

COMBUSTION & COOLING UNITS

To control the heating and the cooling BDF provides a unit which is normally supplied preassembled and ready to be installed.

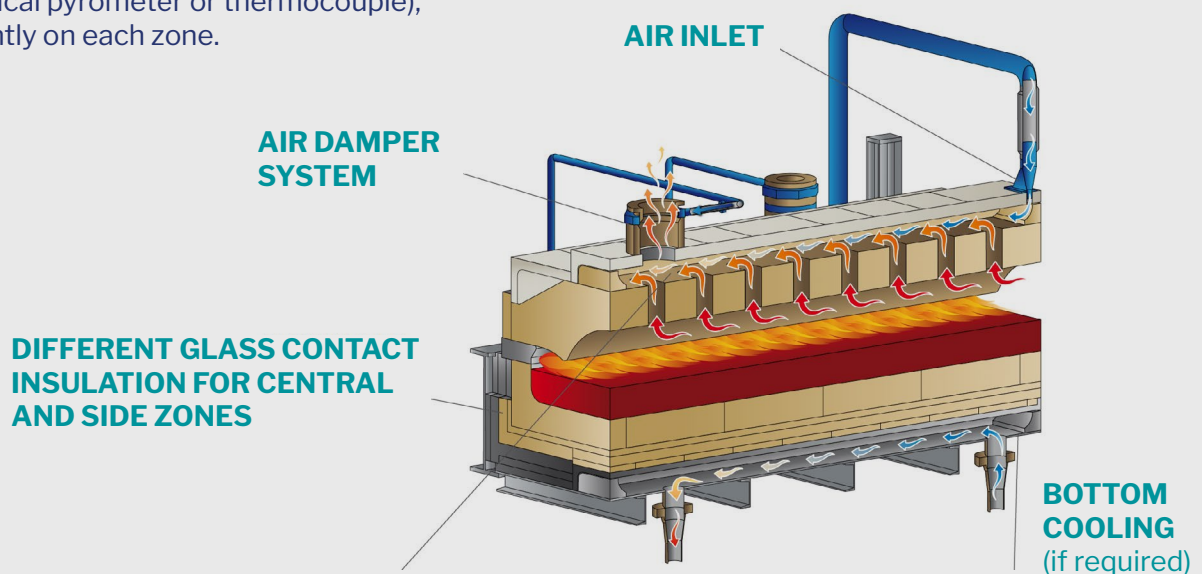
The same ventilators are used for the combustion and for the cooling. The air is fed into a main box to which the heating-cooling section are connected. The burners are installed on the forehearth sides, and they are fed with an air-gas mix, that is introduced in the room over the glass and that burns thanks to the ambient high temperature. The air-gas mix ratio must be kept constant, since any change compared to the optimal value could cause defects (most of all seeds and blisters).

This can be achieved by regulating the gas flow rate depending on the air flow rate, whose valve is operated by the control system. Each cooling and equalizing zone is equipped with an independent group feeding the burners. The temperature control system regulates the opening of the air valve depending on the value detected by the temperature sensor (optical pyrometer or thermocouple), independently on each zone.

The air-gas mix to be sent to the burners is generated independently per each section. A linear characteristic regulating valve with electric actuator is driven by the temperature control system to control the air flow which is passing through a mixer. The air pressure is detected after the air regulating valve and it is used to control the gas flow by a gas regulator. The gas is fed into the mixer to achieve a proper air-gas mix to be sent to the burners.

The system is designed to assure a constant air-gas ratio in a range of 1 to 10 in terms of supplied energy. The cooling air flow is controlled independently per each section by a butterfly valve with electric actuator driven by the temperature control system.

The same actuator drives the air to be sent to the air damper to control the pressure into the forehearth superstructure in order to avoid fresh air infiltration through the chimney when the cooling is working at low capacity.



COMBUSTION ROOF BLOCK COOLING

Over the superstructure is installed a small refractory channel that runs parallel to the forehearth axis. When cooling air is blown along this channel, the upper surface of the roof block is cooled. This reduces the temperature of the lower surface of the tile and energy is removed from the glass bath by radiative heat transfer to the cooled tile. The cooling air travels in the direction

of the glass flow and is exhausted, together with the combustion gases, through the centrally located cooling air exhaust.

The volume of the cooling air blown along the channel is adjusted to vary the cooling effect, that is controlled by the flow regulation of the cooling air stream. The automatic control system will control heating and cooling functions within each independent zone.