

## METHODS OF STERILIZATION

There are four sterilization methods used in medical and dental offices:

1. **Steam (autoclave) sterilization**
2. **Chemical vapor sterilization**
3. **Dry heat sterilization**
4. **Ethylene oxide gas sterilization**

Each of these methods, when used properly, will achieve sterilization. Effective sterilization is dependent upon the ability of the sterilant (e.g., saturated steam, heat or gas) to have direct contact with all surfaces of the device or product being sterilized, for a specified time at a set temperature. Proper techniques in cleaning, preparation, packaging, and placement of supplies in the sterilizer chamber are critical for successful sterilant contact.

### **Steam sterilization**

Moist heat in the form of saturated steam under pressure is the sterilant used in the steam sterilizer (autoclave). Steam sterilization is the least time consuming, and the preferred, method of sterilization for heat and moisture stable medical devices. In steam sterilization it is important that the ambient air in the chamber and contents be completely removed at the beginning of the cycle so that the saturated steam can have direct contact with the items being sterilized. There are three main types of steam sterilization cycles: gravity, pre-vacuum, and flash.

In the gravity cycle, air is displaced by steam entering the chamber. In the pre-vacuum cycle, air is removed very quickly by mechanical means. The flash cycle is for quickly sterilizing unwrapped medical devices that are to be used immediately after sterilization. The flash cycle can use either gravity or pre-vacuum air removal. Flash sterilization is intended only for emergencies where an instrument is needed immediately (e.g. dropped instrument). It is not intended as a primary method of sterilization.

### **Chemical vapor sterilization**

Unsaturated chemical vapor (a mixture of alcohol, water, ketones, and formaldehyde heated under pressure) is a typical sterilant used in this method of sterilization. Because of the low moisture content of unsaturated chemical vapor, it will not cause rust and corrosion on carbon steel instruments. Chemical vapor sterilization requires proper ventilation for post-cycling fumes. Formaldehyde has been shown to be a carcinogen; therefore, as with all chemicals employed in your practice, users must follow strict OSHA standards to protect employees and patients from exposure.

### **Dry heat sterilization**

Hot air is the sterilant used in the dry heat sterilizer (hot air oven). It is a slow process because it depends upon higher temperatures to incinerate microorganisms. This method of sterilization is used for heat-stable, moisture-sensitive, or steam impermeable medical devices and products. The Cox dry heat sterilizer is a rapid cycle dry heat sterilizer and is typically run for six minutes at 375°

### **Ethylene oxide sterilization**

Ethylene oxide (EtO) is the sterilant used for gas sterilization. This method of sterilization is used for heat-sensitive items. OSHA has concluded that exposure to EtO can increase the risk of serious adverse health effects, including cancer and reproductive health hazards. Users must comply with OSHA standards in order to reduce the risks of worker exposure to EtO. EtO sterilization process is seldom used in office-based practice because of the long sterilization and aeration times required.