

5. ETH Conference on Nanoparticle-Measurement

ETH / Hönggerberg, Zürich, Reception and Lecture Hall HPH G2

6. / 7. and 8. August 2001

M. Eberle / Prof. IC-Engines and Director PSI <i>Welcome and Introduction</i>	09.00 - 09.15
A. Mayer / TTM <i>Organization</i>	09.15 - 09.20

Session 1: Current International Research Projects	
Chairman: J. Lemaire	
6.8.2001	09.20 - 10.50
S. Rodt / UBA Berlin <i>EU / GRPE: "Particulate measurement programme" (PMP)</i>	
U. Mathis / EMPA <i>EU-Programme "Particulates"</i>	
L-E. Schulte / RWTÜV <i>ABEME-PM measurement system for the evaluation of extremely low emission vehicles</i>	
J. McAughey / AEA Technology (for J. Marshall) <i>The UK valid analytical measurement programme for ultrafine particles</i>	
Y. Kumagai / Japan Petroleum Energy Centre <i>JCAP Studies on retrofit of CR-DPF and Diesel particle size measurements</i>	
A.G. Konstandopoulos / CERTH-CPERI <i>The Diesel exhaust aftertreatment (DEXA) cluster in the EC GROWTH program</i>	

Coffee Break
Poster Session

10.50 - 11.20

Session 2: Health Effect Oriented Metrology	
Chairman: J. Lemaire	
6.8.2001	11.20 - 12.10
L. Hofer / form.SUVA <i>The health risk of solid particle diesel engine emissions</i>	
J.McAughey / AEA <i>A review of recent health effects research</i>	
M. Costantini / HEI <i>An evaluation of the health risk of using a cerium-based diesel fuel additive in conjunction with a particulate filter</i>	

Lunch

12.10 - 13.30

Session 3: Sampling and Conditioning	
Chairman: M. Kasper	
6.8.2001	13.30 – 15.00
U. Matter / ME <i>Influence of sampling conditions, engine load and fuel quality on measurement of ultrafine particles from a modern Diesel vehicle - sampling-measuring- and analyzing methods</i>	
St. Carli / VW <i>Influence of sampling conditions, engine load and fuel quality on the measurement of ultrafine particles from a modern Diesel vehicle – results</i>	
C. Dickens / AEA <i>Gasoline particle emissions: real or artefact?</i>	
F. Gouriou / CERTAM <i>Quantitative investigation on diesel exhaust: influence of dilution, residence time and hygrometry on soot particles</i>	
D. Booker / Booker Systems Ltd <i>Real-time particle characterization of diesel and gasoline particulate mass</i>	

Coffee Break**15.00 – 15.30**

Session 4: Measurement / Instrumentation (Part 1)	
Chairman: O. Bischof	
6.8.2001	15.30 – 17.30
H. Grimm/GRIMM <i>New portable fine and ultrafine aerosol spectrometer</i>	
N. Collings / University Cambridge <i>A fast differential mobility analyzer for ultrafine particles combustion aerosols</i>	
M. Fierz / ETH <i>First experience with the electrical diffusion battery</i>	
I. Khalek / SWRI <i>Real time particle number weighted size distribution using parallel flow diffusion battery</i>	
S. Schraml/ University Erlangen <i>Real-time measurement of soot from low-emission diesel engines by laser-induced incandescence</i>	
G. Smallwood / NRCC <i>Measurement of particulate matter under transient conditions with self-calibrating laser-induced incandescence</i>	
A. Konstandopoulos / CERTH-CPERI <i>Optical, electrical mobility and aerodynamic measurements of soot particles before and after filter media in diesel exhaust</i>	

Coffee Break**17.30 - 18.00**

Session 5: Measurement / Instrumentation (Part 2)	
Chairman: H. Burtscher	
6.8.2001	18.00 - 19.30
D. Kittelson / University Minnesota <i>Response of DC and PAS to size fractionated particles</i>	
U. Lehmann / EMPA <i>Characterization and cross-validation of particle measurement instruments</i>	
Th. Cartus / AVL <i>New approaches in particulate size and morphology measurements</i>	
M. Maricq / FORD <i>The roles of fracture and coagulation in determining a universal size distribution for light duty diesel particulate matter</i>	
S. Salgado / EPFL <i>Control of combustion conditions - soot generator for liquid fuels.</i>	
J. Schlatter / METAS <i>Interlaboratory comparison with mobility particle sizers</i>	
W. Schindler/AVL <i>Stability of the combustion aerosol standard CAST</i>	

Dinner Party, invited by Sponsors

20.00

Sponsors:

- AKPF Arbeitskreis Partikelfilterhersteller
- AUVA
- BUWAL
- CDT
- CORNING
- ENGELHARD
- Erdöl-Vereinigung Schweiz
- HJS Fahrzeugteile Fabrik
- HUSS
- IBIDEN
- IVECO
- LIEBHERR Machines Bulle
- LUBRIZOL
- OCTEL
- PSA Peugeot Citroën
- TSI
- ZEUNA-STAERKER

Session 6: Nanoparticle from Combustion		
Chairman: C.D. Schegk		
7.8.2001		08.30 – 10.30
D. Kittelson / University Minnesota <i>On-road measurements of nanoparticle emissions</i>		
R. Vogt / FORD <i>Nanoparticle formation in diesel vehicle exhaust: a comparison of laboratory and chasing experiments</i>		
C. Dickens / VPEC <i>Vehicle particulate emissions club: on-road vehicle particle emissions</i>		
J. Czerwinski / AFHB <i>Nanoparticles in the exhaust gas of scooters</i>		
Ch. Gaegauf / Oekozentrum Langenbruck <i>Field investigations of nanoparticle emissions from various biomass combustion systems</i>		
V. Schmatloch / EMPA <i>Particle emissions from small wood fired furnaces and a way to reduce them</i>		
St. Kunte / ETH+PSI <i>Influence of oxygenated fuels on the sooting behaviour within a laminar diffusion flame</i>		

Coffee Break**10.30 – 11.00**

Session 7: Nanoparticles in the Ambient Air and in Working Places		
Chairman: J. McAughey		
7.8.2001		11.00 – 12.15
B. Wehner / Institute for Tropospheric Research <i>Volatility of traffic-related aerosol particles</i>		
N. Metz / BMW <i>Development of particle numbers in cities of the diesel passenger car fleet in Germany</i>		
T. Davenne / University Cambridge <i>Formation and growth of nanoparticles as a result of the ambient dilution process</i>		
D. Carder / WVU (for: A. Bugarski / NIOSH) <i>Size distribution of diesel particulate matter in a non metal mine</i>		
F. Palmgren/NERI <i>Experimental studies of size distributions of ultrafine particles: Emissions and concentrations in streets, indoor along streets and in urban background</i>		

Lunch**12.15 – 13.30**

Session 8: Influence of Fuels and Engine Management on Nanoparticle Emission	
Chairman: A. Mayer	
7.8.2001	13.30 – 15.15
R. Schubiger / ETHZ <i>Influence of common rail fuel injection parameters on particulate emissions of heavy duty diesel engines</i>	
Z. Ristovski / University Queensland <i>Nanoparticle emissions from petrol to CNG and LPG converted spark ignition engines</i>	
R. Hummel / JRC-EI (oral presentation only) <i>Engine and fuel effects on particles emitted from modern diesel vehicles</i>	
M. Gautam / West Virginia University <i>Effect of lubricant sulfur levels on nanoparticle emissions</i>	
L.A. Sgro/University Naples <i>Particles < 3nm in different combustion systems: UV-Vis extinction, atomic force microscopy and differential mobility analysis</i>	
M. Maricq / FORD <i>The effects of the catalyst and fuel sulfur on PM emissions - wind tunnel and dynamometer measurements</i>	

Coffee Break
Poster Session

15.15 – 15.45

Session 9: Exhaust After-Treatment	
Chairman: U. Matter	
7.8.2001	15.45 – 17.30
M. Gautam / West Virginia University <i>Nanoparticle emissions from catalyzed trap equipped heavy-duty vehicles operating on ultra-low-sulfur Diesel fuel</i>	
A. Ayala / CARB <i>Pilot study of emissions from "late-model" diesel and CNG heavy-duty transit buses: preliminary nanoparticle measurement results</i>	
M. Kasper / ME <i>Ultralow emissions from trap equipped diesel engines, a challenge for instrumentation</i>	
L. Rubino / Imperial College <i>Nanoparticle emissions from gasoline engine exhausts</i>	
H. Burtscher / FHA <i>Efficiency of flue gas cleaning in waste incineration for submicron particles</i>	
A. Mayer / TTM <i>Experience with trapping diesel nanoparticles in Switzerland</i>	

A. Mayer

Organizational remarks for

- Workshop "Measurement"
- Workshop "Calibration"
- Visit construction sites and bus fleets

Dinner Party, invited by sponsors

19.00

8.8.2001 Workshop "Failure Mode and Effect Analysis of Nanoparticle Measuring Systems"

Co-ordinator: J.McAughey / AEA

Secretary: H.Burtscher / FHA

The challenging target of this workshop is

- to define and prioritise the key sampling and measurement issues appropriate to a particle measuring procedure for the type approval of Diesel engines (HD, LD and Stationary) with respect to mass and other relevant metrics
- to quantify performance and uncertainties, associated with sampling, conditioning and measurement procedures at each step of the sampling train
- to assess the potential of innovative measurement systems
- to define the necessary steps to reach these targets

It is likely that proposed new methods will not completely replace the existing CVS tunnel / filter / gravimetric method, particularly in the context of EURO IV and V legislation. However, in accordance with the introduction of the transient cycle ETC they may be used as complementary methods to characterize the transient phenomena of particulate emission

The discussion will recognize, but not be constrained by health effect and toxicology related aspects. The goal will be to characterize engine emitted particles as well as metrology can.

8.8.2001 Workshop "Calibration based on EC or what else ?"

Co-ordinator: U. Matter / ME

Secretary: M.Kasper / ME

The outline of EU/GRPE/PMP suggests "solid carbonaceous particles" as candidate for future measurement standard, which implies a calibration based on elemental carbon mass (EC).

The challenging target of this workshop is to

- consider possible alternatives to EC in terms of:
 - substance/chemical properties
 - physical properties (mass, number, surface area)
 - existing standards
- find criteria by which calibration standards should be judged, such as:
 - traceability
 - toxicological relevance
 - relation to the recommended measurement procedure (PMP target)
 - portability

We would like to discuss calibration systems which are already in use by aerosol scientists, instrument manufacturers and engine research groups in order to find out which of those systems might be closed to the targets of scientific soundness and technical practicability associated with the type approval scheme.

Workshop-Rules

- Each workshop is limited to 25 participants.
- It will not be possible to participate in both workshops – however there will be a joint session at the end of the day to address conclusions and common issues
- Each participant is expected to provide a prepared statement (including any relevant overhead slides) to the coordinator before (by e-mail) or on the first conference day – (maximum of 3 slides).
- The Co-ordinator will organize a structured discussion based on the prepared statements
- The Co-ordinator will have the discretion to invite participants to give a presentation on particular issues based upon submitted slides (maximum of 5 minutes)
- Secretary develops conclusions from discussion for the second WS-session in the afternoon leading hopefully to a common position on certain issues, and identifying unresolved issues
- A short joint session of the 2 workshops will be held at the end of the day to present themes considered, best practice, conclusions and unresolved issues
- There will be the opportunity to submit further written statements addressing the preliminary conclusions of each Workshop for consideration by the Co-ordinator / Secretary (to be submitted by end of August).
- Contributions, discussion results and conclusions will be distributed with the conference proceedings – asking again for comments to continue this process

New study on Nanoparticle-Measurement

Within the PMP-program Prof. Dr. H. Burtscher has just completed a literature study on "Tailpipe Particulate Emission Measurement for Diesel Engines".

This study could serve as a starting aid for the workshops and will be distributed to all workshop participants.

Workshop Timetable:

08.30 - 12.00	General Discussion
12.00 - 13.30	Lunch
13.30 - 15.00	Develop conclusions secretary with 2-3 delegated members in sub-groups
15.00 - 15.20	Coffee break
15.20 - 17.00	Common session of both groups Short presentation of themes, conclusions, open questions Decisions for next action (eg proposal to EU-Commission)

Wednesday, 8.8.2001

Visit the construction sites and bus fleets

- Travelling by coach
- Start: 08.00, ETH Höggerberg
- Return: 18.00 (arrival airport Zurich)

