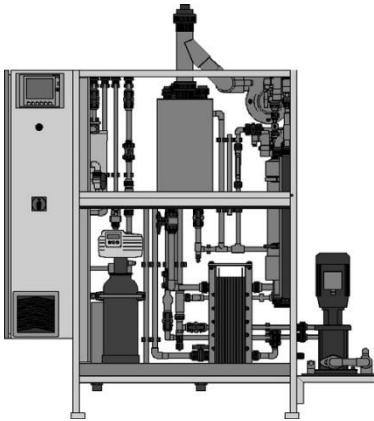


Output of 100 – 3.500 g/h of ultra-pure active chlorine (hypochlorous acid)



Electrolysis systems of the type CHLORINSITU® V generate ultra-pure active chlorine using the unique vacuum method with the membrane electrolysis technology.

The CHLORINSITU® V is especially suitable for applications in which metering hypochlorous acid and simultaneously correcting the pH value are requested.

The electrochemical reaction takes place in two electrode chambers (anode and cathode) which are separated by a cation selective membrane. The formation of active chlorine and sodium hydroxide is physically separated. In the CHLORINSITU® V the freshly produced active chlorine is introduced into the water to be treated by an injector in our installation and fully dissolved as hypochlorous acid in the water to be treated (a bypass).

The super-chlorinated water is then re-distributed via one or more proportionately controllable motor driven ball valves, into the mainstream(s).

The vacuum is kept stable by a single frequency-controlled booster pump. This creates less mechanical stress on the membrane in the electrolysis cell as well as on other parts of the system. Using a single frequency-controlled booster pump permits significant savings in terms of energy.

A standard diaphragm metering pump is first used to correct the initial pH (pH 6.8 – 7) of the super-chlorinated water.

The final correction of the pH value is provided via additional alkali metering pumps for each single circuit or point of injection. These pumps are connected directly to the system's control through an external pH value controller.

Sodium hydroxide (NaOH) and hydrogen gas (H₂) are produced in the cathode chamber. The absolutely chloride-free sodium hydroxide is stored temporarily in an internal production tank and can be used for pH value correction.

The hydrogen produced is diluted with fresh air through an ATEX 95-approved fan and discharged safely. The diluted residual brine is fully discarded. To this end, the diluted brine is strongly diluted with softened water, neutralised by the addition of sodium hydroxide and disposed of in the sewer.

All residual chloride and chlorate are thus disposed of and are not mixed with the process water. Electrolysis systems of type CHLORINSITU® V can thus be compared with pure chlorine gas in terms of their oxidation strength and chloride / chlorate content in the process water.

The salt-dissolving water comes from a softener integrated in the system, thereby preventing the formation of lime deposits and ensuring the long service life of the membrane cell. The efficiency of electrolysis is constantly monitored by various flow meters, the addition of water depending on the sodium hydroxide production and the base pH correction.

A saturated solution of sodium chloride is produced in a salt dissolving tank, included in the scope of delivery, and this solution is then electrolysed in a membrane cell. Chloride-free sodium hydroxide and hydrogen are produced in the cathode chamber, while ultra-pure chlorine gas and dilute residual brine are produced in the anode chamber, separated by the diaphragm from the cathode chamber.

Your benefits

- ✓ Chlorination and pH adjustment with a single system
- ✓ Exceedingly low chloride and chlorate content
- ✓ Production and metering of ultra-pure hypochlorous acid without temporary storage
- ✓ Safe system control with remote diagnosis by Remote Control Engineer
- ✓ Excellent service life of the membrane cells, thanks to constant vacuum
- ✓ A frequency-controlled circulation pump maintains the vacuum constant in the enclosed anode area
- ✓ Maximum operating safety due to their design as negative pressure systems
- ✓ Active process control of production by extended internal measuring and control technology
- ✓ Cost-effective operation thanks to the use of sodium chloride as an inexpensive raw material and no consumption of chemicals for pH correction
- ✓ Complete disposal of the diluted brine, nothing is fed back into the process water being treated
- ✓ Comparable with pure chlorine gas in terms of oxidation strength and chloride / chlorate content in the process water
- ✓ Robust, simple technology
- ✓ Compact, space-saving design
- ✓ Improved working conditions for operating personnel
- ✓ No risk of confusing dangerous chemical tanks

Technical details

- ✓ Modern PLC with large illuminated display
- ✓ Analogue input (optional)
- ✓ MOD bus or PROFIBUS® (optional)
- ✓ Several points of injection (optional)
- ✓ Chlorine metering and pH value correction controlled via contact inputs
- ✓ Multiple booster pumps (optional) can be used for different water qualities (e.g. brine and freshwater pools)
- ✓ Integrated Remote Control Engineer for remote diagnosis and troubleshooting

Field of application

- ✓ Swimming pool water – indoor and outdoor pools
- ✓ Agricultural application – based on NaCl (Sodium Chloride) salt
- ✓ Potable water
- ✓ Process water
- ✓ Waste water
- ✓ Cooling towers

Scope of delivery:

Electrolysis systems of type CHLORINSITU® V are mounted, ready-wired with a PLC, in a powder-coated stainless steel frame in the control cabinet. They include a Remote Control Engineer for remote diagnosis and troubleshooting, integrated water softener system, membrane cells, ATEX 95 compliant hydrogen ventilation system and separate salt dissolving tanks and level monitoring unit.

A duplex water softener is fitted as standard for systems producing more than 2.000 g/h.

A chlorine gas warning unit and automatic monitoring of water hardness downstream of the softening system come as standard with systems producing more than 600 g/h.

On the smaller systems 100 – 500 g/h this can be delivered optionally.

Note:

Electrolysis systems of type CHLORINSITU® II, III, V and V Plus are offered and planned to meet customer specifications. This is true both for the system documentation and the subsequent supply of spare parts and maintenance.

Technical Data CHLORINSITU® V Power supply: 3 x 400 V (> 200 g/h) (VAC/3P/N/PE/50 Hz)								
Capacity	Fuse	Power uptake	Max. salt consumption	Max. volume of process water*	(External) Cons.of cooling water	Dimensions L x W x H (mm)	Brine tank	Recomm. capacity storage tank
g/h	A	kW	kg/d	l/h	l/h	mm	liter	liter
100	3 x 16	1.10	5	60	–	1,655 x 600 x 1,550	130	--
200	3 x 16	1.50	10	60	–	1,655 x 600 x 1,550	130	--
300	3 x 16	1.90	15	60	–	1,655 x 600 x 1,550	200	--
400	3 x 16	2.30	20	60	–	1,655 x 600 x 1,550	200	--
500	3 x 16	2.70	25	60	–	1,655 x 600 x 1,550	200	--
600	3 x 20	3.10	30	90	–	1,950 x 600 x 2,000	200	--
750	3 x 25	3.70	35	90	–	1,950 x 600 x 2,000	380	--
1.000	3 x 25	4.70	50	90	–	1,950 x 600 x 2,000	380	--
1.250	3 x 35	5.70	60	90	–	1,950 x 600 x 2,000	380	--
1.500	3 x 35	6.70	70	90	–	1,950 x 600 x 2,000	520	--
1.750	3 x 35	7.70	80	90	–	1,950 x 600 x 2,000	520	--
2.000	3 x 50	8.70	100	175	200	1,750 x 1,200 x 2,000	520	--
2.500	3 x 63	10.70	150	175	250	1,750 x 1,200 x 2,000	760	--
3.000	3 x 63	12.70	175	175	300	1,750 x 1,200 x 2,000	760	--
3.500	3 x 80	14.70	175	175	350	1,750 x 1,200 x 2,000	760	--

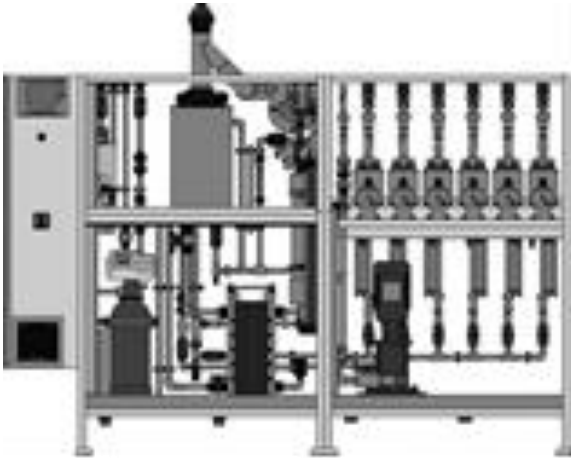
* The consumption of process water depends on the ratio of chlorine gas to stock production. The value is given here for a ratio of 70% : 30 %.

Notes:

Capacities > 3,500 g/h upon request

Dimensions of the installation give for a CHLORINSITU V PLUS are based on one single dosing point. In case multiple dosing points are required an additional dosing cabinet will delivered
 Dosing cabinet can vary: 800 – 1.200 x 600 x 1.500-2.000 mm

Output of 100 – 3.500 g/h ultra pure active chlorine (hypochlorous acid) in combination with sodium hypochlorite (10 – 25 g/l)



Electrolysis systems of the type CHLORINSITU® V PLUS generate ultra-pure active chlorine in combination with a sodium hypochlorite (NaOCl) production using the unique vacuum method with the membrane electrolysis technology.

The CHLORINSITU® V PLUS is especially suitable for applications in which metering hypochlorous acid and simultaneously correcting the pH value are requested but due to the possible peak demands of the system additional sodium hypochlorite, stored in a (day)storage tank should be available

The electrochemical reaction takes place in two electrode chambers (anode and cathode) which are separated by a cation selective membrane. The formation of active chlorine and sodium hydroxide is physically separated.

In the CHLORINSITU® V the freshly produced ultra-pure active chlorine can be processed in two ways.

First of all as super-chlorinated water.

The freshly produced active chlorine is introduced into the water to be treated by an injector in our installation and fully dissolved as hypochlorous acid in the water to be treated (a bypass).

The super-chlorinated water is then re-distributed via one or more proportionately controllable motor driven ball valves, into the mainstream(s).

The vacuum is kept stable by a single frequency-controlled booster pump. This creates less mechanical stress on the membrane in the electrolysis cell as well as on other parts of the system. Using a single frequency-controlled booster pump permits significant savings in terms of energy.

A standard diaphragm metering pump is first used to correct the initial pH (pH 6.8 – 7) of the super-chlorinated water.

The final correction of the pH value is provided via additional alkali metering pumps for each single circuit or point of injection. These pumps are connected directly to the system's control through an external pH value controller.

Secondly, if the complete production output is not needed, excess of ultra-pure chlorine can also be combined with the sodium hydroxide produced and then temporarily stored as sodium hypochlorite (NaOCl). Consequently, the system does not have to be dimensioned according to the maximum active chlorine demand but can be aligned to the average daily demand.

Peaks in demand are met by the additional metering of sodium hypochlorite from the temporary storage tank in order to top up the super-chlorinated water or dosing it separately into any of the mainstream(s).

Sodium hydroxide (NaOH) and hydrogen gas (H₂) are produced in the cathode chamber. The absolutely chloride-free sodium hydroxide is stored temporarily in an internal production tank and can be used for pH value correction.

The hydrogen produced is diluted with fresh air through an ATEX 95-approved fan and discharged safely. The diluted residual brine is fully discharged. To this end, the diluted brine is strongly diluted with softened water, neutralised by the addition of sodium hydroxide and disposed of in the sewer.

All residual chloride and chlorate are thus disposed of and are not mixed with the process water. Electrolysis systems of type CHLORINSITU® V PLUS can thus be compared with pure chlorine gas in terms of their oxidation strength and chloride / chlorate content in the process water. The sodium hypochlorite produced in the CHLORINSITU® V PLUS is kept as fresh as possible in order to avoid degradation of the product.

The salt-dissolving water comes from a softener integrated in the system, thereby preventing the formation of lime deposits and ensuring the long service life of the membrane cell. The efficiency of electrolysis is constantly monitored by various flow meters, the addition of water depending on the sodium hydroxide production and the base pH correction.

A saturated solution of sodium chloride is produced in a salt dissolving tank, included in the scope of delivery, and this solution is then electrolysed in a membrane cell. Chloride-free sodium hydroxide and hydrogen are produced in the cathode chamber, while ultra-pure chlorine gas and dilute residual brine are produced in the anode chamber, separated by the diaphragm from the cathode chamber.

Your benefits

- ✓ Chlorination and pH adjustment with a single system
- ✓ Exceedingly low chloride and chlorate content
- ✓ Production and metering of ultra-pure hypochlorous acid without temporary storage
- ✓ Reservoir of sodium hypochlorite solution to cover peak demand
- ✓ Safe system control with remote diagnosis by Remote Control Engineer
- ✓ Excellent service life of the membrane cells, thanks to constant vacuum
- ✓ A frequency-controlled circulation pump maintains the vacuum constant in the enclosed anode area
- ✓ Maximum operating safety due to their design as negative pressure systems
- ✓ Active process control of production by largely internal measuring and control technology
- ✓ Cost-effective operation thanks to the use of sodium chloride as an inexpensive raw material and no consumption of chemicals for pH correction
- ✓ Complete disposal of the diluted brine, nothing is fed back into the process water being treated
- ✓ Comparable with pure chlorine gas in terms of oxidation strength and chloride / chlorate content in the process water
- ✓ Robust, simple technology
- ✓ Compact, space-saving design
- ✓ Improved working conditions for operating personnel
- ✓ No risk of confusing dangerous chemical tanks

Technical details

- ✓ Modern PLC with large illuminated display
- ✓ Analogue input (optional)
- ✓ MOD bus or PROFIBUS® (optional)
- ✓ Several points of injection (optional)
- ✓ Chlorine metering and pH value correction controlled via contact inputs
- ✓ Simultaneous production and metering of ultra-pure hypochlorous acid and sodium-calcium hypochlorite (optional) Multiple booster pumps (optional) can be used for different water qualities (e.g. brine and freshwater pools)
- ✓ Integrated Remote Control Engineer for remote diagnosis and troubleshooting

Field of application

- ✓ Swimming pool water – indoor and outdoor pools
- ✓ Agricultural application – based on NaCl (Sodium Chloride) salt
- ✓ Potable water
- ✓ Process water
- ✓ Waste water
- ✓ Cooling towers

Scope of delivery:

Electrolysis systems of type CHLORINSITU® V PLUS are mounted, ready-wired with a PLC, in a powder-coated stainless steel frame in the control cabinet. They include a Remote Control Engineer for remote diagnosis and troubleshooting, integrated water softener system, membrane cells, ATEX 95 compliant hydrogen ventilation system and separate salt dissolving tanks and level monitoring unit.

A duplex water softener is fitted as standard for systems producing more than 2.000 g/h.

A chlorine gas warning unit and automatic monitoring of water hardness downstream of the softening system come as standard with systems producing more than 600 g/h.

On the smaller systems 100 – 500 g/h this can be delivered optionally.

Note:

Electrolysis systems of type CHLORINSITU® II, III, V and V Plus are offered and planned to meet customer specifications. This is true both for the system documentation and the subsequent supply of spare parts and maintenance.

Technical Data CHLORINSITU® V Power supply: 3 x 400 V (> 200 g/h) (VAC/3P/N/PE/50 Hz)								
Capacity	Fuse	Power uptake	Max. salt consumption	Max. volume of process water*	(External) Cons.of cooling water	Dimensions L x W x H (mm)	Brine tank	Recomm. capacity storage tank
g/h	A	kW	kg/d	l/h	l/h	mm	liter	liter
100	3 x 16	1.10	5	60	–	2,500 x 600 x 1,550	130	50
200	3 x 16	1.50	10	60	–	2,500 x 600 x 1,550	130	100
300	3 x 16	1.90	15	60	–	2,500 x 600 x 1,550	200	150
400	3 x 16	2.30	20	60	–	2,500 x 600 x 1,550	200	200
500	3 x 16	2.70	25	60	–	2,500 x 600 x 1,550	200	250
600	3 x 20	3.10	30	90	–	2,750 x 600 x 2,000	200	300
750	3 x 25	3.70	35	90	–	2,750 x 600 x 2,000	380	400
1.000	3 x 25	4.70	50	90	–	2,750 x 600 x 2,000	380	500
1.250	3 x 35	5.70	60	90	–	2,750 x 600 x 2,000	380	600
1.500	3 x 35	6.70	70	90	–	2,750 x 600 x 2,000	520	750
1.750	3 x 35	7.70	80	90	–	2,750 x 600 x 2,000	520	850
2.000	3 x 50	8.70	100	175	200	2,350 x 1,200 x 2,000	520	1.000
2.500	3 x 63	10.70	150	175	250	2,350 x 1,200 x 2,000	760	1.250
3.000	3 x 63	12.70	175	175	300	2,350 x 1,200 x 2,000	760	1.500
3.500	3 x 80	14.70	175	175	350	2,350 x 1,200 x 2,000	760	1.750

* The consumption of process water depends on the ratio of chlorine gas to stock production. The value is given here for a ratio of 70% : 30 %.

Notes:

Capacities > 3,500 g/h upon request

Dimensions of the installation give for a CHLORINSITU V PLUS are based on one single dosing point. In case multiple dosing points are required an additional dosing cabinet will delivered
 Dosing cabinet can vary: 800 – 1.200 x 600 x 1.500-2.000 mm