



CAPITAL CONTROLS

The Series 71V2000A electrically-heated evaporators automatically vaporize and superheat liquid chlorine, sulfur dioxide or ammonia at rates controlled by the using system. The evaporators are designed and fabricated in accordance with Section VIII, Div. 1 of the ASME Boiler and Pressure Vessel Code, and are provided with a "L" stamp to meet the pressure vessel requirements of the code. Series 71V2000A also meets recommendations of the Chlorine Institute. The evaporators are housed in corrosion-resistant and attractive fiberglass-reinforced polyester cabinets identical in size and color to the cabinet of the floor mounted gas dispensers.

Capital Controls considers chlorine a lethal gas and as such the evaporator meets the testing and inspection requirements necessary to meet Part UW-2 of the code which covers vessels built to contain lethal substances. The "L" stamp provides a chamber with the following certifications:

- W-L** - Welding meets lethal gas requirements.
- S-L** - Fabricated using seamless pipe for lethal gas.
- HT** - Whole vessel has been postweld heat treated.
- RT-1** - Complete vessel satisfies the full radiography requirements (100%) of all welded joints for lethal substances or design pressures exceeding 50 psi (345 kPa)

Design Features

- ◆ **Heavy Construction:** 1/2 inch wall thickness of the vaporizing chamber exceeds the ASME Code by more than 40%
- ◆ **Efficient:** Design affords good water circulation by convection; no circulators are required
- ◆ **Automatic:** Water chamber temperature is automatically controlled by an electronic temperature controller
- ◆ **Convenient:** Minimum attention is required by operating personnel

CHLORTROL™ Electrically Heated Evaporator



- ◆ For Vaporization of Chlorine, Sulfur Dioxide or Ammonia
- ◆ Ranges to 10,000 PPD (200 kg/h)
- ◆ Heavy Construction
- ◆ Efficient Water Circulation Design
- ◆ Automatically Controlled Water Temperature
- ◆ Minimum Operator Interface
- ◆ Optional Automatic Solid State Controlled Cathodic Protection

Operation

The evaporator is essentially a vaporizing chamber surrounded by a water jacket. The water is heated by an electric immersion heater, thermostatically controlled to maintain a constant temperature. Liquid chlorine, sulfur dioxide or ammonia enters the vaporizing chamber through the inlet tube and is piped to the bottom of the vaporizing chamber. After it emerges from the pipe, the liquid absorbs heat from the hot water and vaporizes. The vapor rises to pass out of the evaporator through the gas outlet. Prior to discharge from the evaporator, the vapor is superheated by being forced against the hot chamber wall by the superheat baffle. The demand of the using system for vapor automatically regulate the level of liquid inside the vaporizing chamber. As vapor pressure inside the chamber increases, the rate at which the liquid enters the vaporizing chamber decreases. If the demand for vapor increases, the pressure inside the chamber decreases, permitting liquid to enter the chamber at a higher rate.

An equilibrium condition is soon achieved where the rate at which the liquid is being converted to gas, exactly equals the rate at which liquid enters the vaporizing chamber.

A low water level switch is wired to shut-off the heater should the water level drop to a preset level in the water jacket.

An automatic pressure reducing and shut-off valve, controlled by the water low temperature, is installed in the gas line to the dispensing system. This valve will automatically close when the water chamber temperature falls below a preset limit, preventing liquid from entering and flooding the gas dispensing system.

A pressure relief valve, installed in the gas discharge line, operates when the pressure within the gas chamber exceeds safe limits.

An optional diaphragm protected pressure switch or a vent flow switch will give a contact closure when the system pressure exceeds the design pressure of the rupture disc.

Gas Pressure Relief Valve

The Model BM-4060 (chlorine) BM-4060-1 (sulfur dioxide)* gas pressure relieve valve is a safety device installed in an evaporator line to relieve excessive gas pressure. A pressure relief valve of this type is required for an evaporator installation to meet ASME code, Section VIII for Unfired Pressure Vessels and be in accordance with recommendation of the Chlorine Institute.

*For ammonia, consult factory.

Operation

The pressure relief valve is factory set to open at 250 psig (1724 kPa). Therefore, as long as the gas pressure within the evaporator remains at a safe level, the valve will remain closed. However, if the gas pressure should rise above this level, the valve will open and gas will be vented to the atmosphere until the pressure falls below the factory setting.

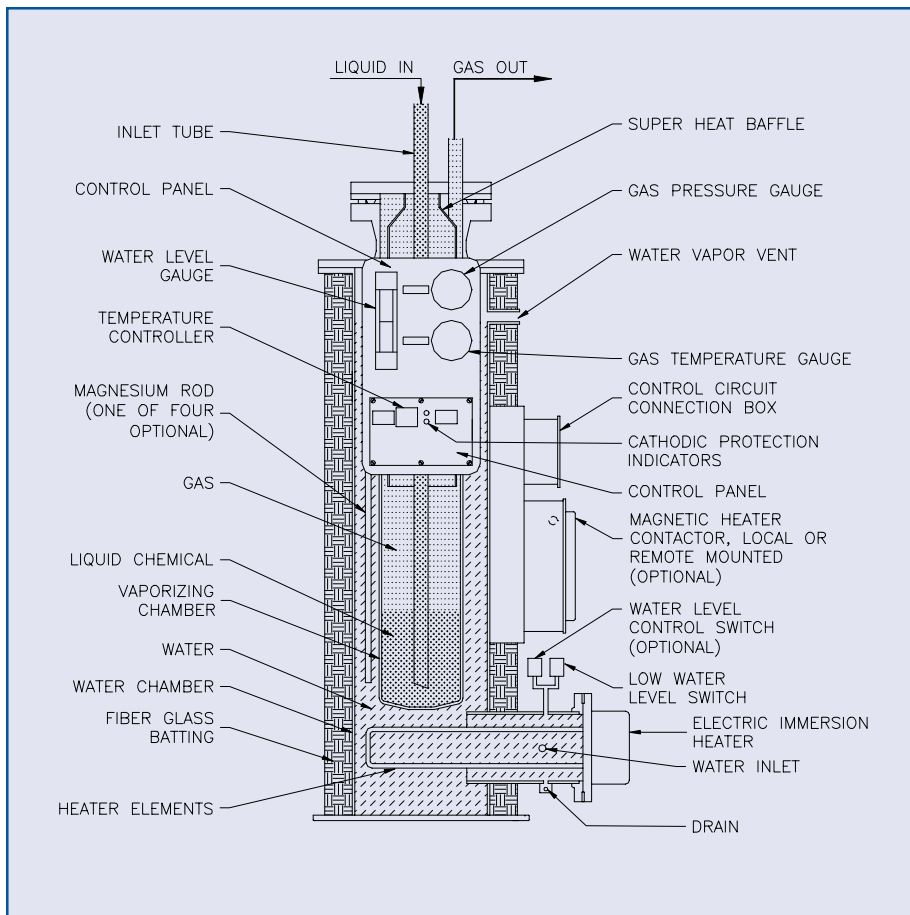


Figure 1 - Sectional Diagram

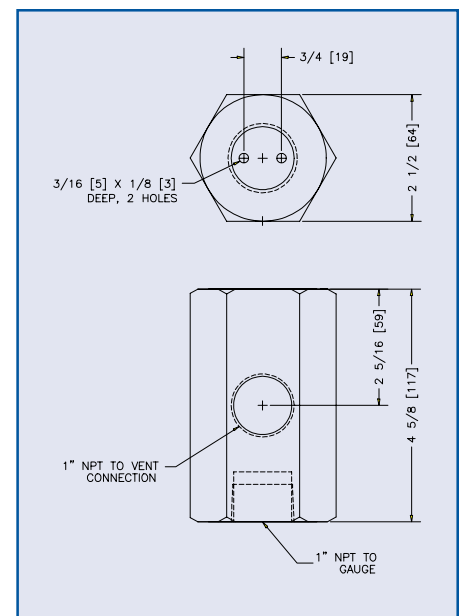


Figure 2 - Gas Pressure Relief Valve

Technical Data

Series 71V2000A

GENERAL

Evaporator:

Model	Capacity and Service						Heater Element Size
	Chlorine		Sulfur Dioxide		Ammonia		
	lb/day	kg/h	lb/day	kg/h	lb/day	kg/h	
71V2106B	6000	120	4500	85	1250	25	12 kW
71V2108B	8000	160	6000	115	1680	35	15 kW
71V2110B	10000	200	7500	140	2100	40	18 kW

Standard Unit Features:

- Electrical immersion heater
- Fiberglass cabinet
- Fiberglass insulation
- Galvanized water chamber
- Gas pressure gauge (psi and kPa)
- Gas temperature gauge (°F and °C)
- Super-heat baffle
- "L" certified vaporizing chamber
- Water level sight gauge
- Water low level switch
- Water temperature controller
- Water low temperature contact

Power Requirements: 220/440 or 240/480 Vac, 1 phase (12 kW only) or 3 phase standard for the heater elements. 120 Vac required for the control circuits. Other voltages optionally available.

Pressure Ratings:

- Hydrostatic Test Pressure:** 715 psig (5.7 mPa)
- Design Pressure:** 550 psi at 212°F (3.8 mPa at 100°C)

Required Accessories:

- Pressure reducing valve
- Pressure relief device
- Magnetic contactor

Optional Accessories:

- Solid state cathodic protection controller
- Water high temperature switch
- Water level control switch
- Water temperature gauge (°F and °C)
- Liquid expansion tanks

Shipping Weight and Cubage: 900 lbs (408 kg), 86 ft³ (2.4 m³)

Pressure Relief Valve:

Materials Handled: Chlorine and sulfur dioxide gas or any gas or mixture compatible with the materials of construction listed below

Materials of Construction:

- Seat:** aluminum silicon bronze: silver plated
- Body:** Low carbon steel
- Spring Bolt:** Glass-filled Teflon
- Valve Plug:** Kynar and silver
- Spring:** Silver plated carbon steel
- O-Ring:** Viton

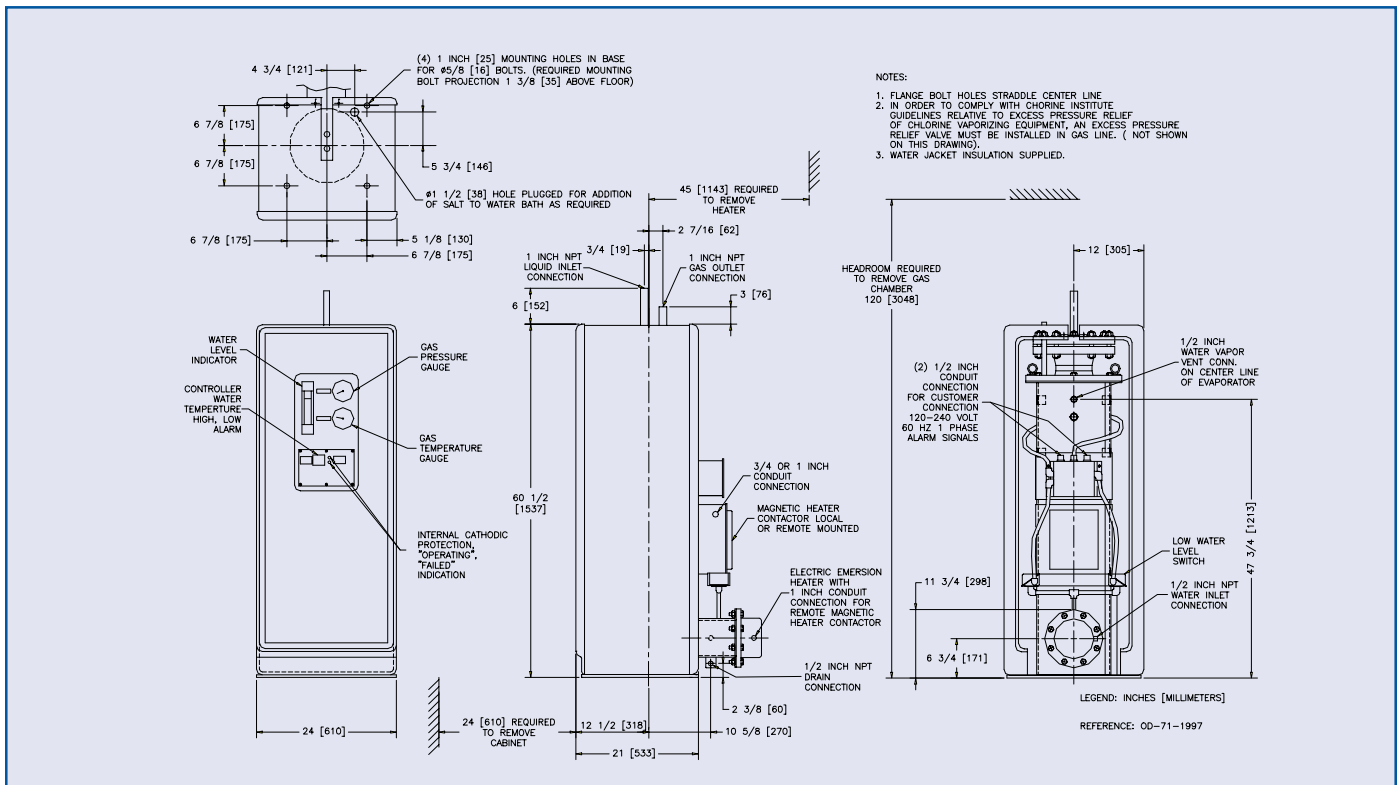


Figure 3 - Evaporator Outline and Mounting Dimensions

Brief Specification

The electrically heated evaporator shall have a maximum vaporizing capacity of ____ (lb/day) (kg/h) of ____, and be provided with a ____ kilowatt heater for ____ volt ____ phase electric service.

The vaporizing chamber shall be constructed of schedule 80 welded steel pipe and forged fittings and shall be designed, constructed and tested to conform to the ASME Code, Section VIII, Unfired Pressure Vessels. The chamber shall be provided with an "L" stamp to meet unfired pressure vessel requirements; with additional stamps for: "W-L" welding meets lethal gas requirements; "S-L" fabricated using seamless pipe; whole vessel has been postweld heat treated and "RT-1" complete chamber satisfies the full radiography requirements "HT" of all welded joints for lethal substances. The chamber shall be hydrostatically tested at 825 psig (5.7 mPa), and the evaporator shall be provided with the front panel mounted electronic temperature controller, water level gauge, gas pressure and temperature gauges. Low gas temperature shall cause the closing of the gas pressure reducing and shut-off valve in the event of low water temperature. Low water level shall shut off the heater power. Temperature control shall be electronic with a user-friendly operator interface display. All control circuitry shall be 120 V. The evaporator shall be housed in a corrosion-resistant fiberglass-reinforced polyester cabinet, removable from the front to allow multiple evaporators to be mounted 1 inch apart to minimize floor space requirements. The unit shall be supplied with 2 inch thick fiberglass insulation for the water chamber in order to conserve energy. The evaporator shall be Capital Controls Company Model 71V2000A.

The gas pressure relief valve shall be a normally closed valve which shall open on increasing pressure at 250 psig. Upon decreasing pressure, the valve shall close. It shall be constructed of materials suitable for use with (____) gas and be provided with 1" NPT internal threaded connections. This valve shall be supplied with a safety head/rupture disc and a (diaphragm protected pressure switch) (vent flow switch). The valve shall be Capital Controls Company Model BM-4060 (chlorine)/BM-4060-1 (sulfur dioxide).

Design improvements may be made without notice.

Represented by:



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