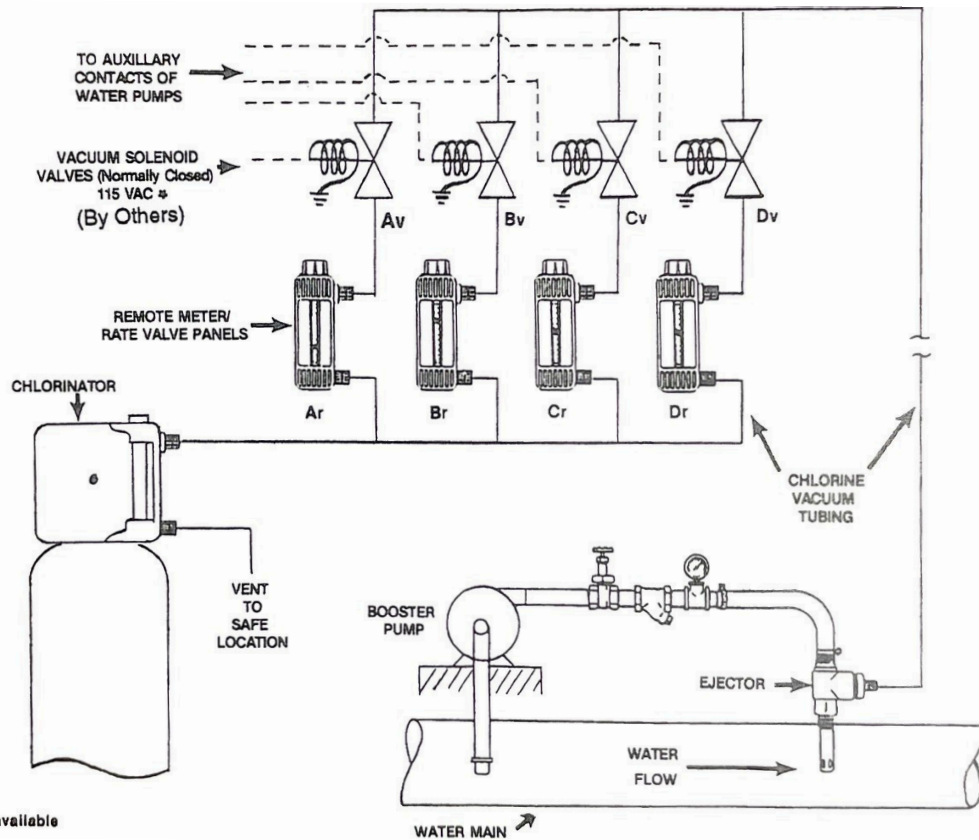




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APPLICATION / INSTALLATION DATA SHEET

MULTI-FEED CHLORINATION FOR A VARYING WATER FLOW USING A SINGLE REGAL EJECTOR



* Other voltage ratings available

Fig. 1 - Typical Installation of Step-Feed Chlorination System

This information is provided as a general guide only. For your personal safety, observe all codes, regulations, and precautions. Read all equipment instructions carefully and thoroughly. Installations must be made in accordance with applicable codes and regulations.

When the water flow variation is caused by turning on and off one or more of several pumps, with each having a fixed pumping capacity, and all connect to one water main, the simplest and most reliable approach is the step-feed method of chlorination. It does not involve expensive and complex flow-sensing devices, therefore initial cost and maintenance are minimized. Generally speaking, any system that involves multiple pumps or multiple sources of water with predetermined flows feeding into a single water line can be chlorinated effectively and accurately with step-feed chlorination.

A single, primary line that is supplied by multiple well pumps, which is controlled by water level switches, water pressure switches, or time clocks is the ideal candidate for step-feed chlorination. When one of these pumps is turned on, the exact amount of additional water added to the flow in the main line is known. The additional amount of chlorine that is required is also known.

Other than a booster pump, piping, and a REGAL gas chlorinator with the appropriate number of remote meter/rate valve assemblies, and one ejector, the only additional equipment that is needed is one gas vacuum-line solenoid valve for each remote meter/rate valve assembly.

SYSTEM OPERATION

For purposes of illustration, we will use a water system with four well pumps (Ap, Bp, Cp, Dp) that turn on and off as demand requires. Provision must be made for the booster pump to be turned on when any pump is on.

The chlorination system consists of:

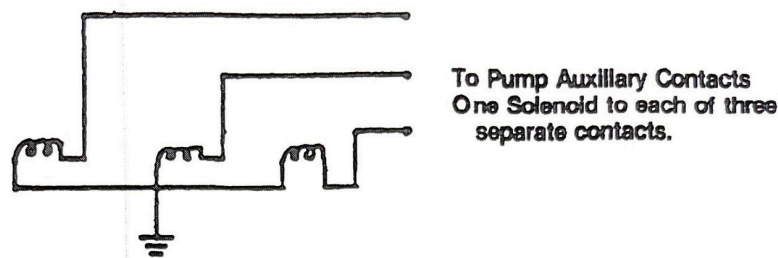
- A REGAL gas chlorinator (direct-cylinder-mounted, wall mounted, automatic cylinder-switchover, or mounted on ton container)
- A single ejector
- (4) remote meter/rate valve assemblies (Ar, Br, Cr, Dr)
- (4) gas vacuum line solenoid valves (Av, Bv, Cv, Dv) See Fig. 1

The illustration does not reflect all of the required piping or electrical connections. It is provided as a guide only. All appropriate local codes and regulations must be followed. All safety regulations must be observed.

The REGAL gas chlorinator is connected to each of the four remote assemblies (Ar, Br, Cr, Dr) with vacuum tubing. These, in turn, are connected to gas solenoid valves (Av, Bv, Cv, Dv) with vacuum tubing. The outlet of each solenoid valve is connected by vacuum tubing to the ejector assembly, which is installed in the water line.

The contacts of each solenoid are connected to the secondary contacts of its related well pump so that when a well pump turns on, the connected solenoid valve opens up and allows chlorine gas to flow through the remote meter/rate valve assembly to the ejector.

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IF in compliance with local electrical codes; solenoids can be wired with a common ground. If building (conduit) ground can not be used - then a wire will have to be run to electrical panel ground.
Solenoid Coils are non-polarized, when used with AC power source.

Fig. 2 - Solenoid Wiring Detail. (Solenoids with various voltage ratings are available)

For this example, we will assign the following flow rates to the pumps:

<u>PUMP</u>	<u>FLOW</u>
Ap	2000 gpm (126 l/sec)
Bp	1000 gpm (63 l/sec)
Cp	500 gpm (32 l/sec)
Dp	500 gpm (32 l/sec)

Based on a water analysis of a sample from each well, the following dosages will be used initially and adjusted if necessary, after the residual is measured.

<u>PUMP</u>	<u>DOSAGE</u>
Ap	3.0 ppm (mg/l)
Bp	Bp 3.5 ppm (mg/l)
Cp	Cp 2.5 ppm (mg/l)
Dp	Dp 1.5 ppm (mg/l)

From this information, the required individual chlorine feed rate can be determined, using the following:

$$\text{ppd} = 0.012 \times \text{gpm} \times \text{dosage (ppm)}$$

or

$$\text{g/hr} = 3.6 \times \text{l/sec} \times \text{dosage (mg/l)}$$

<u>PUMP</u>	<u>Required Chlorine Feed Rate</u>		<u>PUMP</u>	<u>Max. Feed-Rate Capacity of Remote Meter Assembly</u>	
	<u>ppd</u>	<u>g/hr</u>		<u>ppd</u>	<u>g/hr</u>
Ap	72	1361	Ar	100	2000
Bp	42	794	Br	50	900
Cp	15	288	Cr	25	500
Dp	9	173	Dr	25	500
	<u>138</u>	<u>2616</u>		<u>200</u>	<u>3900</u>

The total chlorine feed rate capacity of the remote meter assemblies determines the capacity for which the chlorinator must be sized. In this case, a 250 lbs/day (5000 g/hr) Regal gas chlorinator would be correct for the application. The related ejector assembly would be capable of providing sufficient vacuum to draw enough chlorine to satisfy the full system when all pumps are operating. The remote assemblies are adjusted to the chlorine feed rates indicated above. Once the system is in operation, the chlorine residual is measured after each pump turns on and, if necessary, each remote assembly is adjusted to bring the residual to the desired level.

The booster pump is sized to provide the pressure and water flow required by the ejector to generate the vacuum that would be necessary if the chlorinator was feeding its full rated capacity, in this case, 250 lbs/day (5000 g/hr.) (See Application Bulletin 1002.) The REGAL gas chlorinator can be direct cylinder mounted, wall mounted, or ton container mounted. Automatic switchover chlorinators for automatically switching the chlorine feed from an empty cylinder to a full cylinder are also available.