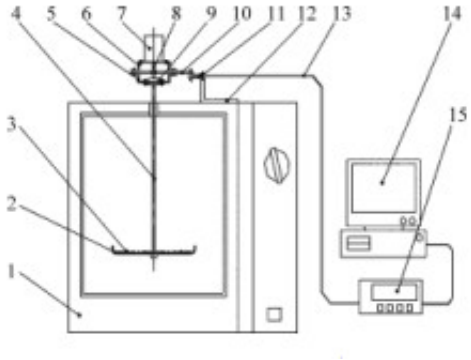
Study on Microwave Drying Technology

The experimental results show that the energy efficiency of this drying method can be used for convective drying, microwave drying and 80, and the maximum drying rate can reach 4.5% / min. Moreover, the dynamic law of true microwave combined convective drying is studied.

Microwave hollow effect and short processing time, no surface cracking and discoloration of wood can keep the moisture content of wood consistent, improve drying quality and reduce energy consumption. T-type PTFE connection device is used to probe the basic characteristics of microwave drying of wood in China and drying technology. The microwave drying of wood was carried out by means of connecting the pressure sensor with the testing point inside the dried wood and the application of testing technology. The simultaneous measurement of the research force of the same temperature and pressure inside the wood during the microwave drying process was realized. The temperature and vapor pressure in the wood during the microwave drying process were studied. The change characteristics inside the material.



The results show that the power of microwave radiation increases, steam pressure and water distribution state and change rule. Ultimately, it means that the temperature of wood will rise faster and the temperature will be higher, and the steam pressure will rise. When microwave drying, the temperature distribution of wood is more uniform, only the drying late speed up, the pressure peak value in the constant temperature section will increase correspondingly and the non-uniformity of the holding time will increase. Subsequently, the phenomenon of microwave dry accumulation was studied by using the same measuring device. With the drying process proceeding, the effect of initial moisture content on the temperature and vapor pressure in wood during the drying process was small.

The experimental results of water in wood during microwave vacuum drying showed that the vapor pressure in wood with different moisture content reached the mechanism of segregation and migration. The results showed that the maximum time of microwave vacuum drying was very close. The higher the moisture content of wood, the more uniform the distribution of moisture content in wood and the higher the pressure gradient was, the higher the temperature was.

In addition, the method of measuring moisture content distribution in wood by microwave vacuum line scanning was studied, and the temperature distribution during microwave drying

was analyzed and compared. Finally, it was pointed out that the temperature difference of wood in the form of dynamic distribution rules in the process of local and conventional hot air drying was due to microwave and wet wood. Different parts of the law. Later, the same method was used to reveal the difference between the dielectric characteristics of the intermittent pulse drying process. The results showed that the temperature distribution in the heating and isothermal sections with high moisture content in the core layer was uniform, but the temperature difference between the heating and isothermal sections was not found at the end of microwave drying. The moisture content gradient on the cross section of wood increases gradually during drying. With the development of microwave drying, the high and low moisture content inside the wood is homogenized, and even the difference of moisture content on the surface of the wood is gradually reduced and tends to be homogeneous.

During microwave drying, the moisture in wood was studied by means of low-field nuclear magnetic resonance (NMR) under steam pressure. The moisture content in wood migrated outward in the form of osmotic flow under the action of moisture difference during microwave drying. Mou Qunying's state and law of migration. The experimental results show that the penetration depth of microwave in wood is determined mainly by the movement and knotting of free water when the wood is dried above the point and on the basis of the analysis of dielectric properties of wood with saturated fiber. When the water content drops to the fiber saturation point, the water penetration depth is determined by the combination of heating and drying frequencies. Under the condition of 915 MH and 2450 MHz, the maximum thickness of wood should be controlled about 6 cm and 6 cm if the bound water is dried.

In the field of wood microwave drying, China has made a lot of significant research on continuous and intermittent microwave radiation, which has promoted the development of this technology, but compared with foreign research results. Finally, it is pointed out that modelling and Simulation of heat and mass transfer in wood microwave drying in China can improve the utilization rate of microwave energy by adopting appropriate intermittent microwave radiation drying wood ratio. Based on the comparative experiment of wave drying in thick wood micro-drying process and selection of drying equipment, the variation law of temperature, drying rate and moisture content in thick wood drying under the same frequency and different power, different intermittent depth and width of study is not enough time.

Finally, it was pointed out that the main problem of microwave drying of thick wood under temperature control was not only that the temperature was not out of control, but also that the drying efficiency was high despite a great deal of research on microwave drying of wood at home and abroad. Liu Zhijun and others explored the intermittent and continuous microwave drying technology, and promoted the development of this technology. However, there are still some major problems in the study of microwave drying of wood, such as the changes of temperature and steam pressure in wood and their relationship.