From: [redacted] <[redacted]@jrc.ec.europa.eu>
Sent: 02 May 2012 11:07
To: [redacted] (JRC-ISPRA)
Cc: [redacted] (ENTR); [redacted] (JRC-ISPRA); [redacted] (JRC-ISPRA); [redacted] (JRC-ISPRA); [redacted] (JRC-ISPRA); [redacted] (JRC-ISPRA); [redacted] (ENV); [redacted] (ENV); [redacted] (ENTR); [redacted] (ENTR)
Subject: Re: NOx emissions depend on engine start temperature

Dear [redacted]
very interesting results.
Would it be possible to add also CO2 emission measurement on the same diagram?
Thanks,
ciao
[redacted]

On 4/30/2012 4:38 PM, [redacted] (ENTR) wrote:
[redacted]

Thanks. This is very useful and a clear case of "hard" cycle beating, i.e. the use of test cycle conditions for activation of emission control (and not just "neglecting" the emission control strategy outside test cycle conditions). From a technical point of view emissions should be lower if Tstart is higher... Which temperature, coolant or oil, did you use as "engine start T"?

[redacted], [redacted]: Would it be possible to include these results in your presentation for Thursday?

Regards,
[redacted]

From: [redacted] [mailto [redacted]@jrc.ec.europa.eu]
Sent: Monday, April 30, 2012 12:29 PM
To: [redacted] (JRC-ISPRA); [redacted] (JRC-ISPRA); [redacted] (JRC-ISPRA); [redacted] (JRC-ISPRA); [redacted] (JRC-ISPRA)
Cc: [redacted] (ENTR); [redacted] (JRC-ISPRA); [redacted] (JRC-ISPRA)
Subject: NOx emissions depend on engine start temperature

Dear colleagues,

please let me draw your attention to the latest results of VELA measurements of a current EU5a car with a common 4 cyl. diesel engine. We derived the dependencies of pollutants on the engine start temperature (we measured different T of coolant and oil) at NEDC. Main focus was on CO2 in the framework of Eco-Innovations, but we see also a very interesting behaviour concerning NOx (see attached diagram):

NOx EU5 limits are fulfilled only in the T range between 20 and 30 °C. Starting the engine below 20 °C or above 30 °C leads to a strong increase of NOx emissions.

This means clearly that the NOx strategy is optimized to the legal frame conditions during Type Approval measurements. NOx reducing devices, like EGR, are fully activated only in a very specific window of engine start T. This NOx optimisation causes slightly higher CO2 emissions and fuel consumption.

There seems to be a new dimension of 'cycle beating' since not only the cycle itself and the current engine and ambient parameters may be 'recognised' by the system, but there is also a kind of 'memory effect'

implemented, influencing the engine strategy for at least 20 min after starting the engine at a specific engine temperature.

Of course, we measured only one vehicle, and the results might not be generalized. But at least, we get an impression of what might be technically feasible. The results might also give arguments within the WLTP to extend the T range of the current TA procedure to hot and real cold tests.

Regards

[redacted]

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