**Health problem addressed**

Ethylene oxide sterilizers are used to sterilize heat- and moisture-sensitive devices that would be damaged by pure steam or liquid chemical sterilization, including most plastic or rubber products (e.g., catheters, resuscitation bags, anesthesia masks, most fiberoptic instruments), as well as non-heat-sensitive devices.

**Product description**

Ethylene oxide sterilizers are comprised of a sterilizing chamber with an air inlet (containing a bacteria-retentive filter); a steam inlet; gas conditioner; vacuum pump; EtO cylinder; and a vacuum system to vent the gas from the chamber to an exhaust drain and/or directly to the outside.

**Principles of operation**

Chambers are heated by electrical resistance or by steam contained in a jacket surrounding the chamber. The sterilization cycle usually consists of four phases: conditioning, exposure (sterilizing), exhaust, and air purge. In the conditioning phase, a vacuum pump or water ejector withdraws air from the chamber and allows controlled amounts of moisture or steam to be released by a chamber heating system, thereby raising the relative humidity. Typically, after humidification, EtO or an EtO/diluent mixture is injected into the chamber, initiating the exposure phase. In the exhaust phase, the vacuum system vents the gas from the chamber to an exhaust drain and/or directly to the outside. Most sterilizers purge the chamber with fresh, filtered air to prevent gas buildup from items degassing in the chamber. The sterilized contents are then aerated to remove EtO residue either within the sterilizer chamber or in a separate aerator.

**Operating steps**

- Items to be sterilized are cleaned of contaminants and are rinsed with distilled or demineralized water to remove any detergent or tap-water residues.
- Items are placed in packs and loaded into baskets or carts and placed inside the sterilizer chamber for the duration of the process.

**Reported problems**

EtO is a potent neurotoxin, a known human carcinogen, a potential reproductive hazard, and an allergic sensitizer. Acute overexposure causes conjunctival, skin, and respiratory tract irritation, as well as headache and nausea. Skin contact with inadequately aerated material can cause severe burns to workers and patients. Chronic exposure can result in significant toxicity to the nervous system, and extremely high exposure can cause decreased consciousness, cyanosis, and pulmonary edema. When changing EtO cylinders or cartridges, employees should avoid exposure to both the vapor and the liquid forms of EtO.

**Use and maintenance**

User(s): Central sterile processing technicians

Maintenance: Biomedical engineering staff and/or service contract with the manufacturer or third-party organization; OEM servicers

Training: Initial training by manufacturer; operator’s manuals; user’s guide

**Environment of use**

Settings of use: Hospital central sterile processing department; hospital surgery departments

Requirements: Stable power source; water; steam (unless electric powered); drain; ventilation

**Product specifications**

Approx. dimensions (mm): 508 x 457 x 787 for portable units; 1981 x 894 x 800 for freestanding units

Approx. weight (kg): 39 for portable units; 286 for freestanding units

Consumables: Ethylene oxide gas; plastic wrapping; muslin wraps

Price range (USD): 5,000-6,000 (5,500 typical) for portable units; 20,000-54,000 (42,000 typical) for freestanding units

Typical product life time: 12 years

Shelf life (consumables): NA

**Types and variations**

- Freestanding (pit-or floor-mounted or on racks)
- Portable
- Steam- or electric resistance-heated