

Safety Concept for other Processes where Organic Exhaust Gases Occur

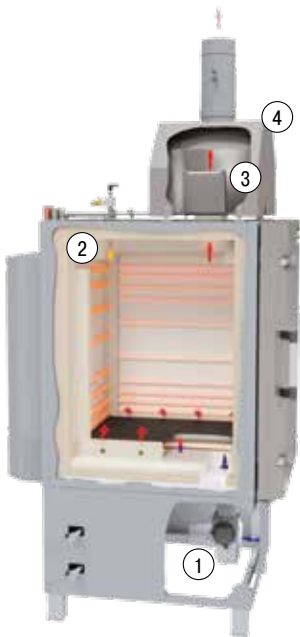
BO Safety Concept for Processes with High Organic Vaporization Rates

The BO safety concept is recommended for processes with high vaporization dynamics that are difficult to control. Diluting the furnace atmosphere with air is not sufficient to guarantee non-ignitable mixtures in the furnace. Examples of this are processes with high binder amounts or rapid vaporization rates. This furnace concept is also suitable for processes in which the product is incinerated through ignition.

Like for the debinding safety packages, air is constantly supplied to the furnace atmosphere to ensure a constant surplus of air. If the amount of fresh air is not sufficient and an ignitable mixture forms in the atmosphere, this is ignited by a gas-heated pilot burner in the furnace. This system ensures that no larger ignitable concentrations can arise and allows the gas emissions to burn off safely. The concept is generally recommended for products that are not damaged by a sudden increase in temperature. Organic components can also be burned off at temperatures above 500 °C. Depending on the furnace model, the burnout process can be followed by a subsequent process up to a maximum of 1000 °C.

Monitored devices and process states for safe operation:

- Temperature-controlled door lock
- Gas inlet pressure of burner system
- Flame of the ignition burner
- Flow rate of fresh air
- Exhaust gas flow
- The furnace controls respond differently depending on the specific malfunction and put the furnace into a safe condition
- Fresh air fan function
- On-site extraction function



Schematic representation of the chamber furnace with BO safety concept

1. Fan for supplying defined amount of fresh air
2. Gas-fired pilot burner
3. Exhaust air flap to remove exhaust gases during the process
4. Exhaust hood



Design of the chamber furnace with WAX safety concept

1. Drawer for wax collection
2. Fresh air supply via supply vents in the furnace bottom
3. Heated drainage and drain pan in the furnace
4. Exhaust flap
5. Exhaust hood

WAX Safety Concept for Electrically Heated Furnaces to Melt Out Wax below its Flashpoint

Furnaces of the WAX series with the corresponding safety concept are suitable for dewaxing parts, e.g. ceramic molds, below the wax flashpoint. The melted wax is collected in a container underneath the furnace. This collection container is positioned in an airtight drawer which can be removed for emptying. The wax runs through a grid into a funnel-shaped drain in the base of the furnace. The drainage channel is heated to stop the wax hardening. The furnace program is started only when the set temperature of the drain is reached. The customer has to choose the melting temperature and the melting time. When the melting process is complete, the furnace can be heated to 850 °C to sinter the molds.

Monitored safety functions for safe processes:

- Temperature of the wax drain
- Two independent over-temperature limiters
 - First over-temperature limiter is set below the wax flashpoint. This prevents the wax from igniting during the melting process. The customer sets the duration of the dewaxing process. When this time has elapsed, the program deactivates the over-temperature limiter so that the furnace can continue the sintering process.
 - Second over-temperature limiter with adjustable cutout temperature as temperature limiter to protect the furnace and load during sintering