1.5.11. TCi SYSTEM FOR NON-DESTRUCTIVE DETERMINATION OF THERMAL PROPERTIES OF MATERIALS

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Weather conditions present numerous challenges to construction industry regarding the development or quality control purposes and obtaining accurate thermal conductivity data for materials presents. Traditional methods are cumbersome, time consuming and offer little flexibility for integration with more advanced production processes. These are the reasons for application of an instrument that has the ability to rapidly and non-destructively determine a material effusivity as a unique thermal characteristic of all materials related to their ability to transfer heat. Effusivity, conductivity, heat capacity, thermal resistance of materials can be determined by using a modified transient plane source (MTPS) technique and the TCi thermal property analyzer instrument. In applying an instrument such as the TCi in testing a wide variety of materials, material types and temperature ranges, careful consideration should be given to the limitations in performance and use of the system under certain conditions. In this paper, the TCi system, sample setup and preparation are presented with its limitations and advantages. Some test results acquired for different materials, temperature and humidity conditions are also presented.