Water quality is important to the proper operations of commercial and institutional kitchen appliances, including steam tables, hot beverage makers, cold beverage dispensers, and ice machines, as well as steam cooking equipment.

This Guide discusses the effect of water quality on the performance and life of steam cooking equipment.

### Water Quality Equipment Life

Cleveland Range has many years of experience in engineering and manufacturing the highest quality, most dependable steam cooking equipment available.

Our experience shows that most service calls for equipment problems are related to the quality of the water supplied to the generator. Dissolved minerals and other impurities in water cause harmful scale build-up and damaging corrosion throughout a steam generation system.

Major components that can be harmful by inferior quality water include the boiler itself, the heat-exchanger surfaces, and the heating elements. Damage is also likely to various operating and safety devices, such as valves, level sensors, and temperature probes.

### **Equipment Warranties**

Since the steam generator is the major component of a steam cooking system, malfunction, and damage due to poor water quality can be very costly, both in terms of down-time and repair costs.

Damage to equipment caused by poor water quality is not covered be the Cleveland Range warranty. The warranty states "The use of good quality feed water is the responsibility of the owner/user...THE USE OF POOR QUALITY FEED WATER WILL VOID EQUIPMENT WARRANTIES."

Warranty coverage is also contingent on the unit being "properly installed, maintained, and operated." Maintenance required by the warranty includes cleaning the generator on a regular basis and keeping records of the cleaning.

### **Quality of Water Sources**

There are very few geographical locations where the local water supply is of sufficient quality to feed directly into a steam generator. Since water comes from many diverse sources, including wells, springs, snow melt, lakes, and rivers, many impurities are usually present. Even though water is "drinkable" and may 'taste good," it is not necessarily good for steam generator.

### **Chlorine Added to Water**

To aggravate the situation, your municipal treatment plant may add chlorine to your water supply. Hot chlorinated water is corrosive, causing rusting and oxidation of generator walls and other metal components.

### **Dissolved Minerals Produce Scale**

All water, expect distilled water, and contains some amount of dissolved minerals. The concentration of dissolved minerals in water's "hardness" factor.

In a steam-cooking unit, water is boiled off in the form of pure steam cooking compartments. Boiled off water is replaced be an automatic fillcontrol value. Since all dissolved minerals introduced by feed water remain behind, the mineral concentration in the generator steadily increases. Aided by heat, the minerals and other component surfaces in the form of a hard coating called "scale."



**Steam Cooking** 

Equipment

For

Water Quality Guide

### Scale Build-up

Scale deposits build up in thickness through daily use of the unit, accumulating inside the generator and in all valves and pipes. Scale buildup restricts the free flow of steam and may cause physical damage to components. Scale will also coat the surface of sensors and cause false readings and malfunctions.

Scale is an insulator. As it builds up inside the generator, it prevents heat from being conducted into the water. Over time, it will take longer and longer to bring the water to boiling. This causes the generator to use more heat than necessary and effectively reduces its life.

### **Test Water Before Installing Steamer**

Before you have any Cleveland Range steam cooker installed, you should have your water supply tested, and treatments evaluated. Have a water treatment specialist perform an on-thepremises analysis. Knowing the exact composition of impurities in your water supply is important when choosing the appropriate water treatment technology.

The recommended minimum water quality standards for steam cooking equipment built by Cleveland Range are shown below:

#### **Scale-Forming Factors:**

Total Dissolved Solids**	50 – 250 ppm
Hardness	50 – 200 ppm
Silica	Max 13 ppm
Total Alkalinity	50-100 ppm

#### **Corrosion-Causing Factors:**

Free Chlorine	Max 0.1 ppm
Chlorides	Max 50 ppm
NH2CI (monochloramine)	max 0.1 ppm
pH factors (acidity)	7.0 – 8.5

- \* ppm = parts per million
- \*\* 17.1 ppm = 1 grain of hardness

After making an analysis, your specialist can advise you on the specific treatment remedy needed to bring your water within the minimum standards specified by Cleveland Range. (There is a summary of "Water Treatment Technologies" on page 4.)

### **Steam Generator Descaling**

Descaling is the most important regular maintenance you can perform on any steam cooking equipment chemical to a freshly filled tank, leaving the tank filled for an hour or more while the chemical dissolves the scale, then flushing the tank by draining, refilling, and draining it again.

Descaling should be performed until all scale is cleaned out. If scale is allowed to build up excessively, full descaling may take several hours, or more than one chemical application.

Use only Cleveland Range's *DISSOLLVE* descaling product. Don does not use a cleaning agent that contains any chloride, including hydrochloric acid (HCI).

(Refer to the *Descaling Procedure* applicable to your cooker for more information and a step-by-step procedure.)

Do not use any so-called pre-treatment chemicals in your water supply, which are supposed to clean a boiler at the same time it is generating steam. These types of cleaners may be harmful and may also violate FDA rules.

#### Inspecting Inside the Generator

All Cleveland Range steam generators have a removable viewing plate that allows visually inspecting the inside of the generator.

You should have the inside of your steam generator inspected on a regular basis. This is the only way you can tell for sure how effectively you are controlling scale build-up. Scale should not be allowed to build up thicker than a business card.

Your first visual inspection should be made no later than three months after the steam cooker is put into operation.

The inspection should be preformed by a qualified technician, following the procedure given in cooker's maintenance manual.

Depending on the results of the inspection, you may decide to increase blowdown frequency (see next page), or descale the generator more often, and/or upgrade your water treatment system.

### **Cleveland Range Products Are Engineered for Long Life**

Maintenance required by water quality conditions is a significant service cost to many of our customers. For this reason, Cleveland Range engineers are constantly investigating and implementing better materials and operating to features to increase steam generator reliablity and life.

As newer and more durable materials and compontes become available, they are incorported into the Cleveland Range line. Stainless steels and other non-corroding alloys are used where possible throughout the equipment. High performance polymers, with superior heat and corrosion resistance, are used extensively in value bodies, hoss, clamps, and other critical areas. Electric boilers are now equipped with new "Firebar" elements that dramatically increase lifespan.

Our engineers also develop operating features aimed at reducing maintenance and lengthening equipment life. One outstanding feature is the automatic clean-water rinse, used in cooking compartment drains and, in the water, level control valves to keep them clean and free running.

### The Blowdown Function

Another life-extending feature is the "blowdown" function, which empties the generator and flushes away spent water containing high concentrations of dissolved minerals.

You can manually activate the blowdown function to help assure long life for your steam generator. Blowdown occurs whenever you switch the frontpanel ON/OFF switch to OFF. Frequent activation of blowdown will lessen scale buildup and reduce descaling requirements.

During blowdown, which lasts about 3 minutes, the steam generator is drained of all water. The drain valve and the water-level control valve are rinsed with fresh water, washing away loose sediment and mineral-laden water.

Since blowdown is activated manually, your operator can control how often it occurs. If you water supply meets standards specified by Cleveland Range, you should blow down at least every 8 hours of operation. But, if you water quality is below standards, you should blow down more frequently, every 4 hours. One factor to help determine blowdown frequency is how long the steam cooker sits idle between meals. If you will not be cooking for an hour or more, you should turn the unit OFF. This benefits in two ways; first, you will save energy by not heating your water unnecessarily, and second, this will take advantage of the benefits of blowdown more often.

### easytimer with LED Light Descale Indicator

A valuable maintenance feature on the newest Cleveland Range steamers is the Descaler Indicator on new easytimer controls. The descale indicator us an automatic indicator that reminds you when you need to descale the steam generator.

Until the development of the Descale Indicator, scheduling the descaling process was an imperfect science. It was usually scheduled every two to four weeks, depending on how much the steamer was in use. This method replied on the operator's memory or on accurate record keeping.

Some systems from other manufacturers indicate cleaning required by means of a scaledetection sensor. This method shuts down the boiler when excessive scale and may give false indications.

The easytimer descale indicator solves these problems by incorporating an elapsed-hours timer into the unit's control circuits. The timer, which can be set hours the systems technician, accumulates the number of hours the system has been generating steam. When the set hours have elapsed, the Descale Indicator indicates that the generator needs a cleaning. (Refer to our *Clean Light* bulletin for more information about this valuable feature.)

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### Water Treatment Technologies

There are many water treatment technologies to choose from. Different treatments, or combination of treatments, are needed for different water conditions.

The information on this page will help you to become familiar with the major types of water treatments, so you can discuss your needs with treatment specialists and with your Cleveland Range representative.

Bear in mind that there is no "magic bullet" water treatment technology. No treatment system will simply make water impurities disappear. Every system has advantages and limitations, as well as the costs associated with upkeep.

#### Mechanical Filtration

Mechanical filtering devices remove water-borne impurities large enough to be trapped via in-line filters. Some level of mechanical filtering should be included for all feed water sources.

Sediment traps and particle filters remove suspended impurities too large to be dissolved. Without these filters, the larger particles in the water would pass on to subsequent treatment systems, clogging them and quickly reducing their effectiveness.

Carbon or "charcoal" filters are highly effective in removing chlorine from water, whether introduced by a municipality or by your own softening system.

### Water Softeners

Water softening is a widely available, proven treatment method. It can be highly effective in some cases, but often is only a part of a more comprehensive treatment system.

One drawback to water softening is that it tends to reduce calcium and magnesium salts, which make up the water "hardness" factor. Softening will not reduce the many other minerals that may be present in your water supply; these other minerals, plus calcium and magnesium salts, make up the "Total Dissolved Solids" factor.

Another drawback to some water softeners is that they periodically flush their wastes through the steam generator instead to a Waste drain; do not use a system that does not flush wastes to a drain.

Proper maintenance of a softening system is also important. A malfunctioning softener can drastically increase scale buildup, instead of reducing it. Also, softening systems that add chlorine or chloride salts during treatment may create problems, causing rapid scale buildup and increased corrosion.

#### **Reverse Osmosis**

Reverse Osmosis (RO) is a treatment method that removes dissolved impurities from water by forcing it through a semipermeable synthetic membrane. Unlike sediment filters, which trap impurities because of their size, RO treatment systems utilize principles of molecular displacement of ionized salts.

The advantage of an RO system is its superior water treatment capabilities. When properly sized and maintained, RO system results in a no scale build up in a steam generator.

Drawbacks of an RO system are its initial costs, its maintenance requirements, and its membrane and filter replacement costs.

Another drawback is that an RO system may double the amount of water normally required, since about half the water entering the system is used to flush away impurities.

### Magnets and Ionic Charging Units

These treatment methods create an electrical energy field around flowing water. This places a charge on the dissolved particles in the water and makes them fall out before reaching the generator.

### Post-Treatment pH Adjust.

Adjusting pH will neutralize corrosion tendencies in heated water systems with metal components. This treatment is required where the pH factor, after all other treatments have been performed, is outside the recommended pH range.

PRESSURE BOILER AND STEAM GENERATOR MAINTENANCE IS THE RESPONSIBILITY OF THE OWNER-USER AND IS NOT COVERED BY THIS WARRANTY. The use of good quality feed water is the responsibility of the Owner-User (see Water Quality Recommendations below). THE USE OF POOR QUALITY FEED WATER WILL VOID EQUIPMENT WARRANTIES. Boiler maintenance supplies, including boiler hand gaskets, are not warranted beyond the first 90 days after the date the equipment is placed into service. Preventive maintenance records must be available showing descaling per applicable Cleveland Operator Manual for Boiler Proration Program considerations.



Water Quality Requirements		
TDS	50-250 PPM	
Hardness	50-200 MM (3-12 GPG)	
pH Value	7.0-8.5	
CL (Chloride)	Max 50 PPM	
CL2 (Free Chlorine)	Max 0.1 PPM	
FE (Iron)	Max 13 PPM	
SiO2 (Silica)	35-80 PSI	

FLT0040



Model	Description	Price
FLT0040	Optipure Water Filtration System	\$571
FLT0014	Replacement Cartridge #300-05828 (1 Required)	\$113
FLT0018	Replacemet Cartridge #300-05831 (1 Required)	\$163
FLT001	Water Quality Test Kit	\$36
DISSOLVE	Dissolve Descaling Solution 6- One Gallon Containers (106174)	\$362

DISSOLVE