

TECHNICAL BULLETIN

Wet and Superheated Steam

The key benefit from steam comes from the tremendous amount of energy released when it condenses. It releases 538 calories of heat energy for every gram of steam condensed. Items underwater will not see the condensing steam, and superheated steam might not condense at all.

Wet steam can come from a number of sources. It can come from the steam line into the sterilizer, and it can be created inside the sterilizer itself. If the steam line is suspected, excessive condensate can be present in the pipes. If a portion of the steam line is vertical, condensate can run down the inside of the pipe and collect at the bottom until it forms a slug of water. This slug can then be expelled over into the sterilizer all of a sudden. Vertical sections of pipe should have a condensate trap at the bottom.

Steam can come from a boiler located a long distance from the sterilizer. Other departments may draw steam from the central boiler, causing the steam quality to deteriorate by the time it reaches the sterilizer. This may happen at different times of the day, for example, when the cafeteria needs steam to heat their dishwashers. If steam quality is wet, then a steam separator may be required to dry the steam before it enters the sterilizer.

The jacket temperature may be too low, causing the steam to condense on the inside of the chamber and drip into the load. Wet steam can also be caused by overloading and stacking of heavy instrument trays. The heavy tray rains condensate down on items below. The door of the sterilizer is not insulated and will have condensate running down it. Do not allow items to touch it. The condensation trap in the drain must function properly to allow normal condensate to drain away. A malfunctioning trap will allow the water to collect and can cause wet packs from below. Sometimes a ring can be seen around the bottom of the chamber where the water level is indicated if the trap is not functioning. It takes twice as long to sterilize under water. Excessive condensate is a problem that cannot be ignored.

Superheated steam can also come from inside or outside the sterilizer. Steam expands as it enters the sterilizer. Steam pressure in the line should never be more than twice the sterilizer pressure. Steam expansion (called adiabatic expansion) causes superheat that is normally seen at the top and back of the sterilizer. This is typically where lighter items are placed. Instruments and other heavy items can overcome superheat because they have a lot of thermal mass and will allow condensation to take effect. Lighter items are more vulnerable to superheat because they may not have enough mass to cause condensation. Dry cottons can create superheat just from contact with steam. Cellulose hydration is exothermic; the temperature rises in dry cottons just from moisture. Make sure cottons and linens are not excessively dry before sterilization. They should be stored above 30% RH for one hour before sterilizing.



74 Inverness Drive East Englewood, CO 80112 (303) 660-4201
www.getinge.com/steritec