

Table 6. Summary of advantages and disadvantages of commonly used sterilization technologies.

Sterilization Method	Advantages	Disadvantages
Steam	<ul style="list-style-type: none"> · Nontoxic to patient, staff, environment · Cycle easy to control and monitor · Rapidly microbicidal · Least affected by organic/inorganic soils among sterilization processes listed · Rapid cycle time · Penetrates medical packing, device lumens 	<ul style="list-style-type: none"> · Deleterious for heat-sensitive instruments · Microsurgical instruments damaged by repeated exposure · May leave instruments wet, causing them to rust • Potential for burns
Hydrogen Peroxide Gas Plasma	<ul style="list-style-type: none"> · Safe for the environment · Leaves no toxic residuals · Cycle time is 28-75 minutes (varies with model type) and no aeration necessary · Used for heat- and moisture-sensitive items since process temperature <50°C · Simple to operate, install (208 V outlet), and monitor · Compatible with most medical devices · Only requires electrical outlet 	<ul style="list-style-type: none"> · Cellulose (paper), linens and liquids cannot be processed · Sterilization chamber size from 1.8-9.4 ft³ total volume (varies with model type) · Some endoscopes or medical devices with long or narrow lumens cannot be processed at this time in the United States (see manufacturer's recommendations for internal diameter and length restrictions) · Requires synthetic packaging (polypropylene wraps, polyolefin pouches) and special container tray • Hydrogen peroxide may be toxic at levels greater than 1 ppmTWA
100% Ethylene Oxide (ETO)	<ul style="list-style-type: none"> · Penetrates packaging materials, device lumens · Single-dose cartridge and negative- pressure chamber minimizes the potential for gas leak and ETO exposure · Simple to operate and monitor · Compatible with most medical materials 	<ul style="list-style-type: none"> · Requires aeration time to remove ETO residue · Sterilization chamber size from 4.0-7.9 ft³ total volume (varies with model type) · ETO is toxic, a carcinogen, and flammable · ETO emission regulated by states but catalytic cell removes 99.9% of ETO and converts it to CO₂ and H₂O · ETO cartridges should be stored in flammable liquid storage cabinet · Lengthy cycle/aeration time
ETO Mixtures 8.6% ETO/91.4% HCFC 10% ETO/90% HCFC 8.5% ETO/91.5% CO ₂	<ul style="list-style-type: none"> · Penetrates medical packaging and many plastics · Compatible with most medical materials · Cycle easy to control and monitor 	<ul style="list-style-type: none"> · Some states (e.g., CA, NY, MI) require ETO emission reduction of 90-99.9% · CFC (inert gas that eliminates explosion hazard) banned in 1995 · Potential hazards to staff and patients · Lengthy cycle/aeration time · ETO is toxic, a carcinogen, and flammable
Peracetic Acid	<ul style="list-style-type: none"> · Rapid cycle time (30-45 minutes) · Low temperature (50-55°C liquid immersion sterilization) · Environmental friendly by-products · Sterilant flows through endoscope which facilitates salt, protein and microbe removal 	<ul style="list-style-type: none"> · Point-of-use system, no sterile storage · Biological indicator may not be suitable for routine monitoring · Used for immersible instruments only · Some material incompatibility (e.g., aluminum anodized coating becomes dull) · One scope or a small number of instruments processed in a cycle • Potential for serious eye and skin damage (concentrated solution) with contact

Modified from Rutala.⁸²⁵

Abbreviations: CFC=chlorofluorocarbon, HCFC=hydrochlorofluorocarbon.