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## TECHNICAL PUBLICATION

INFORMATION & STRATEGY FOR THE  
FACILITY MANAGER

# CLOSED LOOPS - BACTERIAL CONTAMINATION and STERILIZATION

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Once a closed loop is contaminated, bacteria will enter every nook and cranny of the closed loop, spreading like cancer. To ensure complete sterilization, you must ensure that the biocide gets into every part of the system, through proper circulation. Failing to do so will only cause some of the bacteria to hide out in these areas, only to recontaminate the main water loop later. This article will point out some of the excellent hide-out areas.

## Expansion Tanks

Expansion tanks are installed to absorb the expansion and contraction cycles of water, to prevent pipe bursting. There is no direct water flow through expansion tanks.

During sterilization process, drain the expansion tanks to allow biocide to enter. Otherwise, the bacteria will survive and will be re-introduced to the main loop during the expansion/contraction cycles.

## Secondary Loops

These are loops that service specific areas, i.e., a specific room or floor. These loops open and close depending on the HVAC demand.

During the sterilization process, make sure that all secondary loops are opened. If not, biocide will not enter these areas. When these loops are re-opened, all the bacteria will be flushed into the main loop, re-contaminating the system.

## Drip Legs

Drip legs are installed to catch dirt. Some of the drip legs are several feet long. They entrap bacteria like expansion tanks.

During the sterilization process, drain these legs to allow the biocide to get in. Otherwise, the bacteria will survive and re-contaminate the main loop.

## Dead Legs

Dead legs are supply and return pipes that go nowhere. These pipes are sometimes installed for future expansion. Some dead legs were once used to supply water to certain equipment, but are now discontinued,

and the pipes are simply capped off, trapping stagnant water.

During sterilization process, drain the dead legs or cross-connect the supply and return pipes to allow biocide to enter. Otherwise, the bacteria will survive and will be re-introduced to the main loop during the expansion/contraction cycles.

## Two Pipe Systems Cross-Connects

Two pipe systems use the same supply and return pipes for both cooling and heating. At any given HVAC mode, there will be areas where a pipe run is isolated, entrapping water and bacteria. For example, if the HVAC is in the heating mode, the pipes leading to the chiller will be isolated, and vice versa.

During the sterilization process, open all cross-connects, to ensure that all connecting loops are also being sterilized.

## Dual Systems

Dual systems, such as, dual recirculating pumps, dual heat exchangers, etc., where only one runs at a time and the other is used for back up. When back ups are not running, there's no water flow through them, thus not allowing biocide to enter these areas.

During the sterilization process, alternate the main systems with back-ups every hour to ensure complete sterilization.

**Once the sterilization is completed, it is imperative that a maintenance bio-program be implemented for several weeks or even months, depending on the complexity of the closed loop, until all traces of bacteria are eliminated.**