

**MINUTES ON THE 1ST GRPE INFORMAL GROUP MEETING ON RETROFIT EMISSIONS CONTROL DEVICES (REC)
7 June 2010, 10:00 – 12:30, Palais des Nations, Geneva**

1. Introduction & meeting agenda

The Chairman, Mr Baarbé, welcomed all to the REC kick-off meeting and meeting participants introduced themselves (attendance list attached as REC-01-04).

Germany noted that many retrofit schemes in Europe use the German Regulation Anlage XXVII and they see this as a basis for any proposed regulation. The Netherlands also commented that they have a retrofit system in place and the UK expressed an interest in retrofit for helping to meet air quality requirements.

The meeting agenda (meeting document REC-01-01) was adopted without change.

2. Draft proposal for a mandate for an informal group of GRPE dealing with Retrofit Emissions Control devices (REC) – informal document No. GRPE-60-02

It was made clear that REC for HD and NRMM should be done in parallel. It was also commented that the indents under tasks point b) (HD) applied equally to point a) (NRMM).

The EC suggested that the objective should be the development of a separate Regulation rather than amendments to existing Regulations (such as ECE R.49). This was supported by the meeting. The inclusion of ECE R.103 (replacements) in the list of affected Regulations was questioned. The chairman said that this was because in some respects retrofits could be replacements for an existing system. This would be clarified in the final document.

It was agreed that the document should be adapted accordingly.

3. Presentations and discussion documents

a. Chairman's views – meeting document REC-01-02

The chairman reviewed his discussion document with the main principles as technological neutrality and that requirements should be performance based, with Best Available Technology as the core.

Germany commented that the document later suggests excluding certain technologies (e.g. 'open filters') whereas such technologies would be capable of meeting the performance requirements

Euromot agreed with a performance-oriented approach but they would not like to see undefined wording like Best Available Technology (BAT) in the document.

The chairman said that to his view there should be separate approvals for systems that do not increase NO₂ and ones that do increase NO₂ (Issue 2 in his discussion document). Euromot noted that systems that reduce NO_x would also reduce NO₂.

The discussion document suggests 3 target approval schemes for systems that:

- 1). Reduce PM
- 2). Reduce PM and not significantly increase the direct emission of NO₂;
- 3). Reduce PM as well as NO_x and thus NO₂.

AECC suggested adding a 4th point to cover systems that reduce NO_x only. This was agreed.

Regarding national environmental classifications (section B of the chairman's discussion document) it was clarified that there may be 'intermediate' classes as a result of retrofit (e.g. only PM limits for Euro IV). The chairman commented that in Anlage XXVII there is an additional minimum percentage reduction requirement. This is to allow for engines that are already close to meeting the next stage. He suggested that this should also be included in any future Regulation.

With regard to the operational cycle to be used for any validation tests (Issue 5 of the discussion document), it was suggested that HD engines should have no problem running transient cycles in addition to steady states, even if they were homologated only on the ESC cycle. For NRMM engines, there should be careful selection of engines as constant speed engines, for instance, do not run transient cycles.

The chairman commented that point D (secondary emissions) of his discussion document could be controversial. Germany commented that in Anlage XXVII there is a requirement that any additive used must first be approved. Germany also pointed out that VERT is a Swiss programme, not a Swiss-German programme as shown in the chair's discussion document. AECC commented that development of test requirements to support measurement of secondary (unregulated) emissions is likely to be very time consuming.

Regarding durability (Issue 8), the chairman suggested that it would be a waste of all the work that had so far gone into VERT if the new requirements did not allow for the acceptance of existing VERT approvals. Euromot felt that any REC Regulation should stand on its own as it is a Regulation for new approvals; it should not rely on existing work. Euromot also felt that this section mixed durability and warranty. The two items should be separate - as they are in European Regulations. It was commented that the alternative durability requirements suggested in the chairman's document (2000 hours and 100 cycles) are drastically different. The EC agreed that in principle alternatives could be allowed for a limited time period, but there needs to be some assessment of equivalence.

The chairman suggested that data from Inspection and Maintenance procedures could be used to cover in-service conformity (Issue 9). Germany noted that I&M programmes do not cover, currently, NO_x and NO₂. The chairman said that the reference value for the free Acceleration test would need to be changed as the original figure from Type Approval would have changed.

Regarding technology (Section F), the mandate from the EC is based on Euro VI requirements, so the group should consider whether the requirements should include PN and non-regulated emissions, the chairman said. He commented on the difficulty of upgrading engines to Euro VI overall. Article 10 to Euro VI Regulation (EC) No 595/2009 states that member states may grant financial incentives for retrofitting in order to meet the Euro VI emission limits. The Commission expressed the opinion that the EU mandate would allow systems that met, for instance, only the PM requirements of Euro VI. Germany had a different view of the Euro VI text, that it permitted upgrading only to the full requirements of Euro VI. The Commission said that although this would have to be discussed further in Brussels, it should not need to be a consideration for this group as implementation should be a separate discussion from retrofit system certification. The EC felt that for this reason the group should cover requirements for PM control only, for PM with NO_x control and for NO_x control only. It would be possible to upgrade to Euro VI for PM, but NO_x would be much more difficult. Any REC Regulation must, however, allow for upgrading of engines to Euro VI PM levels, the Commission said.

Issue 12 (bypassing and flow direction by design): the chairman noted that there are concerns over both bypassing and reversing the filter and he felt this should not be allowed. Germany noted that where there are safety requirements as a higher level of requirement than emissions (e.g. inland waterways), some form of bypassing might be necessary.

Issue 13 (efficiency): Hungary had commented that ambition levels other than Euro VI should be allowed but the chairman felt that the highest level would cover everything without resulting in unnecessary costs to retrofit system suppliers. He noted that there are currently no PN requirements for off-road but that diesel is classed by WHO as carcinogenic and so should be controlled by BAT. He suggested that there should be a percentage reduction requirement in addition to meeting Euro Stages, for engines that are already close to meeting the next highest limit.

Section 14 (NO_x reduction efficiency): the chairman asked whether there should be 'off cycle' requirements which might mean that retrofit would have to meet higher requirements than original equipment.

Section 15 (shown in the document as a 2nd section 14 – suggested test procedure): AECC commented that the families for testing need to be determined before testing.

Germany said that because of the late distribution of the document, there could be further comments from Germany after internal discussions. The EC would need also time to consult.

b. Other stakeholders

Mr Stein presented the Euromot informal document (GRPE-60-05) on NRMM retrofit, submitted to GRPE. Euromot proposed using Anlage XXVII as a basis but with the addition of elements from California and Switzerland.

The proposal includes degreening for 25 to 125 hours followed by baseline testing of the engine with and without aftertreatment, 1000 hours durability (in field or in the test cell with a specific durability schedule, not just repeated emissions cycles as proposed by Baarbe) and then re-testing with the original engine. Emissions during regeneration (based on gtr.11) would be taken into account. Stein commented that the chairman in his paper had suggested that emissions during regeneration should meet the limit, which is not in line with Euro standards where, as a weighted average, they must meet the limits. Emissions testing would be 3 hot start tests.

The proposal calls for NO₂ to be limited to 20% of NO_x. AECC pointed out that this would require deNO_x capability if the engine-out NO₂ emissions were >20%. The proposal is quite different from current Californian requirements, which is for an increase in the proportion of NO₂ from engine-out. AECC considers that if there are to be limits on NO₂, they should be as absolute limits rather than percentages of total NO_x. Euromot agreed to reconsider this.

Euromot is proposing an emissions classification scheme with 4 different classes for % PM reduction and 4 separate classes for % NO_x reduction. It was commented that there could also be g/kWh requirements equivalent to Euro stages.

Euromot notes that NRMM regulations do not include PN and hence this should not be included in the NRMM retrofit requirements. The chairman commented that PN was introduced because of the difficulty of discrimination between low PM figures. Switzerland commented that they had introduced PN requirements because of this. Euromot repeated that PN should not be included in retrofit as there is no PN standard for NRMM. If there were to be such a requirement it should, in any case, be based on PMP, not the Swiss requirements.

AECC noted that safety and noise are machine requirements, not engine issues and that it would enormously expand the scope of the work to include these aspects as suggested by Euromot. Sweden expressed the opinion that safety and noise must be covered, because the objective of retrofitting is to improve the machine, not just the engine. The chairman commented that it would be impossible to evaluate the safety aspects as this would be machine dependant but noise might be more readily handled though. Germany said that safety issues should be covered in fitting/instruction manuals etc.

Euromot said there are no requirements for off-cycle emissions included in their proposal as there are no current requirements on this for NRMM.

Germany supported the Euromot proposal and said that it would enable a common approach for HD and NRMM.

Sweden queried whether there would be any link between the Euro stage of the engine to be tested and the application. Could a system be tested, for instance, on an NRMM Stage I engine and then be applied to a Stage III engine. Euromot said that this would not be allowed, although depending on test results some extensions might be possible.

The Netherlands commented that from experience with gas retrofit, there should also be requirements on the amount and type of installation information to be provided. Germany agreed that the retrofit supplier needs to provide clear guidance for the installers. The chairman agreed that this would need careful consideration, but he felt that solutions are available.

4. Next steps

a. Roadmap and project planning

The development of standards is planned to take 2 years.

The chairman said he planned to supply the group with a template for a regulation with chapters to be filled in. Members or groups of members would then volunteer to complete these chapters. Main meetings would be held in conjunction with GRPE, but there could also be intermediate

stages. Once the template has been provided, participants should advise the chairman of which sections they wished to work on.

It was noted that Euromot would like to include NOx for NRMM but that OICA felt that there would be limited value for HD. It was suggested that for NOx there should be two subgroups – one for NRMM and one for on-road. The chairman said that he could accept this approach but there would need to be good co-ordination.

b. Contributions from contracting parties

Not discussed.

c. Meetings

The next meeting would be in Frankfurt (hosted by Euromot) or Brussels (hosted by the Commission). *It has meanwhile been confirmed the meeting will be held in Brussels on 27 September; invitation to follow.* There would also be a meeting in the January 2011 GRPE week.

5. A.O.B

None raised.