Kanokon Hancharoen 2013: Measuring Thermal Conductivity of Thermal Insulation from Cellulose Fiber of Pineapple by The Direct Traceability Method. Master of Science (Metrology), Major Field: Metrology, Department of Physics. Thesis Advisor: Miss Sutharat Chotikaprakan, Dr.rer.nat. 61 pages

Thermal conductivity is the main parameter to consider in order to make decision to choose the suitable type of thermal insulation in any application. The reliable thermal conductivity can get from the instrument which is approved by the ASTM C-518 and is calibrated constantly. Generally the heat flux meter is calibrated by the standard reference material. It is necessary to send the reference material to the foreign manufacturer periodically for certifying which is high cost and time-consuming. This research introduces the instrument calibration procedure by the direct traceability method. Instead of applying the reference material, the platinum sensor PT100 is used and the temperatures of hot plate and cold plate of heat flux meter are measured directly. From the results, the uncertainty budget from the direct traceability method at confidence of 95% is 0.0002 W/m.K while the accuracy of the reference material is 0.005 W/m.K. The direct traceability method gives less spending and is able to test in the ISO17025 laboratory which plenty founds in Thailand. For the thermal insulation from cellulose fiber of pineapple, the measurements show that the thermal insulations from core, pore and shell give the thermal conductivity of 0.0402, 0.0320 and 0.0713 W/m.K respectively. The thermal insulation with mixing all three types of fiber gives the least thermal conductivity of 0.0291 W/m.K. These results show an approach to make a profit from the agriculture waste of pineapple.

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