

Water Technologies

Wallace & Tiernan® On-site Electrolytic Chlorination

B2-200 OSEC® System

SIEMENS

Introduction

The OSEC® System provides for the continuous production of sodium hypochlorite solution from salt, water and electricity. This eliminates dependence on commercial chlorine suppliers and the problems inherent in the transport and handling of bulk hypochlorite, particularly in remote or residential areas.

In addition, use of these systems could lower operating costs and disinfection by-products significantly compared to the use of bulk hypochlorite. Operation is completely automatic making the B2-200 OSEC® System ideally suited for un-manned locations.



Benefits

- ATEX compliant
- Major components are pre-piped and mounted on a common pedestal
- PLC based control panel
- Power saving electrolyser
- Economical, reliable and low maintenance operation
- Positive hydrogen gas dilution & removal
- Control panel that supervises and monitors the safe generation of sodium hypochlorite
- Long life anodes with a five year warranty
- Transformer / Rectifier unit provides the low voltage/high current DC supply used for electrolysis

OSEC® System Components

The complete OSEC® System consists of the following components:-

- Water Softener
- Salt Saturator
- Brine Pumps
- Transformer / Rectifier
- Electrolyser
- Product Storage Tanks
- Control Panel
- Product Tank Blowers

Apart from the OSEC® System, additional items to complete the disinfection process include a comprehensive line of sodium hypochlorite metering pumps such as the Encore® 100 and 700 mechanical diaphragm metering pumps and the Chemtube® 200 and 2000 hydraulic diaphragm metering pumps. Also, the LVN 2000 liquid feed system, is available for chemical dosing via vacuum induction. Chlorine residual controllers maintain the desired disinfectant level whilst chlorine residual analysers are available to measure chlorine levels in the treated water.

Electrolyser

The B2-200 OSEC® System consists of a two 200mm tubular PVC electrolyser casings. These house a titanium chassis to which the anodes and cathodes are fixed in a configuration that ensures maximum operational efficiency by providing simple, once through flow operation.

The anodes are DSA-type and manufactured from a titanium substrate with a precious metal oxide coating. The cathodes are made from a special grade of Hastelloy® C and are fitted with Kynar® spacers which maintain a critical uniform distance from the anode. Each electrolyser contains four cells electrically connected in series, containing sufficient anodes and cathodes to produce the desired quantity of available chlorine.

The internal electrolyser design and vertical orientation of the anodes and cathodes provides for the quick removal of hydrogen from the anode to ensure maximum efficiency. The partition discs have gas ports that pass the hydrogen through the compartments. Baffling effectively eliminates mixing between cells thereby reducing competing electro-chemical reactions. This along with an efficient system for removing hydrogen gas from the electrolysing zone results in savings in electrical power and salt.

Hydraulic and Electrical Data

kg/Day Cl ₂	Number of Electrodes		Brine Feed l/h			Peak Water Flow Required l/h	Nominal System Power @ 30 V DC		Flash Heater Rating kW
	Anodes	Cathodes	Saturated Brine	Dilution Water	† Total Water		DC A	kW AC	
117.6	112	128	60	600	660	858	784	24.8	3
126.0	120	136	64	660	724	906	840	26.6	3
134.4	128	144	69	708	777	948	896	28.3	6
142.8	136	152	73	756	829	1008	952	30.1	6
151.2	144	160	77	798	875	1050	1008	31.9	6
159.6	152	168	82	840	922	1110	1064	33.6	6
168.0	160	176	86	900	986	1170	1120	35.4	6
176.4	168	184	90	900	990	1230	1176	37.2	6
184.8	176	192	93	960	1053	1290	1232	68.9	6
193.2	184	200	99	1020	1119	1350	1288	40.7	6
201.6	192	208	103	1080	1183	1350	1344	42.5	6
210.0	200	216	107	1080	1187	1410	1400	44.3	6
218.4	208	224	112	1140	1252	1470	1456	46.0	6
226.8	216	232	116	1200	1316	1530	1512	47.8	6

† Dilution water ratios based on 10:1 Excludes softener regeneration

30 V Transformer / Rectifier

Type No.	No. of Anodes	DC Amps Output	AC Amps Input	Dimensions			DC Ammeter Max.	Busbar Size (mm)	Gross Weight (kg)
				W	D	H			
B2	112-136	1000 A	55.0	800	800	2100	1000 A	76 x 13	710
B2	144-160	1200 A	60.0	800	800	2300	1500 A	102 x 13	800
B2	168-200	1500 A	75.0	800	800	2300	1500 A	102 x 13	1000
B2	208-216	1600 A	80.0	800	800	2400	2000 A	102 x 13	1100

Control Panel

The entire B2-200 OSEC® Systems process is automatically operated and monitored by a central PLC-based control panel. Membrane key pads with character or touch screen display is available.

PLC:

Mitsubishi

Input Voltage:

230 VAC, 1 phase, 50 Hz (110 VAC version available)

Control Voltage & Relay:

24 VDC, 5 Amp

Transformer / Rectifier

Type :

Thyristor regulated variable output via in-built force air-cooled silicon thyristor regulator.

Enclosure:

IP21 - epoxy stove enamelled steel enclosure

Input Voltage:

380V/440V, 3 phase, 50/60Hz, 4 wire

Product Tank

Generally storage is provided for 24 hours of operation, though this can be increased and decreased depending on available space and site conditions. Typically tanks will range from 16,000 to 32,000 litres capacity.

A transducer outside the tank provides start/stop control of the OSEC® process to maintain a continuous supply of hypochlorite. Air blowers mounted at the base of the tank dilute the hydrogen below the flammability limit and force ventilate the tank to an outside discharge.

Salt Saturator

The salt saturator creates the brine solution that feeds the OSEC® electrolyser. This is created by passing the make-up water through the salt bed forming a 32% saturated brine solution which is then fed by brine dosing pumps to the electrolyser.

Typically the saturator is sized for 30 or more days production to ensure sufficient salt quantity to provide production continuity and economical refill cycles. This results in a saturator capacity of between 14 to 27 tonnes for a minimum 30 day period.

Softener

The makeup water used for the salt saturator and feed water used for the dilution of the brine solution must have less than 17mg/l of CaCO₃ hardness, otherwise operating efficiency and maintenance free operation will be compromised.

For water supplies with hardness greater than 17mg/l of CaCO₃, a water softener is required. This usually is a twin cylinder continuous operation resin based softener operating on a duty/stand by basis.

Anode Warranty

The anodes used in the electro-chlorinator are warranted for five calendar years after installation and commissioning unless stated otherwise at the time of quote.

Technical Specifications

Capacity:

118 to 227 kg/day of chlorine equivalent

Housing:

Two 200mm Diameter PVC casings

Anodes:

Precious metal oxide coating on titanium substrate

Cathodes:

Hastelloy® C

Spacers:

Kynar®

Chassis:

Titanium

Dilution Water Flowmeter:

Variable-area meter with low flow alarm from proximity switch

Brine Water Flowmeter:

Variable-area meter with low flow alarm from proximity switch

Salt Requirements:

Salt must be high quality, preferably pure vacuum dried food quality. Salt usage is approximately 3.4 kgs/kg of Cl₂

Supply Water Requirements:

Hardness not to exceed 17mg/l of CaCO₃

Minimum Water Temperature: 6.5°C

Maximum Water Temperature: 25°C

Minimum Water Pressure: 2 bar

Maximum Water Pressure: 5 bar

(Pressure losses through the water softener and heat exchanger must be added to the minimum pressure stated)

Electrical Requirements:

Control Panel:

110/230 VAC, 50 Hz, 1 Phase

Transformer/Rectifier:

460 VAC, 50/60 Hz, 3 Phase

Power Consumption:

5.0 to 5.6 kWh AC per kg of Cl₂ per day

Hypochlorite Strength:

0.7% to 0.9% concentration by weight

Pipe Connections:

Inlet Water - 1", Inlet Brine - ½", Outlet Product - 2"

Brine Pump:

Encore® 100 diaphragm metering pump

Heat Exchanger:

Integral

Alarm:

High & low temperature sensors, low electrolyte level, low dilution water flow, low brine flow.

Overall Dimensions:

Height: 1955mm, Width: 1250mm

Base: Depth: 700mm, Width: 800mm

(660 x 700 hole centres)

Optional Equipment:

Hydrogen Detector

Pump Accessories

Directives Conformance:

*Explosive Atmospheres Directive (ATEX) 94/9/EC

* All OSEC® System equipment has been examined by Sira Certification Services to assess its compliance with the Explosive Atmospheres Directive (ATEX) 94/9/EC. The relevant certificate number is Sira 04ATEX4277X. The equipment will now be marked accordingly:



EEx nA II T6
Ta = +5°C to +40°C

For detailed information see ATEX data sheet

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