



NATIONAL  
COHESION STRATEGY



Silesia.  
Positive energy

EUROPEAN UNION  
EUROPEAN REGIONAL  
DEVELOPMENT FUND

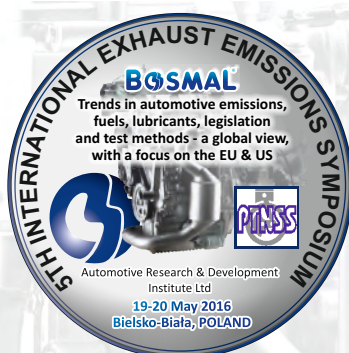


**BOSMAL**



Bielsko-Biała, Poland

# 5<sup>th</sup> International Exhaust Emissions Symposium 19-20 May 2016



## Final Programme

**Trends in automotive emissions,  
fuels, lubricants, legislation  
and test methods - a global view,  
with a focus on the EU & US**

### Media patronage:

Combustion Engines Journal, DieselNet (Canada), Gazeo, Przegląd Techniczny



**DieselNet**

**gazeo.pl**



### Organisers:

BOSMAL Automotive Research  
& Development Institute Ltd  
ul. Sarni Stok 93  
43-300 Bielsko-Biała  
Poland

Polish Scientific Society  
of Combustion Engines (PTNSS)  
ul. Sarni Stok 93  
43-300 Bielsko-Biała  
Poland

# 5<sup>th</sup> International Exhaust Emissions Symposium 19-20 May 2016

Notwithstanding decades of improvement in the industry, concern over the impact of vehicles on air quality remains high. Emissions of greenhouse gases from road vehicles remain very high on the political agenda; emissions of particulate matter are coming under increasing scrutiny as a form of pollution with wide-ranging negative impacts; certain as-yet unregulated gaseous emissions are potential air quality risks. The issue of emissions (and fuel consumption) occurring under real driving conditions has risen to become a top priority for the automotive sector, particularly in the EU and the USA.

The response to this has been the introduction of various pieces of legislation, some imposing increasingly strict emissions limits; others various mandates, incentives and quotas regarding fuel consumption and the types of fuels used. Now, following revelations that emissions from real vehicle usage are generally poorly reproduced in the laboratory, test methods themselves are changing: first in the laboratory (e.g. the WLTP/GTR15; US 1065/1066 procedures); furthermore, real driving emissions have increased in importance to the point where PEMS measurements are becoming an integral part of the emissions testing process – EU plans for RDE implementation have recently taken huge steps forward.

The introduction of PN limits and increased scrutiny of particulate emissions from engine types other than Diesel represents a somewhat new and challenging direction in emissions testing and control. These factors exert massive pressure on vehicle and engine manufacturers (both light duty and heavy duty), their suppliers and the oil and fuel industries. Other, allied fields such as R&D and fuel additive and lubricant suppliers also find themselves subject to the same forces. Many of the aforementioned problems are shared by the various stands of the industry – passenger car and light commercial vehicle/heavy duty/off road/marine – and many of the proposed strategies and technical solutions have multi-segment applicability.

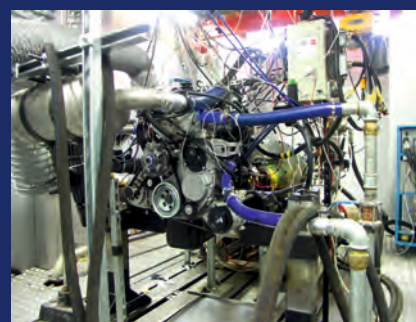
However, the market is dictated not only by political and technical factors, but also by consumer demands, which are themselves also evolving. Something both legislators and the general public have in common is the goal of reducing fuel consumption, without any sacrifices in terms of durability or safety. Increased media focus on the emissions performance of modern vehicles (particularly Diesels) is also increasing public pressure.

Responding to this pressure, a broad range of advanced engine technologies, catalytic aftertreatment systems, revised fuel types, bespoke lubricants and friction inhibitors, etc have been introduced. These strategies are often interrelated: low sulphur fuel is required for aftertreatment system compatibility; advanced engine design has impacts on required lubricant properties, etc. Fundamental changes to the propulsion strategy for on-road vehicles (e.g. fuel types/the implementation of advanced electromechanical systems - hybrids) represent a revolution in the industry. Requirements that regulated emissions are below a certain level under virtually all operating conditions may force certain technologies off the market, or at least require significant modifications. All these new or revised technologies must be developed, tested, approved and certified – and not only in the laboratory.

Mindful of the above, and with a proven track record of organising scientific meetings, BOSMAL & PTNSS are pleased to announce their 5th International Exhaust Emissions Symposium, to be held on 19-20 May 2016 in Bielsko-Biala (Poland). The event shall build upon the successes of the past, but will include the very latest developments in the aforementioned fields and their implications for industry, the environment and beyond. Through the formation of business and personal relationships – and the potential for information sharing and collaboration that results – the various branches of the industry can advance together towards their goals. This invitation, cordially extended to you, represents our desire for you to participate in what promises to be another very successful scientific meeting hosted at BOSMAL. We look forward to hosting you.

**Piotr Bielaczyc, Ph.D.,**  
Chairman of the Organizing Committee

**Antoni Swiatek, D.Eng., D.Sc.,**  
President







## Main topics of the Symposium

- Emissions legislation - for all automotive sectors
- Fuel economy
- New methods of PM testing
- Compounds which are potential candidates for emissions regulation
- Emissions test equipment (including PEMS)
- Emissions reduction technology
- Aftertreatment system and catalyst technologies for the various automotive sectors
- Emissions simulation
- Powertrain development and electrification
- IC Engine test method development - all engine types/sizes
- Vehicular fuel development
- Alternative fuels, fuel additives and fuel blends
- Gaseous fuels: CNG & LPG
- Engine oil development
- Commercial vehicles, heavy duty and off road engines and vehicles (e.g. tractors)
- Synergies and shared challenges/solutions for the various automotive sectors

## International Organising Committee:

- Dr. Piotr Bielaczyc - Chairman - BOSMAL, Poland
- Wolfgang Thiel - Vice Chairman - TRT, Germany
- Arkadiusz Waclawek - Coordinator - BOSMAL, Poland
- Dr. Gerardo Carelli - Carelli Consulting, Germany
- Prof. Jan Czerwinski - AFHB, Switzerland
- Agnieszka Kaźmierczak - BOSMAL, Poland
- Marta Kosakowska-Boda - BOSMAL, Poland
- Dr. Amanda Lea-Langton - University of Manchester, UK
- Prof. Federico Millo - Politecnico di Torino, Italy
- Dr. Piotr Pajdowski - BOSMAL, Poland
- Dr. Andrzej Suchecki - BOSMAL, Poland
- Dr. Andrzej Szczotka - BOSMAL, Poland
- Dr. Thomas Wallner, Argonne National Lab, USA
- Klaudiusz Waniółka - BOSMAL, Poland
- Chris Whelan - WDL, UK
- Joseph Woodburn - BOSMAL, Poland

## Please address any organisational questions to:

Dr. Piotr Bielaczyc, [piotr.bielaczyc@bosmal.com.pl](mailto:piotr.bielaczyc@bosmal.com.pl), phone: +48 33 8 130 598

Mr. Arkadiusz Waclawek, [arkadiusz.waclawek@bosmal.com.pl](mailto:arkadiusz.waclawek@bosmal.com.pl), phone: +48 33 8 130 428

Mr. Joseph Woodburn, [joseph.woodburn@bosmal.com.pl](mailto:joseph.woodburn@bosmal.com.pl), phone: +48 33 8 130 497

Media patronage: Combustion Engines,  
DieselNet (Canada), Gazeo, Przegląd Techniczny

DieselNet will include a detailed report of the symposium and the journal Combustion Engines will publish a symposium summary, the abstracts and the full Symposium Proceedings on CDROM, together with movie reportage on DVD.

## Venue:

BOSMAL Automotive Research  
& Development Institute  
ul. Sarni Stok 93  
43-300 Bielsko-Biała  
Poland

## Accommodation - contact:

- Agnieszka Kaźmierczak  
[agnieszka.kazmierczak@bosmal.com.pl](mailto:agnieszka.kazmierczak@bosmal.com.pl)  
+48 33 8130 546

## Symposium language: English

## Symposium Dinner:

HOTEL PAŁAC KOTULIŃSKICH  
ul. Zamkowa 2  
43-502 Czechowice-Dziedzice  
Phone: +48 32 494 49 60-62,  
fax: +48 32 494 49 64  
email: [hotel@palackotulinski.pl](mailto:hotel@palackotulinski.pl)  
[www.palackotulinski.pl](http://www.palackotulinski.pl)

**DieselNet**  
**gazeo.pl**



# 5<sup>th</sup> International Exhaust Emissions Symposium 19-20 May 2016

## Final Programme

Thursday, 19 May 2016

- ♦ **08:00 - 09:00** - Registration

Welcome & Opening Address

- ♦ **09:00 - 09:10** - **Prof. Jerzy Merkisz (PTNSS), Dr. Arkadiusz Stojek (BOSMAL) & Dr. Piotr Bielaczyc (International Organising Committee)** [10]

Session 1: The Automotive Emissions Landscape in the US and the EU

Chairs: Wolfgang Thiel (TRT, Germany) & Piotr Bielaczyc (BOSMAL, Poland)

- ♦ **09:10-09:40** - **Dr. Piotr Bielaczyc (BOSMAL, Poland)** – Which strategy is better for emissions control - the EU or the US?: an introduction to the question [30]
- ♦ **09:40-10:20** - **Dr. Vicente Franco (The ICCT Europe, Germany)** – A comparison of emission standard design and enforcement approaches in the EU and US [40]
- ♦ **10:20-10:50** - **Giovanni D'Urbano, (FOEN, Switzerland)** – Swiss approach and experience in controlling air pollution emissions from internal combustion engines and gas turbines [30]
- ♦ **10:50-11:30** - Coffee break, poster presentation [40]
- ♦ **11:30-12:00** - **Kurt Engeljehring (AVL, Austria)** – Global emission regulations and testing methods on the local differences [30]
- ♦ **12:00-12:30** - **Dr. Miriam E Gerlofs-Nijland (National Institute for Public Health and the Environment, the Netherlands)** – Adverse health effects of traffic-derived emissions - the impact of biofuel [30]
- ♦ **12:30-13:30** - Lunch, poster presentation [60]

Session 2: Emissions Reduction Technologies and Strategies

Chairs: Tim Johnson (Corning, USA) & Piotr Bielaczyc (BOSMAL, Poland)

- ♦ **13:30-14:15** - **Keynote: Dr. Timothy Johnson (Corning, USA)** – Directions in vehicular emissions and efficiency [45]
- ♦ **14:15-14:45** - **Mike Douba (Center for Transportation Research, Argonne National Laboratory, USA)** – Testing PHEVs and BEVs to determine expectations in reduced emissions and fuel usage [30]
- ♦ **14:45-15:05** - **Prof. Federico Millo (PoliTo, Italy)** – Modelling of LNT and SCR on filter for passenger car applications [20]
- ♦ **15:05-15:45** - Coffee break, poster presentation [40]
- ♦ **15:45-16:05** - **Dr. Gerhard Schopp (Continental, Germany)** – Calibration and validation of engine management systems with respect to actual and future exhaust emission legislations [20]
- ♦ **16:05-16:25** - **Dr. Claus Goersmann (Johnson-Matthey, UK)** – Low carbon transport 2050: Powertrain options [20]

Session 3: Real Driving Emissions

Chairs: Wolfgang Thiel (TRT, Germany) & Vicente Franco (ICCT Europe, Germany)

- ♦ **16:25-16:55** - **Helge Schmidt (TUV, Germany)** – Real Driving Emissions - status of discussion and practical experience [30]
- ♦ **16:55-17:10** - **Prof. Gordon Andrews (University of Leeds, UK)** – Real world SI vehicle emissions in low speed congested traffic [15]
- ♦ **17:10-17:25** - **Prof. Gordon Andrews (University of Leeds, UK)** – Real world emissions performance of a HDD truck with urea SCR NO<sub>x</sub> control [15]
- ♦ **17:25-17:45** - **Prof. Jerzy Merkisz (BOSMAL/Poznan University of Technology, Poland)** – Investigations on exhaust emission from off-road vehicles and rail vehicles using PEMS [20]
- ♦ **17:45-18:00** - **Michael Heuser (Sensors Europe GmbH, Germany)** – Advances in PN PEMS [15]
- ♦ **20:00** - Symposium Dinner and Musical Soiree at Palac Kotulinskich



# 5<sup>th</sup> International Exhaust Emissions Symposium 19-20 May 2016

Friday, 20 May 2016

## Session 4: Particle Matter Emissions and their Measurement and Control

Chairs: Wolfgang Thiel (TRT, Germany) & Piotr Bielaczyc (BOSMAL, Poland)

- ♦ **09:00-09:30** - **Prof. William Northrop (University of Minnesota, USA)** – Semi-volatile particulate matter from low temperature Diesel combustion using conventional and alternative fuels [30]
- ♦ **09:30-10:00** - **William Silvis (AVL Inc., USA)** – Making sense of PM measurement at 1 mg/mi, 6E11 #/km [30]
- ♦ **10:00-10:20** - **Dr. Topi Ronkko<sup>1</sup>, Jenni Alanen<sup>1</sup>, Erkkä Saukko<sup>1</sup>, Kati Lehtoranta<sup>2</sup>, Timo Murtonen<sup>2</sup>, Hilikka Timonen<sup>3</sup>, Risto Hillamo<sup>3</sup>, Dr. Panu Karjalainen<sup>1</sup>, Heino Kuuluvainen<sup>1</sup>, Juha Harra<sup>1</sup>, Prof. Jorma Keskinen<sup>1</sup> (1: Tampere University of Technology, Finland; 2: VTT Technical Research Centre of Finland; 3: Finnish Meteorological Institute)** – Nanoparticles in natural gas engine exhaust [20]
- ♦ **10:20-10:35** - **Dr. Jonna Kannosto, Dr. Mikko Moisio, Ville Niemela, Henna Isherwood (Dekati, Finland)** – Gravimetric PM filter results can be improved with integrated real time particle concentration measurement [15]
- ♦ **10:35-11:15** - **Coffee break, poster presentation** [40]

## Session 5: Fuel and Lubricant Development in Light of Emissions Requirements and Industry Trends

Chairs: Amanda Lea-Langton (University of Manchester, UK) & Sabina Kawczak (PKN Orlen, Poland)

- ♦ **11:15-11:45** - **Keynote: Dr. Thomas Wallner (Center for Transportation Research, Argonne National Laboratory, USA)** – Co-optimization of fuels and engines [30]
- ♦ **11:45-12:05** - **Thomas Hartmann, Uwe Lutz, Mathias Lohman, Marc Walter, (BASF SE, Germany)** – Impact of soot formation on lubricant ageing in DISI engines [20]
- ♦ **12:05-12:25** - **Knut Skardalsmo (Skardalsmo Fuel Consulting, Norway)** – Bridging the gap to the hydrogen economy [20]
- ♦ **12:25-12:45** - **Dr. Heather Hamje (CONCAWE, Belgium)** – Studies of fuel effects in modern Diesel passenger cars [20]
- ♦ **12:45-13:00** - **Prof. Mirosław Wyszynski (University of Birmingham, UK)** – Gaseous and particulate emissions from a diesel fuel emulsion containing up to 20% of pyrolysis oil obtained from woody biomass [15]
- ♦ **13:00-13:20** - **Giovanni Cecconello (Petroneas, Italy)** – Engine oil advanced technologies for FE improvement in modern HD applications [20]

## Symposium summary and closing

- ♦ **13:20-13:30** - **Dr. Piotr Bielaczyc, on behalf of the International Organising Committee** [10]
- ♦ **13:30-14:30** - **Lunch** [60]
- ♦ **14:30-16:30** - **Tour of BOSMAL's laboratories**

Guide: Wojciech Trybus, Testing Laboratory Director, BOSMAL

# 5<sup>th</sup> International Exhaust Emissions Symposium 19-20 May 2016

## Poster session

- ♦ **Prof. Jan Czerwinski, P. Comte, M. Gudel (University of Applied Sciences - Biel-Bienne, Switzerland), J. Lemaire (AEEDA, Switzerland), A. Mayer (TTM, Switzerland), N. Heeb (EMPA, Switzerland), H. Berger (ASTRA, Switzerland), F. Reutimann (BAFU, Switzerland)** – Testing emissions of passenger cars in laboratory and on-road (PEMS, RDE)
- ♦ **Prof. Jan Czerwinski, P. Comte, Y. Zimmerli (University of Applied Sciences - Biel-Bienne, Switzerland), F. Reutimann (BAFU, Switzerland)** – Investigations of emissions of reactive substances NO<sub>2</sub> and NH<sub>3</sub> from passenger cars
- ♦ **Dr. Stephane Furusho-Percot, Torsten Tritscher, Thomas Krinke, Oliver F. Bischof (TSI Gbmh, Germany), Aaron Avenido, Robert Anderson (TSI Inc., USA)** – Improved soot measurements with an engine exhaust particle sizer
- ♦ **Dr. Liisa Pirjola, H. Parviainen, A. Malinen (Metropolia University, Finland), T. Ronkko, E. Saukko (Tampere University of Technology, Finland), H. Saveljeff (Turku University of Applied Sciences, Finland)** – Comparing exhaust emissions of a non-road mobile machine with diesel and HVO fuels under real-world and laboratory conditions
- ♦ **Christian Leidelmeier, Arno Weissnicht, Werner Federer, Dr. Johannes Villinger (V&F Analysetechnik, Austria)** – Time resolved on line oil consumption monitoring in small and large IC engines utilizing soft ionisation mass spectrometry
- ♦ **Dr. Amanda Lea-Langton (University of Manchester, UK), Dr. Piotr Bielaczyc, Michal Olczyk, (BOSMAL, Poland)** – Analysis of Diesel injector deposits
- ♦ **Dr. Rafal Sala (BOSMAL, Poland)** – The influence of the urea dosing method on the NO<sub>x</sub> reduction ratio in the selective catalytic reduction
- ♦ **Stefan Seefeldt, Olaf Thiele, Joachim Deppe (LaVision GmbH, Germany), Juergen Pfeil, Christian Disch, Thomas Koch (IFKM KIT, Germany), Anna Glodek, Radoslaw Boba (CASP System, Poland)** – Transient analysis of both lambda and EGR values measured locally with crank angle resolution in IC engines using a fiber optic sensor
- ♦ **Stefan Seefeldt, Joachim Deppe (LaVision GmbH, Germany), Juergen Pfeil, Christian Disch, Thomas Koch (IFKM KIT, Germany), Anna Glodek, Radoslaw Boba (CASP System, Poland)** – Visualisation of soot formation in a DISI engine for different fuel injection strategies and in cold start conditions with the aid of endoscopic color imaging
- ♦ **Marcel Kaspar, Prof. Hans-Peter Rabl (OTH Regensburg/Hochschule Kempten, Germany), Prof. Wolfgang Mayer (Hochschule Kempten, Germany)** - Mass Spectrometry: Is this analytical Tool for the selective Hydrocarbon Analysis on Diesel Engines suitable?
- ♦ **Dr. Barbara Kozielska et al. (Silesian University of Technology, Poland)** – Geochemical markers and polycyclic aromatic hydrocarbons in particulate matter emitted from diesel engines

Selected written papers based on the keynotes, presentations and posters listed above will be published in a special issue of the journal Combustion Engines.





# 5<sup>th</sup> International Exhaust Emissions Symposium 19-20 May 2016

## Our guests

4c-Consulting, **Italy**  
AFHB University of Applied Sciences, **Switzerland**  
Afton Chemical, **UK**  
Argonne National Laboratory, **USA**  
AVL, **Austria**  
AVL Inc., **USA**  
AVL LMM, **France**  
BASF SE, **Germany**  
BorgWarner, **Poland**  
Carelli Consulting, **Germany**  
Casp System, **Poland**  
Concawe, **Belgium**  
Continental Automotive, **Germany**  
Corning Incorporated, **USA**  
Cracow University of Technology, **Poland**  
Cummins, **USA**  
Decati, **Finland**  
DieselNet, **Canada**  
Ecocat Italia Srl, **Italy**  
Federal Office for the Environment (FOEN) Air Pollution Control and Chemicals, **Switzerland**  
Fiat Chrysler Automobiles, **Italy**  
Fiat Chrysler Automobiles, **Poland**  
General Motors Manufacturing Poland, **Poland**  
Haldor Topsoe, **Denmark**  
Horus Energia, **Poland**  
Hyundai Motor Manufacturing, **Czech Republic**  
Innospec, **UK**  
The International Council on Clean Transportation (ICCT), **Germany**  
JCB Power Systems, **UK**  
Johnson-Matthey, **UK**  
Katcon, **Luxembourg/Poland**  
KIA, **Slovakia**  
Kistler Instrumente AG, **Switzerland**  
Lamborghini, **Italy**  
La Vision, **Germany**  
Landi Renzo, **Poland**  
Linde Gas, **Poland/Germany**  
LOTOS Oil, **Poland**  
Metropolia University of Applied Sciences, **Finland**  
Ministry of Infrastructure and Construction – Transport Department, **Poland**  
Motor Transport Institute, **Poland**  
NGV GAS, **Italy**  
Nissan Technology Center, **Germany**  
Oil and Gas Institute, **Poland**  
OTH Regensburg, **Germany**  
Petronas Lubricants Italy, **Italy**  
PKN Orlen, **Poland**  
Politecnico di Torino, **Italy**  
Poznan University of Technology, **Poland**  
Przegląd Techniczny - journal, **Poland**  
Richard D Atkins & Associates Engineering Consultants, **UK**  
RIVM - Royal Dutch National Institute for Public Health and the Environment, **the Netherlands**  
SAE International, **Europe**  
Sensors Europe, **Germany**  
Silesian University of Technology, **Poland**  
Skardalsmo Fuel Consulting, **Norway**  
Sumika Ceramics, **Japan/Poland**  
Tampere University of Technology, **Finland**  
Tenneco Automotive Polska, **Poland**  
Toyota Motor Manufacturing Poland, **Poland**  
TP Engineering, **UK**  
TRT Engineering, **Germany**  
TSI, **USA/Germany**  
TÜV Nord, **Germany**  
Umicore, **Germany**  
University of Bielsko-Biala, **Poland**  
University of Birmingham, **UK**  
University of Leeds, **UK**  
University of Manchester, **UK**  
University of Minnesota, **USA**  
University of Warsaw, **Poland**  
Valeo Electric and Electronic Systems, **Poland**  
V&F Analyse und Messtechnik, **Austria**

# 5<sup>th</sup> International Exhaust Emissions Symposium 19-20 May 2016

We are hosting guests from the following countries:





# 5<sup>th</sup> International Exhaust Emissions Symposium 19-20 May 2016

## Silver sponsors of the symposium:



## Sponsors of the symposium:





# Bielsko - Biała

