Temperature rise study on fluid in tube subjected to oil burner

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Abstract: Btu Heat Transfer Device mentioned in Aircraft Materials Fire Test Handbook (DOT/FAA/AR-00/12) is widely used in flame calibration before testing hose assembly of engine nacelle. The physical model is based on temperature rise of flowing water in a 50 cm-long copper tube caused by radiant heat absorbing. The temperature increment is affected by several factors, including fluid characteristics, flow rate, initial temperature, copper tube surface condition, etc. The water flow rate, which is the most important factor, was studied by both theoretical and experimental method to determine its influence on temperature rise. Also, temperature rise of fuel and lubricant, which have different fluid characteristics, in steel tubes acquired in previous tests, was used for comparison of the analysis and update of the model. The purpose of this study is to achieve a better understanding of the physical process of Btu Heat Transfer Device and make prediction on the temperature rise of hose assembly before samples were subjected to the test facility.