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Three Dimensional Simulation of the Transient Modeling and Simulation of Different Gas Flows Velocity and Flow Distribution in Catalytic Converter with Porous Media

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Abstract : The transient catalytic converter performance is governed by complex interactions between exhaust gas flow and the monolithic structure of the catalytic converter. Stringent emission regulations around the world necessitate the use of highly-efficient catalytic converters in vehicle exhaust systems. Computational fluid dynamics (CFD) is a powerful tool for calculating the flow field inside the catalytic converter. Radial velocity profiles, obtained by a commercial CFD code, present very good agreement with respective experimental results published in the literature. However the applicability of CFD for transient simulations is limited by the high CPU demands. In the present work, Geometric modeling ceramic monolith substrate is done with square shaped channel type of Catalytic converter and it is coated platinum and palladium. This example illustrates the effect of flow distribution on thermal response of a catalytic converter and different gas flow velocities, during the critical phase of catalytic converter warm up.

Keywords : catalytic converter, computational fluid dynamic, porous media, velocity distribution
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