



SBO 4 COMPACT MACHINE

Oven

27 August 2008

Assembly to ensure precise, efficient and totally homogenous preform heating, with relatively low electricity consumption, in order to prepare preforms for blowing.

a. Oven architecture

- Continuous conveying of preforms using a spindle chain that has two linear sections between the drive wheel at the front of the oven and the tensioning wheel at the back.
- Preforms, in neck up position, are reheated in three phases: heat penetration on the first linear section of the oven with 2 heating modules, stabilization at the back of the oven, and heat distribution on the opposite section with 3 heating modules.

This specific reheating sequence allows for:

- Optimum ramp up of material temperature.
- Definition of temperature gradient between external and internal surfaces of the preform.

b. Spindle chain

The spindle chain is comprised of spindles assembled together as links in a conveying chain. Each spindle includes:

- 1 rotation pulley
- 2 unloading rollers
- 2 plastic rollers for guiding the spindle on spindle chain guides
- 1 (non quick-change) spindle nose screwed onto each spindle with elastic 3-sector ring and loading tip equipped with a radiator.

c. Oven drive and tensioning wheel

- The spindle chain is driven by 1 notched drive wheel actuated by an electric motor. This drive wheel has a torque limiter (to detect oven drive problems and to protect mechanical elements).

- The spindle chain track includes 1 linear frame equipped with 2 sets of 2 linear guides and a notched belt to rotate the spindles.

d. Heating modules

GA/AA/08.08/187



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5 reheating modules in all, mounted on 2 banks that house modules 1 & 2 and 3, 4 & 5 respectively, with adjustable height and distance between the bank and preforms. Each bank has water-cooled neck protection ramps with adjustable positioning. Module banks can be swung open for easy access to lamps.

Each reheating module is fitted with:

- One 3,000 W infrared lamp and eight 2,500 W infrared lamps mounted on a rack with progressive pitch. The heating power and on/off of each lamp can be individually adjusted.
 - Adjustable supports to set distance between lamps and preforms.
 - Air cooling of lamp supports and wiring.
- All oven lamps located at the same height constitute a heating zone, with 9 zones in all.

These different heating zones ensure precise temperature profile distribution on the preform to meet specific process needs.

An infrared camera is located at the oven exit to monitor preform temperature with connection to the controller to automatically regulate heating power of lamps.

5. Preform body ventilation

5 body cooling ventilation banks facing the heating modules and supplied by ventilators. They provide air

cooling of external surfaces of preform bodies.

Each ventilation bank is fitted with reflectors with ventilations slots.

6. Neck protection and ventilation

Located above the preform body ventilation. This ventilation is handled by a flow of air towards the neck. The air is

directed between 2 neck protection ramps mounted one above the other and water-cooled. These ramps also ensure thermal protection of mechanical parts.

g. Preform unloading at oven exit

- 1 unloading cam actuated by cylinder to extract the spindle tip from the preform neck; fitted with a cam positioning sensor.
- 1 detection sensor to detect preforms that haven't been unloaded.