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THEORETICAL PERFORMANCE OF EXHAUST VALVES IN HIGH-PRESSURE PUMPS UNDER MAXIMUM FLOW RATES

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Abstract

In order for a vehicle to perform well in terms of power, fuel consumption and pollutant emissions, it is necessary that all the elements that contribute to the high-pressure fluid transmission process be carefully analyzed and optimized. The performance of valves in high pressure diesel pumps is a subject of interest due to the advantages of their correct operation. The high-pressure diesel pump is a component of the Common Rail system and has the ability to supply high-pressure fuel to its other elements. The hydraulic head of the high-pressure pump has two valves, from inlet and outlet circuit. Their design must be optimized so as to ensure a good fluid flow, at different capacities, depending on the supplied pressure. Our work focuses on the exhaust valve and its behaviour at maximum fluid flow. The theoretical analysis compares two types of valves. The analysis carried out compares two models of exhaust valves, the difference being in the shape of the seat of the ball. As a result of our calculations, the performance of the spherical-seat valve is superior compared to the conical valve.

Key words: conical seat, diesel fuel, emissions, exhaust valve, high-pressure pump, spherical seat

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