

Poom Jatunitanon 2010: A Study of Fluid Flow in Spirally Corrugated Tube Heat Exchanger by Computational Fluid Dynamics Method. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor: Mr. Apichart Chaengbamrung. Ph.D. 159 pages.

The paper presents the results to increase the performance of double-pipe counter flow heat exchanger by computational fluid dynamics method (CFD). The performance can be increase by adds the spirally corrugated in the tube of working fluid. The results obtained from the heat exchanger with spirally corrugated in tubes are compared with those without spirally corrugated in tubes. It is found that the spirally corrugated have a significant effect on the heat transfer and pressure drop augmentations.

The results of smooth tube heat exchanger by computational fluid dynamics method (CFD) are to be compare with Theory of smooth pipe. And the effect of Reynolds number,  $(e/d)$ ,  $(p/d)$ ,  $(Pr)$  for fluid flow in spirally corrugated heat exchanger. As a results the effect of spirally corrugated tube can be set in The equation of friction factor and Nusselt number to compared with experiment.

The results show computational fluid dynamics method (CFD) can be estimate the friction factor and Nusselt number for Theory of smooth tube heat exchanger with the maximum error is 15 % and the equation  $\tilde{f} = 2.025(e/d)^{0.1232} (p/d)^{-0.372} (Re)^{-0.2967}$  from CFD method can be estimate the friction factor for spirally corrugated tube heat exchanger and The equation  $\tilde{Nu} = 0.9362(e/d)^{0.0627} (p/d)^{-0.1218} (Re)^{0.6751} (Pr)^{-0.4794}$  can be estimate the Nuseelt number for spirally corrugated tube heat exchanger with the maximum error is 15 %.

---

Student's signature

---

Thesis Advisor's signature