

Note by the secretariat: At its November 2007 session, WP.29 agreed to include in the programme of work of GRPE plug-in hybrid vehicles in order to study amendments to Regulations Nos. 83 and 101 to improve the representability of such vehicles in the test procedure (see report ECE/TRANS/WP.29/1064, para. 14).

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Transmitted by the representative of the UK

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agenda item 2.2.

## **Plug-In Hybrid Vehicles - Amendment To Regulations Nos. 83 & 101**

### **Introduction**

There is increasing interest in hybrid vehicles with additional electrical energy storage and charging from off-vehicle sources, so called 'plug-in hybrids'. This technology offers many of the benefits of electric vehicles (e.g. zero tailpipe emissions, lower lifecycle CO<sub>2</sub> emissions etc) whilst overcoming some of their limitations e.g. limited range. Manufacturers are close to bringing such vehicles to market. Procedures for approval of such vehicles were introduced in Regulations Nos. 83 (emissions) and 101 (fuel consumption) in 2004. However, at that time the plug-in hybrids envisaged were essentially electric vehicles with internal combustion engines starting only when battery charge drops to a certain level. There is now interest in introducing plug-in hybrids based on existing parallel hybrid technology but with additional battery capacity. In their current form the Regulations do not accurately reflect the environmental benefits of this type of vehicle.

### **Detail**

Regulations Nos. 83 & 101 require testing of externally chargeable hybrid vehicles in two states of battery charge, full charge and a low charge level defined by a set pre-conditioning procedure. A weighted average of the results of these two tests is calculated using the pure electric range of the vehicle and a nominal value for the typical distance between recharges. This procedure works well for vehicles designed to run in pure electric mode until the battery reaches a minimum charge level and then start the internal combustion engine. However the procedure penalises vehicles which preserve the charge imparted to the battery, by starting the internal combustion engine earlier, whenever energy demands are high e.g. whenever the vehicles reaches a certain speed. In this case the weighting attached to the high charge test result is artificially low as the electric range of the vehicle is defined by the point at which the control strategy starts the internal combustion engine, rather than the point at which the energy imparted from the off-vehicle charging has been exhausted.

Amending the weighting procedure in the Regulations to use the proportion of distance travelled before the off-vehicle charging energy is exhausted would more fairly reflect the benefits of each type of plug-in hybrid.

### **Proposal**

The UK requests that WP.29 approve the addition to GRPE's work programme of amendments to Regulations Nos. 83 and 101 to better reflect the merits of hybrid vehicle based plug-in hybrid concepts. In view of the closeness to market of this technology it is desirable that amendments be brought forward as soon as possible. The UK would therefore be willing to raise the issue at the January GRPE session and, with the assistance of industry to prepare a Working Document for consideration in the June 2008 session of GRPE.

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