# Best Sterilization Method for Camera Equipment in Cardiac Surgery

Prepared by : sarwan faisal

## Introduction

Camera wires and lenses used in cardiac surgery are delicate, heat-sensitive devices requiring sterilization that won't damage their components. This report compares four sterilization methods—ethylene oxide (ETO), hydrogen peroxide plasma, Cidex (glutaraldehyde), and autoclaving (steam)—and identifies the most suitable method based on effectiveness and safety.

## Sterilization Methods

### Ethylene Oxide (ETO)

ETO gas sterilization kills microorganisms by disrupting DNA, working effectively at low temperatures (37–55°C).
Suitable for sensitive equipment; penetrates complex shapes and materials.

Requires long aeration to eliminate toxic residues, limiting immediate equipment use.

**Hydrogen Peroxide Plasma**

Plasma sterilization uses vaporized hydrogen peroxide that becomes plasma under vacuum, inactivating microorganisms at ~50°C.

Fast cycles, no toxic residue, suitable for heat-sensitive materials.

Limited penetration; may be less effective on complex devices.

**Cidex (Glutaraldehyde)**

A high-level disinfectant, Cidex kills most pathogens but is not a true sterilant.

No heat required; safe for some delicate materials.

Limited efficacy on bacterial spores; glutaraldehyde can be toxic. Cidex (glutaraldehyde) has several disadvantages: it's toxic, requiring careful handling; can damage some materials over time; and requires long contact times for effectiveness

**Autoclaving (Steam Sterilization)**
**Overview:** Uses high-pressure steam at 121–135°C, effective against all microorganisms.
Highly effective sterilization.
High temperatures and moisture can damage sensitive electronics.

**Recommendation**

**Hydrogen Peroxide Plasma** is recommended for sterilizing camera equipment in cardiac surgery due to its low temperature, fast cycles, and absence of toxic residues. **Ethylene Oxide** is a viable alternative but requires longer aeration time.

**Which type of sterilization is used for sterilizing (camera wire and camera lenses ) in cardiac surgery?**

In the U.S., low-temperature sterilization methods are used to protect sensitive medical equipment, including camera lenses and wires:

1. **Hydrogen Peroxide Gas Plasma**: Effective at killing microorganisms without damaging electronics; it uses reactive radicals at low temperatures.
2. **Ethylene Oxide (ETO) Gas**: A slower process but highly effective, ETO gas is ideal for complex or delicate items sensitive to heat and moisture.
3. **Vaporized Hydrogen Peroxide (VHP)**: VHP provides lower-temperature sterilization and is suitable for electronics but may have lower penetration compared to ETO

**References:**


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