

DIFÚZIA VODY V DREVE VYBRANÝCH ROZTRÚSENOPÓROVITÝCH DREVÍN V POZDĽŽNOM SMERE

DIFFUSION OF WATER IN WOOD OF DIFFUSE-POROUS SPECIES IN LONGITUDINAL DIRECTION

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ABSTRACT

The article concerns the diffusion of water in wood of six different diffuse-porous species in longitudinal direction. Also the article deals with analysis of density influence on diffusion coefficient. So the main targets of the work were evaluation of the diffusion with diffusion coefficient and surface emission coefficient and to find proper relationship between density and diffusion coefficient. The diffusion was investigated by non-stationary method, which enables to determine simultaneously diffusion coefficient and surface emission coefficient values.

Key words: diffusion coefficient, surface emission coefficient, density, non-stationary method, limetree, aspen, maple, birch, beech, hornbeam, longitudinal direction.

SUMMARY

In the article we describe the diffusion of water in wood of six diffuse-porous species with various density values. We used Fick's second law solution that contains diffusion coefficient and surface emission coefficient as quantities describing the diffusion. The density was a factor, which considerably influenced the diffusion coefficient as it was presented in literature. On the basis of experimental results we can conclude that equilibrium moisture content has the smallest variability among the measured quantities. The diffusion coefficient value depends on boundary condition used in solution of Fick's second law. The diffusion coefficient reaches larger value in solution with finite value of surface emission coefficient. The solution with finite surface emission coefficient is on qualitatively higher level due to smaller mean error. The diffusion coefficient from the solution with infinite surface emission coefficient depends on density as is presented in similar way in the literature. The influence of density on diffusion coefficient from the solution with finite surface emission coefficient is small so various diffuse-porous woods equilibrate the moisture content almost with the same speed in longitudinal direction. Surface emission coefficient is the most variable quantity among the measured quantities.

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