

عنوان مقاله:

Experimental Investigation on the Effect a Rotational Shaft on the Thermal Behavior of a Circular Tube under Constant Heat Flux

محل انتشار:

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خلاصه مقاله:

Active and passive methods are two main mechanisms of heat transfer improvement. The active methods use external forces to improve heat transfer. This investigation evaluates the thermal and frictional behavior of a circular tube containing a rotational shaft. Constant heat flux was exerted to the circular tube. The fluid inlet and outlet temperature as well as wall temperature of tubes were measured to calculate the heat transfer coefficient. The Re (Reynolds) number was between 100-2000. Also, the dimensionless rotational speed (Rs) had the values of 1, 1.5, 2, 2.5 and 3. Results revealed that the rotational shaft could increase the Nu number. Up to 18%. Also, the results showed that the rotational shaft could significantly increase the pressure drop and friction factor. The maximum increment of 78% was achieved for friction factor. It was revealed that the use of rotational shaft could be more efficient at low Re numbers and low dimensionless rotational speeds. Also, it was found that by the increment of Reynolds number and being in the transient regime the efficiency of the system would improve.

کلمات کلیدی:

Dimension less rotational speed, Nusselt Number, friction factor, Thermal efficiency factor

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