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Effect of Turbulence Boundary Conditions to CFD Simulation

The CFD simulation of diesel combustion needs as accurate initial values as possible to be reliable. In this paper the effect of spatial distribution of state and turbulence values at intake valve closure to those distributions prior to SOI is studied.Totally five cases of intake and compression stroke simulations are run. The only change between cases is the intake boundary condition of turbulence. In the last case the average values of p, T, k, ? and swirl number at intake valve closure are used as initial values to compression simulation.The turbulence in the engine cylinder is mainly generated in the very fast flow over the intake valves. In this paper the effect of boundary conditions of turbulence to its level at intake valve closure is studied. Several cases are simulated with different boundary conditions of turbulence. Also the swirl number is compared to experimental value.The discharge coefficients over the valves calculated from simulation results are compared to measured values.Simulated engine is a single-cylinder research engine is based on a commercial 6-cylinder off road common rail diesel engine.

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