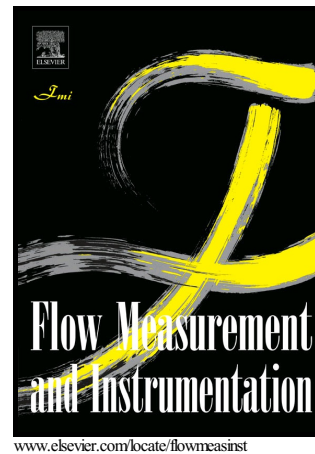


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## Investigating fuel dosage non-repeatability of low-pressure gas-phase injectors

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**Abstract:** The advancement of the means of transport, having its origins in the increasingly stringent exhaust emission limits, forces a better and more accurate fuel dosage to the engine. The increased computing power of the engine ECUs has led to a more precise analysis of the process. A problem arose of the adaptation of engines to LPG fueling. The uneven fuel dosage to the cylinders is partly adjusted by the injection timing. Therefore, in search for other reasons for engine inappropriate operation, the author decided to determine the cycle-by-cycle non-repeatability of fuel dosage of gas-phase injectors. To this end, an original research stand including all necessary equipment was applied. By recording the air pressure at the outlet of the nozzles of different injectors, individual cycles were analyzed. Based on the average pressure values in the cycles, the non-repeatability rate of the fuel dosage was determined. As a result of the performed research on randomly selected low-pressure gas-phase injectors, it was observed that brand new injectors have a non-repeatability rate of approx. 0.3 %. For the injectors already in operation an approx. 36 % non-repeatability rate was observed compared to the brand new ones. When comparing the brand new and the end-of-life (high mileage) injectors, a 1.5 times increment of the non-repeatability of the fuel dosage was determined. The determined parameter is significant because of the narrowing of the combustible mixture control window in modern engine control systems. As a result, this may lead to detecting errors when the fuel dosage repeatability is poor.

**Keywords:** combustion engines; fuel supply; injector; research.

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