



## E-2000 EVAPORATOR

### WALLACE & TIERNAN® GAS FEED SYSTEMS

The E-2000 evaporator is a water-immersed tank heat exchanger specifically designed for the conversion of liquid chlorine to a gaseous state. The latent heat of evaporation limits gas withdrawal from containers. An evaporator is necessary wherever the rate of gas withdrawal from multiple containers is not fast enough to keep with requirements. This evaporator can also be adapted for handling other gases such as sulphur dioxide.

#### General

Where large quantities of gas are required, the evaporator will permit a substantial reduction in the number of containers employed and, therefore, save valuable space. In the case of chlorine, the use of an evaporator is recommended when the rate of unaided gas withdrawal is above 40 kg/h, or when the liquid supply is derived from a bulk storage system.

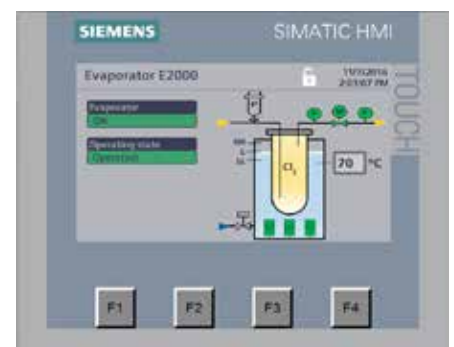
Immersion-type electric heaters supply the heat for the hot water bath. An optional arrangement is available for steam heating from an external source. The vapourising chamber consists of a steel cylinder designed for a test pressure of 60 bar which is guaranteed by a TÜV certificate of the German Testing Authority for Pressure Vessels. Both gas chamber and water-bath tank are cathodically protected by three magnesium anodes against corrosion from the hot water.

The water tank is heavily galvanised inside and out. It is enclosed by an insulating jacket to prevent loss of heat. The whole apparatus is housed in a corrosion-proof fibreglass reinforced polyester cabinet for floor mounting. The two-piece cabinet can easily be removed allowing free access to all components of the evaporator and thus providing high serviceability.

A separate wall mounting control panel houses the fully automatic evaporator and alarm circuitry. All vital operating and alarm signals are indicated by pilot lights on this panel. In the case of major chlorination systems, the evaporator control is included in a central control panel.

#### Benefits:

- Handles chlorine and sulphur dioxide
- Water temperature automatically controlled
- Electrical interlock of all safety arrangements
- Automatic pressure reducing and shut-off valve protects gas feeder from liquid entry
- Intuitive, user-friendly touchpanel with animated process graphics
- Extensive communication capabilities
- Three configurable alarm contacts available



## THEORY OF OPERATION

Liquid gas enters at the top of the vapourising cylinder, but a dip tube extends from the liquid inlet almost to the bottom. The gas outlet at the top has a short drop pipe. This arrangement allows liquid chlorine to enter near the bottom and gas to be withdrawn from the top. Thus the gas chamber pressure is limited to that which exists in the source container. Heat transfer from the water bath heats the liquid and superheats the gas. In addition, the valve at the gas outlet reduces pressure to increase superheat and to prevent reliquefaction beyond the valve.

The liquid level in the vapourising cylinder adjusts to the gas withdrawal rate. When this rate is constant, the 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. The gas pressure builds up until it equals the supply pressure and the liquid level reaches equilibrium. A reduction in the gas withdrawal rate has the opposite effect.

The water bath temperature is maintained constant regardless of the rate of evaporation. A Pt 1000 sensor is provided for measuring and keeping the bath water temperature at 71 °C. An additional high temperature alarm switches signal any malfunction of the temperature control system. From the evaporator, the gas flows to an electrically or pneumatically operated pressure reducing and shut-off valve which is adjusted to provide the desired operating gas pressure for the gas control unit.

### Automatic safety features

- Liquid level in the vapourising cylinder is selfadjusting, in accordance with the need for more or less heat transfer surface
- The liquid-inlet line is protected by a rupture disc arrangement designed for a pressure of 14.5 bar or optionally for 22 bar (hot climate). Combined with an expansion cylinder and a contact pressure gauge this unit protects the liquid gas supply line
- An automatic pressure reducing and shut-off valve combined with a minimum contact pressure gauge and interlocked with a low water temperature

alarm switch prevents reliquefaction downstream of this valve

- A maximum contact pressure gauge in the evaporator outlet protects the vapourising cylinder in the case of an operators error (manual inlet and outlet valves closed, heaters on)

## TECHNICAL DATA

**Standard capacities:** 200 kg Cl<sub>2</sub>/h; 100 kg SO<sub>2</sub>/h

**Power consumption:** approx. 18 kW

**Power supply:** 3/N/PE AC 400/230 V, 50 Hz

Other voltages: consult

**Water connections:**

3/4 " for make-up water (city water quality)

1 " for overflow and drain

1 " vent to the atmosphere

**Gas inlet and outlet connection:**

1 " threaded flange PN 40, DN 25

**Dimensions (B x H x T):** 730 x 1600 x 402 mm

**Space required for installation:**

Room height min. 2800 mm plus additional space

for lifting device 800 x 1700 mm (B x T)

**Foundation required:** 800 x 800 x 100 mm

**Weight:** Unit installed: 650 kg, shipping weight: 500 kg

### Installation and maintenance

In accordance with local regulations relating to chlorination systems, every new installation must be checked and tested by an approved expert prior to its start-up. This applies also to regular inspections. We recommend to have these services carried out by our specially trained technicians.

## CONTROL

SIMATIC® S7-1200 CPU 1214C, SIMATIC HMI KTP400 Basic Panel with 4" TFT, wide-screen display, 65536 colors, LED backlight with automatic dimming

**Connections (optional):**

PROFIBUS® DP Slave, PROFINET® IO, MODBUS® TCP



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