Steam Pressure Sterilizer Encyclopedia Article

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Steam Pressure Sterilizer

Steam pressure **sterilization** requires a combination of pressure, high temperatures, and moisture, and serves as one of the most widely used methods for sterilization where these functions will not affect a load. The simplest example of a steam pressure sterilizer is a home pressure cooker, though it is not recommended for accurate sterilization. Its main component is a chamber or vessel in which items for sterilization are sealed and subjected to high temperatures for a specified length of time, known as a cycle.

Steam pressure sterilizer has replaced the term autoclave for all practical purposes, though autoclaving is still used to describe the process of sterilization by steam. The function of the sterilizer is to kill unwanted **microorganisms** on instruments, in cultures, and even in liquids, because the presence of foreign microbes might negatively affect the outcome of a test, or the purity of a sample. A sterilizer also acts as a test vehicle for industrial products such as plastics that must withstand certain pressures and temperatures.

Larger chambers are typically lined with a metal jacket, creating a pocket to trap pressurized steam. This method preheats the chamber to reduce condensation and cycle time. Surrounding the unit with steam-heated tubes produces the same effect. Steam is then introduced by external piping or, in smaller units, by internal means, and begins to circulate within the chamber. Because steam is lighter than air, it quickly builds enough mass to displace it, forcing interior air and any air-steam mixtures out of a trap or drain.

Most sterilization processes require temperatures higher than that of boiling water (212°F, 100°C), which is not sufficient to kill microorganisms, so pressure is increased within the chamber to increase temperature. For example, at 15 psi the temperature rises to 250°F (121°C). Many clinical applications require a cycle of 20 minutes at this temperature for effective sterilization. Cycle variables can be adjusted to meet the requirements of a given application. The introduction of a vacuum can further increase temperature and reduce cycle time by quickly removing air from the chamber. The process of steam sterilization is kept in check by pressure and temperature gauges, as well as a safety valve that automatically vents the chamber should the internal pressure build beyond the unit's capacity.