

عنوان مقاله:

Effects of the rectangular groove dimensions on the thermal features of the turbulent Al_2O_3 -water nanofluid flow in the grooved tubes

محل انتشار:

مجله تحقیقات انتقال حرارت و توده, دوره 2, شماره 1 (سال: 1394)

تعداد صفحات اصل مقاله: 12

نویسندگان:

Komayl Mohebbi - Faculty of Mechanical Engineering, Semnan University, Semnan

Roohollah Rafee - Faculty of Mechanical Engineering, Semnan University, Semnan

Farhad Talebi - Faculty of Mechanical Engineering, Semnan University, Semnan

خلاصه مقاله:

The forced convection heat transfer of turbulent Al_2O_3 -water nanofluid flow inside the grooved tubes with the different aspect ratio of the rectangular grooves is numerically investigated. The governing equations have been solved using finite volume method (FVM) coupled with SIMPLE algorithm. It is assumed the heat flux is constant on the grooved walls. The Single-phase approach is applied for the computation of the nanofluid flow. The Nanoparticles volume fraction is in the range of 0-5% and flow Reynolds number is in the range of 10,000-35,000. Comparisons between the numerical results and available experimental data show that among different turbulence models, k- ϵ model with enhanced wall treatment gives the better results. The results show that the heat transfer coefficient increases with nanoparticles volume fraction and Reynolds number but it is accompanied by pressure drop augmentation. From the results, it is concluded that the grooved tubes with Al_2O_3 -water nanofluid flow are thermodynamically advantageous. The Correlations for heat transfer coefficients have been presented for grooved tubes in different aspect ratios using the numerical results. The optimum geometric ratios in which the entropy generation is minimized are also determined.

کلمات کلیدی:

Nanofluid, Grooved tube, turbulent flow, Forced convection, Entropy generation minimization

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/2072263>

