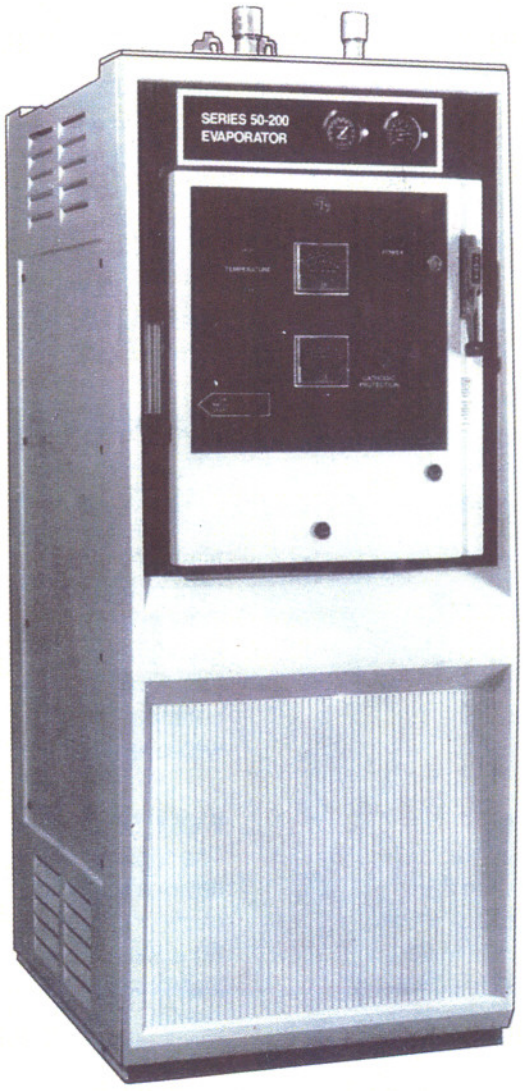
PENNWALT
LIMITED

SERIES 50-200 EVAPORATOR

FOR LIQUID CHLORINE



FEATURES

- Maximum capacities of 120 kgs, 160 kgs, 200 kgs per hour of chlorine.
- NEMA 4 control panel with fused disconnect switch.
- Complete pre-wiring of all electrical components in the standard price.
- Pressure-relief systems on liquid and gas lines included.
- For reliable operation, an electric water heater is external to the vapourizing chamber.
- Conforms to ASME code and Chlorine Institute recommendations.
- Unpowered external-alarm contacts for high and low temperature and low water level are standard.

KNOW-HOW FROM
WALLACE & TIERNAN

APPLICATIONS

The Pennwalt Series 50-200 Evaporator (sometimes called a "vapourizer") is an electrically heated immersed-tank-type heat exchanger. It is necessary wherever the rate of unaided gas withdrawal from multiple containers is not fast enough to keep up with requirements.

Such high-capacity installations include:

- Disinfection in large municipal or industrial water plants;
- Chlorination of municipal sewage;
- Disinfection of municipal and industrial wastewater;
- Bleaching and waste treatment in pulp and paper mills;
- Aluminium fluxing (removal of magnesium);
- Treatment of cooling water in power plants.

FEATURES

RELIABLE, AUTOMATIC OPERATION

To help prevent overfilling, liquid level in the pressure cylinder is self-adjusting. Level in the water-bath tank is maintained by a solenoid which controls make-up water flow. A thermostat maintains hot water temperature. Alarms and readout monitor operation of the liquid-evaporation and hot water systems.

EXTERNAL HEATER

The electric water heater is external to the water-bath tank assuring uniform heat distribution. This prevents "hot spots" and minimizes the possibility of liquid being heated in excess of 100 °C causing pressure build-up which could trigger gas relief.

ALARMS AND MONITORS

A sight glass for water-bath level and a water-temperature gauge help monitor water-bath conditions. Electronic switches provide accurate and reliable water-temperature regulation. Gas pressure and temperature gauges are included. There are high- and low-alarm switches for water-bath temperature and low-water level. An automatic pressure-relief system in the gas outlet is standard. A similar relief system in the liquid-inlet line is also standard. Both systems have high-pressure alarm switches.

MEETS CODE REQUIREMENTS

The Pennwalt Evaporator conforms to ASME standards and meets recommendations of the Chlorine Institute. The pressure cylinder and water-bath tank are cathodically protected against corrosion. The tank is heavily galvanized inside and out. The pressure cylinder and gas pressure-relief valve comply with ASME Boiler and Pressure Vessel Code, Section VIII, Division I.

PRE-WIRING AND OTHER INSTALLATION ECONOMIES

Pre-wiring of all evaporator controls and components is completed at the factory and included as standard. Electrical installation requires only connecting external power to a coded terminal strip. Only one 3-phase power supply is required: a transformer in the panel supplies power for control functions. Three sets of unpowered customer alarm contacts are standard: high-water temperature; low-water temperature; low-water level.

EASY TO CLEAN

The top of the pressure cylinder is a bolted flange removable for access to the interior. A bottom connection allows the cylinder to be flushed in place. An access hole in the water-bath tank permits inspection of the cylinder exterior and the tank interior. The enclosure is easily removed for access to the evaporater interior.

EASY TO INSTALL

The evaporator is shipped completely assembled. The vapour vent and overflow drain are piped separately to insure adequate water-bath overflow. The electric heating elements are mounted from the top of the water heater. Liquid-inlet connections can be made at the top or bottom. Bottom connections are required for evaporators connected to a common liquid supply.

NEMA 4 CONTROL PANEL

The NEMA 4 panel contains a single printed circuit board incorporating all control functions and unpowered alarm contacts. Control switches, alarm lights, and readouts are also on the panel. As a precaution, a fused disconnect switch for the incoming power interlocks with the panel door.

DESIGN AND OPERATION

Liquid enters at the top of the pressure cylinder, but a drop pipe carries it almost to the bottom. An alternate liquid inlet at the bottom has a riser which terminates near the bottom of the drop pipe. A vapourized gas outlet at the top has a short drop pipe. This design limits pressure in the cylinder to that of the ton containers and prevents complete filling of the cylinder with liquid chlorine. The pressure cylinder is immersed in a temperature-controlled hot-water bath. Heat transfer from the water bath heats the liquid and superheats the gas. A vacuum-regulating valve at the gas outlet reduces pressure to increase superheat and prevent reliquifaction beyond the valve.

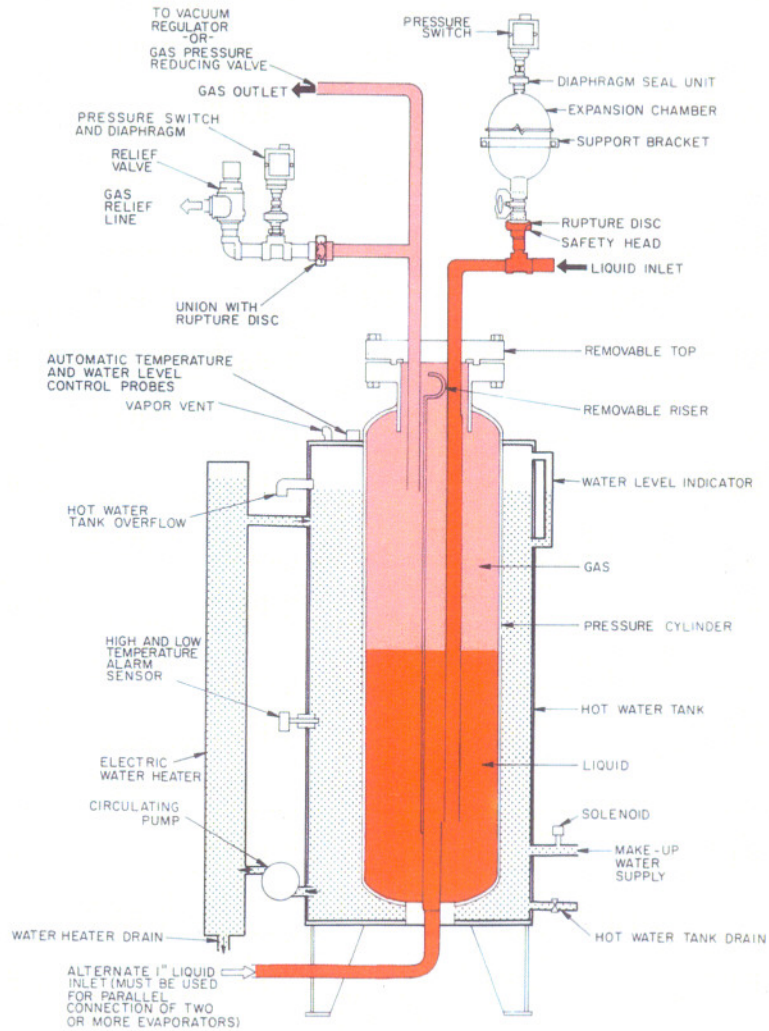
Liquid level in the pressure cylinder adjusts to gas removal rate. When this rate is constant, liquid level remains constant. If the withdrawal rate is increased, gas pressure in the cylinder is reduced and the liquid rises because of the supply pressure. This exposes more liquid to the transfer surface and it evaporates faster. Gas pressure builds up until it equals the supply pressure and the liquid level reaches equilibrium again. A reduction in the withdrawal rate has the opposite effect.

A pressure-relief system is located downstream of the gas outlet. It consists of rupture disc, pressure switch protected by a diaphragm seal and a pressure relief valve. If gas pressure reaches 400 psi, the disc is designed to rupture and the pressure switch to actuate. This can provide an alarm so that corrective action may be taken. Gas pressure, in fact, must rise all the way to 40 kg/cm² before the valve relieves to atmosphere. Additionally, the electrically operated vacuum-regulating valve furnished with the chlorinator offers an extra measure of reliability: It's designed to shut off the gas supply should power fail so that liquid chlorine can't be drawn through the chlorinator. It also contains a low-termperature switch. If liquid chlorine reaches the valve it lowers the temperature and the switch actuates, closing off the valve.

The liquid-inlet line also has its own pressure-relief system. It consists of a rupture disc, expansion chamber and a pressure switch. Should the liquid-inlet line be valved off accidentally and there is a rise in temperature, the disc ruptures. But the liquid is contained in the chamber. The pressure switch can be used to actuate an external alarm.

The pressure cylinder has permanent lifting brackets and is cathodically protected against corrosion. It meets ASME code requirements. The water-bath tank is insulated by a urethane blanket. It has a thermostat which controls water temperature and sensors for a water-temperature meter, high- and low-water-temperature indicators, and a low-water-level indicator. An automatic-water-level system consists of high- and low-level probes which actuate a make-up-water solenoid. Bath-water level shows on a sight glass at the control panel.

The circulating pump helps asssure uniform heat distribution and improves heat transfer between the hot-water bath and the liquid being evaporated. It also reduces heater cycling. Water-circulation piping is insulated.



TECHNICAL DATA

Type:

The Pennwalt Series 50-200 Evaporator is an electrically powered immersed-tank type heat exchanger.

Capacity:

120, 160, 200 kgs Chlorine per hour.

Electrical Requirements:

Heaters: 415V, 50Hz, 3ph

Circulating Pump & Solenoid Controls : 220v, 50hz, 1ph

Heater Ratings
12 KW FOR 120 kgs/hr
15 KW FOR 160 kgs/hr
18 KW FOR 200 kgs/hr

Connections:

Pressure cylinder : 1" BSP inlet/outlet
Water bath tank : 1/2" BSP female
Overflow & Drain: 1¼" BSP female

Cathodic Protection:

The inside of the water-bath tank and the outside of the pressure cylinder have magnesium-anode cathodic protection.

Liquid Chlorine Supply Pressure:

2.0 — 10.0 kg/cm²

Pressure Cylinder:

Rated (working) pressure = 40.0 kg/cm².
The cylinder is hydrostatically tested at 1½ times the rated pressure per ASME test requirements. Design and construction meet recommendations of the chlorine Institute Inc. and ASME code, Section VIII, Division 1 for pressure vessels

Pressure-Relief Valve:

Gas-pressure-relief valve setting is 40 kg/cm². The valve meets ASME code requirements.

Items Furnished:

(a) Liquid-line pressure-relief system.
(b) Gas-line pressure-relief system.
(c) External water bath heater.
(d) Cathodic protection system for pressure cylinder and water-bath tank.
(e) Complete factory pre-wiring.
(f) Pressure cylinder, water bath tank.
(g) Hot water circulating pump.
(h) Automatic water level control.
(i) Electronic temperature switches.
(j) Unpowered customer-alarm contacts for high-and-low water temperature and low-water level.
(k) Plastic enclosures
(l) Bath-tank overflow; gas-vapour vent.
(m) Water-bath tank and re-circulating piping insulation.
(n) Alarm switches; water temperature thermostat; water-level sight glass.
(o) NEMA 4 control panel with interlocking disconnect switch and coded terminal strip.
(p) Gauges, meters and indicators for power and water and gas temperature, pressure and level.

Chlorine Warning:

All unattended chlorination equipment should be continuously monitored for leaks. Sensitive chlorine detectors which respond quickly to chlorine in the ambient air should be installed. Write for catalogue on CHLORATEKT-2 detector.

AFTER-SALE SUPPORT

(a) Erection and commissioning.
(b) Replacement parts
(c) Preventive-maintenance kits.
(d) Preventive-maintenance contracts.
(e) Users training courses.

Overall Dimensions:

3125mm H (minimum to top of relief-system piping) x 1065mm D x 695mm W.

Shipping Weight: 600 Kg.

Manufacturing and Research & Development Centre, Navi Mumbai

PENNWALT LIMITED

D-221, M.I.D.C., T.T.C., Thane-Belapur Road, Nerul, Navi Mumbai-400 706.
Tel: +-91-22-5616 6633, 2763 2503, 2520, 2528, 2539 • Fax: +-91-22-2763-2560
E-mail: pennwalt@vsnl.in • info@pennwalt.com
Website: http://www.pennwalt.com