



**Economic and Social
Council**

Distr.
GENERAL

ECE/TRANS/WP.29/GRPE/2009/17
31 March 2009

Original: ENGLISH
ENGLISH AND FRENCH ONLY

ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

World Forum for Harmonization of Vehicle Regulations

Working Party on Pollution and Energy

Fifty-eighth session

Geneva, 9-12 June 2009

Item 5 of the provisional agenda

**EXHAUST EMISSIONS TEST PROTOCOL OF NON-ROAD MOBILE MACHINERY
(NRMM)**

Final report on the development of a global technical regulation concerning the test procedure for compression-ignition (C.I.) engines to be installed in agricultural and forestry tractors and in non-road mobile machinery with regard to the emissions of pollutants by the engine

Submitted by the expert from the European Commission¹

The text reproduced below was prepared by the expert from the European Commission as the technical sponsor of the global technical regulation (gtr) on Non-Road Mobile Machinery engines (NRMM).

¹ In accordance with the programme of work of the Inland Transport Committee for 2006-2010 (ECE/TRANS/166/Add.1, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance performance of vehicles. The present document is submitted in conformity with that mandate.

FINAL REPORT ON THE DEVELOPMENT OF A GLOBAL TECHNICAL REGULATION
CONCERNING THE TEST PROCEDURE FOR COMPRESSION-IGNITION (C.I.) ENGINES
TO BE INSTALLED IN AGRICULTURAL AND FORESTRY TRACTORS AND IN
NON-ROAD MOBILE MACHINERY WITH REGARD TO THE EMISSIONS OF
POLLUTANTS BY THE ENGINE

A. INTRODUCTION

1. The objective of this proposal is to establish a global technical regulation (gtr) for Non-Road Mobile Machinery (NRMM) compression-ignition (C.I.) engine emissions under the 1998 Global Agreement. The basis is the harmonized non-road test protocol, including test cycles, as developed by the NRMM informal group of the GRPE and also using the non-road transient test cycle (NRTC), developed between 2000 – 2002 by an international task force. This report also documents the development of the gtr by the Working Party on Pollution and Energy (GRPE) and the informal working group on NRMM.

2. Some countries have already enforced regulations governing exhaust-emissions from non-road mobile machinery engines with limits and implementation dates largely aligned, but the test procedures vary.

3. To ensure the maximum benefit to the environment as well as the efficient use of energy, it is desirable that as many countries as possible use the same test protocol for emission control. Society will benefit from this harmonization of requirements through a general global reduction of emission levels. Manufacturers of non-road mobile machinery are already operating in a world market and it is economically more efficient for them to develop engine models to meet internationally consistent emissions regulations. The harmonization achieved through this gtr enables manufacturers to develop new models most effectively. Finally, the consumer would benefit from having a choice of low emitting engines built to a globally recognized standard at a lower price.

4. New research into the worldwide pattern of real NRMM use was fed into the transient test cycle development work which had been initiated by the United States Environmental Protection Agency (US-EPA) and developed in cooperation with the Directorate General Joint Research Centre (DG-JRC) of the European Commission and an international task force. From the collected data a transient test cycle with both cold and hot start requirements was developed. For hot start steady state test cycle (NRSC), the basis was offered by an expert committee of the International Organization for Standardization (ISO). The test cycles have been published in standard series ISO 8178. The procedure reflects exhaust emissions measurement technology with the potential for accurately measuring the pollutant emissions from future low emission engines. The NRTC test cycle has already been adopted in the European Union (EU), Canada and the US emission legislations and it is the basis for the special vehicle legislation under development in Japan. This gtr intends to achieve a high level of harmonization of the complementary testing conditions among these existing or progressing legislations.

5. The test procedure reflects worldwide NRMM engine operation, as closely as possible, and provides a marked improvement in the realism of the test procedure for measuring the emission performance of existing and future NRMM engines. In summary, the test procedure was developed so that it would be:

- (a) representative of worldwide non-road mobile machinery engine operations,
- (b) able to provide the highest possible level of efficiency in controlling non-road mobile machinery engine emissions,
- (c) corresponding to state-of-the-art testing, sampling and measurement technology,
- (d) applicable in practice to existing and foreseeable future exhaust emissions abatement technologies, and
- (e) capable of providing a reliable ranking of exhaust emission levels from different engine types.

6. At this stage, the gtr is being presented without limit values and the NRMM engines applicable power range. In this way, the test procedure can be given a legal status, based on which the Contracting Parties are required to start the process of implementing it into their national law.

7. The gtr contains one option, whose adoption is left to the discretion of the Contracting Parties. This option is related to the dilution air temperature. However, this option should be harmonized when common limit values are established.

8. When implementing the test procedure contained in this gtr as part of their national legislation or regulation, Contracting Parties are invited to use limit values which represent at least the same level of severity as their existing regulations, pending the development of harmonized limit values by the Executive Committee (AC.3) of the 1998 Agreement administered by the World Forum for Harmonization of Vehicle Regulations (WP.29). The performance levels (emissions test results) to be achieved in the gtr will, therefore, be discussed on the basis of the most recently agreed legislation among the Contracting Parties, as required by the 1998 Agreement.

9. In order to facilitate the regulatory activities of certain countries, in particular those that have not yet enforced legislation in this field or whose legislation is not yet as ambitious as the ones mentioned above, a guidance document is also available. The format is based on the one used in the EU for New and Global Approach Directives. It is important to note that only the text of the gtr is legally binding. The guidance document has no legal status as it does not introduce any additional requirements, but it aims at facilitating the use of the gtr and easing its application. The guidance document is placed next to the gtr on the UNECE WP.29 website, as already agreed by AC.3.

B. ANTICIPATED BENEFITS

10. NRMM engines are developed and produced for single world market. It is economically inefficient for manufacturers to have to design and produce substantially different models in order to meet different emission regulations and methods of measuring emissions, which, in principle, aim at achieving the same objective. To enable manufacturers to develop new models

more effectively and within a shorter time, it is desirable that a gtr should be developed. These savings will accrue not only to the manufacturer, but more importantly, to the consumer as well.

11. In order to fulfil the mandate given when work on this gtr was first started, this test procedure does not just address the economic questions, but improves the state of testing of NRMM engines, and reflects better how NRMM engines are used today.

12. It can be expected that the widespread application of this gtr for emissions legislation within the Contracting Parties to the 1998 Agreement will result in a higher control of emissions and finally an improvement for the environment.

C. POTENTIAL COST EFFECTIVENESS

13. Specific cost effectiveness values for this gtr have not been calculated. The decision by AC.3 to move forward with emission gtrs without limit values is the key reason why this analysis has not been completed. However, this information will be available when, in the later phase of this gtr development, harmonized limit values will be developed. Special attention will be given to the ongoing process of the development of such performance requirements for the insertion into gtr No. 2 on Worldwide harmonized Motorcycle emission Test Cycle (WMTC). Experience will be also gained by the NRMM engines industry as to which cost and cost saving are associated with using this test procedure. The cost and emissions performance data can then be analysed as part of the next step in this gtr development to determine the cost effectiveness values of the test procedure in this gtr. While there are no values on calculated costs per ton, the belief of the GRPE experts is that there are clear benefits associated with the adoption of this gtr.

D. PROCEDURAL BACKGROUND

14. The NRMM gtr was developed by the GRPE informal working group on NRMM. The work to develop this gtr began with the establishment of the NRMM working group. The NRMM working group had its first meeting in May 2003.

15. As required by the 1998 Global Agreement, a formal proposal for the establishment of a gtr was proposed to AC.3 by EU. At its fourteenth session in June 2005, the proposal from EU was approved by AC.3 (TRANS/WP.29/AC.3/14) and assigned to GRPE.

16. A preliminary and progress report including a thoughtful review of the proposal was adopted by AC.3 at its June 2007 session (TRANS/WP.29/2007/43).

17. A large number of documents and meeting minutes of the NRMM working group, including a list of the NRMM meetings as well as the representations, provide a chronology of the development of the gtr. This documentation is available on the UNECE website (<http://www.unece.org/trans/main/wp29/wp29wgs/wp29grpe/nrmm.html>).
