

Application and research trend of wood microwave drying

Abstract: This paper analyzes the mechanism and advantages of wood [microwave drying equipment](#), introduces the research and application of wood microwave drying at home and abroad, and points out that wood microwave drying is a new technology with broad prospects for development. It is suggested that the microwave drying theory, drying equipment, drying technology, combined wave drying technology of wood should be strengthened in the future. In 1936, the experiment of waveguide transmission was successful in the United States. When the wood was heated by microwave technology, the wood with high moisture content was quickly obtained in the fields of communication, broadcasting and television. Widely used.

In 1945, the Americans got a lot of heat and higher temperatures; the wood surface was low in moisture and the surrounding P.L. Spencer filed the first patent for microwave heating technology. In 1955, the medium heat dissipation, low temperature, the formation of internal high and external low temperature field (the general heating side of the United States Taipan company launched the world's first microwave oven to the market. The 70s formula is external high and low), which is conducive to the movement of moisture. Moreover, in the early stage of rapid warming of wood, China began to study and popularize microwave heating technology. Since the 1980s, the vaporization rate of raw water has been much faster than the migration rate, resulting in steam pressure in the cell chamber to produce microwave ovens.

Up to now, a series of domestic microwave ovens and industrial microwave ovens have been developed rapidly in China, resulting in a large static pressure difference with the environment, which makes the free aquatic products in wood close to or reach the world's advanced level in product quality and water vapor to form percolation flow, greatly speeding up the water discharge velocity field and the existence of internal and external static pressure gradient, making it tiny. Wave drying is completely different from traditional one.

1. The mechanism of wood microwave drying is based on the drying method. The unique mechanism of wood microwave drying is that the wet wood is used as dielectric. The heating

mechanism of wood microwave drying is that the ions in wood move rapidly under the action of microwave electromagnetic field.

2. The advantages of microwave drying of wood cause the heat loss effect of ionic conduction; 2. There are many differences between microwave drying and traditional drying methods in the non-crystalline region of wood. Heat is not transferred from the polar dipole groups such as xylohydroxyl groups and the water-absorbing wood adsorbed on hydrophilic hydroxyl groups, but from the outside of the wood by microwave alternating electric field. Intermolecular water molecules in wood can propagate and orientate under the action of alternating electromagnetic field, which induces mediation and directly occurs internally. As long as the wood is not particularly thick, the wood along the whole mass loss heat effect; 3. The polarized water molecules in the wood with the thickness of high-frequency alternating electromagnetic field can heat simultaneously, and the heat penetration time has nothing to do with the thickness of the wood. The change of wood's Micro direction rapidly rotates and frictions with each other and generates heat.

Because the [wood microwave drying equipment](#) has a series of advantages (1) fast drying speed, short time microwave drying timber, wood heating and evaporation in the whole wood at the same time. Furthermore, microwave irradiation can change the internal structure of wood and increase the permeability of wood cell wall, thus greatly improving the suffocation and diffusion of wood. The existence of pressure gradient in wood, the increase of pore permeability and daring, caused the rapid movement of moisture in wood, and the drying speed was much higher than that of conventional drying.