ThermOmegaTech®

FULL STEAM AHEAD: SANITIZING WITH STEAM AND HOT WATER

UTILIZING STEAM AND HOT WATER IN MANUFACTURING AND FOOD PROCESSING FACILITIES

About Steam

Steam has long been harnessed for its power in applications such as ships at sea and manufacturing on land. Most facilities and plants have steam incorporated in some way for energy, and many utilize steam and water washdown as a tool for effective sanitization.

Steam Used for Energy

Steam can hold five or six times as much potential energy as an equivalent mass of water, being far more efficient. Consequently, large amounts of water must be pumped around the system to satisfy process or space heating requirements. No pumps are required to circulate steam. However, steam does require steam traps and boiler blowdowns.



The use of steam is environmentally responsible. Companies continue to choose steam because it is generated with high levels of fuel efficiency. Steam does not create a temperature gradient along the heat transfer surface, unlike water and thermal oils, which may provide a more consistent product quality.

Current Misconceptions of Steam

Steam is traditionally thought of as outdated technology or dangerous. Certainly, steam has the potential to cause harm; however, anything can be dangerous if employees are not properly trained in safety procedures and if those procedures are not followed.

Steam can be utilized safely as long as you follow proper guidelines and wear the appropriate Personal Protection Equipment (PPE) when operating it. There are even safety benefits to using steam, as it cannot cause sparks and presents no fire risk.

Efficiently Using Steam in Sanitization Procedures

Food and beverage processing, pharmaceutical, and chemical manufacturing facilities can offer microscopic places for germs and pathogens to hide, especially in worn parts or cracks and scratches in the equipment. Utilizing proper sanitizing procedures and good equipment maintenance can eliminate those germs.

Traditional cleaning methods consist of soap and hot water and sometimes chemical disinfectants. These procedures may require breaking down equipment to ensure all components are efficiently cleaned and sanitized.

The National Library of Medicine has different definitions for cleaning, disinfecting, and sanitizing. Cleaning with soap, detergent, and water removes obvious particles and dirt to physically clean off surfaces of objects but does not necessarily kill germs.

Disinfecting uses chemicals like bleach or alcohol solutions to kill germs on surfaces. You typically need to leave the disinfectant on the surfaces and objects for a certain period of time to kill the germs, and it doesn't always entirely clean the surface and completely get rid of all the germs.

Sanitizing can be done by either cleaning, disinfecting, or both. Sanitizing means that you kill bacteria on surfaces, lowering the number of germs to a "safe" level. The standards of "safe" will vary based on industry.



The United States Department of Agriculture (USDA) states that sanitizing reduces the number of foodborne illness-causes pathogens. Simply put: sanitizing kills bacteria.

When chemicals are used to sanitize within food and beverage processing plants, labor costs, the possibility of safety hazards, and the overall sanitization time increase. Using a steam and water washdown station to sanitize instead increases uptime and maintenance safety, preventing cross-contamination and the growth of organisms that can make food products unsafe.

Steam and cold water from the plant are supplied to the washdown station, which mixes the two mediums to provide an output of very high-temperature water. Using steam as the heat energy source for these stations, compared to water-to-water mixing stations, soap-and-water cleaning, or chemical disinfectants, has several benefits.

Benefits

- Steam and water mixing stations provide instantaneous high-temperature steam-heated water with pressure behind it, which can kill bacteria, sterilize, and break down greases and other residues in processing plants. The World Health Organization states that bacteria are rapidly killed at temperatures between 149°F and 185°F degrees.

- The cost of steam as an energy resource is extremely valuable. Most boilers run on natural gas as the primary fuel type. When natural gas is cheap, the cost to produce steam is low compared to other fuel sources. The system efficiency is even higher if the plant can return the condensate to the boiler. When factoring in the amount of volume that the steam occupies in the pipe, as it is compressible, it allows more energy transfer per pipeline distribution size than water or electricity. Steam as an energy source packs way more BTUs per pound.

Many food processing plants are still using mops, detergent, and some relatively hot water, not realizing that this won't eliminate potential cross-contamination, the presence of microorganisms, and related issues; hot water coming out of a faucet is not hot enough to kill the bacteria.

Steam and water mixing stations provide a simple-yet-efficient and practical way to sterilize surfaces. Using steam to heat water prevents cross-contamination and stops the proliferation of microorganisms that can make food products unsafe to eat.

Sanitizing all equipment used during production can kill germs and microorganisms that can contaminate the equipment, thus contaminating the food as well as avoiding cross-contamination.

This equipment consists of conveyer belts, pasteurizers, coolers, mixers, sorting and packaging machines, and any machines in the meat, confectionary, brewing, wine, or dairy processing manufacturing plants. Sanitizing with high-temperature water ensures safety and hygiene within processing plants.

When utilizing steam-heated water to sanitize manufacturing equipment, there's less downtime for dismantling and reassembly. Steam is sterile as well as being an excellent carrier of heat. Harmful chemicals are also used less or not at all, allowing for more uptime and a safer environment for personnel; while they are doing their jobs.

According to a study published by the National Library of Medicine and the National Center for Biotechnology Information, high-temperature water is just as effective as using water and detergent with microfiber cloths to disinfect and clean an area such as a hospital's intensive care unit.

But Can Steam Do Better?

Using steam to heat the water to a higher temperature was found to have an additional benefit over chemical cleansing because it avoids the use of chemical agents and can reduce labor times and water consumption. That's not to say that just anyone can utilize high-temperature washdown stations; personnel must be trained on proper use to ensure safety. The goal is to sanitize, and the goal of the plant is safety.

According to the United States Food & Drug Administration (FDA), the Code of Federal Regulations Title 21, Subchapter F-Biologics, a physical establishment's work areas (Part A) must be kept orderly, clean, and free of dirt, dust, and items not required for manufacturing. Protocol for sterilizing equipment needs to ensure the destruction of contaminating microorganisms.

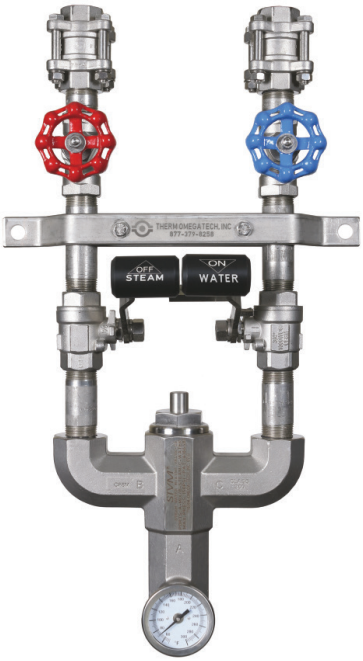
While there are many facets to manufacturing and food processing protocols, steam can help ensure this level of cleanliness and sanitation of all items used in a manufacturing plant.

What ThermOmegaTech Offers

Washdown stations ensure cleanliness in food processing, dairy, breweries, wineries, chemical, petrochemical, pharmaceutical, and other industrial facilities where a high-temperature washdown is required.

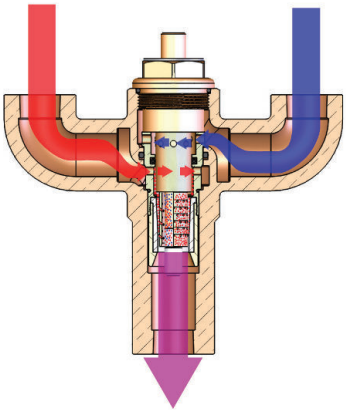
ThermOmegaTech's STVM® Steam & Water Washdown Station has been designed to put the safety of maintenance operators first. The STVM® Steam & Water Washdown Station incorporates unique Venturi mixing technology to deliver water at the required temperature quickly, quietly, and on-demand.

Cold water enters the upper chamber of the mixing valve, while incoming steam enters the lower chamber. Mixing occurs as the two collide, thoroughly mixing and heating the water through a Venturi diffuser with minimal noise and vibration.



How the STVM Will Help in These Industries

The ‘ST’ in STVM stands for ‘Silent Type,’ meaning it is quieter than other washdown mixing stations. The Venturi effect mixes water in smoother than other steam-to-water mixing stations on the market, which can cause cavitation downstream of the mixing valve. The STVM is around 20dB less than most competitor units because of the Venturi mixing technology.

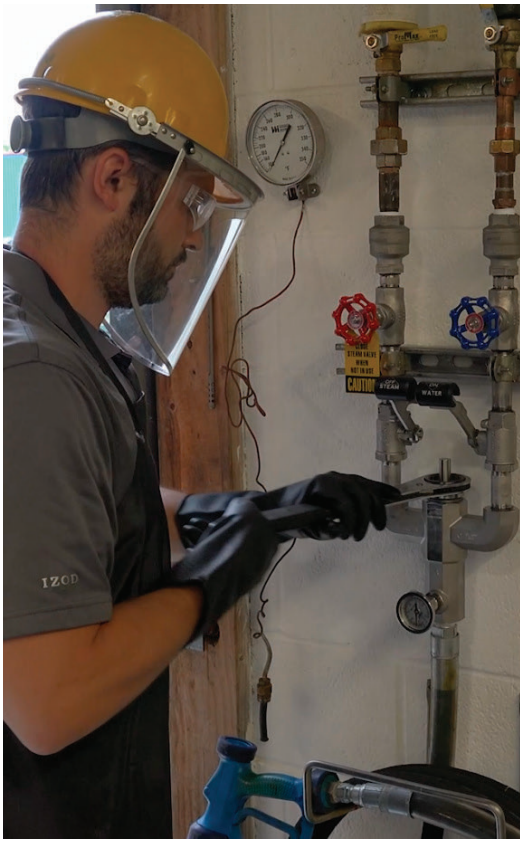


OSHA has safety standards for noise levels in different areas. Depending on different maximum decibel levels and hours of exposure, hearing protection may be required. Typically, around the 80dB level is a specified maximum for equipment from engineering firms.

The steam-supplied station is a self-contained mechanical control unit, so it doesn’t require external hookups for electrical, instrumentation controls, or compressed air.

Maintenance and Safety of STVM

Every STVM® Washdown Station is built-to-last and has two built-in safety features – interlocking ball valves to prevent steam-only operation and an automatic shut-off when output is 15°F over the unit’s temperature set-point (either 150°F or 185°F) or when cold water flow is interrupted.



Maintenance and upkeep of washdown stations are important factors for maintenance staff. The patented mixing design of the STVM washdown station ensures extended, uninterrupted use even if there is high mineral content in the water.

As the opposing vortices of steam and water enter the mixing valve, a scouring action minimizes the buildup of minerals and scale.

During routine maintenance procedures, there is no need to remove the station from its operating location or disconnect the mixing valve body since the only moving component within the station is the thermal actuator inside the mixing valve cartridge.

The cartridge can easily be removed with a standard wrench and quickly replaced allowing the station to be serviceable in-line. A single cartridge replacement takes only five minutes to remove the old one and install a new one.

In contrast, competitor units require removal of the station from the wall or enclosure, and the disassembly of the unit which could require the use of special tools.

Steam is a simple, reliable, mechanical, and highly efficient method to transfer heat energy to a plant’s system processes. In washdown stations, steam is clean, pure, and safe to operate with the proper safety procedures.