

## **Knowledge Domain: Plumbing**

### **Unit: Blockages**

#### **Skill: Descaling**

#### **Tools and Parts Required:**

- 1) Vinegar
- 2) Autoclave, sterilizer, or hot water pot with mineral buildup
- 3) Nylon scouring pad (optional)
- 4) Mineral free (distilled) water

#### **Introduction**

Equipment that uses water may accumulate mineral buildup. Minerals are corrosive to stainless steel. Mineral buildup will reduce the efficiency and lifespan of the equipment. Regular removal of mineral buildup will extend the life of the equipment. Mineral buildup can also prevent adequate sterilization.

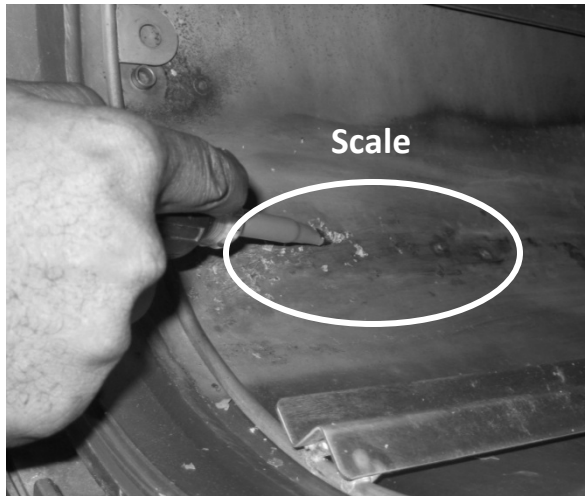
#### **Example**

Below is a picture of an autoclave with mineral buildup (sometimes called scale).



## Identification and Diagnosis

Scale is an accumulation of minerals such as calcium on the surface of a device. Scale is different from rust (see BTA skill on “cleaning rust”). Thick scale can sometimes be scraped off. Scale can be white or gray. Contaminants determine the color of the scale. Scale may appear as flakes as shown below. Some scale may look like a thin film covering surfaces that have been exposed to water.



## Procedure

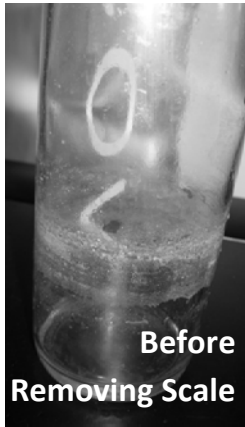
Before working on any medical equipment, ensure that the device has been disconnected from electricity.

Autoclaves become very hot during use. Avoid burns by ensuring the machine is not hot before touching any surfaces.

Begin by scraping any excess scale or contaminants. Use a cloth to wipe off loose contaminants and dirt. A plastic scouring pad can be used for more vigorous scrubbing.

Usually, you will need a solvent to remove scale. Some manufacturers suggest specific products for cleaning sterilizers and autoclaves. A mild acid such as vinegar or lemon juice is a good substitute.

Below is a picture of glass bottle with mineral buildup. Vinegar was used to remove the scale.



**Soaking with  
Vinegar**



For optimal performance, sterilizers and autoclaves should be cleaned once a week.

Mix the descaling solvent according to the manufacturer's directions. When using lemon juice or vinegar, use 1 part vinegar and 1 part mineral free (distilled) water.

Drain water from the reservoir of the autoclave. Fill with descaling solvent. Run a complete sterilization cycle. When descaling a single container, let the solvent sit for at least 30 minutes. Do not attempt to sterilize any equipment while descaling.

After the descaling is complete, drain the solvent. Rinse the system with mineral free water for at least 15 minutes. Do not sterilize any equipment until all solvent has been removed.

Sometimes a mild solvent is not strong enough to remove scale. In some cases you must use muriatic acid (also known as hydrochloric acid), a very strong acid. Always wear gloves and eye protection when using muriatic acid. Dilute muriatic acid with 1 part acid to 20 parts water. Pour the acid carefully into water to avoid splashes. Apply the solution to the scale. Bubbles indicate that the solution is strong enough. Run water over the area to rinse thoroughly after cleaning. Do not allow acid to come into contact with skin or eyes.

Detergents containing chlorine are corrosive to steel. Do not use detergents containing chlorine to remove scale.

### **Exercise**

Removing scale requires the presence of scale. During your hospital visits, your instructor may point out an autoclave or sterilizer with mineral buildup. You may have the chance to remove the scale.

Check hot water pots and kettles for mineral buildup. Use the described procedure to remove the scale.

Your instructor must verify your work before you continue.

### **Preventative Maintenance and Calibration**

Use mineral free water to prevent build up of scale.

Acids can be dangerous to the skin. Always use protective gloves and work in a well ventilated area.

Always calibrate every medical device before returning it to use.