Front Line Technology for Laboratories and Industrial Plants

Linn is expanding its activities in the construction of industrial plants for microwave technology.

In the spring of last year, RF- and microwave engineer and Linn High Thermo announced their cooperation in the microwave heating technology sector. The aim of this cooperation is to achieve a substantial increase in the use of special constructive solutions from the house of Linn using their patents, in large-scale engineering for the ceramics industry. The international presence of the RF- and microwave engineer and Linn High Thermo within the ceramics industry will provide Linn with technical market support. The mutual aim is to concentrate knowhow in the areas of engineering, production and the application of microwave technology. Moreover, development in the internal microwave sector for utilisation in hybrid plants should be promoted. Over the past few decades, Linn has shown great creativity in the development of large-scale temperature furnaces and kilns for special applications and also provides a high level of customer-oriented kiln design.

Company History

Linn High Thermo was founded by Hans Linn in 1969 and specialises in electronically heated laboratory and high temperature furnaces for inductive heating and casting plants for industry and laboratories. In 1979 the production plant and laboratories were extended to include induction-heating equipment, microwave and vacuum furnaces. The special production capacity for the construction of medium-sized steel-heating furnaces was expanded in 1985 with the acquisition of a company in Bad Frankenhausen, which then began to trade under the name of Linn Elektro Thermo. By 2006, the 100th owned Linn Elektro Thermo GmbH subsidiary was then renamed as Linn High Thermo GmbH. Today Linn High Thermo employs 110 employees and the export ratio is at approximately 60%, foreign operations being concentrated on Eastern Europe (Poland, Russia, Ukraine, Turkey, South Korea, Malaysia, Vietnam, China and the Middle East).

Product Philosophy

The strengths of Linn High Thermo GmbH lies in constructing special systems according to customer's specifications. Naturally, the company philosophy relies on the utilisation of basic modules for the design of these systems, in order to be able to keep the construction costs to a minimum. The aim is always to design reliable and specially tailored construction projects:

- Special economical thinking to account all environmental aspects.
- Strictly selecting the most cost-effective materials and working life due to the utilisation of heat-producing technology.
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- Highly flexible and durable design compared to the high temperature furnaces of the company.

For industrial microwave drying, the MICROTECH 300 system offers different kinds of equipment. For continuous processes with short to medium drying times, the continuous microwave system is best used. This system is constructed from standardised modules, but can be adapted in power and length to the individual process requirements. The MICROTECH system (Fig. 3) is offered in a broad range of power, ranging from 8... 150 kW and heated lengths, ranging from 0.5... 39 m. Applications are the drying of ceramic cups and plates, ceramic honeycombs, insulation modules, building materials, ceramic raw materials, and many others. For batch processes with medium to long drying times of also large pieces, chamber dryers of the MTK type (Fig. 3) can be used. This type is available with powers ranging from 2.4... 50 kW and volumes ranging from 1... 30 m³. Microwave power and chamber volume can be adjusted to customer demand. An easy way to operate sliding door dryers is to use the fast loading by hand or lift truck and saves production space or building height in comparison to a swivelling door. Applications are the drying of pretreated fibres, glass powders, gritting wheels, high voltage insulators, and others. Such types of equipment can be designed as hybrid systems, by preheating the inlet air of the dryer by electric heaters, or oil- and gas-burners. This can reduce the required microwave power and improve the temperature homogeneity of the product. The microwave frequency applied is usually 2.45 GHz. Besides this frequency, Linn High Thermo offers, at the moment, exclusively, equipment with the new microwave frequency 3.8 GHz. Due to the special design, older units can be reconverted to this new frequency. The microwave frequency is especially suitable for the drying of thin materials and low water contents or not-coagulating materials.

Other Products Included in the Range

The product portfolio is versatile on the one hand yet able to meet the highest technical requirements on the other. In addition to 800... 1,000 kW laboratory units for universal thermal treatment there are protective gas muffle furnaces that operate at 1,100°C, high temperature furnaces for vacuum and protective gas processes that operate at 2,800°C, vacuum hardening furnaces with high pressure gas quenching up to 1,800°C and 1,800°C high velocity furnaces that operate at 2,800°C for vacuum and protective gas processes, multiple-stream tubular furnaces, tempering and hardening furnaces that operate at 1,300°C and circulating air furnaces that operate at 1,000°C. Furthermore chamber and shuttle kilns at 5... 50 m³ rotary furnace furnaces for 3... 50 m³ and roller kilns 0.6 m. There are also indirect re-melting and treatment plants for preparing samples of oxidised and metallic materials for spectroscopy, high and medium frequency generators, induction centrifugal casting machines for precision casting, jewellery, dental, moulded technology and magnetostrictive industry, special furnaces for research and development, the nuclear industry and pot melting furnaces for aluminium, variegated and precious metals as well as glass and special systems for the treatment of precious stones and the growing of crystals are all integral items in the range of products.

Linn High Thermo, www.linneurope.com