

Thitiwan Luemkanchanaphan 2012: A Study of Physical, Mechanical and Thermal Properties for Thermal Insulation from Narrow-leaved Cattail Fibers. Master of Science (Physics), Major Field: Physics, Department of Physics. Thesis Advisor: Miss. Sutharat Chotikaprakhan, Dr.rer.nat. 114 pages.

The objective of this research was to study physical, mechanical and thermal properties of insulation boards prepared from narrow-leaved cattail fibers by using Polymeric Methylene Diphenyl Diisocyanate as a binder. Hot pressing was employed to produce single layered plain thermal insulation boards with the size 350×350×10 mm. The test results according to the standard of TIS. 876-2547 showed that the moisture content of the boards increased as the density increased. Modulus of Rupture, Modulus of Elasticity and tensile strength perpendicular to surface of the board increased as the density increased. Thermal conductivity measured in accordance with the ASTM C 518-10 revealed that the board with a density of 200-400 kg/m³ had the thermal conductivity values ranging from 0.0438-0.0606 W/m K, which was less than that of fibrous materials and cellular materials such as wheat straw, cotton stalk fibers, vermiculite with the same density range. According to the test results, it can be concluded that this insulation boards from narrow-leaved cattail fibers were an excellent insulating component for energy saving and environmentally friendly.

Student's signature

Thesis Advisor's signature