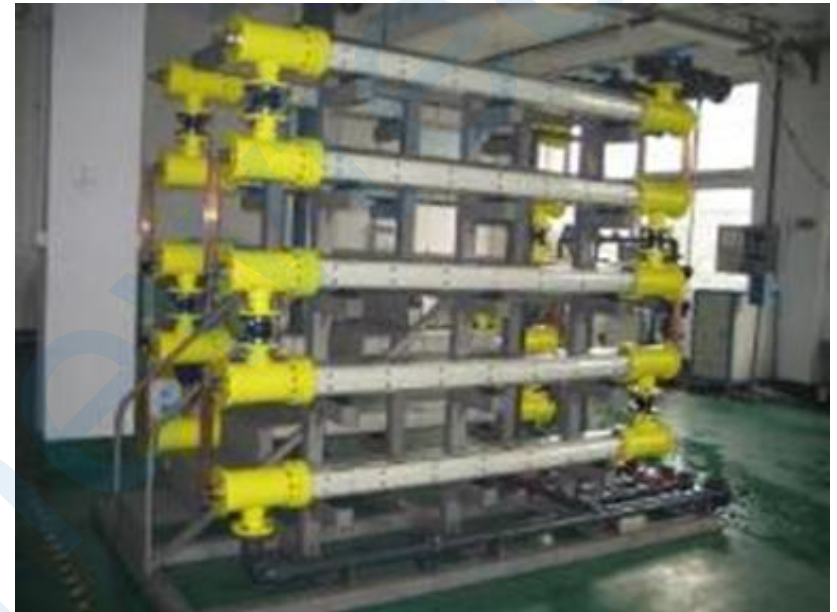
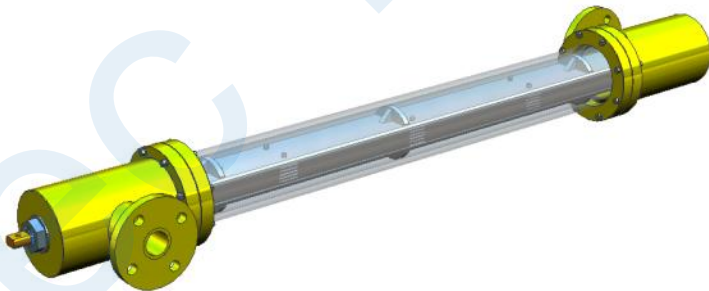
- ✓ Electrical power demand: 3,75kWh /for sea water $[Cl^-] = 15g/L$
- ✓ NaClO concentration: 0,2% (=2000ppm)
- ✓ Hydrogen gas production: $0,35m^3/hkgCl_2$



2x nt-CLE-S 50000
2x 50kg/h

Advantages of nt-CLE-S Systems:

- ✓ Transparent electrolysis tubes with inductive electrode modules
- ✓ Anti-scaling technology based on partial backflow
- ✓ Max. 120kg/h Cl₂ per unit
- ✓ Full-automatic system with online monitoring and remote control



newtec electrolysis products and productivity ranges

- ✓ **nt-BlueBottle** for 0,02% HOCl (10~100mg Cl₂ each electrolysis)
- ✓ **nt-BlueFogger** as aerosol generator (10~50L/h HOCl)
- ✓ **nt-BlueBox** product Line for 0,5% NaOCl (3~150g Cl₂/h)
- ✓ **nt-CLE** salt water electrolysis for 0,8% NaOCl (0,2~60kg Cl₂/h)
- ✓ **nt-CLM** membrane electrolysis for 15% NaOCl (10 ~ 200 kg Cl₂/h)
- ✓ **nt-CLE-S Systems** sea water electrolysis for 0,2% NaOCl (1~120kg Cl₂/h)

1997:

Founding of **Newtec Umwelttechnik GmbH** in Berlin, specialised in adapted solutions in water disinfection.



2002-2005:

Founding own office branch and 3 joint-ventures in Shanghai, as our main production workshops.



2009-2010:

Taking over assets and activities of **Ecodis N.V.** in Belgium.
Founding **Newtec Water Systems N.V. (NWS)** in Belgium.



2014:

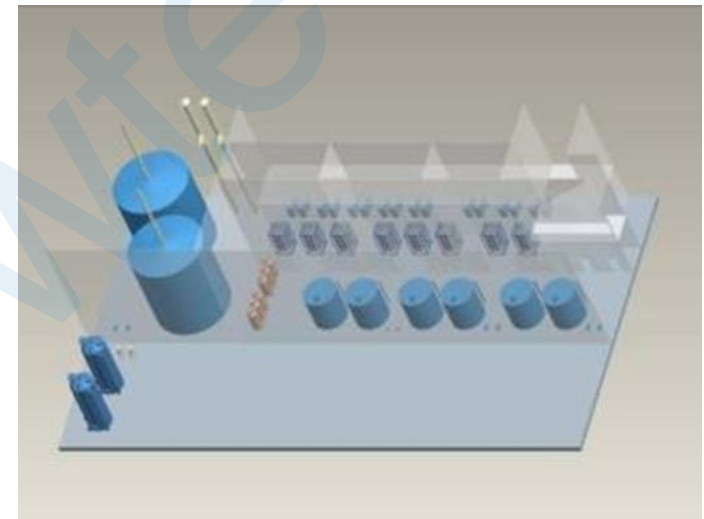
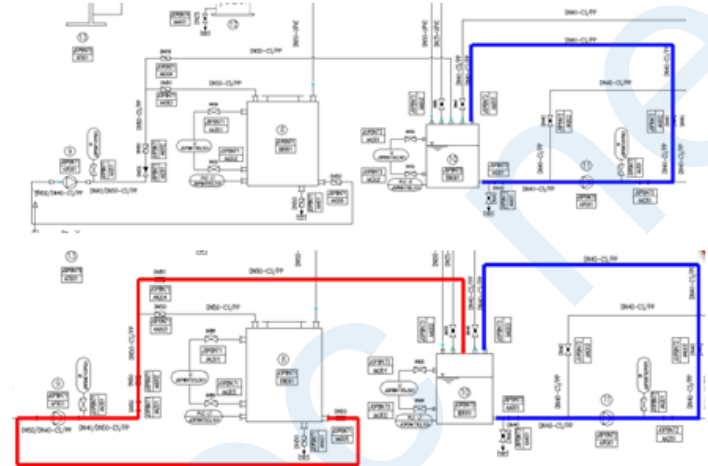
Merging **SmartFlow** into **NWS** in Belgium.



newtec FEPC Turn-key Service

(Financing, Engineering, Procurement & Construction)

- ✓ Financing using low European credit interest
- ✓ Consulting, **process optimisation**
- ✓ Mechanical, electrical & process automation **design**
- ✓ Procurement
- ✓ Equipment fabrication
- ✓ Sub-contracting & manufacturing
- ✓ **Supervision** for construction and installation
- ✓ Commissioning
- ✓ Training, operation & maintenance
- ✓ Provision of consumables



newtec Objectives :

**Consulting and EPC
for best suitable solution**

**Focus on sustainable
technologies with low
environmental impact**

**Cooperation with local partners,
agencies, design institutes for
demand analysis & orientation**

**Combining German technology &
international services for cost-
effective innovation**



Passion in green innovation!

mail@newtec-berlin.de

www.newtec-berlin.de