

**COMMENTS**  
**on the document GRPE-63-06-Rev. 1**  
(transmitted by the expert from Poland)

I. The period of operation with petrol in gas mode was not limited in Regulation 115 until 2009/2010 when the limit of 60/90 s was introduced. Why was this limit introduced? Several retrofit system manufacturers found it difficult to meet the emission limit laid down in Regulation 115. The emission with gas after the retrofit was higher than that with petrol before the retrofit. In order to satisfy the requirements they extended the operation with petrol after the cold start. In the extreme case a vehicle operating with petrol for 1179 s and with gas for 1 s was regarded as “gas vehicles. The introduction of the limit 60/90 s was supposed to sort out this problem and in practice it has done. The paragraphs 6.1.2.4.1.6.2 and 6.2.2.4.1.6.2 in the proposed document:

“It is permissible to use **petrol only** or simultaneously with gas during the entire test cycle provided that the energy consumption of gas is higher than 80% of the total amount of energy consumed during the test.“

if accepted, will make it possible to use petrol in gas mode for some 200 - 250s in type I test after the cold start. The old problem will be faced again only to a lesser extent.

Therefore it is proposed to apply **temporarily** the provisions of the new paragraphs 6.1.2.4.1.6.1 and 6.1.2.4.1.6.2 for LPG as well as 6.2.2.4.1.6.1 and 6.2.2.4.1.6 for CNG only **to vehicles with direct injection engines**. The current provisions should be applied to other vehicles. In the future the provisions of the paragraphs 6.1.2.4.1.6.1 and 6.1.2.4.1.6.2 for LPG as well as 6.2.2.4.1.6.1 and 6.2.2.4.1.6 for CNG may be extended to vehicles with so called “mixed fuelling” if the right formulation is found.

II. Remarks to the measurement method laid down in Annex 6

- (a) The proposed method does not seem to be suitable for CNG vehicles (Annex 6B). Two reference CNG fuels are specified: G20 and G25. My remark refers to G25. This reference fuel is composed of 86% mole of methane and 14% mole of nitrogen (average percentage). If the CNG mass consumed during the

cycle  $M_{CNG}$  is measured by fuel weighing, the total mass of methane + nitrogen is determined. As regards  $FC_{mean} \cdot dist \cdot d$ , it means the mass of methane only. Therefore the method for G25 needs correcting. One of the ways is to use a correction coefficient.

- (b) The gas energy ratio limit is expressed in % (80% in paragraphs 6.1.2.4.1.6.2 and 6.2.2.4.1.6.2). Therefore  $G_{LPG}$  and  $G_{CNG}$  in the formulae in paragraph 2 in Annex 6A and in paragraph 2 in Annex 6B should be also expressed in %. If I am not mistaken, it does not seem to be a case.