



Justification for an ECE R41 Revision

The present noise test during the vehicle type approval procedure is defined in ECE Regulation 41. The noise measurement is made at the track edge, on a standardized road surface, with wide open throttle, in second and/or third gear. The entry speed (at -10m from the microphone position) is 50 km/h. The resulting noise level is the average of the measured noise levels in second and third gear, if both gears have to be measured.

Based on this procedure, the maximum allowed noise level has been strongly reduced (from 86 to 80 dB(A) in 15 years). This has not resulted in a lowering of noise levels in real traffic. With all major noise sources now of comparable importance, a test procedure that correctly simulates the noise source balance is of primary importance for having optimum regulatory efficiency.

ISO has been addressing this problem, establishing within the framework of TC 22 SC 22 a Working Group (WG 16) which is charged with revising the motorcycle test procedure in ISO 362 standard. This work is done in close consultation with ISO TC 43 SC1 WG 42 (the lead WG in charge of revising the entire ISO 362). The concept for new test procedure was based on operating parameters relevant to actual urban traffic operations. For that reason, in-use driving behaviour data was analysed with respect to vehicle speed, acceleration and engine speed, the most important parameters for noise generation.

The revised method developed by ISO is based on a target acceleration as a design-independent performance requirement. The target acceleration represents 95% of accelerations occurring in urban traffic at speeds around 50 km/h (40 km/h for motorcycles up to 50 kW/t). These vehicle speeds have been chosen because they have the highest occurrence in the in-use data. On average, the peak acceleration in urban traffic increases with the power to mass ratio (and decreases with the vehicle speed). The engine RPM at which this peak acceleration takes place decreases with the power to mass ratio (and it is weakly dependent on the vehicle speed on urban streets). The accelerations in real traffic are predominantly partial load accelerations with the degree of partial load depending on the power to mass ratio. Since noise measurements with partial throttle acceleration have a poor repeatability they are approximated by a combination of wide open throttle acceleration and constant speed tests.

The gear choice is determined by a reference acceleration for the wide open throttle tests. This makes the test more robust in terms of cycle bypass prevention and independent from transmission type, number of gear ratios and type of engine. In effect, the new procedure can be applied to every conceivable propulsion technology that will be suggested in the future (hybrid vehicle, electric vehicle, fuel cell vehicle, etc).

The fact that the new procedure is derived from actual in-use driving behaviour data provides for transparency, allowing comparability with other vehicle types in the same operating environment.

The revised test provides a better balance of the involved noise sources than the present method, compared to the situation in urban traffic.

- + include reference related to link between R41 and R92
- + consider best reformatting and rewording (cosmetic)