

Flash Sterilization—How It Works

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Objectives:

- Discuss the various sterilization cycles.
- Describe how to handle and prepare items prior to sterilization
- Describe how to transfer items to the point of use after flash sterilization.

As Central Sterile Technicians, we do not often have an opportunity to participate in and/or learn about the use of flash sterilization also known as point of use sterilization. Flash sterilization is not often practiced within the realm of Central Sterile although most of the current steam sterilizers have a flash sterilization cycle on them. If you are currently employed as a CS Tech practicing in the Operating Room arena, you will have more of an opportunity to use flash sterilization and as such must have the knowledge base to understand how it works and when it is appropriate to use flash sterilization.

In most current hospitals, the flash sterilizer is a pre-vacuum cycle, but for those that still use the gravity displaced sterilizers, it works pretty much for the flash sterilizers as it does for the floor models. In a nut shell, during the conditioning phase, the steam enters the sterilizer jacket (the space between the sterilizer chamber and the outer shell.) As the process starts, the steam from the sterilizer jacket will enter into the sterilizer chamber and start to push the air in the chamber out through the chamber drain (commonly found in the floor close to the door). This is an important step as all the air must be removed because steam can't sterilize in an air pocket. As the air continues to be removed, the contents of the load will start to heat. When all the air is pushed out of the chamber, the trap will close allowing the pressure inside the chamber to increase. This will gradually bring the temperature of the chamber to sterilizing temperature.

Once all this happens, the exposure phase starts. This phase lasts as long as the amount of time necessary for the particular item involved to become sterile.

The nonporous cycle is used for surface sterilization of simple, routine all-metal instruments only. The minimum exposure time for nonporous items in a gravity displacement sterilizer is three (3) minutes at 270 degrees F.

In the porous cycle, items such as rubber bands, plastic cups, etc are run. If the items involved have lumens, or have multi parts this is also flashed in a porous cycle. This is because of the need for longer exposure times. The minimum exposure time for a porous cycle is ten (10) minutes at 270 degrees F. Once the exposure cycle has completed, the exhaust stage kicks in.

During the exhaust stage, steam is removed from the chamber, by the reverse of the same process as put steam in it. Air is reintroduced into the chamber, a small amount at a time. As the air is reintroduced, it is filtered to prevent contaminants from settling on the item being sterilized. Ordinarily there is no dry cycle with flash sterilization, however there are some more current models that allow you to set a short drying time at the end of the cycle.

For most of us, the use of the pre-vacuum sterilizer has helped tremendously. The cycles in a pre-vac sterilizer are much faster. Instead of having to let gravity do the work of removing the air, there is a method by which the air is mechanically pulled from the machine as steam is being injected during the conditioning phase. By the same token, at the end of the cycle, steam is pulled from the chamber and air is injected. There are usually four injections of steam during the conditioning phase. Each injection is followed by a chamber evacuation to remove both air and steam. At the same time, the chamber is being heated by the steam coming into it so the sterilization process is already beginning even before the so called exposure phase has started. Again, once the

appropriate temperature has been reached and the sterilizing time has been met, the machines are exhausted in a similar pattern as the condition phase. With pre-vac sterilizers, a drying time can be added to the end of the cycle if needed.

The original intent of flash sterilization was to assist in the immediate sterilization for any emergency reprocessing of individual items in an OR where there is not enough time to use the preferred method of sterilization. Flash sterilization can be used in the following situations:

1. When an instrument is dropped on the floor and it is needed for the case at hand and there aren't any more sterile.
2. When vendor instruments are brought for a very specific case, such as a hip fracture and the case is an emergency.
3. When you can't pre-sterilize the equipment because it needs to be charged, i.e., batteries for the Stryker drills.

It has become more and more popular to use flash sterilization for several reasons:

- A. We are doing more cases than we have instruments for, i.e., cataracts.
- B. When we borrow instruments for cases because we don't do them often enough to have a stock of instruments on hand or the service has lost its' surgeon and we have a locums.

In the past, implants were flash sterilized because they were often bought in at the last minute for a case. Nowadays most manufacturers have developed sterilization practices that make sure the implants are sterile before being shipped. However, there are still some items that are not sterile when they reach your facility. Because of the importance of these issues, the CDC got involved. They also got together with the AORN (Association of Operating Room Nurses) as well as AAMI (Association for the Advancement of Medical Instrumentation). What they all decided was that any implantable surgical implant that is going to remain in the body will **never** be flash sterilized. One of the

primary reasons for this is that in the advent of a surgical infection at the site of the implant, to cure the infection, the implant most likely would have to come out. This is not a good thing for a total knee or hip implant patient. The agencies above all recommend that in order to have a wide margin of safety regarding the implant, each load containing implantables should be tested with biological monitors and that the sterilized item not be released for use until the spore test is negative. If it is not possible to process an implantable object with a confirmed spore test before use, the CDC recommends that the unwrapped object receive the equivalent of full-cycle steam sterilization and not flash sterilization. **Flash sterilization is not recommended for implantable items.** The problem is not the sterilization process itself but the delivery of the unwrapped sterilized item to the sterile field without contamination. The biological monitoring process of the cycle only gives the assurance of cycle effectiveness.

All of the same parameters must be met before the item can be flash sterilized. Even in the OR, nothing must be taken for granted. In many instances, items come to the OR by courier, in plastic totes. Sometimes they are delivered by the sales rep that has been carrying the tray around in the trunk of his vehicle. When opening trays delivered in this fashion, we have found grass, sticks and even bone chips from previous cases. All outside trays must be decontaminated before the sterilization process can even be attempted. Hopefully, the sales rep would be able to provide the correct decontamination, packaging and sterilization information. If not, the manufacturer of the product will be able to tell you how to properly clean and sterilize the item or tray. For future reference, the department should keep a copy of the manufacturer's instructions available to the staff to insure the same care is taken each and every time the item or tray comes into the facility. And you don't have to keep reinventing the wheel.

If the item to be flash sterilized is an item dropped from the field, the circulating nurse should not pick up the item without first putting on gloves. The item can then be placed in a plastic bag and transported to the decontamination area. In decontamination, the item needs to be cleaned following manufacturer's specific instructions. Because of the need for the item to be flashed, the item is cleaned manually using warm water and a detergent that is appropriate for the item being cleaned.

There are some trays out there now that are specifically designed for use in a flash sterilizer, contact your manufacturer or sales rep to insure they are being used correctly. Once the items are cleaned, they should be positioned in the sterilization tray so that air removal and steam contact can take place easily. Only a few instruments at a time should be flash sterilized. If there is a full tray or multiple trays, the amount of time necessary to sterilize these instruments is increased because of the increased length of time it takes to get the load to sterilizing temperature due to the fact that metal instruments take longer to heat up. Also, a full tray of instruments is much more difficult to handle after sterilization without contaminating it in transport. Most ORs have an area they call the sub-sterile area where the flash sterilizer is kept. Personnel working in that area are required to wear hair coverings, surgical attire and masks. There should not be any sinks or trash disposal areas in the same area.

Once the items have been sterilized, the next challenge is the transfer of the sterilized items to the operating room where they will be used, without contaminating them. Items that are both hot and wet are magnets for airborne particles. For that reason, the transport of these sterile items must be thought thru before the items are removed from the flash sterilizer. First, we need to remember that these items will be **HOT!!!** The person removing these items from the sterilizer needs to be dressed in the appropriate surgical attire as well as a mask, sterile gloves and a sterile gown if there is any question at all about contamination possibilities. Sterile towels can be used as pot holders. If the tray is the right size, a sterile towel can be placed over the instruments to prevent possible airborne contamination, providing it can be done without contaminating the sterile items. A flat metal tray like a mayo tray can also be used, if the tray of instruments is too heavy to carry without contamination. This only works if the mayo tray is sterile and can be unwrapped sterilely. The flashed tray is removed from the sterilizer by personnel wearing sterile

Once the items are deemed ready for flashing, they are placed in an open, perforated or mesh bottomed tray. gloves, a mask and a sterile gown. It is placed on the opened, sterile mayo tray and covered with a sterile towel or drape to prevent airborne contamination. The drape must not be so large that it hangs over the edge of the table and has the potential for contamination due to coming into contact with an unsterile item. Just as in regular steam sterilizers, the flash sterilizer must be monitored the same way. We look at the chemical, biological, mechanical and Bowie-Dick type indicators. If you are using a metal flash container (the kind with a lid), an efficacy test must be done using a biological to ensure that the flash sterilizer you are using is set up to do sterilization using this particular style of container. AAMI has a document that addresses flash sterilization if you need to have further documentation to help your ORs improve their flash sterilization processes.

All healthcare professionals are responsible for understanding the flash process and we as Central Sterile technicians must have an adequate knowledge base in order to assist the OR to obtain good outcomes when using flash sterilization.

References:

Training Manual for Health Care Central Service Technicians, 5th edition, 2006

Here's hoping we'll be doing some of this really soon.



