

MEASUREMENT OF EFFECTIVE HEAT TRANSFER IN ELASTOMERS WITH LASER FLASH INSTRUMENT

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The aim of this project is to design a low-cost laser flash instrument for measuring the effective heat transfer in elastomers. Heat transfer in elastomers primarily occurs through conductivity, and various methods can be employed to measure thermal conductivity. However, considering the time-consuming nature of these methods, the laser flash instrument proves to be the most suitable option to be used for industrial applications. This project proposes the use of halogen lamps as a heat source, an IR detector to obtain temperature data, and a NodeMCU acting as a server to transmit recorded temperature data for further processing. The data will be used to calculate the thermal diffusivity and thermal conductivity based on the rate of temperature rise of the test specimen after the application of a heat pulse. Instrument was calibrated using specimens of material with known thermal conductivity and thermal diffusivity.

Keywords: Elastomeric Materials, Effective Heat Transfer, Low-Cost, Laser Flash Method, Contact Resistivity, Halogen Lamp, IR Temperature Detector, Thermal Diffusivity, Thermal Conductivity