REGAL GAS CHLORINATOR

APPLICATION / INSTALLATION DATA SHEET

REGAL GAS CHLORINATOR OPERATION USING RECIRCULATED WASTEWATER

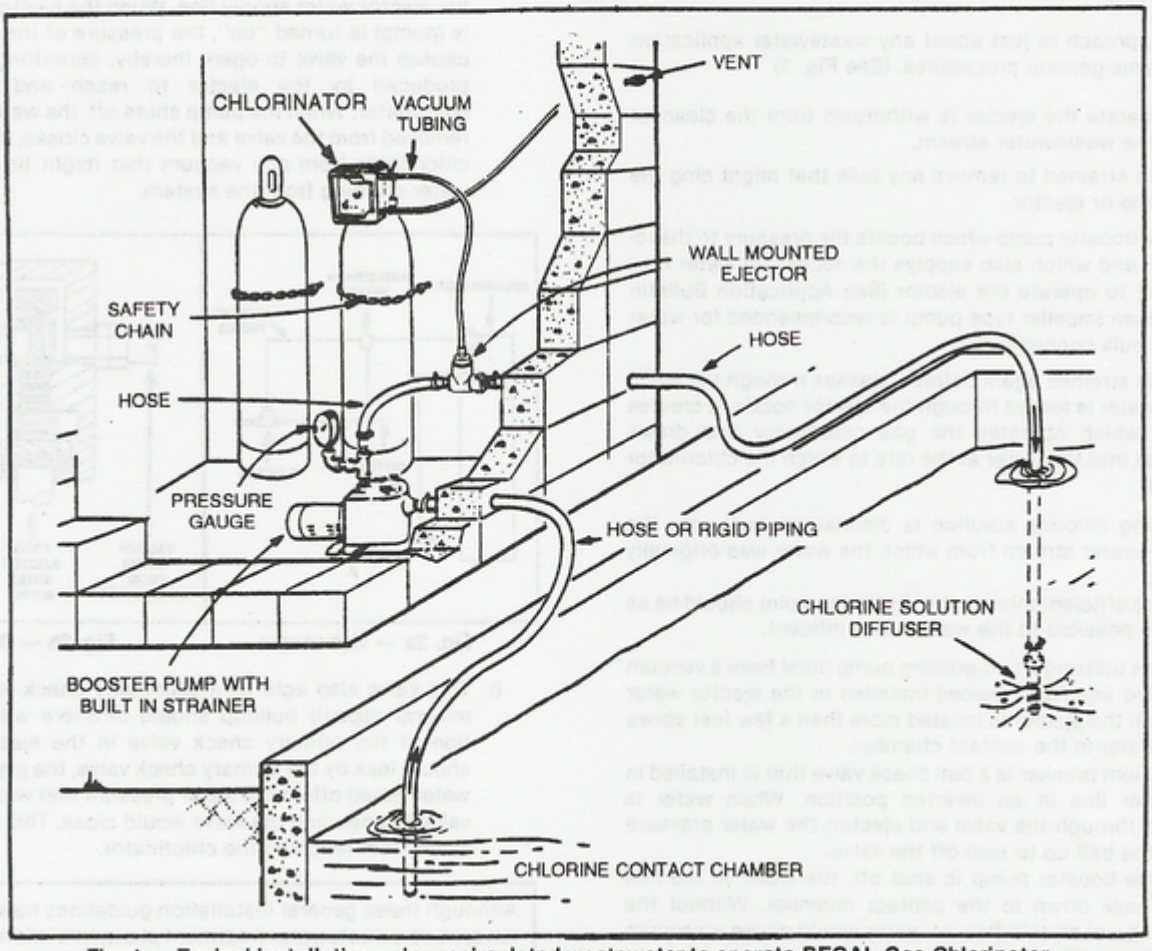

Fig. 1 — Typical installation using recirculated wastewater to operate REGAL Gas Chlorinator.

OF SPECIAL INTEREST FOR:

- Wastewater Treatment Plants
- Food Processing Plants
- Plating Operations
- Chemical Processing Plants
- Cooling Towers
- Similar Operations

Concern for our water supply as a valuable natural resource coupled with the rising cost of potable water are both strong reasons to conserve fresh water usage. Any reasonable steps that can be taken to curtail the wasteful use of fresh water should be taken.

Because wastewater must be properly treated before it can be safely discharged, one area in which fresh water conservation can be practiced is in the use of contaminated water to operate a gas chlorinator. Since gas chlorinators require water to operate a vacuum-producing ejector, it is often possible to recirculate a portion of contaminated water through the ejector, rather than using a fresh water source.

IMPORTANT ADVANTAGES OF USING CONTAMINATED WATER FOR EJECTOR OPERATION

1. Fresh water conservation.
2. Cost-savings by the elimination of fresh water usage.
3. Possibility of cross-connection between fresh water supply and contaminated water is avoided. Also eliminates piping that would otherwise be required to install a regulation-required air break between contaminated water and fresh water supply.
4. Mixing of chlorine into solution is improved.

Chlorination is one of the most important treatments that wastewater receives to put it into condition for discharge. Because gas chlorination is the least labor-intensive and most cost-effective method of chlorination, it is also the most widely-used.

The vacuum-producing ejector of a gas chlorinator can use less-than-pure water to create the vacuum necessary to feed the chlorine gas. Therefore, this application represents an ideal opportunity to use contaminated water, thereby conserving fresh

water and reducing costs. As long as the wastewater does not contain material large enough to clog a booster pump or an ejector nozzle orifice, or if such material can be strained out, the wastewater can be used instead of fresh water to supply the ejector's water and pressure requirements. The problem of plugging the ejector can be further minimized by using a vacuum-producing nozzle with a large orifice to permit easier passage of waste material.

INSTALLATION

The basic approach to just about any wastewater application involves the same general procedures. (See Fig. 1)

1. Water to operate the ejector is withdrawn from the cleanest portion of the wastewater stream.
2. The water is strained to remove any bulk that might clog the booster pump or ejector.
3. It is fed to a booster pump which boosts the pressure to the required level and which also supplys the necessary water flow (gpm, l./sec.) to operate the ejector (See Application Bulletin 1002). An open impeller type pump is recommended for water with heavy bulk concentration.
4. The water is strained again before it passes through the ejector. As the water is forced through the ejector nozzle, it creates a vacuum which operates the gas chlorinator and draws chlorine gas into the water at the rate to which the chlorinator is adjusted.
5. The resulting chlorine solution is discharged back into the main wastewater stream from which the water was originally withdrawn.
   a. To insure efficient mixing, the discharge point should be as close as possible to the wastewater influent.
6. Installations utilizing a self-priming pump must have a vacuum breaker (also see No. 7 below) installed in the ejector water supply line if the ejector is located more than a few feet above the wastewater in the contact chamber.
   a. The vacuum breaker is a ball check valve that is installed in the water line in an inverted position. When water is pumped through the valve and ejector, the water pressure forces the ball up to seal off the valve.
   b. When the booster pump is shut off, the water in the line drains back down to the contact chamber. Without the vacuum breaker, this flow of water would cause a vacuum in the ejector. This would draw chlorine gas into the line. As the remaining water drains out, the line can fill up with raw chlorine gas which would be discharged in a burst when the booster pump was next turned on. In addition, some of the chlorine gas in the line might enter the booster pump while it is shut off possibly resulting in damage to the pump. The vacuum breaker prevents both of these from happening. With the vacuum breaker installed, the ball will fall when the pump is shut off allowing air, rather than chlorine, to enter the line to satisfy the vacuum.
7. a. Another solution to the situation outlined above is to install an anti-siphon/secondary check valve in the vacuum line connecting the ejector and the chlorinator. This special, spring-opposed, normally-closed valve is also connected to the ejector water supply line. When the ejector water supply (pump) is turned "on", the pressure of the supply water causes the valve to open, thereby, permitting the vacuum produced by the ejector to reach and operate the chlorinator. When the pump shuts off, the water pressure is removed from the valve and the valve closes, separating the chlorinator from any vacuum that might be produced by water draining from the system.

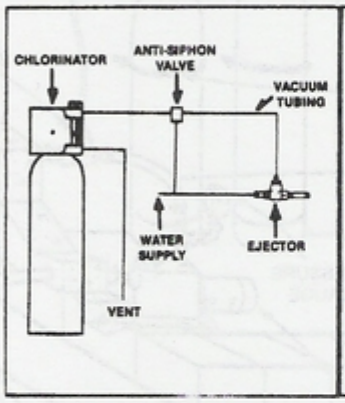

Fig. 2a — Schematic

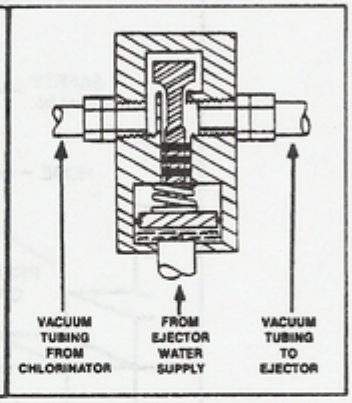

Fig. 2b — Detail

   b. This valve also acts as a secondary check valve if dirt or mineral deposit buildup should interfere with the operation of the primary check valve in the ejector. If water should leak by the primary check valve, the pressure of this water would offset the water pressure that was causing the valve to open and the valve would close. This prevents any water from reaching the chlorinator.

Although these general installation guidelines have been written around a wastewater treatment plant, this information may be applicable for industrial and commercial use, also. Individual installations should be modified to meet appropriate regulations and the requirements of the specific application.

Distributed by:

chlorinators incorporated
1044 S.E. Dixie Cutoff Road
Stuart, Florida 34994 U.S.A.
Phone: (772) 288-4854 FAX: (772) 287-3238