



# Safe management of wastes from health-care activities

## A summary



World Health  
Organization

thus the location of the treatment and/or ventilation options should be considered.

Steam treatment can be combined with mechanical methods like shredding, grinding, mixing and compaction to reduce waste volume, however, it does not destroy pathogens. Shredders and mixers can improve the rate of heat transfer and expose more surface area of waste for treatment. Mechanical methods should not be utilized for infectious and sharp waste before the waste is disinfected, except if the mechanical process is part of a closed system that disinfects air before it is released to the surrounding environment.

**Autoclaving:** Autoclaving is the most common type of steam treatment and utilizes saturated steam under pressure to decontaminate waste. Potential infected air evacuated from the autoclave is filtered effectively (e.g. through a high efficiency particulate air (HEPA) filter). Autoclaves operate at temperatures of 121°C to 134°C. Autoclaves which do not have an integrated shredder should ensure that the air is removed from the autoclave chamber before the waste is decontaminated (e.g. by a vacuum pump), as air remaining in the waste can inhibit the decontamination efficiency of the autoclaving process.

**Microwave:** Microwaving technology heats the water contained in the waste by microwave energy. Some microwave based devices include transformation systems like blending or shredding. Some systems are designed as batch processes and others are semi-continuous. A typical semi-continuous system uses a HEPA filter to prevent release of airborne pathogens. Waste goes through a shredder, and the waste particles are conveyed through an auger (conveyor screw) where they are further exposed to steam and heated to 100°C by microwave generators.

**Frictional heat treatment:** This treatment is based on friction and grinding of the waste in a moist environment. The treatment process takes place inside a chamber by means of a high-speed rotor. The temperature rises to 150°C and is held for the time necessary to achieve sterilization. When all the liquid contained in the waste has evaporated, it is brought to dry, superheated conditions. The residue is a dry and unrecognizable product with reduced volume.

## 6.2 Incineration

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Incineration is a high-temperature (850°C to 1100°C) dry oxidation process that reduces organic and combustible waste to inorganic, incombustible matter and results in a very significant reduction of waste volume and weight. In accordance with the Stockholm Convention, the best available technology should be used to