

## **Thermal Conductivity of Building Materials Employed in the Preservation of Traditional Structures**

Marc Assael<sup>C, S</sup>

*Chemical Engineering Department, Thermophysical Properties Laboratory, Aristotle University, Thessaloniki, Greece*

Maria Stefanidou

*Laboratory of Building Materials, Civil Engineering Department, Aristotle University, Thessaloniki, Greece*

Konstantin Antoniadis and Gregory Matziaroglou

*Chemical Engineering Department, Thermophysical Properties Laboratory, Aristotle University, Thessaloniki, Greece*

Historic structures are a part of our cultural heritage and nowadays, in the polluted environment, the need of their preservation is more intense than ever. The approach of preserving a structure of high historic value needs to follow guidelines defined by the Venice Chart (1964). One of the problems anticipated is the problem of materials which have to fulfill the criterion of compatibility with those existing in the structure, old building materials. Many studies have been made during the last 20 years concerning the parameters which can be tested in order to produce strong, durable and compatible new, repair materials. In the case of mortars, traditional binders such as lime, natural pozzolanas, brickdust and white cement have been proven to be combined successfully for the above mentioned reason [1]. Nevertheless, the thermal properties of these materials have never been tested up to now. In the present paper a series of mixtures combining lime, two types of natural pozzolanas, brick dust and different types of cement have been produced in order to measure their thermal conductivity for the first time. The parameters tested are: the binder type, the proportion of the binders and the age of testing. For the measurement of the thermal conductivity of the samples, a commercial thermal conductivity measuring instrument (Quickline 10, Anter Corporation, USA) was employed. The instrument is based on the imposition of an axial temperature gradient through the sample, being placed between a temperature-controlled upper plate and a lower calibrated heat flux transducer attached to a liquid heat sink. To test the operability of the commercial instrument and extend its range, a transient hot-wire instrument was employed.

[1]I. Papayianni, M. Stefanidou “The influence of mixture design parameters on the long term strength of lime-based mortars”  
International Conference Studies on Historical Heritage SHH07, Edited by Gorun Arun, Atalya September, Turkey pp.347-354