FOR EFFECTIVE, SAFE AND CHEMICAL FREE PEST MANAGEMENT… TURN UP THE HEAT!

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The process of using heat as a method of controlling pests is termed "heat sterilization" or " heat treatment." This method of using high temperatures to rid enclosed structures of insects has been used since 1900's. During heat treatment, the ambient air of all or parts of a facility is raised to temperatures that are lethal for insects.

Although heat has yet to achieve the popularity of chemicals, it has been proven to be more effective in killing insects. As methyl bromide continues to be phased out, heat is gaining more popularity and recognition as a viable and safe alternative to chemicals and fumigants.

Research Findings

Over the past several years, researchers at Kansas State University have been collecting data on the use of heat to effectively kill insects in food processing facilities. Their research found that insects die in less than an hour at 122 ºF. They also found that temperatures of 122 ºF, held for three or more hours, kills all exposed life stages of the red flour beetle and other stored product insects. During heat treatments, the lethal temperatures should be held for up to 24 hours for better air distribution and penetration of areas where pests hide, like cracks, crevices and electrical conduits.

TEMPERATURE RANGE	INSECTS' RESPONSE
95 – 107.6 ºF	**Lower survival; prolonged developmental time; reduced egg production; insects seek cooler environment**
107.7 – 113 ºF	**Death in less than a day**
114 – 122 ºF	**Death in less than an hour**
143.6 ºF	**Death in less than a minute**

Heat Treatment Using 100% Outside Air (Patented process # 6,141,901)

Using 100% outside air to heat treat an enclosed structure is an extremely effective means of controlling pests. The process uses a combination of direct fired, make up air heaters, fans and ductwork to control the flow of air and maintain a constant temperature throughout the treatment area.

Heaters are placed outside the building or in such a manner that outside air is drawn across the heat source. Using 100% outside air creates positive pressure within the building and allows for an even distribution of air throughout the facility. The process is engineered to generate four to six air changes per hour, pushing hot air into corners, cracks and crevices – making it virtually impossible for pests to hide anywhere. The use of outside air also lowers the relative humidity within the facility. Humidity plays a role in the length of time it takes to kill insects. By keeping the relative humidity at less than 30%, the insects die at a quicker rate.

Heat Treatment Using Recirculated Inside Air

When inside air is recirculated within the structure, the heat from the unit rises quickly and concentrates directly under the ceiling. Simply stated, cold air from uncontrolled infiltration points collect in the lower levels and hot air stratifies at the upper levels. There is no practical way to redistribute the stratified heat within the structure. It becomes a vicious cycle. The higher the discharge temperature, the faster the stratification and the more intense the cold air infiltration. No matter how many BTUs the unit generates, it will never produce a uniform level of controlled heat throughout the structure. Recirculating the inside air causes negative pressure within the building and an uneven distribution of heat. Because the infiltration is uncontrolled, there are no air changes.

Monitoring Temperatures in the Heat Treatment Area

There are three different methods for monitoring temperatures inside the heat treated areas.

1) Using HOBOs, a programmable device that is set up to record temperatures starting at a certain time and ending at another. A disadvantage of using this device is that you have to wait until the treatment is over and take the device to download the data recorded.
2) Technicians manually recording temperatures throughout the facility using a laser heat gun. In many cases, readings are not accurate because the device is not manufactures to work in that hot environment. The longer the gun is in the heat, the less accurate the readings.
3) Wireless sensors are placed throughout the facility to measure and log temperatures in the treatment area from an external location. The data is displayed and saved in the computer. A graph of temperatures versus time is displayed on the laptop screen. The advantage of this technology is that

you will be able to know what the temperatures are in the heat treated areas at all times without a physical presence inside (real time temperatures readings). Sensors are self calibrated and give accurate readings.