



# HOSHIZAKI TECHNICAL SUPPORT

## TECH -TIPS

Rodd Burger  
Writer/Editor

Hoshizaki America, Inc.  
618 Hwy. 74 South  
Peachtree City, GA 30269

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Ph: (800) 233-1940 Fax: (800) 843-1056 E-mail: techsupport@hoshizaki.com

### HOW WATER IMPACTS ICE QUALITY

*By Danny Moore* This article originally appeared in the October 2002 issue of RSES Journal

An ice machine is an important piece of equipment to any business where it is installed and is vital to a food service customer. Most of these businesses depend heavily on ice for their applications however; many ignore their ice machine and fail to consider that it is a self-contained “mini factory”. An ice machine takes a raw material and manufacturers a consumable product. This product is then stored and provided to the customer for whatever purpose it is needed. We must remember that ice is considered a food source and that the single component material in ice is water. The quality of the product depends on the quality of the water supplied to the unit. Good water quality will produce a crystal clear, hard cube that provides excellent cooling capacity and last a long time. Poor quality water will produce poor quality ice that can be soft and cloudy and will result in less BTU cooling capacity and/or ice bridging in the storage container.

Water can contain many different minerals in various levels and the quality is constantly changing. In fact, Water Quality varies throughout the country and may vary across town or even across the street. It can be improved through filtration and treatment. Water filtration and treatment is a separate industry within itself. It is comprised of technical experts who know about the chemical make up of water and how to treat specific problems. Few service technicians have this level of expertise when it comes to resolving water quality issues. It is important for a service technician to have a basic understanding of water quality in order to service this “mini ice factory”. While the typical ice machine service technician is not a water expert, he is called on from time to time to

recommend filtration or treatment at the point of use for ice making equipment.

Of course, the best source of information concerning filtration and treatment is to consult a water filter manufacturer. These manufacturers will work with you and make recommendations to resolve your water quality issues. A quick search of the Internet will provide many interesting web sites with educational information on water quality and water filtration and treatment. Although it is impossible to cover every aspect of water quality in a single article, it should be helpful for a technician to have a basic knowledge of some of the key water treatment terminology and how it applies to an ice machine.

**Filtration:** Using a device installed in the water supply inlet of the ice machine to remove contaminants from the water. Course filtration will remove the “rocks and boulders”. Fine filtration will remove smaller particles.

**Treatment:** Using a device that adds chemical or minerals to the water to effect a change in the water quality. Other treatment technologies are also available in the industry. Treatment is generally required to address scale and bacteria concerns.

**Sediment:** Larger particles of dirt, trash, sand, minerals, etc. A sediment filter is generally installed prior to the filter/treatment device to remove larger contaminants. This allows for longer life of the filter/treatment device by reducing rapid plugging of the filter medium.

**Flow rate:** The volume of flow through a device measured in gallons per minute (GPM). It is important to size a filter system properly to supply the proper flow rate to the unit per the required specifications as stated by the manufacturer.

**Scale:** A build up of minerals that forms a flaky coating on the surfaces of the evaporator and water system. Scale buildup will restrict water flow and reduce heat transfer in an ice machine. This buildup will affect unit efficiency and usually causes service concerns.

**Scale inhibitor:** A material or element that slows down the ability of scale to stick to a surface. Many filter manufacturers use Polyphosphate to inhibit calcium or lime scale buildup.

**Water Softener:** A device that uses salt to provide an ion exchange which reduces the hardness of water to make it less likely to produce scale.

**Reverse Osmosis (RO):** A device that forces water, under pressure, against a fine membrane to remove small minute particles of contaminants from the water.

**Iron:** A compound or bacteria found generally in well water. Iron compounds will cause a rust colored scale. Iron bacteria will show up as rust colored slime.

**Total Dissolved Solids (TDS):** The level of dissolved minerals in the water measured in part per million (PPM). Higher concentrations of TDS can increase mineral buildup.

**Turbidity:** The degree of cloudiness of water generally caused by high mineral saturation or the presence of air bubbles in the water.

**pH:** The term used to express the level of acid or alkaline in water or solutions. The scale for pH ranges from 0 to 14. A reading of 7 is considered a neutral pH and is the desired condition for ice machine applications.

**Acidic-water:** Water containing dissolved carbon dioxide that forms carbonic acid. Acidic water is considered aggressive to most components it comes in contact with and will be represented by a low pH reading.

**Alkaline:** Water that has a surplus of hydroxyl ions which results in a high pH over 7, will contain a concentration or a mixture of soluble salts or alkali that is picked up from basic minerals in the earth like

calcium, magnesium, silica, etc. These are scale-causing minerals.

**Chlorine:** A disinfectant used to treat municipal water systems against bacteria. Chlorine can be corrosive to metals. Charcoal filtration is generally used to reduce the amount of chlorine in the water to improve offensive chlorine taste and odor.

**Chlorimine:** A disinfectant used to treat municipal water systems against bacteria. Chlorimine is a mixture of chlorine and ammonia. A higher concentration of charcoal is generally needed to reduce the amount of chlorimine in the water.

**Hardness:** The amount of calcium and magnesium measured in grains per gallon. From the US BUREAU OF STANDARDS: **WATER HARDNESS**

Description	Grains Per Gallon	Parts Per Million(TDS)
Soft Water	Less than 1.0	Less than 17.1
Slightly Hard	1.0 to 3.5	17.1 to 60.0
Moderately Hard	3.5 to 7.0	60.0 to 120.0
Hard Water	7.0 to 10.5	120.0 to 180.0
Very Hard	10.5 and over	180.0 and over

One last term that is usually understood by the service technician but seldom understood or considered by the customer is **Preventative Maintenance**. This term refers to the action of regular scheduled maintenance performed on a unit including inspecting, cleaning, sanitizing, and servicing of the ice machine and external water filtration/treatment system. Preventative Maintenance pays big benefits. Every equipment manufacturer provides recommendations and instructions that detail the steps necessary to perform Preventative Maintenance. This process along with providing proper water filtration/treatment at initial installation is vital to protect the customer's investment, maintain maximum efficiency, and provide longer life for the ice machine.

A basic understanding of these terms will help a service technician communicate his water quality concerns to a filter manufacturer and to his customer. This will definitely help in resolving ice machine water quality issues.