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A comparison of the performance of new and used common rail diesel injectors

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Abstract

An investigation was conducted into the effects of wear on the performance of common-rail fuel injectors, in terms of flow and spray characteristics. The investigation conducted involved the testing of four used injectors, and the comparison of the performance of these injectors with that of an identical brand new injector. The used injectors had deteriorated in different ways, with solenoid wear, mechanical wear in the body of the injector, and mechanical wear in the upper section of the injector being identified. All of the manners of deterioration affected the flow characteristics. The solenoid wear and mechanical wear in the body did not affect the spray performance, but wear in the upper section of the body and a combination of wear in the body and solenoid did affect spray performance. A correlation was developed between the spray penetration of the new injector and the spray theories according to Dent and Hiroyasu.