

Practical  
Excursion:  
TÜV SÜD  
Emissions  
Lab

13th International CTI Conference

# Exhaust Systems

19 – 21 January 2015 | Stuttgart | Germany

→ Conference Days 20 – 21 January 2015

→ Introductory Seminar “Basics of Exhaust Systems” 19 January 2015

## CONFERENCE FOCUS

- Exhaust Gas Purification vs. CO<sub>2</sub> Reduction of Gasoline and Diesel Engines
- Low Pressure Exhaust Gas Recirculation
- Developments in SCR Technologies
- Exhaust Gas Sensors
- On-Board Diagnostics
- NO<sub>x</sub> Reduction:  
New Advances in Ammonia Injection

*Very good mixture  
of basic research and  
system optimization.*

Dr. M. Weirich, Daimler AG

## PRESENTERS INCLUDE



**AMMINEX**  
Emissions Technology



**Continental**



**DENSO**



**EMISSIONS ANALYTICS**

**EngineSens  
Motorsensor  
GmbH**

**FEV**



**HJS**  
Emission Technology

**LIEBHERR  
Components**

**LOGE**  
LIND COMBUSTION ENGINEERING

**PROVENTIA**



**CTI**

Car Training Institute



**Simultaneous Translation**  
German ↔ English  
English proceedings!

## INTRODUCTORY SEMINAR

### Basics of Exhaust Systems

Monday, 19 January 2015



**SEMINAR CHAIRMAN: Stefan Carstens**  
CEO, EnginSense Motorsensor GmbH

### Main topics

#### Composition of pollutants

- HC, NO<sub>x</sub>, CO, PM
- Effects on humans

#### Emission legislation in Europe

- Development of emission limits
- CO<sub>2</sub> objective
- Stoichiometric gasoline engines

#### Aftertreatment for stoichiometric gasoline engines

- Catalytic converter basics: three-way catalytic converter (TWC)
- Possibilities to shorten light-off times
- Influence of substrates and cell density
- OBD: dual lambda concept

#### Stratified direct petrol injection

- Combustion process
- NO<sub>x</sub> storage catalytic converter LNT, design
- Regeneration, desulphurization
- Typical exhaust gas system

#### Diesel exhaust emissions – Diesel particulate filter (DPF)

- French “FAP” system
- Catalytic filter systems
- Regeneration strategies

#### Commercial vehicle exhaust systems

- SCR with urea
- CRT®
- Combination systems for EPA 10 and Euro 6

#### DeNO<sub>x</sub>-systems PC diesels

- SCR and SCRT®
- LNT (Lean NO<sub>x</sub> Trap) diesel

#### Practical examples

- Volkswagen: MQB Modular Transverse Matrix
- LNT (Lean NO<sub>x</sub> Trap) at Daimler gasoline engines
- Opel Ampera with range extender

#### TIME SCHEDULE

8.30	Opening of the introductory seminar	with flexible coffee breaks
12.00	Lunch	
5.00	End of the introductory seminar	

## CONFERENCE DAY 1

### Exhaust Systems

Tuesday, 20 January 2015



**CHAIRMAN: Prof. Dr. Werner Müller,**  
Former Professor at the Internal Combustion Engines Department, Technical University of Kaiserslautern

- 8.15 – 8.45 Reception  
8.45 – 9.00 Welcome address and opening

### Emission Challenges

9.00 – 9.30

#### The Importance of Real On-Road Performance of Exhaust Systems – Revealing True Behaviour

- Real-world diverge of performance from certification levels
- Experience of Euro 6 diesel passenger cars
- Behaviour under DPF regeneration and cold start
- How PEMS can help in the development and validation process



Jane Thomas,  
Global Sales Manager,  
Emissions Analytics

9.30 – 10.00

#### Diesel EGR Systems to Meet Future Emissions and CO<sub>2</sub> Requirements: Options and Challenges

- Description of future emissions and CO<sub>2</sub> requirements in US and EU markets
- EGR system options being investigated: Improved HP, LP and “Dual Loop” HP & LP
- Unique challenges of LP EGR and solutions required



Daniel Styles, P.E. – Group Leader and Technical Specialist Powertrain and Advanced Engineering, Ford Motor Company

### Innovative Systems and Components I

10.00 – 10.30

#### Downsizing SCR System with Efficient Mixing

- System efficiency and downsizing – contradictory targets?
- Versatile location adaptation to various applications including SCR and SCR on filter
- CFD vs. real world results



Arno Amberla,  
Vice President Technology,  
Proventia Emission Control Oy

10.30 – 11.00 Discussion  
 11.00 – 11.30 Refreshment Break

11.30 – 12.00

**Effect of Exhaust Temperature Sensor Accuracy on Fuel Consumption and CO<sub>2</sub> Emission**

- Simulation of several non-road driving cycles with different sensor accuracy setups
- Measurements of typical Stage IV heavy duty engines with DOC, CDPF and SCR after treatment as database
- Investigation of temperature related functions of after treatment control like passive (NO<sub>2</sub>) and active (O<sub>2</sub>) DPF regeneration and their particular fuel saving potential
- Estimation of the side effects oil dilution and DOC life time along with the fuel saving



Eric Brückner, Project Engineer, FEV GmbH

Co-Authors: Verena Koll, Academic at Institute for Combustion Engines RWTH Aachen University

Dr. Stefan Schmidt, Key-Account-Manager Europe, Watlow GmbH

12.00 – 12.30

**Mind the Gap – the Paradox of low NO<sub>x</sub> & CO<sub>2</sub> in Real Driving Conditions**

- Major cities continue to struggle with high NO<sub>x</sub> concentrations
- Real World Driving: A challenge for emission control systems
- Direct NH<sub>3</sub> dosing: Exploring full SCR potential at low exhaust temperature
- DeNO<sub>x</sub> solutions for LD/HD providing high efficiency without fuel penalty



Dr. Tue Johannessen,  
 Chief Technology Officer,  
 Amminex Emissions Technology A/S

12.30 – 1.00

**Practical Experiences with Opto Electronic Sensor for AdBlue-Quality**

- AB Elektronik within TT electronics as specialist of sensors for aftertreatment systems
- Why AdBlue-Quality needs to be determined
- Technical realization at AB Elektronik



Frank Rothe,  
 Sales Manager Automotive,  
 AB Elektronik Sachsen GmbH

1.00 - 1.30 Discussion  
 1.30 – 3.00 Lunch Break in the Exhibition Area

3.00 – 3.30

**Design of an Exhaust Aftertreatment System for Off-Road-Applications including the Integration of SCR Functionality into the Particle Filter**

- SCR catalysts for integration into a DPF
- FSCR/SCR architecture at different frame conditions like regeneration strategy, available space and catalyst ageing
- Test of DeNO<sub>x</sub> performance under steady-state and transition test conditions
- Design study



Dr. Thomas Wolff,  
 Leitung Entwicklung Keramik & Katalysatoren,  
 Dinex GmbH

**Innovations in Measurement Systems**

3.30 – 4.00

**RDE Real Driving Emissions on Street and Chassis Dyno – Experience from the TÜV SÜD Emission Network**

- How to deal with the moving target RDE
- Practical Application of PEMS
- Data Evaluation Tool overview



Karsten Mathies, Emission Expert, Homologation of HD Engines and PEMS for all Applications, Passenger Car RDE, Truck ISC and Nonroad, TÜV Technische Überwachung Hessen GmbH

4.00 – 4.30 Discussion

4.30 – 6.30

**Excursion to the TÜV SÜD Exhaust Gas Emissions Lab**

Enjoy a technically oriented event in the extensive surroundings of the TÜV SÜD Exhaust Emissions Lab!

**Highlights of the lab:**

- 3 chassis dynamometers (incl. exhaust gas test rig, 48" roller and analysis equipment)
- Low-temperature air conditioning down to -18°C
- SHED chamber
- Approval accreditation for Japan and the EU



6.30

**Get together!**

At the end of the first conference day CTI invites you to a social get-together.

## CONFERENCE DAY 2

### Exhaust Systems

Wednesday, 21 January 2015

8.30 – 9.00

Reception with Coffee and Tea – bring plenty of business cards and follow up on your networking!

### Simulation as Development Tool

9.00 – 9.30

#### Transient Simulation of Emissions Reduction in a Three Way Catalytic Converter

- Emissions formation simulated in a stochastic engine model
- 1D catalytic converter modeling
- Detailed reaction kinetics for catalytic Pt and Rh surfaces
- Transient emission reduction simulation including engine cycle variations



Prof. Dr.-Ing. Fabian Mauss,  
CEO,  
LOGE AB

9.30 – 10.00

#### Emission Reduction Strategies using Advanced Computational Modeling and Simulation

- Mitigating emissions at source – combustion operating strategy, impact of fuel, EGR, injection timing, split ratios, intelligent design of experiments
- Mitigating emissions using advanced aftertreatment modelling
- Mitigating PM emissions in terms of mass and size



Dr. Julian Dizy Suarez,  
Applications Engineering Manager,  
cmcl innovations

### Innovative Systems and Components II

10.00 – 10.30

#### Improvements in predicting the Freezing Behaviour of SCR Dosing Systems

- Important properties for the simulation of freezing forces of aqueous solutions
- Problems in the usage of current FEA approaches
- Advantages when using the grid free method FPM
- Simulation examples



Dr.-Ing. Kay Schmidt,  
Engineering/Simulation, Cummins Deutschland GmbH / Cummins Emission Solutions

10.30 – 11.00 Discussion

11.00 – 11.30 Refreshment Break

11.30 – 12.00

#### SCR on Filter, the Future for Construction Machinery?

- Advantages and disadvantages using SCR on filter for construction machinery
- Risks due to SCR on filter for heavy-duty equipment



Yves Hohl,  
Research Engineer,  
Liebherr Machines Bulle

12.00 – 12.30

#### OBD for Commercial Vehicle Exhaust Systems

- Scope of diagnostic: OBDII, FSM and service functions
- Impact of increased efficiencies on OBD
- Diagnostic architecture to cover the variety of exhaust systems
- Introduction to OBD4HDD



Matthias Weber,  
Senior Manager, Global System Integration,  
Continental Engineering Services GmbH

12.30 – 1.00

#### Benefit of Close-Coupled Pre-Catalyst for EU 6 Gas Engine-Application – Development and Validation

- Catalyst layout
- Mechanical validation
- Emission validation



Dominik Lamotte,  
Head of Department System & Integration,  
HJS Emission Technology

1.00 – 1.30

#### Impact of the NOx Sensor Performance on the Control and Feedback of SCR Urea Dosing, for future PC and HD Applications

- NOx sensor characteristics
- SCR Urea dosing control and adaptation
- Impact of sensor error on the SCR performance
- Sensitivity analysis



Om Parkash Bardwaj,  
Project Engineer,  
FEV GmbH Aachen

Co-authors: Dr. Bernhard Lüers and Dr. Bastian Holderbaum,  
FEV GmbH Aachen

Toshikazu Hirose, Olaf E. Herrmann and T. Katafuchi,  
Denso Corporation

1.30 – 2.00 Discussion & Final Remarks

2.00 End of the international CTI conference and Lunch Break in the Exhibition Area

## Exhibitors



The companies of TT Electronics Sensing and Control Division have a proud pedigree with more than 30 years in automotive, truck, off-road and industrial applications. Emission exhaust-gas-technology is one of our core competences and we have several years of experience in mass production for EURO4 and EURO5 as well as Tier4i and f engines. Products like high-temperature sensors with integrated electronic, freeze protected pressure sensors and also special electronics are invariably powerful and provide excellent cost-benefit ratios, which are dedicated to the applications of leading OEMs in transportation segment.

**AB Elektronik GmbH** | Feldmark 50, 59368 Werne, Germany | [www.abelektronik.com](http://www.abelektronik.com), [www.ttelectronics.com](http://www.ttelectronics.com)



**CeramTec** is an international manufacturer and supplier of technical ceramics. The Ceramic Experts supply with the current portfolio well over 10,000 different products, components and parts made of a variety of engineered ceramic materials. They are used worldwide in a wide range of applications. Discover the world of advanced ceramics

**CeramTec GmbH** | Luitpoldstraße 15, 91207 Lauf | [www.ceramtec.com](http://www.ceramtec.com)



Since 2006 **Continental Engineering Services (CES)** has been active worldwide as an independently operating provider of comprehensive engineering services. The extensive know-how and creativity of our engineers, as well as access to Continental's entire technology pool, provides a unique position for our development. The flexibility and speed of small engineering team combined with the strength of an internationally leading company. In addition, our adaptability enables established mass production technology to become a reality from small series and niche applications at economical costs.

**Continental Engineering Services GmbH** | Graf-Vollrath-Weg 6, 60489 Frankfurt | [www.conti-engineering.com](http://www.conti-engineering.com)



**Dana Holding Corporation**, a global technology leader, manufactures innovative solutions for current and future automotive engines and transmissions. When using Dana's award-winning sealing and thermal technologies, major OE manufacturers maintain a decisive lead in technology by reducing complexity, friction losses, weight, and emissions. Dana's automotive solutions are found in virtually every vehicle engine and transmission worldwide.

**Dana Holding Corporation** | Power Technologies Group, 3939 Technology Drive, Maumee, OH 43537, USA | [www.dana.com](http://www.dana.com)



**Cummins Emission Solutions (CES)** is a leading global aftertreatment and engineered component supplier that provides the highest level of technology to support and meet the constantly evolving emissions standards for the on- and off-highway transportation markets. CES offers a variety of proven solutions to best fit your needs, from fully integrated aftertreatment systems to individual system components.

**Cummins Emission Solutions – A Division of Cummins Deutschland GmbH** | Am Schlossfeld 1, 97828 Marktheidenfeld | [www.cumminsemissionsolutions.com](http://www.cumminsemissionsolutions.com)



**LOGE AB**, Lund Combustion Engineering, is a Swedish consultancy and software development company. Our main competence is the development of software tools used for simulating chemical processes, such as combustion, emission formation and after treatment. Our product LOGEsoft is specialized in analyzing and simulating complex chemistry processes for engineering applications.

**Lund Combustion Engineering – LOGE AB** | Scheelevägen 17, SE-223 70, Lund | [www.loge.se](http://www.loge.se)



( Understanding Temperature. )

Mannheim-based **Thermamax Hochtemperaturdämmungen GmbH, Thermamax Inc.**, with headquarters in Aurora / Illinois, and the Chinese Taicang Thermamax High Temperature Insulation Equipment Co., Ltd. are recognized worldwide as specialists for the design and manufacture of thermal and acoustic insulation systems for engine compartments and exhaust lines for diesel and gasoline engines, fuel cells, and electric drive systems.

**Thermamax Hochtemperaturdämmungen GmbH** | Ölhafenstraße 20-28, 68169 Mannheim, Germany | [www.thermamax.com](http://www.thermamax.com)



**Infoline: +49 (0) 211.96 86-35 99**

**If you have any questions about the forum, we will be pleased to help you.**

**CONTENT AND CONCEPTION**

Elisa Ansar, Conference Manager  
Email: elisa.ansar@car-training-institute.com

**CUSTOMER SERVICE AND REGISTRATION**

Elisabeth Janik  
Email: registration@car-training-institute.com  
Phone: +49 (0) 211.96 86-39 01

**MEDIA PARTNERS**



**ADVISORY BOARD**



Dr. Ewa Bardasz



Prof. Galen Fisher



Dr. Mansour Masoudi,  
Emissol



Dr. Claus Görsmann,  
Johnson Matthey



Prof. Dr. Werner Müller



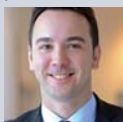
Stefan Carstens,  
EngineSens Motorsensor



Dr. Addy Majewski,  
Diesel.Net

**SPONSORING & EXHIBITION**

The conference will give you an opportunity to present your company, products and services to an exclusive gathering of potential clients. For further information on sponsoring/exhibition opportunities and target groups please contact:



**Senel Çelik, Sales Manager**  
Email: senel.celik@car-training-institute.com  
Phone: +49 (0) 211.96 86-37 28  
Fax: +49 (0) 211.96 86-47 28





Your personal registration code

## Registration and Information

**CONDITIONS OF PARTICIPATION** The attendance fee (excl. VAT) per person, which includes conference documentation, lunches, tea/coffee and evening dinner, is payable on receipt of the invoice. Once your registration has been received you will be sent a confirmation slip. Registrations can be cancelled (in writing please) free of charge up to 14 days before the event. When a cancellation is made within 14 days of the conference date, half the participation fee will be reimbursed. In the event of cancellation on the day of the conference, or failure to attend, the full fee will be payable. The registered delegate may of course send a substitute at no additional cost. The organisers reserve the right to amend the programme of events if necessary. Discounts on group bookings depend on the number of people booked as delegates on the date of the event.

**DATA PROTECTION.** CTI is a division of EUROFORUM Deutschland SE. We use the data collected in connection with your order and use of our services and products within the applicable legal limits for the purpose of performing our services, and to provide you with information by post and e-mail about further offers by us, companies of our Group or co-operation partners, which are similar to the services of which you availed yourself previously. If, during the use of the data, it is transmitted to countries lacking an adequate level of data protection, we will create sufficient guarantees to protect the data. Furthermore, we will use your data if you have given us your consent to do so. You may object to the use of your data for advertising purposes or to being contacted by email or fax at any time by contacting EUROFORUM Deutschland SE, Postfach 11 12 34, 40512 Düsseldorf, Germany. Our customer services (Phone: +49 (0)211.96 86-33 33) shall be pleased to accept requests for changes.

**ACCOMMODATION.** In the conference hotel, there is a limited allocation of rooms available at a reduced price. Please arrange the room reservation directly with the hotel quoting the reference "CTI conference".

### YOUR CONFERENCE HOTEL.

The Dormero Hotel Stuttgart invites you warmly for a drink at the end of the first conference day.

### Dormero Hotel Stuttgart

Plieninger Straße 100, 70567 Stuttgart, Germany

Phone: +49 (0) 711. 721 - 0

### Payment by credit card is of course possible!

Just register and you will receive a link with all the relevant reservation data. Use the link and make your credit card payment in an easy and secure way.

13th International CTI Conference

# Exhaust Systems

19 – 21 January 2015 | Stuttgart | Germany

→ Conference Days 20 – 21 January 2015

→ Introductory Seminar "Basics of Exhaust Systems" 19 January 2015

Register by  
7 Nov. 2014  
and save  
300 EUR!

Register Now  
Online!

[www.car-training-institute.com/registration/P2300378](http://www.car-training-institute.com/registration/P2300378)

or fill in and fax it to: +49(0)211.9686-4040

YES, I WANT TO REGISTER FOR:	EARLY BIRD PRICE		REGULAR PRICE
	up to 7.11.2014	up to 19.12.2014	from 20.12.2014
<input type="checkbox"/> Conference and Seminar 19-21 January 2015 [P2300378M013]	€ 2.499,-*	€ 2.599,-*	€ 2.799,-*
<input type="checkbox"/> Conference 20-21 January 2015 [P2300378M012]	€ 1.899,-*	€ 1.999,-*	€ 2.199,-*
<input type="checkbox"/> Seminar 19 January 2015 [P2300378M100]	€ 1.199,-*	€ 1.299,-*	€ 1.399,-*

[A substitute may attend in your place at no additional cost. The fee covers full conference documents.]  
\*excl. VAT per person

- I cannot attend, but please send me the forum documents as download for € 399.- excl. VAT  
[available two weeks after the conference] [P2300378M740]
- Yes, I will make use of the simultaneous translation service.
- I'm interested in exhibition and sponsoring.
- Please amend my address as shown.  
[Should you wish to change your address by telephone, please dial +49 (0)211.9686-3333.]

Name	
Job title/Division	
Phone	Fax
Email	

EUROFORUM Deutschland SE may contact me about various products and services offered by it as well as by companies of the Group and co-operation partners:

E-Mail:  Yes  No Fax:  Yes  No

Company
Address
Division
Contact person
Date, Signature