

Study of Insulating Material and Comparison with Locally Available Material

Malik Parveez

Department of Chemical Engg.
NIT Srinagar

Abstract—A thermal insulation is a poor conductor of heat and has a low thermal conductivity. Insulation is used in buildings and in manufacturing processes to prevent heat loss or heat gain. Although its primary purpose is an economic one, it also provides more accurate control of process temperatures and protection of personnel. It prevents condensation on cold surfaces and the resulting in the reduction of corrosion effects. The present study has numerically conveyed overall heat loss in a bare Galvanized iron pipe with different insulating materials having different flow rates and temperature ranges. From the present experimental work, using different locally available insulating materials to minimize heat loss has shown promising effects with Sheep Wool Blanket. The value of heat loss depends on parameters such as Thermal Conductivity of insulating material. Flow rate of fluid inside pipe, ambient Temperature, Reynold's Number and Prandtl Number, Area of pipe are the parameters which are to be studied. Thickness of Insulation and thermal conductivity are the most important parameters for efficiency improvement. For same mass flow rate, the heat loss rate through sheep wool blanket has come out to be minimum. The relationship between the efficiency has come out to be as Sheep wool blanket was found to be higher than other material like Jute rope. Not only thermal efficiency but cost is also a main criterion for consideration of type of insulation to be used in specific industry/ area. If we have same average temperature of fluid flowing inside pipe, then heat loss is directly proportional to the flow rate of fluid inside the pipe. All the results discussed above have been achieved at different thickness of insulating material which in general is greater than that of the critical thickness of insulation.

