

EU study: No significant difference in car fuel consumption between 95E10 and 98E5 petrol grades

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A study conducted by VTT Technical Research Centre of Finland indicates that there is practically no difference between commercial petrol grades 95E10 and 98E5 sold in Finland as regards fuel consumption in normal driving. The finding is based on driving tests conducted by VTT using six used cars of different make under laboratory conditions.

It has been frequently claimed in public that [fuel consumption](#) is significantly higher with 95E10 [petrol](#) than with its predecessor 95E or the 98E5 petrol currently on the market. The suspected higher consumption has deterred drivers of cars whose manufacturers recommend E10 from actually using it.

"The point of this study was to highlight how fuel consumption should actually be measured to give comparable results. Measuring fuel consumption very accurately is not as simple as it seems, because other factors affect consumption besides the fuel itself. In laboratory conditions, we can eliminate these other factors," says Juhani Laurikko, a Principal Scientist at VTT.

The VTT measurements show that the cars tested used an average of 10.30 litres of 95E10 per 100 km, as opposed to 10.23 litres of 98E5 per 100 km. The difference was 0.07 in favour of 98E5 on average, meaning that using 95E10 petrol, which has a higher ethanol content, increases

consumption by 0.7%. Normalising measurement results of each individual test run with observed slight scatter in actual total work done over the driving cycle yields to somewhat higher overall difference, 1.0%.

An [estimation](#) of calorific values based on approximate fuel composition came out at 1.1% in favour of E5, which is highly consistent with the aforementioned 1.0% difference in consumption. Fuel consumption depends mainly on the calorific value of the fuel, i.e. its energy content per unit of volume or mass.

See tables: Tabel 1: Cars used in the tests and Table 2: Summary of [test results](#): <http://www.vtt.fi/files/news/2011/E-10/E10-tables.pdf>

How was the study conducted?

VTT obtained all the fuel used for the test runs at the same time from the Otaniemi Neste Oil service station in Espoo. So as to ensure that ethanol contents was in accordance with the specifications, the ethanol contents of both fuel batches was determined by the Finnish Customs Laboratory. The results showed 4.7% for the E5-grade and 9.4% for the E10 grade.

VTT performed the comparison test under controlled laboratory conditions, because of practical and almost unsurmountable difficulties in measuring a car's fuel consumption accurately and repeatability in normal driving. Therefore, the public claims concerning differences in fuel consumption may be due to any number of other factors besides the type of fuel used.

The study involved six petrol-driven cars loaned by VTT employees. The cars were of model years between 1999 and 2010 and, according to their manufacturers' recommendations, compatible with E10-fuel. The cars

were checked to ensure they were free of any faults or malfunctions that could have influenced the test results.

VTT measured fuel consumption using the simplest and most reliable method: measuring the weight of fuel consumed. As the density of the fuel grades was known, establishing the volume of fuel consumed was a simple matter.

The driving programme used for the test drives was the FTP72 programme, which features more aggressive accelerations and a high average speed than corresponding EU cycle. Two drivers were used for the tests, both of them experienced and qualified for conducting accredited exhaust emission tests. Each [car](#) was driven by the same driver in all tests. Two tests were conducted on consecutive days for each petrol grade. The running order of the fuels was random.

Provided by VTT Technical Research Centre of Finland

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