Title: **OpenFOAM® modeling of air jet interaction with a surface.**

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Abstract

The air jet impingement process has been used in a wide range of industrial applications such as spraying of fluids, drying, annealing of metals, and cooling of electronic components and gas turbine blades.

The jet flow field is simulated numerically by using openFOAM® package.
The algorithm applies a finite-volume method to approximate the equations of motion, constructing a system of discrete algebraic equations with conservative properties. Further, a Poisson-type pressure correction equation obtained by combining the continuity and momentum equations, is solved. A pressure-implicit scheme with splitting of operators (PISO) is selected.

The RNG k-ε turbulent model is chosen for RANS closure.

Several variations in inlet pressure, distance between inlet nozzle and impingement plate, and shape of nozzle are studied. The jet flow shows a sharp decrease in velocity just before hitting the impingement surface. The vorticity of the flow is shown to vary considerably with the angle of impingement.

Improved Spalart-Allmaras delayed detached eddy simulation (IDDES) model is planned for future research and comparison with existing data.