
CARBOJET®. High-speed gas injection for advanced heat treatment.



Description

CARBOJET® is a patented technology by Linde which allows for better gas convection in heat treatment furnaces without ventilators. By injecting small amounts of nitrogen at high velocities (250-300 m/s) into several parts of a roller hearth furnace, CARBOJET® creates a movement in the furnace gas to ensure homogeneous gas and temperature distribution. CARBOJET® can be installed in every continuous furnace for neutral annealing, carburizing and decarburizing. CARBOJET® can also be used in pit furnaces for wire annealing with nitrogen or natural gas/nitrogen mixtures.

CARBOJET® benefits

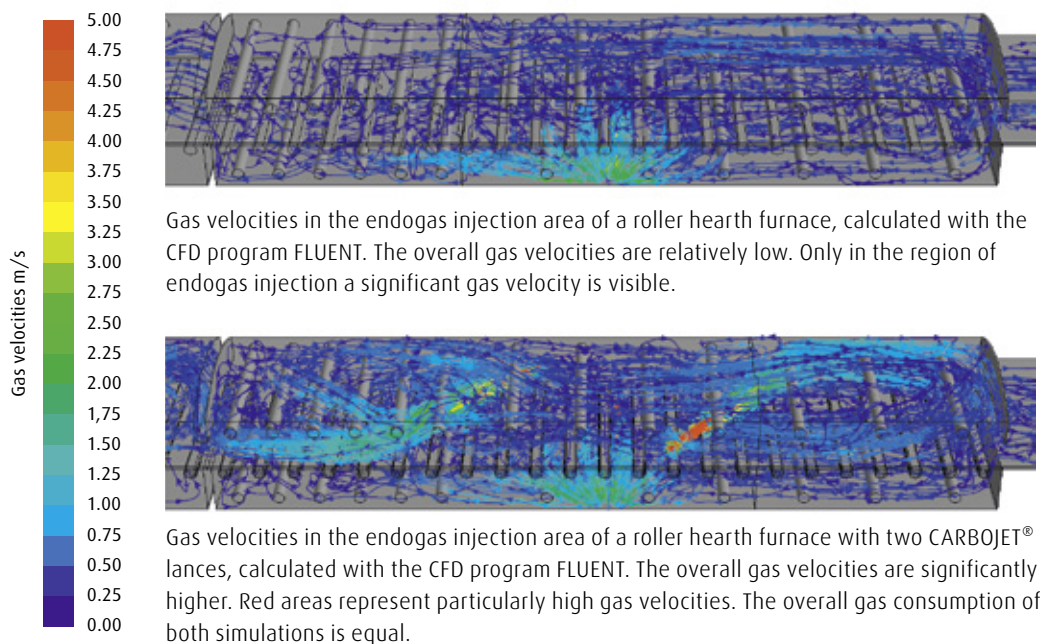
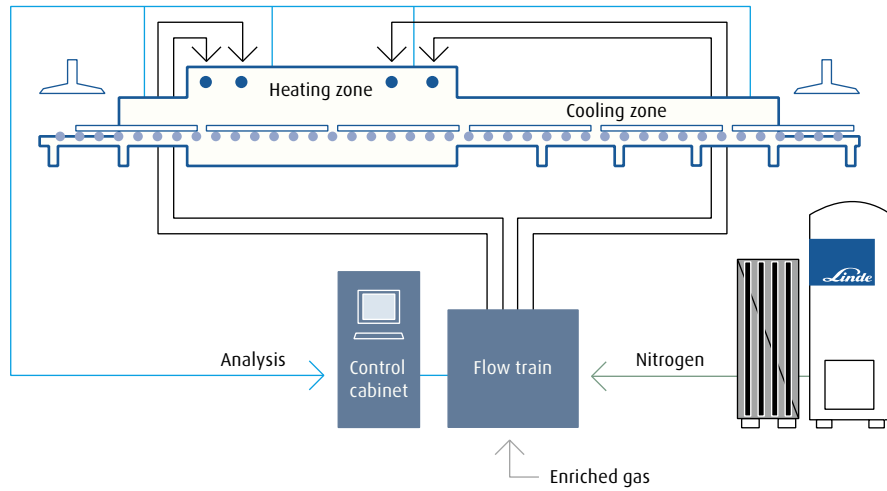
- Homogenizes product quality in tube annealing and other heat treatment furnaces using endogas, exogas or monogas.
- Increases the utilization of carburizing gases and reduces the soot formation in heat treatment furnaces (such as roller hearth furnaces and walking beam furnaces). The high-speed injection of gases also optimizes the functionality of analyzing equipment due to better gas mixing.
- Increases the carbon transfer on material surfaces due to forced convection of protective gases.
- Allows a faster switch of atmospheres.
- Allows the use of higher carbon potentials due to advanced premixing of gases.
- Optimizes the heat transfer in furnaces with convective heating.

System

The system consists of one or several CARBOJET® lances with piping and flow train. The number of lances is adapted to the furnace size and the existing gas consumption. The lances can be controlled manually or through a CARBOFLEX® control unit. The specially designed lances are made of heat resistant material to ensure a long lifetime. In order to provide tailor-made solutions, Linde adapts its CARBOJET® systems to individual customer needs.

CARBOJET® is applicable to any continuous furnace for heat treatment. Linde has extensive experience using CARBOJET® in roller hearth furnaces and walking beam furnaces.

Roller hearth furnace with CARBOJET®



Atmosphere supply

Nitrogen can be stored in and supplied by on-site liquid tanks, but Linde also offers competitive CRYOSS® on-site gas production units. In order to allow for higher carbon potentials, acetylene, propane or natural gas can be added through CARBOJET® lances. Propane is supplied in tanks or cylinders, acetylene is supplied in cylinders or bundles.

References

Linde has installed several CARBOJET® lances in several European tube annealing companies.

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