Using Automated OpenFOAM Simulation to Inform Acoustic Models of Perforated Mufflers

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Abstract

When modeling the reduction of noise from mufflers, the effect of the flow and temperature on the acoustic characteristic must be accounted for in order to have accurate predictions. In the past, effectively obtaining and applying this information required time, effort and strong coordination between acoustics and CFD modeling groups. However, the VA One acoustic FE modeling capabilities have been expanded so that a VA modeler who is a non-expert CFD user can make use of an automated link to the open source OpenFOAM software to be able to include 3D flow and temperature effects in the muffler acoustic simulation.

Recent enhancements also allow accurate results to be obtained even when perforation elements are present in the muffler. An overview of the modeling approach and capabilities are shown. Validation results for some industrial applications are presented along with some comments about current limitations and planned next steps for improvement.