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SCHUTZGASTECHNIK GMBH

Controlled Atmosphere Conveyor Furnaces

for continuous heat treatment of mass-produced components

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General

Increased automation and the demand for high-quality products are of foremost importance to the metalworking industry. This requires the design and the installation of new heat treatment plant which can be incorporated into continuous production lines. The use of high-quality, delicate raw materials nowadays demands almost exclusively the use of a protective gas atmosphere and a uniform transport of components. This can be achieved by the use of a continuous conveyor belt.

1. Operation

Components are placed automatically or manually on the conveyor belt which passes through the furnace and the cooling zone. The immission of a protective gas prevents oxidation, and components leave the furnace with a bright finish.

2. The Furnace

With its distinct and neat grouping, the unit offers ease of access to all its assemblies, and component parts can be easily replaced.

The furnace housing is lined with a light weight material, offering excellent heat insulation and therefore shorter heating-up periods at lower energy cost.

Depending on size and temperature of the unit, electric heating is effected by means of radiating chamber heaters or by heater coils carried on ceramic tubes. These are easily replaced, in some cases without having to shut down the furnace.

The heating channel is divided into several zones, each with its own temperature control; this permits fine overall adjustment of the temperature. For certain heat treatment processes temperatures can be set at different levels.

A gas-tight retort made from heat-resistant steel or cast steel passes through the furnace. Refractory supports safeguard the unit against distortion and wear, particularly at constant high temperatures. A cooling zone with indirect water cooling is flanged to the unit, and water consumption is automatically controlled by thermostats.

Depending on the size of the plant the controls can be

either built in or can form a free-standing unit. Electric cables run in conduits and are fully wired. An electric timer can start up the furnace at a preset time. Belt speed indicator, printer, overnight cooling, excess temperature cutout and other features can be built in on request.

3. The Conveyor Belt

The conveyor belt is driven by a geared motor with electronic speed control, having a range of 1:30. Smaller plants are driven from the output end, larger furnaces from the inlet end.

A variety of belt types is available, depending on shape and weight of components:

3.1 superfine mesh woven belt, used on small furnaces for minute components and for those with pointed or barbed features.

3.2 wire link belt, of reciprocal design, with welded edges, made in various link sizes and wire gauges.

3.3 strip conveyor, used for low weights at fast speeds, e.g. annealing of metal strip using unwinding and wind-up coils.

3.4 fine mesh wire link belt with lateral ridges, made from a variety of wire gauges, ideal for bulk material.

4. The Use of Protective Gas

These furnaces can be operated using all the traditional reaction and protective gases.

The gas is introduced through jets built into the retort and is metered by gas flow controllers.

Cracked ammonia (75 % H₂, 25 % N₂) is a suitable protective gas for a number of heat treatment processes. Ammonia cracking plants are simple devices which can be built into the smaller types of conveyor furnaces.

For special heat treatment plants Exo- or Endo-gas producers are available. The direct introduction of gas by adding droplets of Methanol is also possible.

Nitrogen (N₂), supplied in bottles or tanks, is also suitable. Hydrogen (H₂) may be admixed in some cases.

Special heat treatment processes such as oxidizing or burning-out can be carried out using air, oxygen or an air/oxygen mixture.

