SUPERIOR

WATER SOLUTIONS

FOR POULTRY

Poultry Drinking Water & Poultry Processing Application Bulletin

Be part of the gold standard for safety, Low cost, and user friendly, easy maintenance. Clean use water equals better yield. Increased yield equals more profit.

Chemical Injection Technologies, Inc.

CHLORINE DISINFECTION OF POULTRY DRINKING WATER AND PROCESSING PLANT WATER

POULTRY DRINKING WATER DISINFECTION

WHY CHLORINATE?

Disinfection of process water is only a part of the overall goal to ensure the quality and health safety of poultry. The farmer starts at the beginning. Clean water has to start at the beginning. Poultry farms that grow up the birds must provide a top quality, healthy product to the processing plant. This is where chlorine plays a vital role. Properly disinfecting the poultry drinking water supply controls the diseases normally found in poultry houses. Vitally important to the growers and integrators, cleaned water means increased body weight and better egg production, and that means higher yield and higher profits.

Even when poultry houses use a bacteria free water source for the poultry drinkers, such as a municipal water system, diseases such as fowl cholera often pass from bird to bird via the drinking water. In addition, when drinkers are contaminated with feed and manure they provide an ideal growth media for E coli, a coliform bacteria that indicates the presence of fecal contamination. When an adequate level of chlorine is maintained in the drinkers the numbers of bacteria present are greatly reduced.

Chlorine in water exists in two basic forms; Free Chlorine and Combined Chlorine. Free Chlorine is the most effective form for destroying bacteria. It is found as Hypochlorous Acid (HOCl) and measured in Parts Per Million (PPM). Something else that must be considered is the fact that maintaining a Free Chlorine level can also be dependent on the acidity or alkalinity, measured as pH. More free chlorine (hypochlorous acid) will develop when the pH is low, and more combined chlorine will develop when the pH is higher. Ideally pH should be kept below 7.5 whenever possible. (Poultry actually prefer to drink more acidic water!) Most feed and poultry feces contain ammonia and this will tend to raise the pH so it should be checked to ensure that the alkalinity does not get too high. This will ensure that bacteria are effectively being killed and will minimize the amount of chlorine that needs to be added. Higher pH can also point to increased levels of magnesium and calcium in the water, which can reduce water flow. If pH tends to be high, then use of a pH reducer may be considered.

Application of the chlorine should be continuous since the drinkers are constantly being contaminated with feed, manure, mucus, and saliva from the birds, possibly also from any fertilized ground water influence. To assure that adequate disinfection is being done, a free chlorine residual level (chlorine measured after it is allowed to contact the contaminants in the water) should exist at the point in the drinker that is farthest from the application point of the chlorine. Regular, thorough flushing of the water lines between flocks and regular cleaning of the drinkers will minimize the amount of chlorine required and, at the same time, maximizes its effectiveness. NOTE: the chlorination system must provide for manually shutting off the application of chlorine to the drinkers whenever the birds are being medicated. A switch should be provided in the booster pump operation circuit to lockout the pump during medication (See Drawing 1).

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Higher Yield.

Higher Profit.

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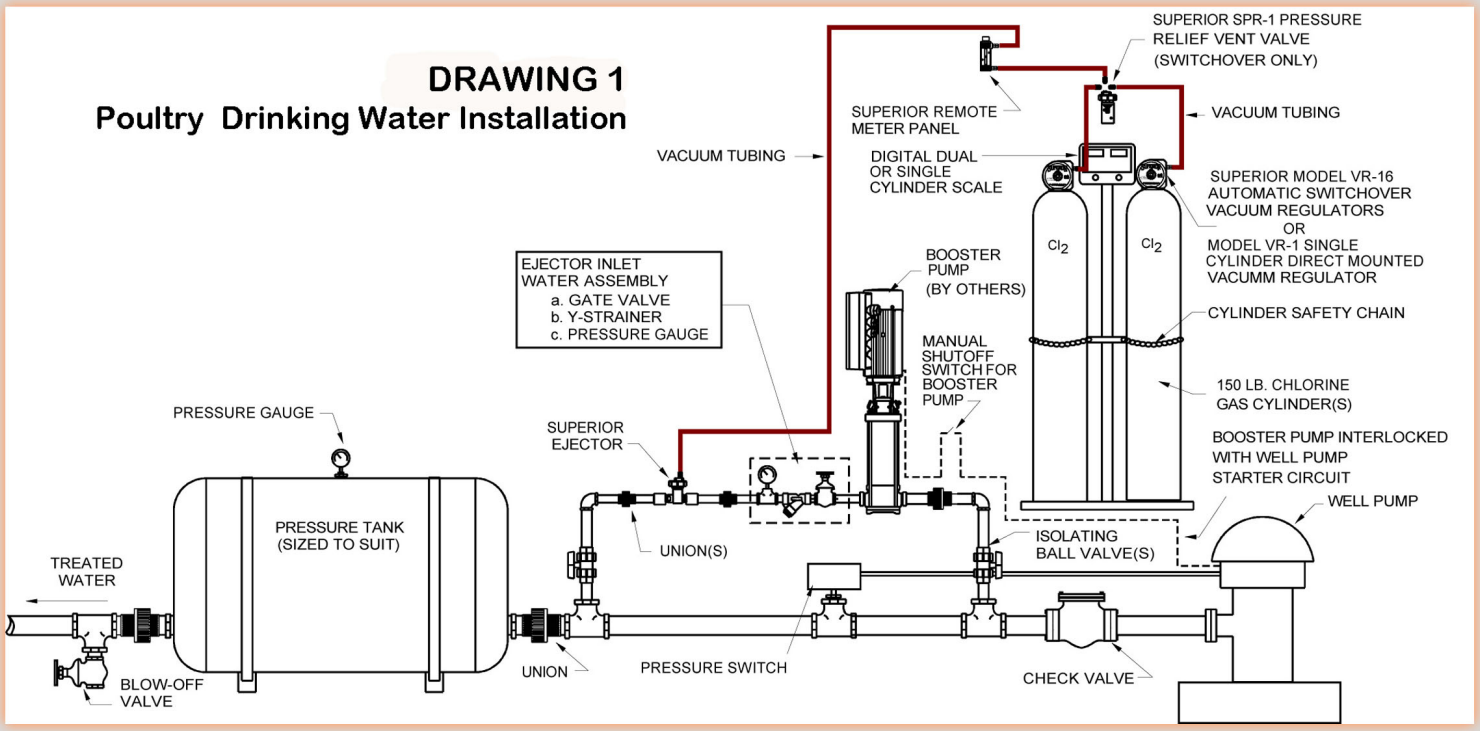
SUPERIOR WATER SOLUTIONS

SUPERIOR™ design for growers, farmers, processors, and integrators. You are priority.



TYPICAL GAS CHLORINATOR INSTALLATION FOR POULTRY DRINKING WATER (DRAWING 1)

Poultry farms have the option of using a direct cylinder mounted, single cylinder or a dual cylinder automatic switchover gas chlorinator. Both of these systems use a safe all-vacuum design which eliminates any pressurized chlorine gas lines and ensures that chlorine gas feed ceases in the event that a feed line is broken or disconnected. SUPERIOR Safety!

A heavy duty steel yoke type connection attaches a vacuum regulator directly to the chlorine cylinder valve. Chlorine entering the vacuum regulator is immediately reduced to a vacuum. In the event that this vacuum is interrupted by any physical breakage or shutting off the water supply to the vacuum producing ejector, a heavy spring opposed inlet valve will immediately close, preventing any chlorine gas from escaping.

Use of the optional SUPERIOR dual cylinder automatic switchover gas chlorination system, ensures uninterrupted, safe chlorination at all times when one of the cylinders becomes empty. Then, the chlorine feed automatically switches over to a standby full cylinder and chlorination continues without interruption, even when no one is in attendance. For very large farms where high volumes of drinking water are used, one ton chlorine containers can be fitted with SUPERIOR vacuum regulators directly mounted onto the gas valves with the SUPERIOR TCA-1 Ton Container Adaptor.

While individual installation may vary slightly from the system shown in DRAWING 1, the basic component arrangement will be similar. When installed as shown in DRAWING 1, the SUPERIOR Gas Chlorination system will provide safe, low maintenance operation. The ejector shown in the drawing creates the operational vacuum for the system, using a water operated venturi. A booster pump raises the water pressure to provide enough differential pressure to create the vacuum. Since the booster pump is electrically interlocked with the well pump starter circuit, the chlorinator system operation is automatic, turning on and off as the well pump turns on and off. Chlorine feed rate is manually adjusted at the meter panel, located wherever it is most convenient for operations personnel, and will always remain constant unless the chlorine dosage requires changing.

Below are a few gas chlorinator system installation tips that our SUPERIOR experts have compiled with you in mind, from over 100 years of combined operation, service, and maintenance experience:

1. Installation of water pressure gauges as shown in Drawing 1 is one of the best diagnostic tools for maintaining proper operation of your gas chlorination system. It will save time and money if and when any operational issues arise both at system installation startup, as well as in the future. These low cost instruments are most often overlooked when plumbing a new system.

2.A chlorine cylinder weighing scale, while optional, is nevertheless a very handy tool. Chlorine in the cylinder is in the form of a liquid under pressure, like propane. Since the pressure of the chlorine gas in the cylinder is only dependant on the temperature, that will not tell you how much chlorine remains in the cylinder. To determine how much chlorine remains, and consequently to know when it is about time to change to a new cylinder, you can weigh it and deduct the tare weight of the cylinder from the total weight to determine how much chlorine is left.

3.Remember to install pipe unions as shown. Nothing is more frustrating than trying to perform service or routine maintenance and then having to take apart huge pipe sections to be able to unscrew a component for service or replacement.

4.Isolation valves, as shown, are an absolute necessity if you ever need to do any maintenance or service to the ejector or booster pump without having to shut down the entire water supply.

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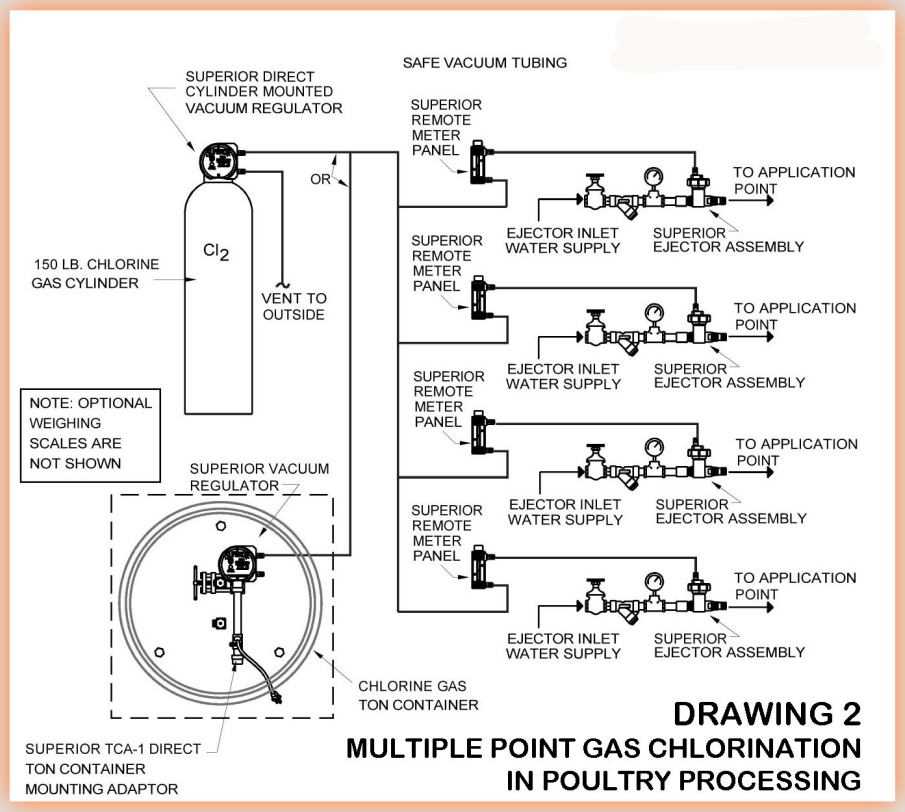
POULTRY PROCESSING PLANT WATER DISINFECTION

WHY CHLORINATE?

Since the late 1960's, chlorine disinfection has been mandated in poultry processing plants. Early adopters proved that properly chlorinated water used throughout processing, including carcass wash water, hand wash stations, chilling water, equipment washdown, and assembly line spray water provide a bird with much greater shelf life which means increased product appeal, sellability and profitability. Today, USDA requires poultry processing plants to maintain disinfection of all process water throughout the plant, and long experience has proven that the use of gas chlorination is by far the most effective and cost efficient method by which to achieve these sanitation requirements.

The previous section spoke about the need to deliver a high quality product to the processing plant through properly disinfected poultry drinking water. Once the birds arrive at the processing plant , and during the various processing steps, top priority is to prevent outside microbial contamination of the poultry. Chlorination can perform multiple disinfection tasks throughout the process, from the kill and pick line, through the eviscerating line, and into the chillers.

In addition to chlorinating the sprayers and carcass washers the disinfection process must also address the many pieces of equipment through which the poultry passes, which normally present an ideal breeding ground for bacteria. Additionally, the personnel involved in handling the birds throughout the processing line must maintain a constant hand washing with chlorinated water to avoid cross contamination and reinfection of the carcasses. Continuous chlorination at every step of the process will produce the longest possible shelf life to give the best sellability. This translates into increased profitability. Score!



DRAWING 2
MULTIPLE POINT GAS CHLORINATION IN POULTRY PROCESSING

SUPERIOR™ Multi-Point Gas Chlorination System

The SUPERIOR Multi-Point gas chlorination system is ideally suited to providing the safest and most accurate chlorine concentrations (dosages) to the various stages of the process. The vacuum regulator(s) can be placed in a safe, secure area, mounted directly on 150 lb. or one ton chlorine containers. Individual meter panels, each connected to its own ejector, allow chlorine solution to be applied directly at the point where it is needed throughout the plant. The chlorine strength can be adjusted independently as needed at each stage of the line, without affecting the feed rate of other meter panels. See DRAWING 2.

While processing procedures may vary slightly at each processing plant, there are some basic steps that generally include the following operations. Each operation should have properly chlorinated flowing water and/or spray water.

1. Birds are first slaughtered and hung on a line or conveyer and then passed through a tunnel (often called the "blood tunnel") to give sufficient time to completely drain the blood. Continuous washing with chlorinated water maintains the lowest bacteria counts.
2. From the tunnels, the birds enter a hot water "scald" tank made up of flumes and troughs designed to keep the birds completely submerged. Then birds pass through a series of picking machines to knock off most of the feathers, and on to the pinning area, where the remaining feathers are removed by hand. The people doing the pinning wash their hands with chlorinated water to reduce odors and bacteria count.
3. After pinning, the birds pass through a singer to remove the remainder of the hair and feathers, and are then conveyed to the outside washer which is made up of a series of chlorinated water sprays and is used to wash all remaining unwanted material from the carcass.
4. Some internal organs are then removed and each bird is inspected for signs of disease. After inspection, the heart, liver and gizzard (giblets) are removed and sent through for additional processing. Remaining organs are sent to waste.
5. The carcasses of the disease-free birds then go through an inside-outside washer which cleans the inside of the carcass with a constantly flowing stream of chlorinated water while the outside is cleaned with chlorinated water sprays. While this is happening, the giblets are trimmed and washed in a flowing stream of chlorinated water. The giblets are then packed in a bag and returned to the body cavity.
6. At this point, the birds are removed from the conveyer then weighed and classified. The birds move into the chill tanks for 3 to 6 hours in order to quickly bring their internal temperature down to between 36°F and 38°F (2°C and 3°C). The chilling water is also chlorinated. After the chill tanks, the birds are hung up to dry, then packed in ice or frozen for shipment to market.

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