



Microwave chamber with power of 6 kW, stepless controlable with exhaust air system.

Testing equipment:

EL-A offers for microwave application equipment testing plants with different power.

Beneath two microwave testing chambers with variable power. Other units are suitable.

For special purposes EL-A also builds new testing equipment or changes existing units.



Microwave chamber drier with power of three times of 1,2 kW, switchable and stepless controlable.

Services:

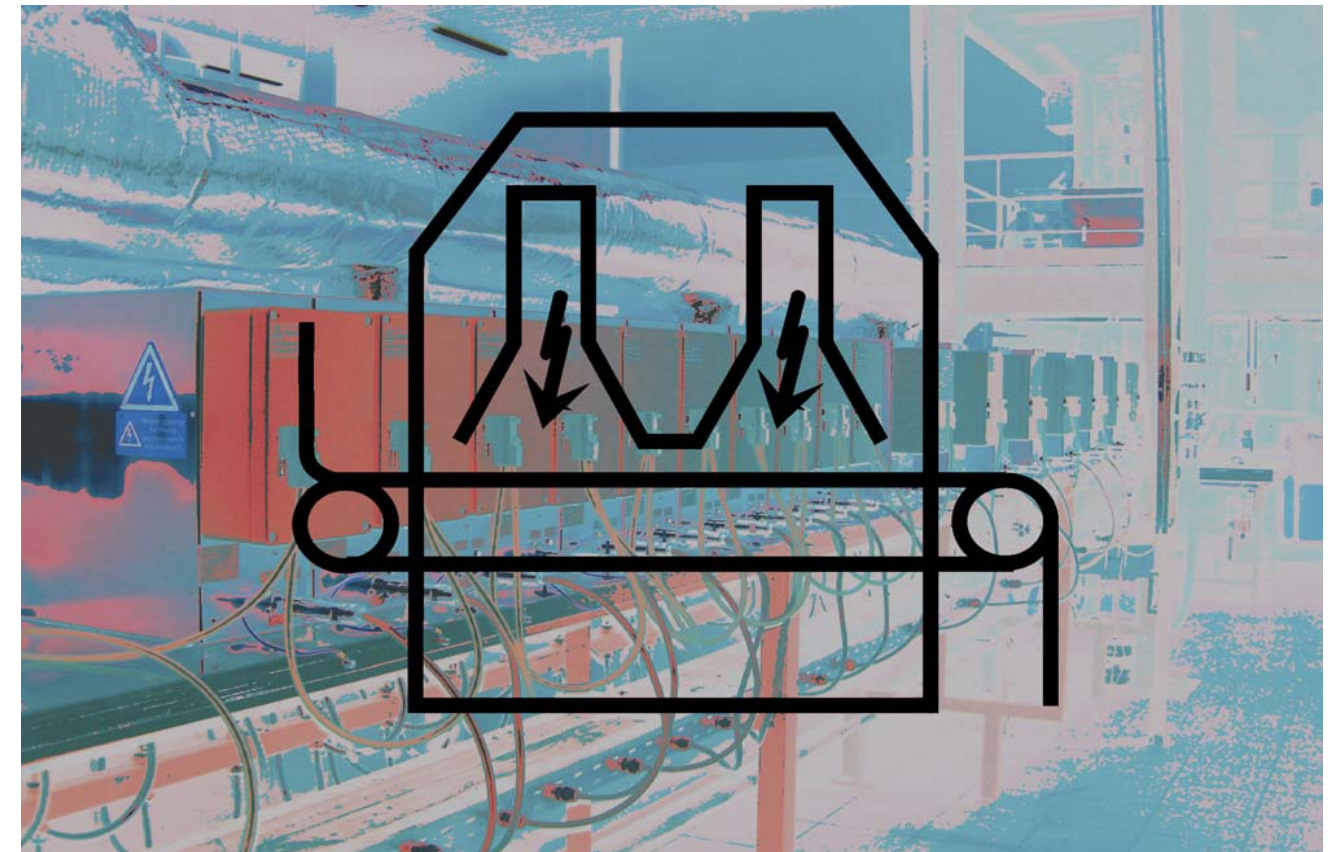
- Engineering, assembly and commissioning of drying plants including accessory equipment
- Engineering, assembly and commissioning of drying components and accessory equipment
- Optimisation, repair, and increasing of requirements of existing drying plants
- Assembly and dismantling of components and complete plants
- Spare part supply
- Periodical maintenance
- Laboratory tests and simulations

Products:

- Feeding and decoupling devices
- Spredder and granulators
- Convective belt driers
- Contact belt driers
- Microwave plants
- Transportation devices
- Controlling systems

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Competent Technology for:

Chemical, Pharmaceutical,
Food and Animal Food Industry

Ceramic and Insulation
Production

MICROWAVE DRYER

Process

Microwave processes will be used for many thermal processes and replace or complete in many cases conventional methods of product heating like contact or convective processes.

Microwaves heat the product or product components by high frequent magnetic waves with a frequency of 2.45 GHz. The waves couple on the product molecules and set them into oscillation.

So the development of heat takes place inside the product in difference to conventional processes, which heat the product from outside through heat conductivity.

Fields of application

Microwave technology is suitable for all products with a high dielectric constant or a marked dipole moment, like water.

Also dielectrics with more or less free ions or products with a high dielectric loss factor are suitable for microwave processes.

Microwaves penetrate into the heart of the product and heat it uniformly from inside through the whole volume.

Surface overheating, possible with conventional methods, is prevented.

Microwaves do not heat stainless steel, so it is suitable and used for applicator material and for shielding.

Microwaves will be used as a heat source for the following processes:

- drying
- Melting, calcining
- sterilising
- de-gasing
- polymerisation/vulcanisation

Treatable products:

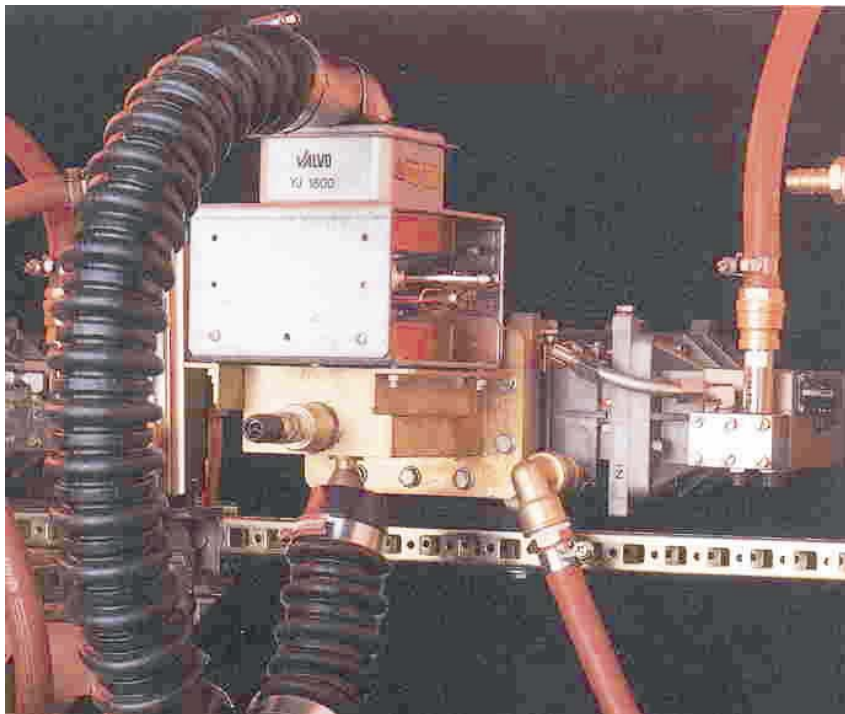
- ceramic materials
- synthetic / foam materials
- latex/rubber
- mineral insulation
- food
- medicine



Semi-continuous chamber dryer



Magnetron chamber



Water and air cooled magnetron

Method of operation

Microwaves are generated in a high frequency tube, called **magnetron**. Because of the geometry of the tube, high voltage and magnetic fields the frequency will be generated in close tolerances.

Tube wave guides transmit microwaves with **horn radiators** or **slotted antennas** to the applicator room, where microwaves are distributed regularly.

In the **applicator**, which is available for **continuous and discontinuous processes**, the product is treated by microwaves. From the special form of the applicator results a **regular field distribution** of the microwaves inside the chamber.

In **discontinuous processes** a door allows the feeding of the chamber, in continuous processes different continuous feeders are available, which transport the product into and through the applicator room. As feeding equipment are belts or vibration conveyors common. Depending on the consistency of the product it will be fed via sluices, oscillating belts, -tubes or pumps.

In continuous processes special **microwave sluices** prevent the escape of microwaves out of the unit.

A **ventilation system** removes offgas and vapors out of the applicator chamber.

Microwaves do not heat up applicator materials, so in many cases it is not necessary to insulate the apparatus.

Controlling system

Depending on the special application there are used several small air cooled or bigger water cooled magnetrons.

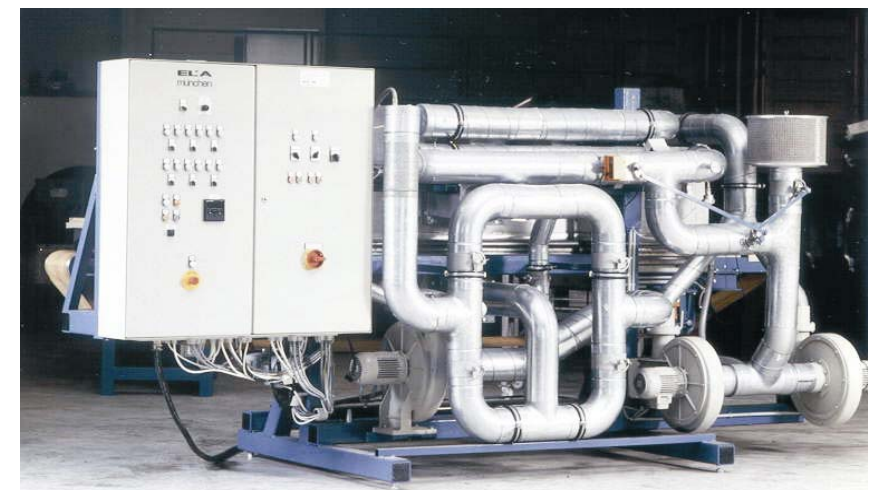
For controlling, smaller magnetrons are tacted, bigger are regulated steplessly.



Continuous microwave plant



Microwave plant with circulation air



Continuous microwave hybrid plant

Security systems prevent a overheating and destruction of the magnetrons if there is no product in the applicator. Additionally they protect maintenance personnel. Security switches prevent the loss of microwaves and protect staff during the process, in case of prohibited access.