

# *F a c t s*

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## CHLORINATORS

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Drinking water is a necessity of life. Unfortunately, not all sources of drinking water are safe. Surface water from lakes, rivers, streams and springs are often contaminated with germs, which, if consumed, can cause illness. Groundwater supplies, particularly those very close to the surface, such as dug wells, can also become contaminated. For surface water and some dug wells a treatment device is required to make the water safe for drinking. One of the most common treatment devices is the chlorinator.

### **Hypochlorinators**

There are many different chlorinators on the market. For small water supplies, the type used most often is the hypochlorinator. The hypochlorinator works by pumping a chlorine solution into the water supply, which disinfects the water. When chlorine remains in "contact" with the water for 20 minutes or more, it can kill most of the disease causing germs present in the water. Without this 20 minute contact time the water cannot be considered safe for drinking.

The most common type of hypochlorinator is the positive displacement chemical feed pump. It injects chlorine into a water distribution line under pressure. It can operate independently of the water pump, but in most cases, it is electrically coupled to the water pump so that they can both operate at the same time.

### **Chlorine Solutions**

The chlorine injected into the water by the hypochlorinator is usually in the form of a hypochlorite solution. Hypochlorite comes in a powder or a liquid form with different chlorine strengths. If powdered chlorine is used, it is important to stir the mixture well and siphon off the clear solution for use. Regardless of the type of chlorine used, it is important to know the strength. Information about the amount of available chlorine in the product is printed on the product label.

# **— Health & Environment Facts —**

## **Dosing Solutions**

Hypochlorinators work by pumping a chlorinated dosing solution into the water supply. The dosing solution is stored in a storage container. The container should be large enough to hold several gallons of dosing solution and it should be made of a material which will not react with chlorine. Clean garbage type containers made of food grade plastic are commonly used for this purpose. The dosing solution can be prepared at any strength desired. In some cases, bleach at 5.25% can be used, as is, without dilution. In other cases a dosing solution must be prepared by mixing chlorine with water.

It is important that the hypochlorinator feed line, which is submerged in the dosing solution, does not touch the bottom of the dosing solution storage container. This will help prevent clogging of the hypochlorinator lines by sediment which may have settled out to the bottom of the storage container. Dosing solution levels should be closely monitored and the dosing container refilled as required.

## **Air Locks**

All hypochlorinator line connections must be carefully installed using the correct fittings. Loose fittings can lead to recurring air lock problems in the lines, which can lead to problems with the injection system. Clear or light coloured lines are preferred as the presence of air locks in the system can be easily detected.

## **Contact Time**

As mentioned earlier, contact time is critical for ensuring a safe water supply. Therefore, a contact chamber big enough to ensure 20 minutes of contact time must be provided after the hypochlorinator injection point. This is in addition to a conventional pressure tank. The contact chamber can be one large tank or several small tanks in a series. Separate inlets and outlets are required and they should never be in close proximity to each other (e.g. both at the bottom or the top of the tank directly across from each other). Under peak flow conditions this could result in water movement directly through the chamber from inlet to outlet with little or no retention time. To prevent this problem have the inlet and outlet points at opposite ends of the chamber (e.g. inlet at the top of the tank and outlet at the bottom.)

# **— Health & Environment Facts —**

## **Chlorine Testing**

Water supplies treated with a hypochlorinator must be tested daily to determine the chlorine content. To do this, a chlorine test kit is required. The most effective test kits available use a chemical called D.P.D. for the test solution. This test solution can either be in a liquid form or a pill form. Another type of test kit uses a test solution called O.T.O.. Although somewhat effective, this type of kit is not as accurate as the D.P.D. kit, and is not recommended. The test kits should be used to determine the chlorine content in the water by analyzing the water for "Free Available Chlorine". The free available chlorine should be kept between 0.5 mg/L (ppm) and 1.0 mg/L (ppm).

## **Hypochlorinator Adjustments**

If testing shows the free chlorine residual drops below 0.5 mg/L (ppm), immediate action should be taken to restore it to a safe level. Most hypochlorinators have adjustment settings which allow the amount of dosing solution being injected into the water supply to be increased or decreased. In addition, adjustments can also be made to increase or decrease the chlorine content of the dosing solution.

## **Test Records**

Water supplies intended for use by the public, such as restaurants or resorts, should test for the free chlorine residual every day. The results of these should be recorded in a record book and be held available for reference for a period of one year.

## **Filters**

Although a properly installed chlorination treatment system is effective against most germs it may not remove some germs called parasites. Examples of parasites, not destroyed by chlorination, are *Giardia lamblia* which causes Giardiasis (Beaver Fever), *Entamoeba Histolytica* which causes Amoebiasis (Amoebic Dysentery) and *Cryptosporidium*. To remove these organisms, the use of a water filter with a pore size equal to, or less than, 3 micrometres (microns) is also required.

## **Communal Supplies**

In accordance with the Ontario Water Resources Act, the Ministry of the Environment must be notified if a chlorinator is installed on a communal water system.

## **Questions?**

If you have any questions regarding chlorination systems, please contact the Grey Bruce Health Unit at 519-376-9420 or 1-800-263-3456.