



# *Chemical Injection Technologies*

## Installation/Service Bulletin

### **SUPERIOR Series CLP Pressure Feed Type Gas Chlorinators**

#### **IMPORTANT!! READ THESE PRECAUTIONS BEFORE PROCEEDING!!!**

**They are very important for your personal safety, and for proper chlorinator operation.**

1. Read these precautions and all related instructions thoroughly and follow them carefully. If you do not understand any of the information, call your local SUPERIOR supplier or Chemical Injection Technologies, Inc. Do not attempt to install or operate any gas chlorination/sulfonation equipment unless you are properly trained.
2. Read the "CHLORINATOR CYLINDER CHANGING PROCEDURE" card supplied with your chlorinator, and be certain you fully understand the information presented on the card. If you do not have the card, contact your local SUPERIOR supplier or Chemical Injection Technologies, Inc. and we will supply one.
3. Make certain all required safety equipment is in place and operational.
4. When performing any maintenance or changing cylinders, Chemical Injection Technologies, Inc. strongly recommends that a gas mask (a pressure-demand type air pack is strongly recommended) should be available in the immediate area of the chlorination equipment and all operating personnel should be properly trained in its use.
5. Chlorine gas or the fumes from chlorine solutions can be lethal in large enough doses. Therefore, you should always have a co-worker observe from a safe location when you are working on any type of chlorination equipment.
6. Avoid breathing the gas or fumes of chlorine solutions and avoid contact with your skin. Work only in a well-ventilated area. Chlorine will bleach clothing.
7. Before working on the chlorination system, make certain that the cylinder valve is shut off. If it seems to be shut off already, open it one quarter turn and immediately close it to make certain that the valve is not frozen in the open position. If the valve stem does not turn easily, you may use the heel of your hand to tap the cylinder wrench. Never use a hammer or other tool to force the valve stem. If you cannot turn the cylinder valve in either direction, always assume it is open. **BE POSITIVE THIS VALVE IS CLOSED BEFORE LOOSENING THE CHLORINATOR MOUNTING YOKE OR VALVE CAP.** If you are not sure, call your chlorine supplier.
8. Do not use wrenches larger than the standard cylinder wrench and do not hit the wrench with a heavy object to open or close the valve.
9. Do not re-use lead gaskets. **THIS IS VERY IMPORTANT!** Do not re-use a lead gasket because used gaskets will not properly seal the chlorinator/cylinder connection and will cause leaks.
10. Use only lead gaskets. Other types may contract with temperature variations resulting in the escape of gas.
11. Check for chlorine gas leaks every time the chlorinator is connected or remounted onto the cylinder. Using a plastic squeeze bottle of strong ammonia, approximately 1/3 full, squeeze fumes under the lead gasket connection and around the cylinder valve bonnet and valve stem. A piece of rag or paper towel wetted with ammonia may also be held under the connection. *Do not pour ammonia onto the valve or connection.* A chlorine or Sulfur Dioxide leak will create "smoke-like" fumes similar to cigarette smoke. Correct the leak before proceeding.
12. Open the cylinder valve 1/4 to 1/2 **turn only**, and leave the wrench on the cylinder valve when it is open.
13. The rate valve is not a shut-off valve. To shut-off chlorine, use the chlorine cylinder valve.
14. Always use safety chains or clamps to secure the chlorine cylinders so they may not be accidentally tipped over. Protective hoods and valve caps must be in place whenever cylinders are not in use.

NOTE: These instructions are also applicable to SUPERIOR Gas Sulfonators. Just substitute "Sulfonator" wherever the word "chlorinator" appears and substitute "sulfur dioxide" wherever "chlorine" appears. Parts for the two types of units, except for the front and back bodies, the diaphragm front and back plates, and the remote meter panel bodies are interchangeable.

<sup>†</sup>To prevent reliquification or condensing of Sulfur Dioxide (SO<sub>2</sub>) gas in locations where the temperature may fall below 50°F (10°C), Sulfonator installations should be inside a heated enclosure. DO NOT apply heat directly to chlorine or sulfur dioxide cylinders as this will cause a rapid increase in the gas pressure which could rupture the cylinder.

**CAUTION!!! THIS EQUIPMENT IS NOT DESIGNED FOR USE IN PRESSURIZED WATER SYSTEMS OPERATING OVER 10 PSIG ( 0.7 BARS). DO NOT ATTEMPT TO ADJUST THE REGULATED PRESSURE BY REMOVING THE FRONT CAP AND TURNING THE PRESSURE SET SCREW.**

## INSTALLATION (See drawing on Page 4)

- 1. Handling of Chlorine Cylinders.** Chlorine gas is potentially dangerous. The following rules must always be adhered to: (A.) Never move a cylinder unless the valve protection cap is screwed on tightly. (B.) Locate the cylinders where they will not be bumped or damaged. (C.) A safety chain should be placed around the cylinders and secured to a wall or support. (D.) When the pressure regulator is mounted directly on the chlorine cylinder valve, the cylinder and chlorinator need not be in a heated room. For outdoor installation, when temperatures exceed 100° F., the cylinder should be shaded from direct sunlight. (E.) Do not open the cylinder valve more than ¼ to ½ turn.

Note: The term "Chlorinator", as used in this publication, refers to the Pressure Regulator, the Remote Meter Tube/Rate Valve Panel, Manual Pressure Relief Valve, and the Diffuser Assembly, as a complete system.

- 2. Mounting Pressure Regulator.** Follow these steps to mount pressure regulator on the chlorine cylinder valve..
  - A. Unscrew the valve protection cap from the chlorine cylinder.
  - B. Check to make sure the cylinder valve is closed. Carefully unscrew the cap nut which covers the chlorine cylinder valve outlet.
  - C. Remove any dirt that may be in the valve outlet or on the outlet gasket surface.
  - D. Remove all shipping tape & inlet protective cap from the pressure regulator. (DO NOT remove the porous, white filter which is inserted in the pressure regulator inlet).
  - E. Unscrew the yoke screw until the sliding valve plate can be pushed all the way back.
  - F. Place 1/16" thick lead gasket over the chlorine inlet of the pressure regulator. *Never* use other types of gaskets or gasket materials. **Never re-use the lead gasket.** Replace the lead gasket each time the chlorine cylinder is changed.
  - G. Mount pressure regulator on cylinder valve by placing the yoke over the valve, engage the pressure regulator inlet properly with the valve outlet, and tighten the yoke screw, compressing the lead gasket. Excessive tightening will squeeze the lead gasket out of the joint and should be avoided. Do not open the chlorine cylinder valve until all components are installed.
  - F. Use of a chlorine cylinder weighing scale is highly recommended, since this is the only way to know when the chlorine supply is becoming depleted.
- 3. Installation of Remote Meter Module**
  - A. Install remote meter panel right side up in a location that is convenient for the operator and/or affords greatest security. Connect plastic tubing from the pressure regulator to the remote meter panel and from the remote meter panel to the diffuser assembly as shown in Drawing No. 1.
- 4. Installation of Manual Pressure Relief Valve.**
  - A. The manual pressure relief valve must be installed in the plastic tubing line between the pressure regulator and the remote meter panel. Be certain that the valve is in the CLOSED position (handle is perpendicular to the valve body) before proceeding, and at any time when the chlorine cylinder valve is opened.
- 5. Connecting Pressure Regulator to Manual Pressure Relief Valve, Remote Meter, Diffuser, and to Vent.**
  - A. Appropriate size plastic tubing is normally used for the low pressure line between the pressure regulator and manual pressure relief valve; pressure relief valve and remote meter; the remote meter and diffuser; and for the emergency vent as well as the manual pressure relief outlet. Use enough length for each line to allow for movement of the pressure regulator from one cylinder to another.
  - B. Remove connector nut from connector and slip onto tube. Push tube onto connector and tighten connector nut **HAND TIGHT.**
  - C. Upper connector on chlorinator pressure regulator is for connecting the plastic tubing to the bottom connector of the remote meter after passing through the manual pressure relief valve. The upper connector on the remote meter is for connecting the plastic tubing to the diffuser. The lower connector on the chlorinator pressure regulator is for vent line exhausting to safe location outside building. An insect screen is provided for the outside of the vent line, and **MUST** be installed to prevent insects from entering the pressure regulator and causing service problems.
  - D. The outlet connector on the manual pressure relief valve is also for vent line exhausting to a safe location outside the building. An insect screen should also be installed on this line to prevent insects from entering the tubing and blocking the vent path.
- 6. Installation of porous ceramic diffuser/check valve assembly.**
  - A. The diffuser consists of a back-check valve to prevent water from backing up into the metering or regulating assemblies, as well as a porous ceramic diffuser designed to create very fine chlorine gas bubbles which greatly enhance absorption of the chlorine gas in water.
  - B. **IMPORTANT:** Do not use the porous ceramic diffuser in an indoor location!
  - C. The diffuser assembly must be submerged at least 4 ft. (1.2 meters) below the surface in order to allow sufficient absorption of chlorine gas. Some chlorine gas may escape at the surface. Chlorine solubility in water is greatest at 40 degrees F and decreases as temperature is increased. Water flow and mixing also play an important role in allowing the chlorine gas to be dissolved in the water.
  - D. Pipe brackets (supports) made of suitable corrosion resistant materials (PVC, ABS) may be used to anchor the diffuser assembly to the bottom of a tank or flow channel, or may be used to attach the diffuser assembly to a weight if necessary.

## START-UP

1. **IMPORTANT:** be certain that the manual pressure relief valve is in the CLOSED position and that all plastic tubing connections are tightened before proceeding.
2. Open chlorine cylinder valve 1/4 turn and *close immediately*.
3. Wet small piece of cloth in household ammonia (avoid breathing fumes) and hold below the lead gasket inlet connection and below the cylinder valve bonnet. If chlorine is leaking, a smoke will appear similar to cigarette smoke. Tighten bonnet or replace gasket and eliminate leaks. (**NOTE:** Do not pour ammonia solution on the pressure regulator or cylinder valve).
4. Open chlorine cylinder valve 1/4 turn, leave open, and recheck for chlorine leaks.
5. Set chlorine gas flow rate at the remote meter panel.
6. Check the diffuser assembly to be certain it is submerged and that there is no excessive "breakout" of chlorine gas at the surface.

## CHANGING CYLINDERS - IMPORTANT!! READ CAREFULLY AND FOLLOW STEPS IN ORDER.

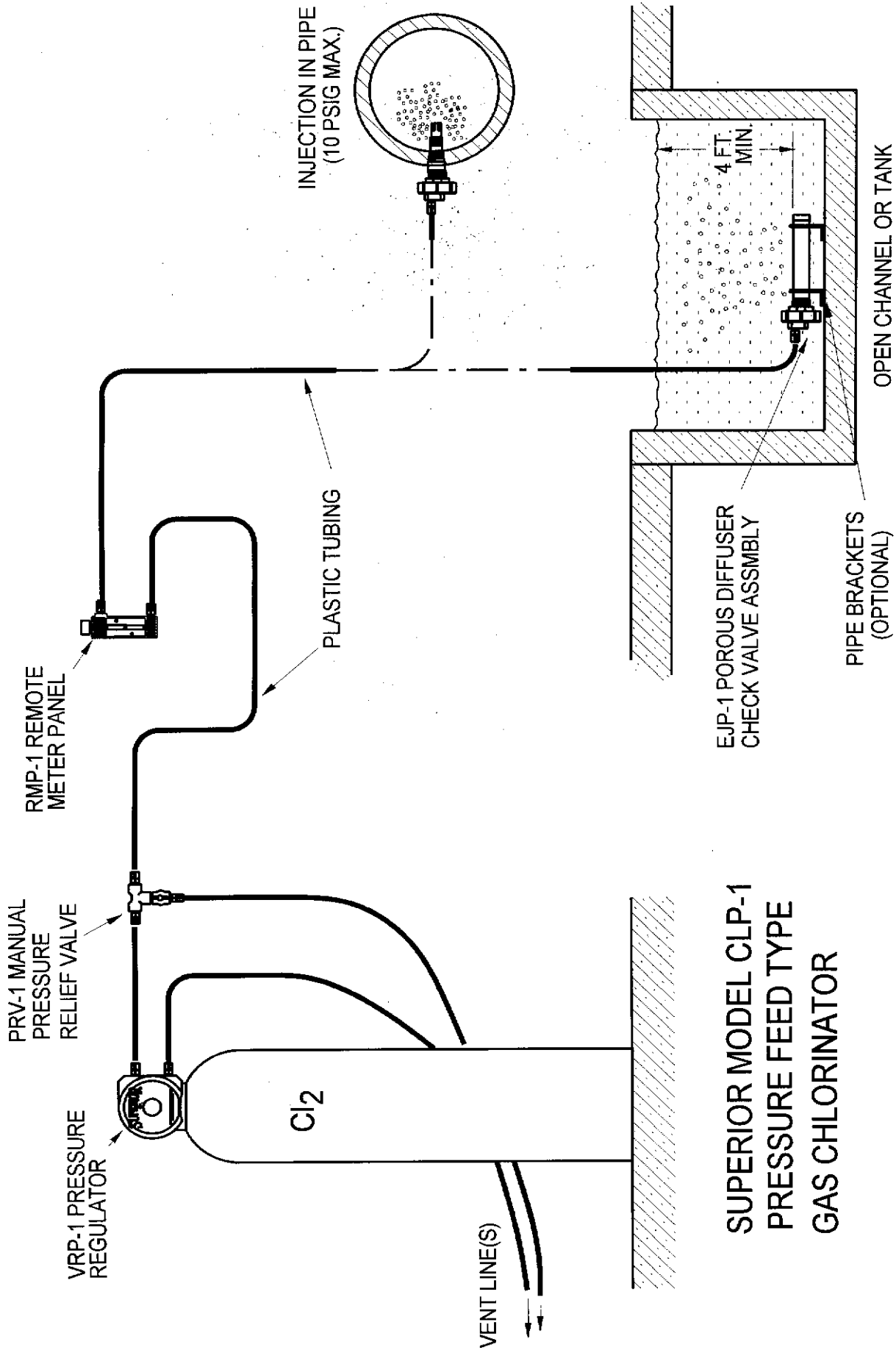
1. Unlike vacuum operated gas chlorinators, pressure feed type gas chlorinators will always leave some PRESSURIZED chlorine gas in the system, even when the chlorine supply is depleted. Care must be taken when changing cylinders to exhaust or vent this pressurized gas to a safe area BEFORE REMOVING THE REGULATOR from the cylinder.
2. First, close the chlorine cylinder valve. Make certain that the cylinder valve is closed before removing the regulator.
3. After the chlorine cylinder valve is closed, open the manual pressure relief valve to allow any chlorine gas pressure to dissipate.
4. Remove the regulator from the cylinder valve.
5. Remove the lead washer from the inlet area and replace it with a NEW lead washer. Do not re-use lead washers since this will cause chlorine gas leakage. Also, do not use fiber type washers. If your chlorine gas supplier does not supply lead washers with new cylinders, you may obtain them from your SUPERIOR distributor.
6. Follow "INSTALLATION" instructions for mounting of pressure regulator.
7. **IMPORTANT:** make certain that the manual pressure relief valve is CLOSED before you open the chlorine cylinder valve.
8. Follow "START-UP" procedure, above.

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**SUPERIOR MODEL CLP-1  
PRESSURE FEED TYPE  
GAS CHLORINATOR**

## TYPICAL INSTALLATION