

# VARIABLE CHARGE MOTION FOR 2007- 2010 DIESEL ENGINES

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## **ABSTRACT**

The use of direct-injection diesel engines in U.S. heavy-duty pickup truck applications is becoming increasingly popular, with over 250,000 produced in 2002. The high torque density and greatly improved fuel consumption offer distinct advantages to the end user.

The 2007 and 2010 emissions legislation will present another set of technical and product-cost challenges to this type of powertrain. The introduction of efficient aftertreatment systems is mandatory for the success of these engines, but optimization of engine-out emissions is also a critical element.

Much has been written about the improvements in modern fuel systems, which offer great flexibility for the direct introduction of fuel into the cylinder. This paper presents complementary technologies that allow improved air/fuel mixing processes by the additional flexibility of variable in-cylinder charge motion. This approach is particularly applicable to pickup truck engines, which require high BMEP levels across a wide engine speed range to offer the driveability demanded by the consumer.

Design solutions for 2-valve and 4-valve engines are presented along with the potential emissions and fuel consumption benefits.