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EU / GRPE: "Particulate measurement program" (PMP)

Particulate Measurement Programme (PMP) of ECE-GRPE

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Abstract

This presentation describes an approach which will play a major role for the future limitation of particulate emissions from passenger cars and heavy duty vehicles with the intention to harmonize regulations in this field worldwide.

The European PM standards for Diesel cars have been reduced by more than 90% during recent years when comparing stages EURO I up to EURO IV.

Article 3 of directive 98/69/EC asks the Commission to propose new regulations to be effective after 2005 taking into account particulate emissions of GDI engines, availability of aftertreatment systems and improvement of measurement procedures for fine particulate on the basis of recent research in health effects of particulates.

Furthermore the Environment Council invited the Commission in December 2000 in its conclusions on the Auto-Oil II programme to devise a new measuring procedure taking into account the results of recent studies into the health effects of nano-particulate emissions as well as to bring the provisions on limit values for diesel engines closer to the provisions for petrol engines.

In the year 2000 a group of likeminded countries took up discussions how to address these questions and in May 2001 the mandate for a new working group under the chairmanship of the UK was confirmed by ECE Working Party 29 and GRPE (Working Party on Pollution and Energy of UN ECE WP 29) as an open collaborative group in cooperation with the EU MVEG (Motor Vehicle Emission Group).

This Particulate Measurement Programme (PMP) will develop of a new approach to the measurement of particles in vehicle exhaust emissions, which may be used to replace or to complement the existing regulated mass based system.

The PMP programme began in March 2001 and will end in March 2003 with a formal proposal for (a) new test system(s) as well as providing data on emission levels from advanced technology. The requirements for candidate test systems resp. instrumentation are shown in more detail.

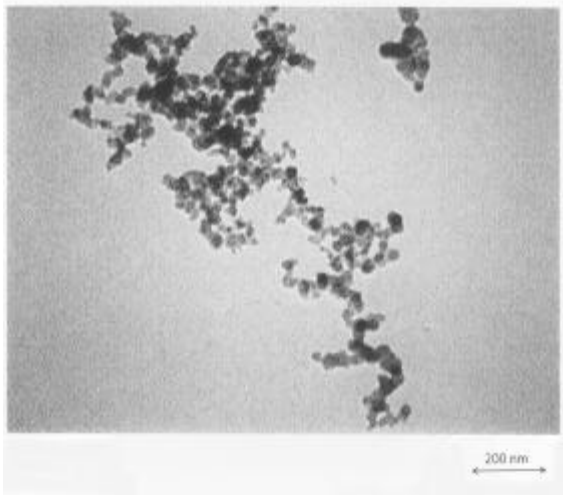
It can be concluded that the PMP is a very ambitious programme with a tough time table. It offers the chance for all authorities, research institutes and industrial associations on the ECE level worldwide which are active in this field to be involved and to make contributions. This way it will lead to most relevant proposals based on the best knowledge available.



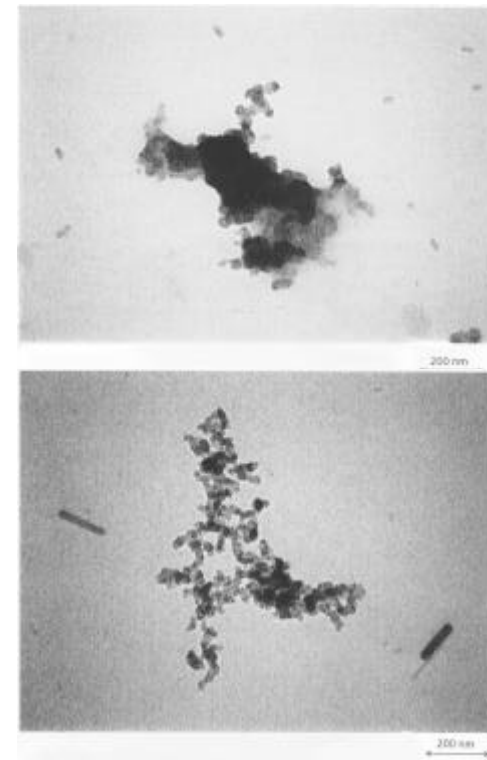
Particle Measurement Programme (PMP)

of ECE-GRPE*

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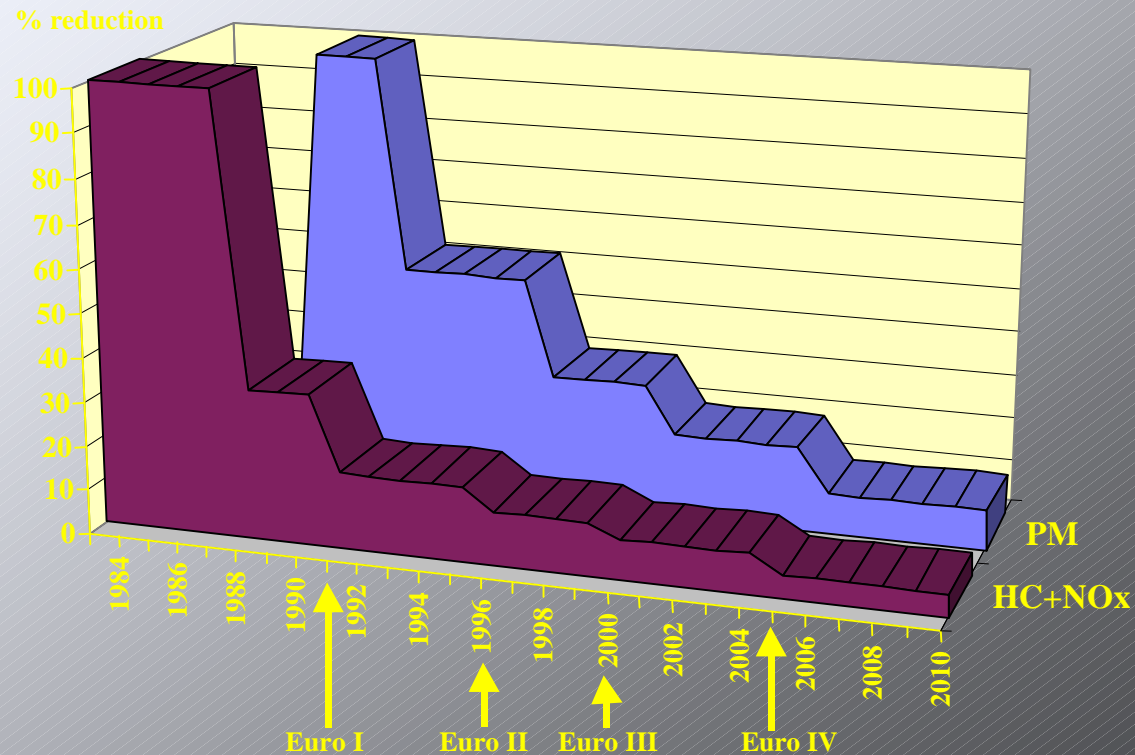
- **Political Mandate**
- **Background and Starting Point**
- **Scope and Time Plan**



* Working Party on Pollution and Energy of UN ECE WP 29



Diesel cars



European Commission, DG Enterprise, CAPoC5, Brussels 12 April 2000 Slide: 13



98/69/EC on Passenger Cars (Article 3):

The Commission shall submit proposals after December 31, 1999 on regulations to be effective after 2005, i.a. taking account of recent research in **health effects** of particulates:

- Particulate emissions of **GDI** engines
- Availability of **aftertreatment systems**, i.e. traps
- Improvement of **measurement procedures** for fine particulates



Environment Council on 18 and 19 December 2000

Council conclusions on "Auto-Oil II"

In line with the conclusions of the Commission's report, and in order to give clear and early guidance to all stakeholders, the Council invites the Commission to:

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Make continued efforts to **significantly reduce nano-particulate emissions**, and in particular devise **a new measuring procedure** for private cars, light duty vehicles and heavy duty vehicles taking into account the results of recent studies into the health effects of nano-particulate emissions.

The Council invites the Commission to give consideration to the need to bring the provisions on **limit values for diesel engines** – for example, on emissions of nitrogen oxides – **closer to the provisions for petrol engines**.

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Background of PMP

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|----------------------|--|
| Jan 2000 | UK approached Germany with the proposal to coordinate particle research |
| 2nd half 2000 | Group of countries extended to the Netherlands, France, Sweden, Switzerland, Denmark as well as to EU Commission representatives (DG ENTR, DG ENV) |
| Dec 2000 | Statement of the like-minded countries to EU-MVEG |
| Jan 2001 | Proposal by the UK concerning the future programme of an ECE-GRPE Particle Emission working group |
| May 2001 | Mandate confirmed by ECE WP 29 and GRPE, working group under the chairmanship of the UK (M. Dunne) as an open collaborative group |



ECE-GRPE PARTICLE MEASUREMENT PROGRAMME (PMP)

GRPE 42nd , 29 May – 1 June 2001

The GRPE Particulate Measurement Programme (PMP) is a collaborative programme operating under the auspices of the UNECE WP29/GRPE Group. Its focus is on the **development of a new approach to the measurement of particles** in vehicle exhaust emissions, which may be used **to replace or to complement** the existing regulated mass based system.

In this context “**system**” comprises a description of the **test procedures, sampling equipment and measurement instrumentation**.

To assist in the setting of future limit values for light-duty vehicles and heavy-duty engines, the programme will **provide data on the emissions of particles** from engines employing a range of **advanced technologies**, and in particular from different diesel particle filters (DPF), measured using the new PMP recommended test system.



ECE-GRPE PARTICLE MEASUREMENT PROGRAMME (PMP)

GRPE 42nd , 29 May – 1 June 2001

PMP is **open to contributions** from governments, industry and NGOs who are members of the GRPE.

Literature reviews reporting studies on the health effects and assessing instrumentation, analytical methodologies and the future of particle measurements will be undertaken under several national programmes. **The relative importance of particle mass, size, number, surface area, and chemical composition on human health is yet to be decided.**

Based on an initial literature study the programme will be divided into the following elements:

Phase I - development of candidate systems

Phase II - testing programme and validation of systems

Phase III - characterisation of advanced technology



PMP - Develop candidate test systems:

- Preconditioning of vehicles/engines;
- Preconditioning of the dilution tunnel;
- Design of sample probes;
- Tunnel losses;
- Temperature and humidity;
- Avoidance of artefacts;
- Scrubbing the dilution air;
- Dilution and residence times;
- Fuel and lubrication oil components (esp. Sulphur).



PMP - Basic Requirements for Instrumentation:

These requirements include good:

- Accuracy;
- Repeatability;
- Reproducibility;
- Durability;

As well as:

- Reasonable price;
- Ease of calibration;
- Potential for market availability within [5] years;
- Practicality and ease of handling for type approval purposes.



ECE-GRPE PARTICLE MEASUREMENT PROGRAMME (PMP)

GRPE 42nd , 29 May – 1 June 2001

TIMESCALE

The programme **began in March 2001** and will **end in March 2003**. It is intended to:
transmit a formal **proposal for (a) test system(s)** to the UN ECE in October 2002 for discussion at the **January 2003** meeting of GRPE
deliver **preliminary data on emission levels** from advanced technology to the UN ECE in **December 2002** for discussion at GRPE
deliver **final data on emission levels** from advanced technology to the UN ECE in **March 2003** for discussion at GRPE.



PMP – Meeting of Researchers in London, July 31/August 1, 2001

Presentations of research programmes from contributors to the programme:

- Mr Stein – OICA heavy-duty programme
- Mr Rickert – Influence of DeNOx Catalysts on Particles
- Mr Vogt - OICA light-duty Programme
- Mr. Momique (PSA) – Primequal Programme
- Mr. Goto (NTSEL)
- Prof. Dr. Burtscher – Review of literature study (sampling & conditioning)
- Mr Schulte (RWTHÜV Essen) – ABEME Project
- Mr. Schrami (LTT Erlangen) – Laser based LII Technology
- Dr. Mohr – Selection criteria
- Mr. Andersson (Ricardo) – UK Heavy Duty Programme
- Mr. Blaikley (AEA Technology) – UK Light Duty Programme
- Mr. Mayer (TTM) – Phase I results and future activity.

Workshop: Sampling and Measurement

Workshop: Instrumentation and Calibration



Thank You for your attention !

For further information please contact:

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