

# Powell Continuous Bleach Plant

## General Information

### Introduction

The sodium hypochlorite process is a unique process utilizing dry chlorine and sodium hydroxide (caustic). It will safely produce high quality bleach at a minimum operating cost and is constructed with the highest quality components available to ensure long service life with a minimum amount of maintenance. The plant is equipped with numerous safety devices which are intended to shut the system down in the event of a process upset. The plant is completely automatic and requires only that someone be available if a process upset occurs.

### General Description



The continuous bleach plant is available in two basic designs; systems using dry liquid chlorine from a container or using dry pressurized vapor chlorine from a chlor-alkali plant. The systems are available in various production rates with standard systems rated from 25, 50, 80, and 150 gallons per minute of 160 grams per liter available chlorine. Each system has an adjustable production rate and is able to produce up to 200 grams per liter available chlorine; however, the rated production rate will be decreased slightly at strengths above 160 gpl due to the increased heat load on the system.

The bleach strength and residual caustic levels are controlled at very high tolerances and can be adjusted at any time during production. The systems are designed for a completely automatic operation and can be started or stopped at any moment.

Systems are completely skid mounted on a structural steel frame approximately 20' long x 8' wide x 8' high.

### Continuous System Advantages

Powell Sodium Hypochlorite Continuous Systems considerably reduce the man-hours required to manufacture bleach in comparison to other process methods. One operator can produce as much as 72,000 gallons of 160 grams per liter bleach in an 8 hour day.

The continuous system also offers major cost savings in raw materials due to its 99% plus efficiency when compared with a 93-96% efficiency experienced in batch operations. This increase in efficiency results in a decrease in the amount of sodium chlorate produced. The following example helps quantify these savings in efficiency.

	Efficiency	
Raw Materials	99%	93%
Chlorine Required (Tons/Year)	8,066	8,580
Caustic Required (Tons/Year)	9,100	9,680

Annual Cost Savings @ \$500/ECU: \$273,000

Due to the extremely high repeatability of the continuous system, considerable savings are experienced from using fewer raw materials. In addition, residual caustic levels can be lowered and final product strengths can be closer to guaranteed levels, resulting in less product giveaway.

Another major savings results from the type of cooling used. Mechanical refrigeration is typically required with other bleach manufacturing processes. The Powell system utilizes cooling tower water for cooling resulting in considerable energy savings, lower equipment costs, and lower maintenance costs.

## Utility and Raw Material Requirements

The basic utility and raw material requirements are as follows:

- Dry liquid chlorine with a minimum pressure of 120 PSIG or dry vapor chlorine at a minimum pressure of 60 PSIG.
- Sodium hydroxide at a minimum pressure of 80 PSIG.
- Process water (typically soft water) at a minimum pressure of 80 PSIG.
- Cooling water at a maximum temperature of 85°F.
- Instrument quality dry air at a minimum pressure of 80 PSIG.
- Three phase electricity for motors.
- Instrument quality power for control system.

## Materials of Construction

All units are constructed from the best materials available to maximize the service life of the system. Standard materials of construction are listed below. Other materials are available upon request.

- Process water, caustic, and chlorine: Schedule 80 seamless steel pipe with 3000# forged steel fittings.
- Cooling water: Schedule 80 PVC pipe and fittings.
- Sodium Hypochlorite: Teflon lined steel pipe and fittings in high pressure areas and schedule 80 PVC pipe and fittings in low pressure areas.
- Sodium Hypochlorite Pump: Titanium centrifugal pump with single mechanical seal.
- Sodium Hypochlorite Recycle Tank: Steel tank with black chlorobutyl rubber lining.
- Heat Exchangers: Plate and frame style with titanium plates and EPDM gaskets.

## Construction Lead Time

Construction time for a continuous bleach system is typically six months. The systems are completely water tested and all control systems are thoroughly checked before the system is shipped. After delivery, the purchaser must make all raw material and electrical connections. After these connections are made, Powell technician(s) will perform additional water testing, startup, and training. Startup is typically performed in a relatively short time since the unit is completely tested at a factory.

Contact us today at 888.800.2310 or 989.681.2158 (local and outside of the US) to learn more about how the Powell Sodium Hypochlorite Continuous System can meet your bleach production needs.



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