

NAECCewsletter

Association for Emissions Control by Catalyst

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Affiliated to CEFIC

May – June 2004

INTERNATIONAL REGULATORY DEVELOPMENTS

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EUROPE

1. NRMM Directive 2004/26/EC Published

The final act of the Non-Road Mobile Machineries (NRMM) Directive has been published in the Official Journal of the European Union on 30 April 2004.

Since then, a corrigendum has been published which comprises a complete re-issue of the document with specifications to the application dates.

The new Directive introduces stages IIIA, IIIB and IV for NRMM and amends Directive 97/68/EC.

2. Light-duty Test Protocol for Particle Measurement

At a meeting of the UN/ECE's Group of Experts on Pollution and Energy, (GRPE), in early June, the Particulate Measurement Programme (PMP) protocol for light-duty vehicles was frozen. No further changes will be made until it has been assessed in the inter-laboratory correlation exercise (Phase III of the PMP).

The EU's Joint Research Centre (DG-JRC) hopes to start the inter-laboratory correlation programme in autumn with the objective of having results available for the January 2005 GRPE.

The protocol will now be put forward as a protocol in ECE regulation format, rather than a proposal to change Regulation 83, as the first adoption is expected to be in the European Commission's proposal for Euro 5.

The heavy-duty version of the protocol was modified further and it is intended to freeze it in autumn. An inter-laboratory correlation programme on Heavy-duty engines could then start during 2005.

3. Dutch Plan to Reduce Emissions from Traffic

The Dutch Council of Ministers has, on proposal of the State Secretary of the Environment Ministry (VROM), agreed with a policy note on emissions from traffic. The note outlines proposals to make the traffic in the Netherlands cleaner, quieter and cheaper.

A large-scale introduction of environmentally friendly techniques and fuels is the chosen option. The first measures will come into effect in early 2005, including the stimulation of particle filters for diesel cars and cleaner freight transport. As from 2006 the Cabinet wants to introduce biofuels in traffic.

Fiscal measures will be created to have an early introduction of clean trucks and buses on the roads from 2005 on. The Cabinet wants to stimulate the European Commission to finalise regulations for new diesel cars with particle filters from 2005 on. New Euro 5 diesel cars (with NOx-catalysts) will get fiscal incentives as soon as this is technically possible.

At European level, the Cabinet will plead for new standards reducing emissions further from passenger cars, vans, trucks, inland waterway ships and seagoing ships.

4. Report says Dutch Environmental Conditions Still Inadequate

'Environmental Balance 2004', a yearly review of the Dutch environment and related policies, stated that, although the Dutch air, water, and soil have become cleaner, the current environmental policies will not be enough to meet national and European Union environmental goals by 2010. The report was compiled by the Dutch National Institute of Public Health and the Environment (RIVM).

According to the report, under current policies the Netherlands will meet EU requirements for ammonia by 2010 but not for other substances including sulfur dioxide, nitrogen oxides and volatile organic compounds. State Secretary van Geel said that additional measures would be necessary to reduce air pollution from automobiles. Possible steps include an 80 km/h speed limit and mandatory filters on diesel-powered cars, van Geel said.

5. French Study says Air Pollution Kills Thousands

A report by the French Agency for Environmental Health Security (AFSSE) says that urban air pollution causes thousands of deaths in France per year.

The report, called 'Sanitary impact of urban atmospheric pollution', follows eight months of analyses. AFSSE calculated that 6 to 11% of total lung cancer deaths of people aged over 30 are due to particulate emissions in the atmosphere. If added to the deaths due to the cardio-respiratory diseases, 7% of which are directly imputable to urban pollution, the count goes up to 4 876 people a year. According to the report, the cost of each death, connected to air pollution, was estimated at €900 000.

The AFSEE experts demanded a new tax on all cars linked to both energy consumption and pollution levels, and called for obligatory particle filters for diesel trucks, further development of public transport, and limitation of traffic in urban areas.

6. French 'bonus-malus' Incentive Proposals

On 21 June the French environment Minister, Serge Lepeltier, announced a 'bonus-malus' system for the purchase tax on cars, which is due to come into force in January 2005.

The buyer of a small diesel car, such as Peugeot's 206, with particulate filter could benefit from a tax credit of up to €700. The proposal would also see the introduction of purchase disincentives ranging from €400 up to the maximum of €3 200 to heavy, large-engined, relatively emissions-intensive vehicles such as V8 SUVs.

Two vehicle categories would be eligible for bonus incentives: those emitting less than 120g/km and those less than 140g/km of CO₂ respectively. Cars emitting 140-180g/km would attract neither bonus nor disincentive, but those emitting over 180g/km would attract a graduated purchase tax disincentive. This would be €400 for cars emitting between 180-200g/km, rising to €800 for 200-250g/km and reaching €3 200 for vehicles putting out 300g/km or more.

The criteria have yet to be fully decided, but will be based on CO₂ emissions and equipment reducing particulate emissions.

It has to be noted, however, that there is some political controversy over the plans. One party in the French government, the UMP, has asked for adjustments to the tax plans, while Minister of Industry Patrick Devedjian said that clean vehicle purchase incentives should be decided at European rather than at national level. Prime Minister Jean-Pierre Raffarin clarified that the proposed measure is still under study.

7. German Chancellor appeals for Earlier EU Diesel Car Standards

The German chancellor Gerhard Schröder has written to the European Commission asking to bring forward by three years plans to set tougher new limits for diesel car emissions. The Commission is planning to propose the new Euro 5 limits in 2005. The standard would probably take effect from 2010.

Mr. Schröder said that from 2005, his government wants to provide diesel cars meeting the standard with tax breaks, but that this depends on the Commission proposing the Euro 5 standards by the end of this year. His appeal was welcomed by environment minister Jürgen Trittin. Already in April, Mr. Trittin proposed a law allowing a tax break for diesel cars equipped with particle filters.

8. German Drivers prefer Clean Diesel Cars

According to a recent survey commissioned by the Federal Environment Ministry and carried out by the Forsa Institute, environmental compatibility and low fuel consumption are more important for car buyers in Germany than a low purchase price or engine horsepower.

83% of buyers said they paid particular attention to the environmental compatibility of the car, while 80% regarded low emissions of carcinogenic exhaust fumes as an important asset. More than two thirds (69%) were prepared to pay for the additional cost of a soot filter, even if the planned tax incentive has not entered into force by the time they buy their next cars. 54% said they would even change brands for a soot filter.

9. AdBlue Demand in Western Europe

ACEA, the European Motor Manufacturer's Association has recently published a presentation on expected demand for AdBlue, the name adopted for the urea solution for Selective Catalytic Reduction (SCR) systems.

The data shows an expected demand of nearly 3,5 million tonnes per year by 2012, with Germany, France and Italy as the largest markets.

10. EC Environment & Health Action Plan 2004-2010

The European Commission launched on 8 June an action plan to reduce diseases caused by a polluted environment. The action plan is part of the EU Strategy for Environment and Health known as the 'SCALE' initiative.

The plan would develop an EU system integrating information on the state of the environment, the ecosystem and human health. It identifies 13 actions, which include initiatives on how to better understand the environment-health link and establish how environmental exposure leads to epidemiological effects. It also focuses on research activities, for instance on asthma/allergy, neuro-developmental disorders, cancers and endocrine-disrupting effects. It calls for awareness-raising on risks affecting the citizen, and training of professionals in environment and health issues. It also looks at the feasibility of human biomonitoring at European level, i.e. monitoring of blood, urine or hair samples to measure exposure to environmental pollutants.

The Action Plan is the Commission's main contribution to the Fourth WHO Ministerial Conference on Environment and Health (see next item).

11. WHO Study on Childrens' Health & the Environment

A study by the World Health Organisation (WHO) identifying road traffic accidents, lead intoxication and air pollution as some of the biggest child killers in Europe, was published at the occasion of a Ministerial Conference on Environment and Health which was dedicated to 'The Future of our Children' and held from 23 to 25 June in Budapest.

The study, entitled 'The Environmental Burden of Disease', calls on ministers to adopt the proposed 'Children's Environment and Health Action Plan for Europe' (CEHAPE). At EU level, the Commission recently published its Environment and Health Action Plan for 2004-2010 (see previous item).

Air pollution, both indoors and outdoors, is a major source of concern. Up to 13 000 deaths per year among children aged 0-4 years are attributed to pollution from particulate matters across Europe, 10 000 of which have occurred in the region comprising Poland, Romania, Bulgaria, Slovakia and Turkey.

"Although the report carries some ominous warnings, it also opens the door to a healthier future for Europe's children," said Dr Marc Danzon, WHO Regional Director for Europe. "This unique report (...) provides a framework for policymakers to prioritise actions and protect our children's health from environmental hazards."

12. Environment-Related Indicators

The European Commission's DG Environment has published a new 2-page leaflet on EU Environment Related Indicators.

The document includes graphs of NO_x emissions to air, noting that since 1990 the EU has reduced its NO_x emissions by 25%, and is broadly on course to meet its 2010 targets as set by the National Emissions Ceiling Directive.

However on Urban Air Quality it says that in 2001 approximately 30-35% of EU urban populations were exposed to levels of ozone and PM₁₀ that exceed EU limits, and that increased ozone levels have serious health implications, especially for vulnerable

groups such as asthmatics, children and the elderly, as was observed during the heat wave in summer 2003.

13. EU Air Pollution Rules Not Anticompetitive

There is no evidence that EU air pollution legislation has significantly damaged the competitiveness of European industry, according to a consultancy study released by the European Commission's DG Enterprise.

Focusing just on air pollution legislation, the Commission's study picks apart the various ways in which it has been claimed EU controls could be damaging industry and rebuts them.

The cost to industry for industrial environmental expenditure as a percentage of gross value-added is 0,1% in Japan and 0,4% in both the EU and USA, the study says. More important than the fourfold difference is the fact that all the costs are so small as to be unlikely to have competitiveness effects.

In general, air-pollution legislation costs less in practice than is predicted before it is passed. And though there is some evidence of increased costs, these are usually small in relation to wider price effects or other factors. One example given is that whereas it was predicted that EU vehicle emission controls introduced since 1993 would boost new car prices by up to 20%, in practice prices fell by 7% in real terms.

Next year, the European Commission is due to propose a new EU thematic strategy on air pollution growing out of the Clean Air for Europe program. Taken together, these initiatives "are likely to have very large effects on future air-pollution policy and EU industrial performance," the study notes.

14. Motor Fuel Sulphur Levels Falling in the EU

The European Commission's first annual report on the implementation of the fuels directive says that by 2002 low-sulphur (<50ppm) fuels had already attained a share of 47% for petrol and 43% for diesel.

Some countries, including Germany and the UK, encouraged the use of lower-sulphur fuels through tax incentives. By 2002, six states had defined a separate grade of low-sulphur fuel. The EU-15 market share of low-sulphur petrol grew threefold and sales of its diesel counterpart more than doubled between 2001 and 2002.

All road fuels must meet the standard of 50ppm sulphur from 1 January 2005. Current limits are 150ppm for petrol and 350ppm for diesel

The market share of 'sulphur-free fuels' (<10ppm) was unchanged from 2001 at 2% of the market. This share is likely to have expanded considerably since 2002 under the influence of a separate directive agreed in that year that requires all road fuels to be sulphur-free from 2009. Germany already offers tax incentives for the near zero sulphur fuel.

15. EU Environment Council agrees Action on Ship Emissions

On 28 June, the EU's Environment Council has reached political agreement on the Commission's marine fuel sulphur proposal, agreeing to reduce ships' SO₂ emissions in the EU by over 500 000 tonnes every year from 2007. Ships have become the single biggest source of SO₂ in the EU.

The agreement also contains some new text on ship trials for seawater exhaust-cleaning technology. The proposal will now go back to the European Parliament for a second reading, before final agreement by the Council.

16. CIVITAS - Promoting Clean Urban Transport

17 out of 31 projects involving 71 cities have been selected for the EU's €50 million CIVITAS programme for the promotion of clean urban transport.

The aim is to promote the development of attractive alternatives to the use of private cars in cities. Measures include 'clean zones' in city centres, where only clean vehicles are allowed; innovative promotional and awareness campaigns for public transport; and flexible parking charging systems based on environmental indicators.

17. Proposal to allow Flexibility in Gearshift Point Selection

During the GRPE meeting in June Germany and the motor industry association (OICA) introduced proposals to allow flexibility in gearshift points for manual and semi-automatic gearboxes into Regulation 83.

Alternative shift patterns would be permitted providing 'intelligent gear-shift indicators' are fitted to inform the driver about the optimum gearshift points. OICA showed examples where this would result in up to 10% improvement in CO₂ with, in their view, minimal changes in emissions.

18. Swiss Guidelines on Construction Equipment

The Swiss Agency for the Environment, Forests and Landscape (SAEFL/BUWAL) has published a Guideline document on Air Pollution Control at Construction Sites.

The chapter on "Measures for abatement of emissions at construction sites" includes requirements on vehicle engine emissions, and there is further detail in Annex 2: "Curtailling emissions from combustion engines at construction sites".

NORTH AMERICA**19. EPA issues Final Rule on Non-road Diesel Engine Emissions**

The US EPA's new Non-road Diesel Rule will cut emission levels from construction, agricultural and industrial diesel-powered equipment by more than 90% and will also reduce fuel sulphur from the current levels of around 3 000ppm to 500ppm in 2007 and 15ppm by 2010.

Over 650 000 pieces of non-road diesel equipment covered by this rulemaking are sold in the United States each year. There are currently about six million pieces of such equipment in use in the United States. The anticipated costs of meeting the requirements vary with the size and complexity of the equipment but are in the range of 1 to 3% of the total purchase price for most equipment categories. The overall benefits of the non-road diesel program are estimated to significantly outweigh the costs by a ratio of 40 to 1.

The Rule is expected to result in the widespread introduction of advanced emission control systems. The standards for new engines will be phased in starting with the smallest engines in 2008 until all but the very largest diesel engines meet both NOx and PM standards in 2014. Some of the largest engines, 750+ horsepower, will have one additional year to meet the emissions standards.

20. EPA Drafting New Locomotive and Marine Emission Standards

The US EPA has also issued an Advance Notice of Proposed Rulemaking (ANPRM) for future emission standards for locomotive and marine diesel engines.

The standards would be modelled on the 2007-2010 highway-engine program and the

Tier 4 non-road rule, with an emphasis on achieving large reductions in PM and NOx emissions through the use of advanced emission-control technology.

EPA is considering more stringent standards for new and existing locomotives and new marine diesel engines of under 30 litres per cylinder. The marine standards would apply to diesel engines used in all applications: commercial (excluding ocean vessels), recreational and auxiliary. They would also apply to engines ≤ 37 kW, previously included in the non-road standards.

The standards would be based on the application of after-treatment technologies enabled by the availability of ultra-low sulphur diesel fuel. (15ppm sulphur is already required from 2012 on). For locomotive engines from 2011 on, EPA is considering establishing Tier 3 standards based on a 90% reduction from engine-out levels by use of after-treatment technologies for both PM and NOx emissions. Emissions for both pollutants would be reduced by about 90% relative to the engine-out levels. A similar approach is considered for marine engines except the largest (Category 3) engines of over 30 litres per cylinder. The latter will be subject to a separate regulation to be developed by April 2007. The PM controls could be introduced starting in 2011, with NOx standards phased-in over 3 years.

Without new standards, EPA projects that railway and marine diesels will cause some 27 and 45% respectively of total nitrogen oxides (NOx) and particulate matter (PM) pollution coming from mobile sources.

The EPA expects to publish a Notice of Proposed Rulemaking by mid-2005 and a Final Rule by mid-2006.

21. Rhode Island to adopt California Vehicle Standards

The Governor of Rhode Island has announced that he will bring California's Low-Emission Vehicle program, Phase II (LEV II) to Rhode Island. The program is expected to reduce air toxics by an extra 25% over the federal emission standards, HC emissions an additional 16% and greenhouse gas emissions an additional 2% by 2020. Neighbouring states including Massachusetts and New York have already adopted the stricter Californian standards.

Two weeks earlier the EPA had announced that the entire state of Rhode Island fails to meet health-based air-quality standards for ozone levels.

22. Study indicates High Pollution Exposures inside Buses

A new study being carried out by the Center for Environmental Research and Technology is reinforcing the concerns associated with pollution inside buses.

Results to date are summarized below.

Average Exposure Factors (air concentration * time) in three micro-environments			
	Loading/Unloading	Bus Stops	Urban Commutes
Black Carbon ($\mu\text{g}/\text{m}^3 * \text{min}$)	5	20	600
Particle Bound PAH ($\text{ng}/\text{m}^3 * \text{min}$)	45	230	10 000
NO ₂ (ppb * min)	105	270	5 500
Particle Counts ($\#/ \text{cm}^3 * \text{min}$)	25	310	10 000
PM _{2.5} ($\mu\text{g}/\text{m}^3 * \text{min}$)	N/A	130	3 500

Levels of all pollutants that were monitored were strikingly higher inside the buses than they even were at bus stops. Surprisingly, higher mean particle counts were found on rural suburban routes than on the urban route. Levels are usually higher when windows are closed than when they are open.

23. US Court rejects Need for Mexican Trucks Environmental Study

The US Supreme Court has ruled that Mexican trucks can be allowed on US highways in compliance with a key provision of the North American Free Trade Agreement, without conducting an extensive study of the environmental effects.

The Transportation Department had done an initial environmental review and decided an extensive study was not required. However, environmental, labour, consumer and trucking groups had objected on the basis that the Transportation Department had underestimated the impact older diesel Mexican trucks would have on air quality in border states, especially in cities like Houston and Los Angeles that have struggled to reduce pollution to comply with the federal clean air law. They estimated that 34 000 trucks from Mexico would be on US highways in the first year alone. By 2010, trucks from Mexico would likely emit twice as much of certain pollutants as US trucks.

LATIN AMERICA

24. Uruguay ends Leaded Gasoline

Lead has now been phased out of gasoline in Uruguay. It appears that MTBE will be used as an octane substitute.

ASIA-PACIFIC

25. Australia requires Monitoring of 'Air Toxics'.

Environment ministers for Australia's federal, state, and territorial authorities meeting as the Environment Protection and Heritage Council (EPHC) have approved the mandatory monitoring and reporting of five air toxics.

The new National Environment Protection (Air Toxics) Measure will require the government of each Australian state and territory to monitor levels of benzene, polycyclic aromatic hydrocarbons, formaldehyde, toluene and xylenes.

The EPHC communiqué noted that "these air toxics have been shown to be responsible for a range of health problems, including asthma, respiratory illness and cancer," and that current Australian data on these pollutants is very limited.

EPHC also agreed to contribute up to A\$300 000 (approximately €175 000) for a study of the effects of urban air pollution on children's health and a study of the effects of urban air pollution on the elderly. These will form the basis of a review of national ambient air quality standards next year.

26. Chinese Policy Paper on Domestic Car Industry

China has issued a policy paper aimed at consolidating the fragmented car production sector into a strong, domestic industry that can also expand into overseas markets.

The goal of this strategic restructuring is to help auto makers develop into large-scale conglomerates, according to the state planners. Beijing will decree a minimum investment in new plants of two billion Yuan (\$241,7 million or €195 million). This effectively bars smaller companies hoping to cash in on a car market that nearly doubled last year to about two million passenger cars.

Out of concern for energy conservation and environmental protection, the new policy encourages the development of automobiles with low emissions and fuel consumption. It requires that the "average fuel consumption for newly assembled passenger vehicles by the year 2010 will be reduced by at least 15% compared to the level of 2003."

AFRICA

27. Dakar+2 Conference for Clean Fuels in Africa

The Dakar+2 conference was attended by over 150 representatives from all but 4 Sub-Saharan Africa countries. The Ministers' Session had about 100 participants with 30 Ministers of Environment and Energy. Countries such as Somalia, Liberia and Djibouti participated in the Conference for the first time and committed themselves to join the phase-out of lead.

During the Technical Session, the five working groups covering the entire Sub-Saharan Africa region prepared sheets detailing progress made so far by individual countries within their sub-region in phasing out leaded gasoline. They also detailed the necessary actions and organizational responsibilities for ensuring that countries and sub-regions phase out leaded gasoline by December 2005.

GENERAL

28. PM10 from Cars 'may cause One in Six Cot Deaths'

An international study published in the online journal 'Environmental Health: A Global Access Science Source' says that PM10 from vehicles may be to blame for up to 16% of cot deaths (unexplained deaths among babies of normal birth weight). PM10 may also be responsible for 24% of all respiratory disease deaths of normal birth weight infants under the age of one.

The international team looked at death rates among 700 000 infants in the United States between 1995 and 1997 and compared them with air pollution levels. Approximately 75% of cases were from areas where the current levels are at or below the new US PM2.5 standard of 15 µg/m³ (equivalent to 25 µg/m³ PM10).

The scientists led by Dr Reinhard Kaiser wrote: "Evidence is building that air pollution has an effect on infants and young children and a potential impact during the foetal period. [...] We conclude that air pollution-related infant mortality is a major public health problem."

29. Pollution could affect Unborn Children

Researchers have found that genetic mutations known to be caused by some pollutants can be passed through sperm to baby mice. They suggest that the same thing could happen to humans and other animals.

Somers et al (Science, 14 May 2004, Vol. 304) found that mice exposed to HEPA-filtered air at an urban-industrial site had paternal mutation rates that were 52% lower than those breathing unfiltered air.

The study identifies airborne particulate matter as a contributor to heritable mutation induction in mice; however, a direct link between [...] mutations and health effects has not yet been established. Nonetheless, they say, structural changes in DNA have been detected in human sperm after air-pollution exposure". How the inhaled pollutants cause mutations is not yet clear.

30. Air Pollution a Serious Threat to Heart Health

Exposure to air pollution not only creates breathing problems but also poses a serious threat to cardiovascular health and overall health, the American Heart Association (AHA) warns in its medical journal 'Circulation'.

An AHA panel led by Dr. Robert D. Brook of the University of Michigan in Ann Arbor conducted a comprehensive review of the medical literature on air pollution and cardiovascular disease. One conclusion is that short-term exposure to elevated levels of particulate matter (PM) "significantly

contributes to increased acute cardiovascular mortality, particularly in certain at-risk subsets of the population". Also, hospital admissions for several cardiovascular and pulmonary diseases increase acutely in response to higher levels of PM exposure.

The evidence also implicates prolonged exposure to elevated levels of PM in reducing overall life expectancy by a few years, according to the panel. The panel is particularly concerned that "a number of the studies" have shown associations between particulate air pollution and harmful cardiovascular effects even when levels of PM were within the current standards. This suggests that "even more stringent standards for PM should be strongly considered" by the EPA, they write.

FORTHCOMING CONFERENCES

8th International ETH-Conference on Combustion Generated Particles

16-18 August 2004, ETH Zurich, Switzerland

Details at www.nanoparticles.ethz.ch

Sessions will focus on the formation of nanoparticles during combustion; nanoparticles in ambient air; instrumentation; the influence of engine technology, fuels and lubricants on nanoparticle properties; after-treatment technologies to reduce nanoparticle emissions; deployment experience with DPFs on cars, trucks, buses and off-road; and legislation and enforcement to implement best available technology.

13th IUAPPA (International Union of Air Pollution Prevention and Environmental Protection Associations) World Clean Air and Environmental Protection Congress and Exhibition

22-27 August 2004, London, UK

Details at www.kenes.com/cleanair

The Congress is expected to bring together over 1 000 scientists, regulators and representatives of the industrial and business communities from all around the world. Subjects include: low-emission vehicles; the interaction of climate change and pollution; the challenge of resource efficiency; and the prospects for a transition to a low-carbon economy.

16th International AVL Conference Engine & Environment

9-10 September 2004, Graz, Austria

Which powertrain systems offer the most promise in satisfying the increasingly stringent legislative requirements and increasing customer expectations at an acceptable cost? What is to be expected in the future from the politicians and legislators?

KONES2004 30th International Scientific Conference on Internal Combustion Engines

12-15 September 2004, Cracow, Poland

The latest achievements in research, development and design of compression-ignition and spark-ignition as well as other combustion engines (hybrids). Topics include exhaust after-treatment, particulate filters, fuels and lubricants, environment protection, catalysis, catalyst systems, air pollution control and ecology.

3rd International Exhaust Gas and Particulate Emissions Forum

14-15 September 2004, Sinsheim, Germany

Details at <http://www.forum-emissions.com/index.php>

The Forum will take a general look at the current state of the art and the statutory requirements but also present future trends and developments in exhaust gas and particulate measurement technology as well as in exhaust after-treatment systems and strategies.

13. Aachener Kolloquium "Automobile and Engine Technology"

4-6 October 2004, Aachen, Germany

details from www.rwth-aachen.de/ac-kolloquium

The congress will provide a wide range of technical presentations addressing to current challenges of the vehicle and powertrain industry. Program-related test vehicles, prototypes and aggregates from participating companies and institutions will be presented on ika's test track. 82 exhibitors will present their products and services on an exhibition area of more than 1 600 m².

Short Course on Diesel Particulates and NOx Emissions

18-22 October 2004, Sacramento, USA

Details at

<http://www.leeds.ac.uk/fuel/shortc/diesela.htm>

SAE Powertrain & Fluid Systems Conference & Exhibition

25-28 October, 2004, Tampa, Florida, USA

Abstracts are due 15 March 2004

Details at <http://www.sae.org/calendar/pfs/>

Innovative Powertrain Systems

11-12 November 2004, Dresden

Abstracts are due by 8 March 2004

Details at <http://www.vdi.de/fvt>

The conference will deal with improvements of today's gasoline and diesel engines; new fuels; hybrids; new solutions for transmissions; energy storage and management; and fuel cell technology.

Internal Combustion Engine Performance & Emissions Conference

7-8 December 2004, IMechE, London, UK

Abstracts are due by 19 March 2004.

This Conference will address the on-going need for emissions reduction strategies and technologies in automotive, truck, off-highway, industrial, marine and locomotive market sectors.

Symposium on International Automotive Technology

19-22 January 2005, Pune, India

Details at

<http://www.araiindia.com/html/siat2005/siatindex.htm>

Topics will include Durability evaluation techniques, Powertrain, Engine, Emissions (EU3 and beyond), Fuel, Inspection & Maintenance Programmes, Global Harmonisation of Standards, Off-road vehicles, and Emissions inventory and ambient air quality.

Additives 2005

5-7 April 2005, Dublin, Ireland

This meeting will put future developments of fuel and lubricant additive technology in the context of the challenge in simultaneously meeting the needs of vehicle owners and of government legislators on targets for exhaust emissions, fuel economy and vehicle recyclability

Beograd 2005 EAEC European Automotive Congress

30 May -1 June 2005, Belgrade, Serbia & Montenegro

Details at

www.jumv.org.yu/eaec2005/prog2.html

Main topics include advanced propulsion and powertrain; energy, emissions, ecology, environment; safety; automotive logistics; and advanced engineering techniques and tools.

SAE 2005 World Congress

11-14 April 2005, Detroit, USA

Details at www.sae.org/congress

Deadline for offers of papers: 1 June 2004