

## **Overall Heat Transfer Coefficient of Different Coolants and Frontal Air Velocity in Automotive Radiators (Book Chapter)**

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### **Abstract:**

An educational experimental test rig was designed to evaluate the performance of an automotive radiator. The effect of liquid coolants and frontal air velocity on the radiator performance based on the overall heat transfer coefficient were investigated by using the test rig. The experimental setup consisted of a real engine and an educational test rig. A set of experiments was conducted with three different coolants while parameters including inlet and outlet temperatures were recorded at constant flow rate. In order to study the effect of frontal air velocity, the engine was taken to be in motion by giving an external air flow to the radiator. An air tunnel was designed to be mounted at the frontal area of the radiator. In this experiment, the temperature of the radiator was also measured at different engine speeds and frontal air velocities. Analysis of engine cooling parameters such as flow rate, inlet, and outlet temperature, surrounding and radiator temperature, surface area, and rate of heat dissipation was performed using the log mean temperature different (LMTD) method and finally the overall heat transfer coefficient (OHTC) was determined. The results showed that the radiator performance for both real engine and educational test rig increased when a coolant is used. In addition, increasing the speed of fan at the frontal area improved the heat dissipation of the radiator.

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