Klorigen™ M-Series
On-Site Electrochemical Chlorine Systems

The Klorigen™ M-Series Chlorine Generator is a smaller scale electrochemical system specifically intended for remote applications and designed for safe and cost effective production of chlorine gas and sodium hydroxide using food grade salt. These systems can also be configured to produce high quality commercial strength bleach at concentrations up 10%.

Production capacity ranges from 40 to 200 lbs per day of equivalent chlorine as either elemental chlorine gas or liquid bleach. The Klorigen™ M-Series systems eliminate the hazards typically associated with the use of pressurized chlorine gas and commercial bulk supplied sodium hypochlorite. The M-Series units are ideal for industries and municipalities that are currently using or require a form of chlorine for disinfection, sterilization or bleaching.

Features

- Replaces pressurized chlorine gas to eliminate the potential for toxic gas release
- Membrane-grade sodium hydroxide is produced as a co-product
- On-demand Cl_2 - output scalable from 10% to 100% of designed capacity
- Single-pass brine feed system using food-grade salt for maximum purity, efficiency and minimum maintenance
- Touch screen PLC control system compatible with SCADA systems for remote monitoring and control
- System utilizes NSF/ANSI Std. 61 certified components
- Hydrogen safely diluted below LEL
- Multi-year warranty and maintenance contracts available
- Containerized ("monocoque") configurations

Electrolyzer

- Partitioned cells employ ion-selective Nafion® membranes, coated titanium DSA® anodes and 316 stainless steel cathodes
- Vertical design eliminates H_2 gas pockets
- No acid cleaning requirement

Utility Requirements

- Motive water: 20 to 40 GPM at 60 psig for water operated eductor-based systems
- 208 or 460 VAC, 3 phase electric requirement (depending on output capacity)
- Potable water supply for making brine and diluting generated caustic
- Cooling water: 2 to 10 GPM depending on unit capacity

General System Performance

- Power Consumption: less than 2.5 DC kWh per lb Cl_2
- Salt Consumption: less than 2.5 lbs NaCl per lb Cl_2
- Electrochemical Efficiency: 70% to 85%
- Sodium Hydroxide (NaOH) Co-Product: 10% to 20wt% (user option)

Klorigen™ Designated "ATT" (Anti-Terrorism Technology) by DHS on February 16, 2010

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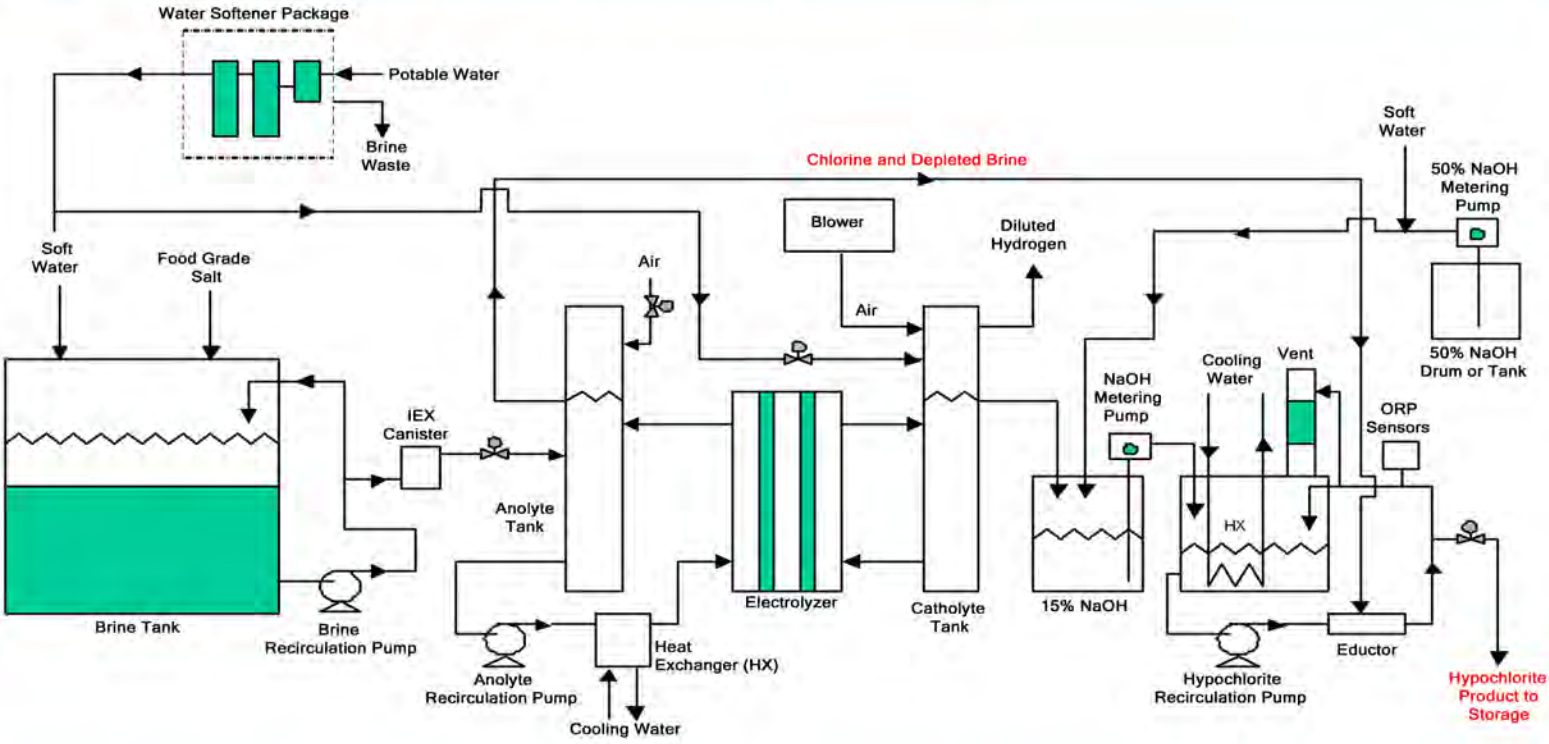
System Flow Diagram (sodium hypochlorite application)



Construction

- Modular construction reduces installation time and cost
- Structural assemblies of chemical-resistant non-conducting pultruded GRP and UHMWPE
- 316L stainless steel fasteners
- All piping and valves are thermoplastic welded
- All fluid and gas fittings are thermal welded
- Components are NSF certified

Hydrogen Safety

- Membrane-separated cells isolate electrical potential
- Automatic blower with flow safety switch
- Vertical orientation allows natural gas lifting
- Robust electrolyzer construction
- Diluted hydrogen safely vented to atmosphere as it is produced

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Power Supply

- Precision engineered SCR regulated DC rectification to maintain steady state DC output
- Oil-cooled rectifiers are quiet and clean
- Chlorine output directly proportional to power input

Media Conditioning

- Water and brine are purified onboard to ultra pure levels to optimize performance, eliminate cell maintenance (acid cleaning) and increase operating life

Benefits

- Eliminates Risk Management Plan (RMP) reporting
- Low carbon footprint
- Allows for retention of current disinfection method and aspiration / injection systems
- Proven chlor-alkali technology uniquely modified for on-site generation
- Fully automated requiring minimal operator attention

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