Feasibility of Using CFD for Simulating the Performance of Cooling System for Induction Hobs

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Abstract

The paper presents a method of simulating the cooling system of an induction hob using Computational Fluid Dynamics (CFD). CFD analysis of the induction hobs takes a lot of computational resources and involves solving for the flow fields along with the energy equation. Special attention is required to model the hob to get accurate results. This paper explores the modelling requirement to comprehensively capture the correct flow regime with a focus on accurately estimating component temperatures for an induction hob. A full model for an induction hob in a typical furniture cabinet is modelled and solved for surface temperatures of IGBTs using fluent Ansys. To validate the model CFD results are compared with manufacturer's specifications and experimental results. The numerical results are shown to achieve an agreement of 80% with the experimental results.

Keywords

Computational Fluid Dynamics (CFD), Induction hob cooling, Thermal management.