CO2 emissions and energy demands of vehicles tested under the NEDC and the new WLTP type approval test procedures

Abstract:
The European Commission has been actively involved in the development of the World-wide harmonized Light duty Test Cycle (WLTC) and corresponding Test Procedure (WLTP), and is currently working to introduce them in the European type approval (TA) procedure. The present study is analyzing and estimating effects of the introduction of WLTP on the average CO2 emissions and average vehicle energy demands (VEDs) from different segments of the European vehicle market. Twenty gasoline and eleven diesel vehicles were tested on the current European TA procedure NEDC, and on the evolving WLTP. These WLTP tests were then used as basis to estimate for each vehicle a WLTP best case and a WLTP worst case, in line with the finalized version of the WLTP. In the WLTP worst case scenario (WLTP-H) results show on average 11% higher CO2 emissions and 44% higher energy demands than NEDC. Best case scenario (WLTP-L) has on average 1% higher CO2 emissions and 26% higher energy requirements than the NEDC. These values should be seen as additive to the 8% average difference between the JRC NEDC test results and the official type approval values. The higher vehicle inertia and road loads (RLs) along with the higher vehicle speeds, are the key parameters of the new procedure that contribute to the increased CO2 emissions and vehicle energy demand (VED). Results from the present study seem to show that moving from NEDC to WLTP has a higher impact on diesel than on gasoline vehicles. The highest effect of WLTP introduction is measured for vehicles that comply with EURO 6 emission standard (14% increase in CO2 emissions from NEDC to the simulated worst case WLTP), with also the highest difference between JRC measured NEDC tests and declared type approval values (11% difference).


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