

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

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Potential competing interests: No potential competing interests to declare.

Overall assessment:

The paper addresses the effect of winglet vortex generators added to a fin and tube heat exchanger on the aerothermal performance. Overall, the paper is more an engineering study than a scientific paper. The novelty of the work, as well as its contribution to the state-of-the-art research in the field, is very limited. The physical mechanisms behind the described observations are not properly explained. The writing is poor; some sentences should be rephrased to improve readability, and grammar should be checked.

Further comments:

1. In the introduction, it should be elaborated why the studied problem is relevant and what the objective and novelty of the present study are. How does this study contribute to the state-of-the-art?
2. The citations of previous work are given in a confusing manner. The style of citation should be "Authors A and B performed an experimental/numerical study of this type of design and found this and that [X]."
3. The introduction is overly long and presents only a list of past efforts without a proper synthesis of the findings.
4. It is stated that compressible air is chosen as the working medium, but the NS equations are for an incompressible fluid, and also density is listed as constant in Table 1.
5. Table 1 lists properties of the solid heat exchanger material, but only the airflow is simulated, i.e., they are irrelevant to the study.
6. Inlet velocity not specified (only "very low").
7. Motivation behind turbulence model selection – citation missing.
8. Grid independence not evaluated (what is the grid convergence index, error estimation on the selected grid).
9. What is the y^+ and the wall boundary condition treatment for the turbulence model?
10. Figure 4 – visualization not clear, the streamlines are too dense so that they cannot be distinguished from each other, transforming it to a quasi-contour plot. Streamlines are missing in some parts of the domain. Description of velocity field not clear, annotations and markings of the discussed zones and regions should be added to the figure to provide a clearer description. Effects of the velocity field on heat transfer are mentioned, but not supported by a plot of heat transfer distribution.

11. It is stated that the sinusoidal vortex generator provides better performance than the flat one, but the mechanisms behind this difference are not explained at all. As this seems to be the main finding of the paper, a clear explanation is necessary.
12. “Thermal-hydraulic” performance discussed, but should instead be aerothermal, as the working fluid is air, not a liquid.