

# Lake Water System #1

## How It All Works

### Step #1 - pH Adjusting Filter

**Calcite** is a naturally occurring calcium carbonate media. One of the advantages of Calcite is its self-limiting property. When properly applied, it corrects pH only enough to reach a non-corrosive equilibrium. It does not overcorrect under normal conditions. Upon contact with Calcite, acidic waters slowly dissolve the calcium carbonate to raise the pH which reduces the potential leaching of copper, lead and other metals found in typical plumbing systems. Periodic backwashing will prevent packing, reclassify the bed and maintain high service rates. Depending on pH, water chemistry and service flow, the Calcite bed will have to be periodically replenished as the Calcite is depleted.

**Corosex** can correct acidic water conditions and render it less corrosive. Corosex, being a highly reactive magnesium oxide, is used most effectively where pH correction is substantial or high flow conditions are in use. pH correction and media consumption are affected by a number of water chemical variables. Corosex will slowly dissolve and will need to be replenished periodically. On a per weight basis, magnesium oxide can neutralize much more acidity than can calcium carbonate, (five times as much). This results in greatly reduced chemical usage for the same pH correction. Please note, under certain low flow conditions, Corosex may overcorrect and create a highly basic (high pH) condition. Under certain hardness conditions, pH correction can cause hardness minerals to precipitate out of solution, resulting in cementing or solidification of the Corosex mineral bed. Upflow service is generally recommended with hardness exceeding five grains per gallon. As Corosex's magnesium oxide neutralizes the water, it will increase hardness and occasionally a softener may become necessary after the neutralizing filter. Corosex can be effectively combined with Calcite to combine the high flow neutralization properties of Corosex, along with the slower reacting low flow properties of Calcite, reducing potentially high basic properties due to overcorrection.

### Step #2 - Tannin/Colour Removal

Tannins are large molecular weight organic compounds. They are formed through the decomposition of plants and, to a much lesser degree, animals. These organics are generally found in surface waters like our lakes and rivers or shallow wells. There are two primary categories in which tannins fall: Humic acid and Fulvic acid. These are simplified structures of very large molecules. The structure of the tannin varies from location to location, depending on the vegetation in the area. Tannins can cause a yellow to dark tea color in water and may impart taste and odor. The tannins most typically found in our region are brown or tea coloured.

Tannins can be difficult to remove from water. One treatment method may be effective in one area, but may be totally ineffective 10 miles down the road. It is dependent on the vegetation of the well, lake or river. At Muskoka Clean Water we have found that acrylic-based resin are producing excellent results in most cases. We use a gel based resin in almost all of our tannin removal filters but can custom build a system based on our test results.

The removal of tannins via anion exchange resins occurs through both an ion exchange and an absorption process. Tannins have a slightly negative charge. Because of this, they are exchanged for chloride onto the resin and a brine tank for salt regeneration is required. Tannin filters look and function a lot like softeners.

#### PH ADJUSTMENT

Lake water in our region is typically low in pH and consequently represents a risk to your plumbing and fixtures as it is corrosive. In addition, low pH can cause a dry itchy skin condition and sting eyes when showering or bathing. It can also be hard on colour treated hair!

#### TANNIN REMOVAL

For a UV to be able to work at its intended efficiency it must have clear water with a good UVT. The natural colour in the lake and river water of this region will typically drop the transmittance level below 75% so we need to remove the tannins to make sure the UV lamp can operate effectively.

#### UV LIGHT

The most often used and easy to maintain method of disinfecting water for safe consumption is UV light. With clear water filtered to 5 microns prior to exposure to the light and a correct flow rate of water, 99% of microbial contaminants can be successfully removed.





### Step #3 UV Light for Disinfection

Ultraviolet or UV is a commonly used form of disinfection. It provides a chemical-free, low-maintenance option for treatment of private water sources. UV water treatment can be used on water from dug or drilled wells, surface water like lakes, and for harvested rainwater.

Each water source can present unique water quality challenges which can impact the effectiveness of the UV system. For a UV water treatment system to be completely effective, the UVC light generated by the lamp needs to be able to pass through the water unimpeded so that it can inactivate any microorganisms present.

The ability of the water to transmit UVC rays is known as ultraviolet transmission (UVT). To be an effective method of disinfection, the UVT of the source water needs to be greater than 75% and some sources say 85%. The difficulty for a typical residential installation is that UVT does not directly correlate with the visual clarity of the water. For instance, a glass of distilled water will transmit UVC rays at 99 -100% however, if you add a teaspoon of sugar to it and dissolve it completely, the water will look just as clear as before, but the UVT will have dropped from 100% to as little as 50%. Many water contaminants will have a similar impact.

## About Muskoka Clean Water

- Well trained courteous staff.
- Store front location to serve all your water treatment needs.
- We use NSF certified and CSA certified products when and where applicable in our filters and installations.
- We service all types of water treatment systems even if we did not sell it.
- Members of the Canadian Water Quality Association and the Water Quality Association.

#### SERVICES AVAILABLE

Technical Support

Installation and Setup

Maintenance



**Muskoka Clean Water**

**What's in Your Water?**

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