

Review of: "Numerical Study of Thermal Performance on Fin and Tube Heat Exchanger with Flat Rectangular and Sinusoidal Winglet Vortex Generators"

Dr Arnab Karmakar¹

¹ Birla Institute of Technology, Mesra

Potential competing interests: No potential competing interests to declare.

- Numerical studies (CFD method) of different types of vortex generators in a finned heat exchanger are of much importance and are sufficiently available in the literature. The CFD method is very effective in understanding the thermal-hydraulic behavior of a complex heating device if the CFD method is well validated. Have the authors validated their numerical simulation with similar types of experimental data from the literature? The validation not only helps to increase the accuracy of the simulation but also paves the way for the development of correlations (empirical or mathematical) among the important dimensionless numbers.
- The author should mention the assumptions of Eqs. (1-3). Is the solution obtained with the steady-state governing equations? Please mention here the limitations and advantages of using these steady-state equations.
- In 2.1 Governing Equations, justify how Eqs. (1-3) are dimensionless. If the transport equations are dimensionless, provide or specify the dimensionless variables. Are the terms "averaged Navier–Stokes equations" and "dimensionless Navier-Stokes equations" the same?
- The author should present the proper forms of the transport equations used in the RNG k- ϵ model with reference.
- The author should specify the notation 'H' (in Fig. 1 or 2) and explain the origin of the reverse flow with an explanation in section 2.1.
- The author should specify all the Neumann boundary conditions used in the solution.
- Please specify the corresponding subjects of the boundary nodes (562707, 858963, 0.95 million). Check whether the term "values of nodes" is appropriate in section 2.1.
- Why did the author not consider the Prandtl number (Pr) in the study? The Nusselt number is a function of both the Reynolds number and the Prandtl number. How effective will the correlation be without the Prandtl number?
- In Figs. 3 and 6, has the author considered the Prandtl number (Pr)? Is the Pr varied throughout the range of Re? Specify the Pr in the two figures (Fig. 3 and 6). Please explain the effect of the Prandtl number on Nu.
- From Fig. 7, it has been observed that the baseline configuration has the higher value of j/f . So, it is advantageous over the sinusoidal and rectangular winglet types of vortex generators. Why did the author choose the baseline configuration of higher thermal performance? Please explain the necessity.
- Please check the notation of the y-axis title in Fig. 7. The y-axis is j/f or the reciprocal of it (f/j). The reciprocal of the factor can alter your understanding of the result.

