

Numerical Simulation Filter Section of Catalytic Converter in a Diesel Engine

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ABSTRACT

Spark ignition and diesel engines are a major source of urban air-pollution. The major Pollutant in exhaust gases of SI engines are oxides of nitrogen (NO_x), carbon monoxide (CO),and organic compounds which are unburned or partially burned hydro carbons(HC).To reduce exhaust emission, most new cars have a catalytic converters located in the exhaust system, convert harmful pollutants into harmless gases.

The purpose of paper is optimizing of the filter of catalytic converters. As we know the role of filter in uniform distributing of the flow and particles and increase the surface of Reaction. In this paper the porous media model is defined as a cell zone in which the porous media model is applied and the pressure loss in the flow is determined via our inputs as described in momentum equation.

To have a numerical simulation, a CFD Software base finite-volume method is used, and to modeling turbulence the RNG $k - \epsilon$ turbulent model applied. This program after discretization governing equations on a body fitted coordinate system, that is produced in preprocessor, integrates this equations on control volumes and determines the rate of quantities on control volume faces using order two (upwind) approximations.

keywords: *Computational, Fluid Dynamics, diesel engines, catalytic converters*

INTRODUCTION

Most cars are using oxidizing catalytic converters to achieve the current emission standards. The use of these converters has allowed the engines to be optimized for improved fuel economy and drive ability while providing the required hydrocarbon (HC), carbon monoxide (CO), and nitric oxide (NO_x) reduction for 50,000 miles[2]. Significant reductions will be required in all three constituents in 1977. If essentially the same converter system is used, the engine will have to be recalibrated to reduce the engine out emissions. These modifications which will primarily consist of spark

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