

Liquid vs Solid Cleaning Agents

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As health care workers, the CS technician knows that cleaning is the most important step in the disinfection/sterilization process. We now know that what we use as cleaning/disinfection agents also has a major part in the continued sterilization process. Since the inception of cleaning products, these products have always been liquid. But recently a new style of cleaner has hit the market. It is classified as a solid. Both types of cleaners must have the same key elements in order to perform their job functions correctly. They must both contain specific chelating ingredients that can bind water minerals and keep them in solution. If these ingredients are not present, minerals in the water can cause spotting and filming on the instruments themselves. This can affect both the look and usability of the instrument.

Both types of cleaners must be safe enough to be used on plastic, brass, copper, any anodized aluminum equipment as well as the usual stainless steel, gold or chrome plated instruments. In addition, both types must be low sudsing / foaming. Cleaners that are high foaming will cause damage to the cleaning equipment as well as prevent adequate spray pressure in the washer/decontaminators themselves. Also, high foaming / sudsing products can prevent adequate rinsing which can cause buildup in the box links of the instruments which will necessitate additional time spent manually cleaning the instrument. If detergent residue is left on the instrument because of inadequate rinsing, this residue can be baked on the instrument during the sterilization cycle which can result in staining, corrosion or impaired usage.

Another reason for using low sudsing/foaming cleaners lies in the fact that bursting bubbles of high-sudsing/foaming detergents can create more

aerosol droplets that can carry microorganisms. These droplets can easily be inhaled by the health care worker and cause infections/diseases. Generally speaking, both solid and liquid detergents need to be biodegradable in order to prevent problems in the environment. This means that bacteria found in lakes and other water sources can easily digest and break down to base elements the detergents / enzymatics.

Water itself is important for both liquid and solid cleaners. The quality of the water determines whether or not the products can be broken down in order to be effective cleaning agents. A water sample is generally taken when the equipment is first set up. This allows the equipment technician to test for hardness, impurities, the pH of the water, alkalinity, purity and temperature to list a few. The temperature is important because this affects the chemical reaction. If the temperature is too cold, the enzyme won't be activated. If the temperature is too hot, the protein can be coagulated on the instruments and not be adequately removed. It is also necessary to have the equipment technician come back at regular intervals to check a water sample to see if anything has changed since the original setup.

What about the dilution rate, you ask? Both liquid and solid cleaners must adhere to the manufacturer's recommended rates. This is important to be aware of when you are trying to set up protocols in your own departments. If the correct dilutions are not used, this will increase the odds of having instruments that are corroded or pitted. You could possibly also see staining or discoloration of the instruments. If the solution is too weak, the instruments will not be cleaned appropriately nor will the bacteria involved be removed. You could also see instruments that are increasingly difficult to use due to stiffness. It is also recommended that

the equipment technician, when doing regular PMs on the equipment, check the dilution rate to insure that the correct rate is still being dispensed by the equipment involved. It is also the responsibility of the department to set up protocols that are within the parameters of the manufacturing company in order to insure that instrumentation being cleaned will not be harmed by the cleaners being used.

We have discussed the things which make both solids and liquids the same. What makes them different? Here are some advantages to liquids. Liquids can be accurately and safely measured. A liquid can be fed automatically into the cleaning equipment but can also be measured manually into a sink or bucket, if needed for manual cleaning purposes. Thirdly, using liquid cleaners insures a complete and immediate solubility of the involved ingredients. There is also the fact that currently there is no solid lubricant. Even the company making solids doesn't have the lubricant in the solid form. However, they do have the lubricant in liquid form.

If you are interested in the solid form there are positives there as well. One of the largest positives is that it is convenient to use. There are no large barrels that weigh 150 pounds per each. You do not have to have two people to help get it to the decontamination area. This product comes in two pound packs and hangs on the wall. This gets the barrels out of your decontamination area and off the floor, which gives you more space in your work areas. Because of the light weight of the concentrate, there are generally fewer complaints of back problems. The dispensers are easy to use. They are attached to the wall and a solid block is put in the dispenser. Water,

Liquid vs. Solid Cleaning Agents cont.

at a temperature of roughly 100°F to 120° F is forced into the dispenser in order to dissolve the detergent. These products are then dispensed at the same formulary as the liquid detergent. If using the enzymatic in your sink as a soaking agent, it can be dispensed from the dispenser on the wall through the tubing just as the detergent is dispensed to the washers. The advantage of this is that the correct amount of detergent or enzymatic cleaner is dispensed at the correct rate without fear of the technician using whatever amount they feel like using today. The concept of solid detergents has been used for several years in other industries and has been tested extensively to insure that consistent results are obtained each time they are used.

For Additional Reading & References

1. Training Manual for Health Care Central Service Technicians, 4th Edition, 2001
2. Sterilization Technology for the Health Care Facility, 2nd Edition, 1997
3. "The Essentials of Instrument Decontamination", Study Guide, Steris, 2001
4. "Healthcare Technical Affairs", Ecolab, Inc. 11/2004

Liquid vs Solid - Post-test

1. What properties must both liquid and solid cleaning agents have? (Most right answer)
 - A. non-abrasive, non-toxic, low sudsing, cost effective
 - B. high sudsing, long shelf life, biodegradable
 - C. low sudsing, long shelf life, biodegradable, not cost effective
 - D. abrasive, non-toxic, low sudsing, cost effective
2. Cleaning is the most important step in the disinfection/sterilization process.

T F
3. If cleaners are used that are high sudsing, all but one of the following

can happen:

- A. Damage to the equipment
 - B. Maintain adequate rinsing
 - C. Prevent adequate spray pressure
 - D. Cause buildup on the instrumentation
4. Bursting bubbles of high sudsing cleaners can create more aerosol droplets that can carry microorganisms. **T F**
5. The quality of the water does not determine whether or not the products can be broken down in order to be effective cleaning agents. **T F**
6. When the technician sets up equipment for first time use, the water is tested for the following things:
 - A. Hardness, alkalinity, impurities, temperature
 - B. Acidity, hardness, impurities, temperature
 - C. Alkalinity, temperature > 140° F, hardness
7. Manufacturer's recommended dilution rate does not need to be followed when using liquid or solid cleaners.

T F
8. If the correct dilutions are not used, which of the following can occur:
 - A. Corroding or pitting of the instruments
 - B. Staining or discoloration of the instruments
 - C. Instruments being cleaned properly
 - D. Increasingly stiff instruments
9. It is the responsibility of the department to insure that the parameters set by the manufacturing companies are being followed. **T F**
10. Some of the positives for using solid cleaners include:
 - A. No heavy lifting
 - B. Space saver
 - C. Easy to use
 - D. Hard to dispense

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