



STERILIZATION EQUIPMENT FOR HEALTHCARE BUYING GUIDE

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According to the CDC, the disinfection and sterilization of medical devices and surgical instruments is essential for ensuring that infectious pathogens are not transmitted to patients.







Any time surgical instruments or medical devices encounter the internal tissues or mucous membranes of the body there is a risk that pathogens will be introduced that will lead to infection.

Hand hygiene, PPE, and safe needle practices top the list of measures for infection control. Sterilization equipment takes infection control in healthcare environments to the next level.

Understanding the types of sterilization in hospitals and identifying the medical sterilization equipment available in the market is a major step forward in preventing and eliminating healthcare-associated infections (HAI).

CME Corp. offers an array of laboratory, medical and hospital sterilization equipment to accommodate a broad range of sterilization requirements and budgets. This comprehensive guide and the CME team of product experts will help you choose the best sterilization equipment for your facility's needs.

In this buyer's guide we will delve into:

-  Understanding Sterilization in Healthcare
-  Importance of Sterilization Procedures
-  Types of Sterilization Equipment
-  Factors to Consider When Choosing Sterilization Equipment.
-  Best Practices for Sterilization Procedures
-  Buyer's Guide to Sterilization Equipment for Healthcare Facilities FAQs

UNDERSTANDING STERILIZATION IN HEALTHCARE

Medical Sterilization Definition

In the familiarity of the healthcare environment, surrounded by colleagues with similar professional backgrounds it is easy for healthcare professionals to relax and use terms interchangeably that are not truly synonymous.

To avoid this pitfall, we will be using the medical sterilization definition published by the CDC for this guide. As defined by the CDC,

sterilization *“describes a process that destroys or eliminates all forms of microbial life and is carried out in health-care facilities by physical or chemical methods.”*

The term is intended to convey absolute destruction of microbial life.

IMPORTANCE OF STERILIZATION PROCEDURES

Ensuring Patient Safety

Cleaning visible material from medical equipment and devices is a key step in ensuring patient safety. Cleaning prior to high-level disinfection and sterilization with sterilization equipment is essential.

The step of sterilizing medical devices and instruments in medical sterilization equipment completely destroys all microorganisms on the surface of an item. This complete destruction prevents pathogens, bacteria, spores, and the like from being transferred to a patient.

Even today, despite our best efforts, one out of every twenty-five hospitalized patients are affected by healthcare-associated infections. That is 1.7M infections each year. While we will never know exactly why HAIs still happen, we do know that inadequate sterilization practices related to hospital sterilization equipment may be a contributing factor.

Compliance with Regulations and Standards

Compliance with CDC sterilization guidelines such as exposing wrapped healthcare supplies for thirty minutes in an autoclave set to 250 degrees Fahrenheit are critical in the battle to eliminate HAIs. Anything less than compliance with this guideline will result in inadequately sterilized devices and instruments.

Proper sterilization of instruments with sterilization equipment is so vital that the World Health Organization (WHO) has published a comprehensive guide for infection control in healthcare environments that includes a section dedicated to sterilization methods.

Both the CDC and WHO work to establish universal standards and guidelines to ensure that populations the world over are protected from HAIs while they are at their most vulnerable.

TYPES OF STERILIZATION EQUIPMENT

Autoclaves

Autoclaves are the most common of the distinct types of medical sterilization equipment. Using pressurized steam as the method of disinfection, autoclaves are the most efficient and reliable.

There are two types of autoclaves, also known as steam pressure sterilizers.

- **Gravity Displacement Autoclaves** are the most common. They are a dependable and affordable option for sterilizing steel instruments, glassware, and biohazardous waste containers. These autoclaves pump steam into the chamber to displace the ambient air. Displaced air is forced through exhaust valves and the remaining steam fills the chamber, sterilizing the contents.
- **Vacuum or Pre-Vacuum Autoclaves** provide deeper sterilization for large or porous items like bedding and wrapped surgical kits. It is the vacuum function of this sterilization equipment that deepens the sterilization process. Ambient air is not just displaced, it is evacuated, leaving more areas open to the high-temperature steam.

Ethylene Oxide (EO) Sterilizers

EO Sterilizers use Ethylene Oxide (abbreviated EO or ETO) in a low temperature gaseous process to sterilize instruments or equipment that cannot tolerate elevated temperatures, plastics, or electronics for example.

During the process, the gas penetrates plastic or packaging without damaging it but sterilizes other surfaces. As the sterilization process is low temperature, the cycle time takes over 14 hours to complete.

Sterilization equipment that uses this method of sterilization accommodates items with inside tubing or products that have touching surfaces.

Although a thorough method of sterilization, ethylene oxide (EO) poses safety risks as it is flammable and carcinogenic to humans. This form of sterilization might only be used when other options are not available.

Hydrogen Peroxide Gas Plasma Sterilizers

Sterilization with hydrogen peroxide gas plasma is a relatively new method of sterilization.

Medical sterilization equipment used for this method of sterilization evacuates the air from the chamber and injects a vaporized hydrogen peroxide solution which diffuses through the chamber, sterilizing the contents.

Like sterilization with EO, this method of sterilization operates at a lower temperature making it compatible with plastics, electrical devices, and corrosion-susceptible metal alloys.

Hydrogen peroxide gas plasma sterilization equipment chambers are smaller than those of EO sterilizers. Compared with EO sterilization, hydrogen peroxide gas plasma has less efficacy than EO making it less effective in penetrating the hard-to-reach areas of the chamber contents.

Low-Temperature Sterilizers

Low temperature sterilization equipment, like EO and Hydrogen Peroxide sterilizers, use plasma gases to completely kill microorganisms.

These sterilizers are commonly used for the more delicate medical devices and instruments that cannot tolerate high temperatures or moisture.

While low temperature sterilization is widely used in healthcare facilities, the sterilization process is lengthy. The gases used are also potentially hazardous to patients and staff. Cost is another less than optimum factor associated with low temperature sterilization methods such as plasma gases can be expensive. Medical sterilization equipment used for low temperature sterilization may also require more frequent safety checks and specialized accessories.

Cold Sterilization

Another form of low temperature sterilization is cold sterilization. This process uses liquid chemical germicides as a sterilant. These germicides must be approved by the Food and Drug Administration. During the process, instruments are fully immersed in liquid germicide for at least twelve hours.

Not all instruments can be cold sterilized. To benefit from this process the items should be moisture resistant, relatively smooth, and exposed on all sides. Dental instruments, surgical forceps, and instruments with lenses are great examples.

Since the cold sterilization process is time consuming, this method is typically used when alternate medical sterilization equipment is not available for heat sensitive instruments. Also to consider, the effectiveness of cold sterilization cannot be verified with biological indicators.

The sterilizers discussed are all approved and effective for destroying and eliminating all microbial life in the healthcare environment. But not every method is appropriate for every setting. Choosing the best medical sterilization equipment for your health care environment is important.

FACTORS TO CONSIDER WHEN CHOOSING STERILIZATION EQUIPMENT

Facility Needs and Size

The first step in determining what type and size medical sterilization equipment is best for a healthcare facility is to consider the answers to questions such as:

- How often will devices and instruments need to be sterilized?
- How many devices and instruments will need to be sterilized?
- Will electronics need to be sterilized?
- Will bulky items such as bedding need to be sterilized?

Also consider the space available for sterilization equipment. Large hospitals and clinics may have dedicated areas for sterilization equipment while private practices or laboratories may only have limited counter space.

Sterilization Time and Cycle

In terms of cycle time for sterilizing devices and instruments, autoclaves are the most efficient and pose the least disruption to workflows.

However, healthcare environments that use equipment incompatible with high-heat and moisture will need longer running, low temperature medical or hospital sterilization equipment. Workflows in these environments may need to be choreographed to accommodate the longer sterilization process.

Material Compatibility

Unfortunately, not all medical devices and instruments are compatible with all methods of sterilization. The following table identifies the best sterilizer or sterilization method for common medical items.

	MATERIALS SAFELY STERILIZED
<p>GRAVITY AUTOCLAVES are best for non-porous items</p>	<ul style="list-style-type: none"> • Stainless steel surgical instruments and lab utensils • Polypropylene Pyrex® or Type I borosilicate glassware • Biohazard waste • Unwrapped instruments
<p>VACUUM AUTOCLAVES are best for sterilizing large or porous items</p>	<ul style="list-style-type: none"> • Media solutions in containers, like tissue culture flasks with loose caps • High-density polyethylene products, such as pipette tips and syringes • Wrapped dry items that can trap air
<p>EO STERILIZATION EQUIPMENT is best for items that cannot withstand high temperatures or moisture.</p> <p>EtO sterilization has the greatest efficacy of the low temperature methods.</p>	<ul style="list-style-type: none"> • Plastic or resin • Metals • Glass • Electronics • Items with multiple layers of packaging or wrapping
<p>HYDROGEN PEROXIDE GAS PLASMA sterilization is also best for items that cannot withstand high temperatures or moisture.</p>	<ul style="list-style-type: none"> • Some plastics • Electrical devices • Corrosion-susceptible metal alloys
<p>COLD STERILIZATION is best for items that are moisture resistant, reasonably smooth, and exposed on all sides.</p>	<ul style="list-style-type: none"> • Metals • Some plastics • Glass

Validation and Monitoring

Medical sterilization equipment should be routinely tested to validate that the Sterility Assurance Levels (SAL) are within established parameters for healthcare.

Most medical devices and instruments are sterilized to achieve a SAL of 10⁻⁶. This means that the probability of an item being nonsterile at the conclusion of the sterilization process is one in a million.

Validation cannot be performed by healthcare facilities. **The multistage process of validation may be conducted by manufacturers of sterilization equipment or qualified third parties.**

While the formal validation of equipment cannot be performed by healthcare professionals, monitoring can.

The CDC recommends monitoring sterilization procedures using mechanical and chemical indicators for every sterilizer load.

During sterilization cycles, clinicians should monitor pressure, temperature, and exposure time to determine if they have reached recommended levels. This observable information is recorded in facility sterilization records.

Indicator tapes that change color when exposed to high temperature and/or over time should be attached to the packaging of all items in the sterilizer. These tapes or markers are generally inspected immediately following a cycle.

To ensure patient safety, if any mechanical or chemical indicators indicate inadequate processing, those items should not be put into use.

BEST PRACTICES FOR STERILIZATION PROCEDURES

Staff Training and Compliance

Adherence to sterilization standards set by organizations like the CDC and WHO is essential to patient and staff safety.

To comply with set standards, sterilization procedures must be clearly defined and communicated to staff operating medical sterilization equipment or hospital sterilization equipment.

Ongoing training can ensure that staff are equipped to react to unexpected changes in routine or priorities without resorting to shortcuts to maintain the workflow. Policies related to training and competency assessment are specific to a healthcare facility or larger IDN.

Equipment Maintenance and Calibration

Over time sterilization equipment can fall out of calibration, require scheduled maintenance to maintain efficacy levels, or need to be validated to comply with local requirements. Continued use of sterilizers that do not comply with the sterilization standards set for sterilization equipment puts patients and staff at risk for healthcare associated infections.

CME's Biomedical Technicians perform testing with biomedical and chemical indicators, conduct full performance checks, electrical safety inspections, and temperature verifications on tabletop autoclaves. Combined, these tests and inspections satisfy full validation requirements.

In the battle to eliminate healthcare associated infections sterilization equipment is essential to all healthcare facilities regardless of size. Choosing the right sterilizer is a critical first step.

Whether looking for a small tabletop autoclave for private practice or larger standalone sterilizers for high volume hospitals and clinics, CME can help identify the best sterilization equipment based on facility specific sterilization requirements and available budget.

As a comprehensive healthcare equipment and turn-key logistics company CME will:

- work with purchasing and manufacturers' representatives to ensure that your orders are accurately to avoid restocking fees and delays.
- manage the logistics of receiving, inspecting, and delivering your medical sterilizers with Direct-to-Site services.
- keep your sterilizers in compliance with safety standards with our expert Biomedical Technicians.

Visit our website to explore our selection of sterilization equipment.

BUYER'S GUIDE TO STERILIZATION EQUIPMENT FOR HEALTHCARE FACILITIES FAQs

What are the guidelines for sterilization of surgical instruments?

Using a gravity displaced autoclave, the CDC recommends 30 minutes at 250° F for wrapped healthcare supplies. When a pre-vacuum sterilizer is used, the cycle time is decreased to 4 minutes at 270° F.

How do you handle sterilized equipment?

In ideal conditions sterilized equipment with intact packaging and stored in covered or closed cabinets can be safely stored for up to 96 weeks. Some methods of sterilization allow for instruments to be sterilized in closed packs which can then be stored.

What is the process of sterilization in hospitals?

There are three basic steps in the sterilization process:

- Cleaning/ Disinfection to remove excess debris and fluids.
- Packaging the items.
- Sterilization to kill all pathogens, bacteria, viruses, and spores.

When should “used” instruments be transported for sterilization?

Contaminated medical instruments should be placed in appropriate containers and transported for sterilization immediately or as soon as possible after use.