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DESIGN OF AN INTERFACE TO MEASURE THERMAL CONDUCTIVITY IN AN AUTOMATED FURNACE

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ABSTRACT

This paper takes a sincere attempt to enable advanced research in electric furnace simulation in order to determine thermal conductivity. A simple model was adopted for determining the thermal conductivities of brass, aluminium and copper materials using a system designed, constructed and tested and applying steady state method. C-Sharp program was developed using the standard subroutines to solve the model equations in order to predict the thermal conductivity over a wide range of temperature and process conditions. The furnace was demarcated into heating chamber (made by sandwiching heating coil within thermal insulators), sample holder region and the cold end area. The thermal conductivities of copper, aluminium, and brass were measured using the system and the results obtained were compared statistically with other standards. It was observed that the measured thermal conductivity values were 112.9, 244.4 and 403.2 $Wm^{-1}K^{-1}$ for brass, aluminium and copper respectively. These results compared relatively well with other standard values. Such values are in order 109, 236 and 396 $Wm^{-1}K^{-1}$.

KEYWORDS: Thermal Conductivity, Conduction and Steady State