



# THERMA-KLEEN

## INDUSTRIAL DRY VAPOR CLEANERS

### Industrial Plant Sanitation Using the Dry Vapor Process

#### OBJECT OF PLANT SANITATION

An effective program for the sanitation of food and pharmaceutical facilities must accomplish following:

- Clean - it must be free of materials that promote the growth of microorganisms.
- Sanitized – pathogens must be either destroyed or reduced to a safe level.

#### TRADITIONAL METHOD

Normally this process involves several steps:

- Pre-rinse with water, removing dirt and product.
- Wash with chemical cleaning agents to clean equipment (chemicals leave toxic residue)
- Rinse to remove chemical residue.
- Apply a sanitizing agent in an effort to kill pathogens.

The facility must then test the area to determine if they meet the proper level of sanitation. The traditional processes do not ensure that all potentially dangerous pathogens have been eliminated for the following reasons:

- There are many areas where water can't be used like around electrical motors, controls, etc.
- Process equipment has a multitude of small spaces where product finds its way into. Traditional sanitizing process does not adequately remove this material.
- Not all types of bacteria elimination can be addressed with just one type of chemical agent. Since not all bacterial harboring material has not been removed, there is the real possibility that pathogens can become exposed to food production during the normal manufacturing processes.
- If water is used to try and force product from these small spaces, there is the real possibility that the water can remain in some areas and facilitate the growth of bacteria & mold.

#### THERMA-KLEEN® DRY VAPOR METHOD

The basic physics behind why Dry Vapor is so efficient, is that the high temperature low moisture vapor produces vapor droplets which are Nano sized, allowing them to enter the tiniest of opening, and when these hot vapors encounter the cool surfaces, they will violently expand expelling residue.

Therma-Kleen® Dry Vapor provides sanitization and offers infection control of listeria, e-coli, salmonella and other pathogenic microorganism's on food processing equipment.

#### HIGH TEMPERATURE:

- Therma-Kleen® boilers produce water up to 380° F
- Heat over 248° F effectively and efficiently kills pathogens.



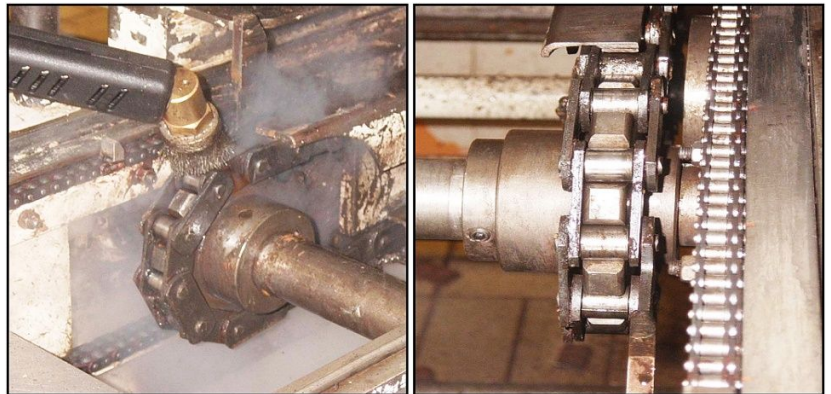
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- Heat eliminates the possibility of bacteria developing resistance to chemicals.
- Heat melts oils & greases making them easy to wipe up and remove.
- Heated surfaces dry quickly.



#### LOW MOISTURE:

- 5% to 6% water content, which equates to 3 to 15 gallons of water usage per hour (depending on settings) as opposed to 150 gallons or more per hour for pressure washing.
- Low moisture means it can be used around electrical equipment and controls without danger of causing damage. There is no need for time consuming masking off areas prior to cleaning.
  - Therma-Kleen® Dry Vapor systems can even be used to clean computer circuit boards using the proper protocol
- Up to 95% reduction in water consumption over pressure washers which equates to reduced waste water disposal cost.
- With little water to clean up equates to labor savings.
- Low water usage means Therma-Kleen® Dry Vapor can be used in areas without drains.
- Low moisture and high heat leaves surfaces dry and ready for almost immediate use reducing downtime.
- Low moisture (usually less than ambient humidity) will not cause an increase in humidity.
- Low moisture reduces the possibility of scalding.



#### LOW PRESSURE:

- Discharge pressure of around 180 psi compared to 1000 to 3000 psi for pressure washers
- Will not damage surfaces, bearing seals, motors, sensitive equipment, etc., so there is no need to protect them prior to cleaning.
- Minimal scattering of debris and moisture allows for adjacent equipment to remain running.
- Low pressure and minimal vapor moisture will cause powders and dry ingredients to fall to the floor in the immediate area.
- Reduced safety hazard to personnel.
- The ability to use Dry Vapor allows organic producers to maintain sanitation standards without chemicals



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