

## ClorTec® On-site sodium hypochlorite generators

The latest generation of brine electrochlorination technology, the ClorTec DN range, offers simple operation and maintenance as well as unrivalled safety advantages.

### ClorTec makes electrochlorination easy

The latest generation of brine electrochlorination technology, the ClorTec DN range, offers simple operation and maintenance as well as unrivalled performance and safety advantages.

Systems generate hypochlorite using three common consumables: water, salt and power. The benefits of generating on-site include:

- Safe, simple and reliable technology solution
- Non-hazardous hypochlorite solution of <1.0%
- No transportation of hazardous materials
- Reduced cost vs bulk hypo (no price fluctuation)
- Reduced contaminants levels versus bulk hypo

### De Nora Water Technologies and ClorTec

- Market leader with > 3,500 systems installed worldwide and 25+ years' experience across many markets
- Provided the largest installed capacity system in the world at 21,000 ppd (9,525 kg/d) ClorTec (Brine)
- Offer wide range of systems/units from 2 ppd (0.9 kg/d) to 3000 ppd. (1,360 kg/d)
- DSA® anode technology pioneered by Industrie De Nora
- Utilizes proven technology supported by a dedicated R&D Center and experienced electrochemistry staff.



visit [www.denora.com](http://www.denora.com) for more information

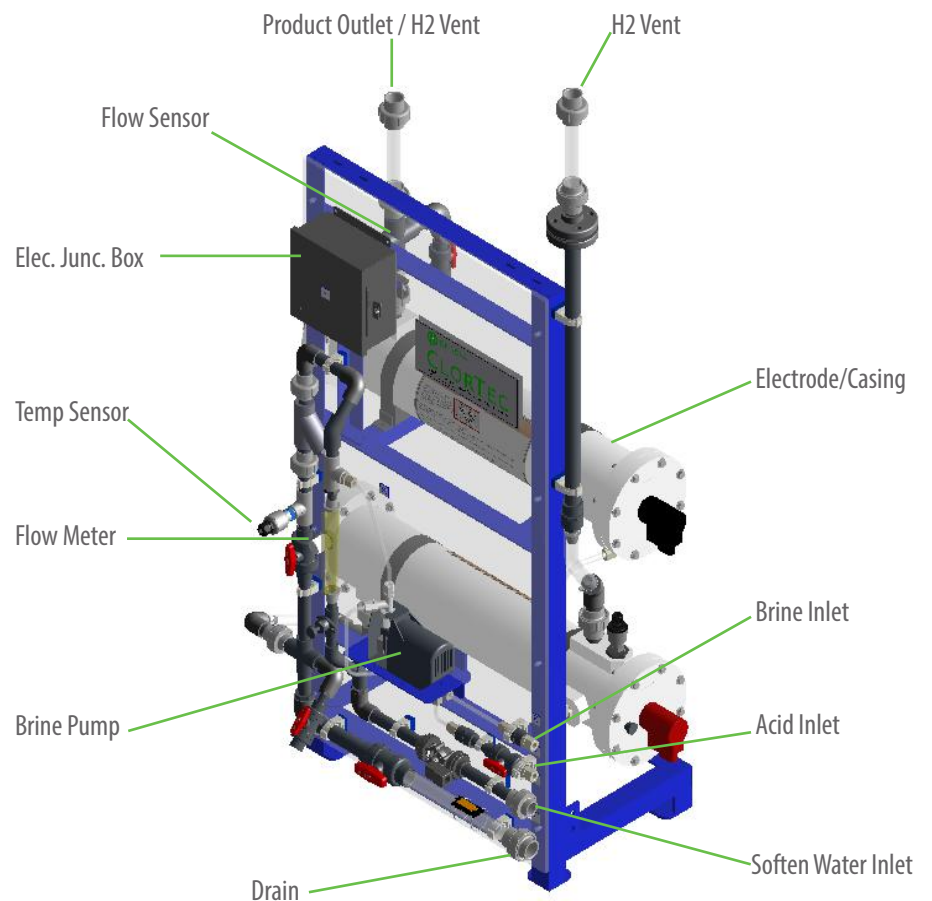
# Brine Electrochlorination Made Easy

## ClorTec Advantages

ClorTec offers a number of unique advantages:

- The best electrode technology in the world is a De Nora DSA bipolar electrode providing the **most efficient salt and power usage** at 3.0 lb (1.36 kg) of salt and 2.0 kWh DC power per lb (kg) equivalent of chlorine produced and guaranteed 0.8% product concentration.
- Individual hydrogen venting on each cell delivers **safety advantages over competing designs**
- Simplified piping, open access, **reducing maintenance and operational issues**
- Less complex system with fewer instruments and simplified controls which **means easy operation**
- Electrolytic cells are operated based on high current/low voltage vs low current/high voltage for **optimal power efficiency**
- Cell casings in PVC/FRP and acrylic depending on the size of the system.
- ClorTec utilizes a double star transformer/rectifier configuration for **precise and stable control of current, high efficiency, reliable performance**
- Simple acid cleaning procedure
- Multiple Frame Options: Powdered Coat, 304SS and FRP
- Wide range of **aftersales services**
- Option for new remote "**Smart Monitoring**" system to monitor the system performance via the internet. This tool allows DNWT to make recommendations on how to maintain and/or improve system performance and allows for remote maintenance and troubleshooting.

All this from the supplier of the longest lasting electrodes in the industry!



## Simplicity and ease of operation

- 1) Salt in the brine preparation tank is combined with water to create a saturated brine solution
- 2) The saturated brine solution is pumped via brine pump and mixed with softened water to make 6% brine solution, which is fed to ClorTec electrolyzer. The brine and water flow rates are constant and steady.
- 3) The brine solution is passed through the ClorTec electrolytic cells containing De Nora DSA electrodes and generates guaranteed 0.8% hypochlorite solutions upon applying DC electrical current.
- 4) The process parameters such as temperature and electrolyte flow in the electrolytic cell are continuously monitored by PLC to ensure reliable and efficient operation of the system.
- 5) The only by-product generated by ClorTec system is hydrogen, which is vented from each cell and diluted with air to reduce H2 to 25% of LEL in air before venting out to atmosphere.

6) The design of the ClorTec electrode/cell allows for rapid and effective removal of the H2 from each cell due to the short height of the electrode and baffles in the cell. The ClorTec design prevents an increase in hydrogen bubble sizes as they rise and reduces amount of hydrogen on the surface of the electrode to minimize blinding the electrodes surface, which prevents an increase in resistivity and therefore cause fluctuations in solution concentration and Cl2 production.

7) Due to our horizontal configuration of the cells, the temperature can be maintained low and piping kept simple without additional piping for recycle of electrolyte to cool the system

8) After passing through one or more electrodes/cells, the hypo flows to the product tank(s). As the product exits the system, the temperature is checked to make sure the system is not operating too hot. Also, at the outlet of the last cell there is a flow sensor to check that there is flow before energizing the electrode(s). There are not no isolation valves on the outlet which prevents any potential over pressurization situations.

9) The complete system is controlled by a new combined HMI/PLC logic controller.



Control panel interface



ClorTec acid cleaning cart



## Product configuration

Model	Cell Configuration	Output Capacity (PPD)	Output Capacity (kg/d)	Total Flow (gpm)	Total Flow (m <sup>3</sup> /d)	Softwater (gpm)	Softwater (m <sup>3</sup> /d)	Brine Flow (gpm)	Brine Flow (m <sup>3</sup> /d)	Salt (lb/day)	Salt (kg/d)
<b>MINI SIZE SYSTEM</b>											
MCT-12	1 x 12	12	5.44	0.13	0.71	0.12	0.65	0.01	0.05	36	16.33
MCT-24	2 x 12	24	10.89	0.25	1.36	0.23	1.25	0.02	0.11	72	32.66
MCT-36	3 x 12	36	16.33	0.38	2.07	0.35	1.91	0.03	0.16	108	48.99
MCT-48	4 x 12	48	21.77	0.50	2.73	0.46	2.51	0.04	0.22	144	65.31
<b>MID SIZE SYSTEM</b>											
CT-75	1 X75	75	34.02	0.78	4.25	0.72	3.92	0.06	0.33	225	102.06
CT-100	1 X100	100	45.36	1.04	5.67	0.96	5.23	0.08	0.44	300	136.08
CT-150	2 X75	150	68.04	1.56	8.50	1.44	7.85	0.12	0.65	450	204.12
CT-200	2 X100	200	90.72	2.08	11.34	1.92	10.47	0.16	0.87	600	272.16
CT-225	3 X 75	225	102.06	2.34	12.75	2.16	11.77	0.18	0.98	675	306.17
CT-300	3 X100	300	136.08	3.13	17.06	2.88	15.70	0.24	1.31	900	408.22
CT-400	4 X100	400	181.44	4.17	22.73	3.85	20.99	0.32	1.74	1200	544.31
<b>LARGE SIZE SYSTEM</b>											
CT-450	1 x 450	450	204.12	4.69	25.57	4.33	23.60	0.36	1.96	1350	612.35
CT-600	1 x 600	600	272.16	6.25	34.07	5.77	31.45	0.48	2.62	1800	816.47
CT-750	1 X 750	750	340.20	7.81	42.57	7.21	39.30	0.60	3.27	2250	1020.58
CT-900	2 X 450	900	408.22	9.38	51.13	8.65	47.15	0.72	3.93	2700	1224.7
CT-1200	2 X 600	1200	544.31	12.50	68.14	11.54	62.90	0.96	5.23	3600	1632.93
CT-1500	2 X 750	1500	630.39	15.63	85.2	14.42	78.60	1.20	6.54	4500	2041.17
<b>DUAL LARGE SIZE SYSTEM</b>											
CT1800	900 + 900	1800	816.47	18.75	102.20	17.31	94.36	1.44	7.85	5400	2449.4
CT-2400	1200 + 1200	2400	1088.62	25.00	136.27	23.08	125.81	1.92	10.47	7200	3265.87
CT-3000	1500 + 1500	3000	1360.78	31.25	170.35	28.85	157.26	2.40	13.08	9000	4082.33

For more information on ClorTec on-site sodium hypochlorite generation systems visit [www.denora.com](http://www.denora.com)

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