Effect of temperature and vacuum on the drying rate and various parameters of wood samples, using an indigenously designed and developed vacuum drying system

Talib Hussain, author

Abstrak

A
vacuum drying system is being designed and developed at National Institute of Vacuum Science & Technology (NINVAST) to dry various materials under vacuum conditions. Its performance and capabilities are tested by carrying out different experiments on green (freshly cut) wood samples of Poplar and Eucalyptus with dimensions of 990.6 mm x 76.2 mm x 25.4 mm and 469.9 mm x 50.8 mm x 25.4 mm, respectively. These samples were dried from green moisture content (MC) 78% to 10% by this system at ultimate vacuum of about 1.6 x 103 pascal and at a temperature ranging from 35oC to 55oC for about 20 hrs. Drying quality tests included: prong test, warp measurement, surface checking and moisture content measurement, which were all performed. The resulting wood samples showed no dislocation and no excessive stress buildup. If compared to ordinary drying process, the vacuum drying is rapid and the drying rate increases with rise in temperature. The designed system is beneficial for commercial use.