

Numerical Analysis of Heat Transfer Enhancement in Heat Exchangers by using Dimpled Tube

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Abstract : The heat transfer coefficient can be improved passively by using a dimpled surface on the tube. The contact area where heat transfer takes place can be enlarged and turbulence will be purposefully produced inside the duct; as a consequence, higher heat transfer quality will be achieved by employing an extended inner or outer surface (dimpled surface). In order to compare the rate and quality of heat transfer between a regular-shaped pipe and a dimpled pipe, a dimpled tube with a fixed dimple radius was created. Numerical analysis of the plain and dimpled pipes was performed using ANSYS. A 23% increase in Nusselt number was seen for dimpled tubes compared to plain tubes. In comparison to plain tubes, dimpled tubes' increase in thermal performance index was found to be between 8% and 10%. An increase in pressure drop of 18% was noted.

Keywords : heat transfer, dimpled tube, CFD, ANSYS

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