

INFORMATION ABOUT HIGH EVAPORATIVE EMISSIONS AND ITS RELATION TO BLENDING OF ETHANOL INTO PETROL

Regulation on evaporative emissions is a part of ECE Regulation No. 83. Evaporative emissions together with cold start emissions stand for an increasing proportion of the hydrocarbon emissions, while the proportion from hot emissions decreases. Today, evaporative emissions account for one third of the emissions from road traffic in Sweden (not including refuelling emissions). The results concerning evaporative emissions obtained through the Swedish in Service Testing programme give cause for concern. 40 percent of the tested vehicles between 2002 and 2005 have exceeded the limit of 2 grams in the type IV test. One possible explanation for the high percentage of failures could be that the cars do not comply with the 5 percent ethanol content in the petrol sold in Sweden.

For many years Sweden has run a national programme to inspect vehicle emissions from passenger cars and light duty trucks. The programme runs parallel to, and is somewhat similar to the mandatory programme concerning manufacturers as specified in ECE R83. There are also some supplementary tests run through the national programme, one of these being the Type IV evaporative emissions test that is conducted in line with the ECE R83, which amongst other things means using a reference fuel.

Of the 50 vehicles tested in the programme between 2002 and 2005, 40 percent (20 vehicles) exceeded the limit value of 2 grams. This can be compared to the results obtained in the corresponding programme in Germany where only 2 of the 19 vehicles tested (10 percent) failed to pass inspection.

One clear difference between Sweden and Germany is the 5 percent ethanol content in the petrol sold in Sweden started in year 2000. It is important to state that the Swedish fuel with 5 percent ethanol fulfil the requirements of EU Directive 98/70/EC and European Standard EN228. Different studies from other countries (USA, Australia, and EU) have shown that the presence of ethanol in petrol increases permeation through the fuel system components and also reduces the working capacity of the carbon canister. This could be a plausible explanation for the high percentage of failures even though the differences found in the literature review were not as large as what was found through the durability tests in Sweden.

With this informal document we would like to inform GRPE and vehicle manufacturers about the problem with evaporative emissions in Sweden. We would also like to be informed if there are other experiences within this field that can be shared. The question on the influence of ethanol must be analysed in greater depth. One important on going programme is the EUCAR/JRC/CONCAWE programme¹.

Further, it is our assessment that this problem will not be worse if the ethanol content is increased from 5 to 10 percent. The problem already exists at 5 percent. The discussion in Europe concerning changing the fuel directive to allow an increase in the ethanol content to 10 percent can therefore continue in conjunction with further analyses of the problem.

¹ EC DG-JRC, CONCAWE, EUCAR (2006) Interim Report, Joint EUCAR/JRC/CONCAWE Programme on: Effects of gasoline vapour pressure and ethanol content on evaporative emissions from modern cars