

عنوان مقاله:

Magnetic Field Effect on Ferro-Nanofluid Heat Transfer in a Shell and Tube Heat Exchanger with Seven Twisted Oval Tubes

محل انتشار:

مجله بین المللی طراحی پیشرفته و تکنولوژی ساخت, دوره 15, شماره 2 (سال: 1401)

تعداد صفحات اصل مقاله: 10

نویسندگان:

Mansour Talebi - *Reactor and Nuclear Safety Research School, Nuclear Science & Technology Research Institute, Iran*

Mehran Tabibian - *Department of Mechanical Engineering, Majlesi Branch, Islamic Azad University, Iran*

خلاصه مقاله:

This article investigates the effect of magnetic field on the performance of a special shell-and-tube heat exchanger using ferro-nanofluid. The heat exchanger comprises seven twisted oval tubes with triangular array mounted on a hexagonal cross section. Water/iron oxide nanofluid with a volume ratio of ۴% is used as hot fluid in tubes and water is employed as cooling fluid in the shell. The flow regime is laminar and calculations are performed at different Reynolds numbers and various magnetic fields. The governing equations include continuum, momentum, energy, and magnetic field equations that are solved using a finite volume method. It is demonstrated that the wall temperature of the tubes at the output is lower when the magnetic field is present compared to the case in which the magnetic field is not applied. Applying the magnetic field to the ferro-nanofluid leads to an increase in the Nusselt Number by about two times, leading to an increase in thermal efficiency of the heat exchanger. Also, the effect of the magnetic field was quite different with respect to the geometry and position of the tubes relative to the flow field. The effect of increasing the Nu in the first half of the twisting of the tube is approximately equal to the rate of reduction in the second half of the .tube, resulting in a reduction in the impact of the magnetic field intensity

کلمات کلیدی:

Ferro-Nanofluid, magnetic field, Shell and Tube Heat Exchanger, Twisted Oval Tubes

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1611403>

