



## Recuperative Thermal Oxidizer

Efficient oxidation and energy recovery

Environmental regulations related to elimination of odors and process water and vapor purification require the application of integral technologies to ensure the use of the best available technologies to protect the environment. Thermal oxidation is widely accepted by legislative bodies and is proven to be the most efficient method of dealing with odor at rendering plants whilst reducing treatment and eventual water emissions to sewer.

The recuperative thermal oxidizer permits the thermal oxidation of gases and process vapors and produces useful steam for the cooking/drying process by recovering most of the energy from the oxidation process.

Today more than 40 thermal oxidizer systems from Haarslev Industries are working successfully in rendering plants around the world.

### Applications

The recuperative thermal oxidizer system is capable of purifying the gaseous effluents produced from the following emission points:

- Cooking vapors from cookers and dryers.
- Process air with VOC contaminants from the rendering process.
- Optionally, evaporated waste water from washing floors and vehicles.

The basic characteristics of these emissions can be summarized as process air containing volatile organic compounds (VOC).

The main objectives to be achieved are:

- Elimination of odors.
- Production of steam to cover the requirements of some or all of the rendering plant or equipment.
- Reduction of the contaminant load in the discharged water by eliminating the main source: the

condensed cooking vapors and optionally the waste water.

The VOCs are oxidized thermally with the effect of eliminating these organic smells. The hot gases from the oxidation process are then passed through a steam generator where energy is efficiently transferred to the boiler water to make steam for the rendering process.

### Process

The maximum temperature during the thermal oxidation process is 1742 °F and retention time is at least 1 second, conditions enabling the total oxidation of VOCs which are responsible for most of the odor load.

A recuperative thermal oxidiser consists of an automatic system for feeding cooking vapors and process air into a special combustion chamber insulated internally by special ceramic refractory materials.

Here the temperature is raised to above the threshold required to initiate oxidation into less harmful, odor-free components. The temperature is maintained for at least 1 second to achieve the best oxidation of the VOCs. The hot, oxidized reaction gasses are then passed through a boiler and/or a heat exchange unit, to recover energy in form of steam and/or heat for subsequent utilization in the rendering plant.

Finally, the gases are vented to the atmosphere via a chimney, at temperatures and emission levels well within those permitted by relevant regulations.

Design parameters and standards of Haarslev Industries are developed in-house and continually improved to give optimum performance and operation. Each oxidation solution is tailor-made and fully integrated in the process of the rendering plant.

## Design

The key to specifying a successful oxidation solution lies in accurate determinations of flows in the system. Haarslev Industries establishes the exact requirements for steam production, vapors and extraction air capacity and handling required at the specific plant. Furthermore, we have many years expertise in the design of applied systems to ensure all flows are perfectly controlled within precise limits to ensure perfect modulation and response of the oxidizer to these controlled inlet conditions.

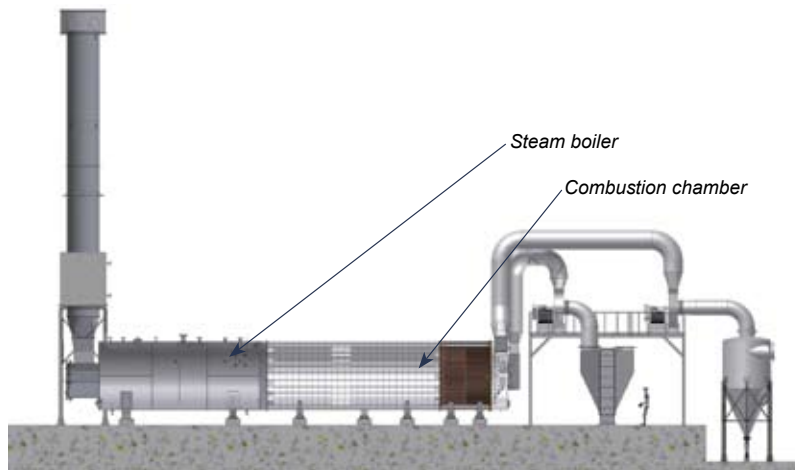
Selection of the burner is of major importance to the whole process. Haarslev Industries uses rotary cup burners which can be prepared for different types of fuel (tallow, gas, diesel, heavy fuel oil etc.) as specified by the customer.

## Energy recovery

The recuperative thermal oxidizer efficiently recovers energy from the hot gases emerging from the oxidation chamber in one, or both of the following ways:

- A boiler which generates a very high quality steam responding to the varying demands during processing, automatically modulating the required steam generation as and when required.
- Optionally, a thermal exchange unit can be used to preheat vapors and/or process air, to further increase the system efficiency by reducing fuel consumption per pound gases oxidized with consequential temperature reduction in chimney.

Short start-up time provides maximum flexibility in the rendering plant. The design of the oxidation chamber has proved to be stable, resistant and it allows the thermal oxidizer to start-up from cold and reach operational temperature within an hour. This feature permits the most cost effective use of the thermal oxidizer in most rendering plants with production shifts and daily or frequent shut-downs.



*We reserve the right to alter the specifications at any time without prior notice.*



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