# engine ress

**Meeting Place for the Engine Community** 







18 and 19 February 2020 | Baden-Baden | Germany with accompanying trade exhibition

#### Main topics

- Climate protection: specifications, technology, economy, markets, life cycle
- $\bullet$  Gasoline, diesel and gas engines: efficiency optimization, electrification,  $\text{CO}_2$  reduction
- Emissions: outlook to EU7, real emissions, solutions
- Synthetic CO<sub>2</sub>-neutral fuels, hydrogen: efficiency, production, application, costs

#### Panel discussion

Future mobility and environmental objectives – what will be the role of the internal combustion engine?

### Top speakers



Prof. Dr. Christian Beidl, TU Darmstadt | Dr. Martin Berger, MAHLE Powertrain GmbH |
Dr. David Bothe, Frontier Economics Limited | Dr. Matthias Brendel, AUDI AG |
Rolf Heinrich Dreisbach, AVL List GmbH, Austria | Dr. Günter Fraidl, AVL List GmbH, Austria |
Markus Maly, OMV Refining & Marketing GmbH, Austria | Dr. Peter Sauermann, BP Europa SE |
Dr. Thomas Schlick, Roland Berger GmbH | Tong Wang, China Automotive Technology & Research Center

# engine ress

## A WARM WELCOME TO ALL PARTICIPANTS

Climate protection targets and air quality specifications are changing our mobility. Europe has agreed on a further reduction in  $CO_2$  limits. The electrification of powertrains is one solution that can fulfill part of our mobility and transportation requirements. However, national and international markets require a multi-track approach that must not neglect the internal combustion engine.  $CO_2$ -neutral fuels are indispensable components of this approach.

Once again in 2020, the International Engine Congress will continue its systematic examination of the complete system of internal combustion engines and innovative fuels on which it has consistently focused for many years. Efficient passenger car and commercial vehicle engines combined with new fuels are the key technology for  $\mathrm{CO}_2$ -neutral individual mobility with low emissions.

Stay abreast of current trends and benefit from a lead in knowledge!

- You can expect international speakers as well as top-level presentations and panel discussions
- You can switch between lectures at any time, if you prefer to hear about another topic
- The congress is a great opportunity to "network" the evening event for the engine community offers stimulating discussions in a pleasant, relaxing atmosphere
- The trade exhibition, held in parallel, provides ample information about innovative products and services in the field of combustion engine development

We look forward to your participation.

On behalf of the program advisory boards

Dr. Johannes Liebl

Scientific Director of the Congress, Editor-in-Charge ATZ | MTZ | ATZelektronik

## EVENING FOR THE ENGINE COMMUNITY AT THE UNIMOG MUSEUM GAGGENAU

As part of the International Engine Congress, we cordially invite you to spend an evening with other guests at the Unimog Museum in Gaggenau. Look forward to interesting discussions with your colleagues over dinner and expand your network.



Experience the fascination of the Unimog – with vehicles you can examine, touch, and be driven in. Have dinner among historic vehicles, learn more about the technical features of the Unimog, and enjoy a very special driving experience on the museum's thrilling outdoor test circuit, with its 100 % uphill gradients, 70 % downhill gradients, and 20 degree tilt angles.

ATZlive and VDI Wissensforum cordially invite you: Tuesday, 18 February 2020, 19:00 h in Gaggenau

A bus transfer from the congress center to the Unimog Museum and back will be provided.





SIMULTANEOUS INTERPRETING GERMAN → ENGLISH

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www.vdi-wissensforum.de

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#### **PARTICIPANTS**

The event is primarily aimed at engineers and technicians in the industry or those involved in research and teaching, who are engaged in the optimization of the traditional developmental areas of the combustion engine or the advancement of procedures and systems to produce conventional or renewable fuels and lubricants. The lectures will be equally attractive for chemists and biologists who work in this industry. The focus will be on both diesel and spark-ignition engines (gasoline/gas) for passenger and commercial vehicles and off-highway applications.

#### PROGRAM ADVISORY BOARDS



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Prof. Dr. Christian Beidl Director of the Institute, VKM, TU Darmstadt



Dr. Andreas Broda Vice President Internal Combustion Engines & Exhaust Aftertreatment, MAN Truck & Bus SE



Jürgen Lehmann Head of Development Mercedes-Benz Legacy Engines and Aftertreatment Systems, Daimler AG



**Bernd Lindemann** Vice President Diesel Powertrains, FEV Europe GmbH



Roland Nipp Chief Operating Officer, ISUZU MOTORS Germany GmbH



Bernhard Raser Product Manager Commercial Vehicles On-Road, AVL List GmbH [A]



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#### **INNOVATIVE FUELS**



Wolfgang Maus Managing Director, WM Engineering & Consulting GmbH



**Dr. David Bothe**Associate Director,
Frontier Economics
Limited



Dietmar Goericke Managing Director, Research Association for Combustion Engines (FW e. V.)



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Prof. Dr. Thomas Koch Director of the Institute, IFKM, Karlsruhe Institute of Technology (KIT)



Prof. Dr. Georg Wachtmeister Ordinary, Chair of Internal Combustion Engines, TU Munich



Dr. Wolfgang Warnecke Chief Scientist Mobility, Shell Global Solutions (Deutschland) GmbH



Dr. Werner Willems
Technical Specialist
Powertrain
Combustion Systems,
Ford Forschungszentrum Aachen GmbH



10:30 Coffee break 12:45 Lunch 16:00 Coffee break

08:30

Welcome and opening of the congress as well as introduction to the program of lectures Dr. Johannes Liebl, Scientific Director of the Congress

#### **KEYNOTE LECTURES I**

Tuesday, 18 February 2020

Moderation: Dr. Johannes Liebl, ATZ | MTZ | ATZelektronik

**Energy transition in the** transport sector needs legislative changes

Passenger car propulsion systems - vision and technical reality



08:45

09:35

Markus Maly, Department Manager Market Analysis Downstream Oil, OMV Refining & Marketing GmbH, Austria, Co-author: Johanna Julia Atzmannstorfer, OMV AG, Belgium

09:10

Dr. Günter Fraidl, Senior Vice President, AVL List GmbH,

Climate protection and mobility - an economic optimization problem!



Dr. David Bothe, Associate Director, Frontier Economics Limited

10:00

Keynote speakers I, moderator, plenary session participants

of the keynote lectures

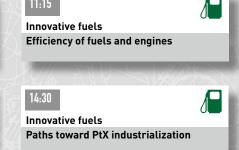
Joint discussion

11:15

Auditorium (Basement)

PC engine technology Electrification PC engine technology **Emissions I** 

CV engine technology Gas engines CV engine technology Variable valve timing, ultra-low emissions



#### **PANEL DISCUSSION**

Future mobility and environmental objectives what will be the role of the internal combustion engine?





Dr. David Bothe, Associate Director, Frontier Economics Limited

as well as one representative from politics



Karl Dums, Director Advanced Engineering Powertrain & Powertrain Strategy, Dr. Ing. h.c. F. Porsche AG



Prof. Dr. Uwe Dieter Grebe, Managing Director, AVL List GmbH, Austria



Gregor Petrowitsch, Representative, Fridays for Future Graz, Austria



Moderation:

Dr. Alexander Heintzel, Editor-in-Chief ATZ | MTZ Group, and Wolfgang Maus, Managing Director, WM Engineering & Consulting GmbH

Evening for the

Auditorium (Basement)



## Wednesday, 19 February 2020

12:00 Lunch

14:30 Coffee break

08:30

parallel sessions 08:30

PC engine technology
Internal combustion engine optimization

08:30

CV engine technology Supercharging



08:30

Innovative fuels
PtX production and use



**KEYNOTE LECTURES II** 

Moderation: Prof. Dr. Christian Beidl, TU Darmstadt

Pathways to sustainable propulsion systems – let us go for innovation and fresh thinking



Modular hybrid powertrain adapted for synfuels



10:15

**Prof. Dr. Christian Beidl,** Head of Institute for Internal Combustion Engines and Powertrain Systems (VKM), TU Darmstadt

10:30

11:30

**Dr. Martin Berger,** Vice President Corporate Research and Advanced Engineering, MAHLE Powertrain GmbH, Co-authors: Dr. Marco Warth, MAHLE International GmbH, Simon Reader, Dr. Mike Bassett, both MAHLE Powertrain Ltd., UK

50 % efficiency for the internal combustion engine – the realization of a vision



Audi Denkwerkstatt: What can the powertrain world learn from the agile start-up world?



11:00

Rolf Heinrich Dreisbach, Executive Vice President, Co-authors: Martin Wieser, Hans Felix Seitz, Helmut Theissl, all AVL List GmbH, Austria STIMULUS KEYNOTE

**Dr. Matthias Brendel,** Head of Audi Denkwerkstatt, AUDI AG

13:30

Auditorium (Basement)

parallel

13:30

PC engine technology Emissions II 13:30

CV engine technology The engine in the hybrid powertrain



13:30



Innovative fuels PtX application

**KEYNOTE LECTURES III** 

Moderation: Dr. Johannes Liebl, ATZ | MTZ | ATZelektronik

Mobility 2050



China automotive fuel economy standards and fuel efficiency promotion policies



15:00

**Dr. Peter Sauermann,** Regional Technology Director Europe, BP Europa SE

15:30

**Tong Wang,** Senior Project Manager, China Automotive Technology & Research Center (CATARC)

Future powertrain mix 2030 and beyond



16:00

**Dr. Thomas Schlick,** Senior Partner Automotive, Roland Berger GmbH

During the breaks you have the opportunity to visit the exhibition!

to the parallel sessions



Outlook and concluding remarks

Dr. Johannes Liebl, Scientific Director of the Congress

Auditorium (Basement)



## **Presentations**

parallel sessions

### Tuesday, 18 February 2020



#### PC engine technology

Auditorium (Basement)



#### **ELECTRIFICATION**

Moderation: Dr. Martin Berger, MAHLE International GmbH

11:15

#### Results of a patent analysis and a market study for the estimation of concepts of future hybrid vehicle drives

Prof. Dr. Wilhelm Hannibal, Professor of Design, Faculty of Mechanical Engineering, South Westphalia University of Applied Sciences, Co-authors: Niklas Haverkamp, Kanzlei Patentanwalt Prof. Dr. Jens Haverkamp, Prof. Dr. Peter Eilts, Institute of Internal Combustion Engines (IVB), TU Braunschweig

11:45

# TwinRex – Dedicated Hybrid Engine for a serial-parallel powertrain with excellent cost-value index

**Dr. Oguz Budak,** Team Manager Gasoline Combustion Systems, Co-authors: Dr. Norbert Alt, Andreas Sehr, Dr. Tolga Uhlmann, all FEV Europe GmbH

12:15

# Future diesel powertrain in LCV and SUV – electrified, modular platform with focus on emission, efficiency and cost

**Dr. Wolfgang Schöffmann,** Head of Technology Base Powertrain, Co-authors: Michael Howlett, Michael Weissbäck, Hannes Wancura, all AVL List GmbH, Austria



#### **EMISSIONS I**

Moderation: Dr. Norbert Alt, FEV Europe GmbH

14:30

# The path towards vehicles with ultra clean internal combustion engines and the future emission regulations in Europe

**Dr. Panagiota Dilara,** Clean Vehicles Team Leader, Internal Market, Industry, Entrepreneurship and SMEs, European Commission, Belgium

15:00

# Systemic development approach of optimized piston ring design to reduce particulate raw emissions

**Thomas Bastuck,** Project Manager Pre-Development, Co-authors: Richard Mittler, both Federal-Mogul Burscheid GmbH, Dr. Steffen Hoppe, Federal-Mogul Holding Deutschland GmbH

15:30

## The ring catalyst – an innovative, ultracompact solution for EU7

Rolf Brück, Managing Director, Co-author: Thomas Härig, both Vitesco Technologies Emitec GmbH

#### CV engine technology

Forum (Ground Floor)



#### **GAS ENGINES**

Moderation: Prof. Dr. Christian Beidl, TU Darmstadt

11:15

# MPI valves for use in large engine applications – challenges in the development and derived benefits for operation

**Dr. Peter Christiner,** Senior Manager Engineering, Co-authors: Claudia Hengstberger, Michael Köhler, Markus Schmitzberger, Andreas Stimmeder, all Robert Bosch AG, Austria

11:45

## Natural gas vehicle development in Japan: the utilization of natural gas as an alternative fuel

**Akiyoshi Kishi,** Section Manager, Isuzu Motors Limited, Japan

12:15

## Managing cryogenic fuels on heavy-duty vehicles

Adrian Post, Chief Systems Engineer, Fuel Supply, Co-authors: David Mumford, Gage Garner, Robbi McDonald, all Westport Fuel Systems, Canada



## VARIABLE VALVE TIMING, ULTRA-LOW EMISSIONS

Moderation: Roland Nipp, ISUZU MOTORS Germany GmbH

14:30

## Variable valve actuation as an efficient measure for OHW drive systems

**Dr. Georg Töpfer,** Coordinator of Advanced Engineering, Co-authors: Adrian Troeger, both DEUTZ AG, Justus Himstedt, Stefan Steichele, both MAHLE GmbH

15:00

# CO<sub>2</sub> reduction by minimizing friction at the pcu in conflict of targets with increased oil aerosol formation

Magnus Lukas Lorenz, Engineer for Durability and Functional Testing HDEP and MDEG Engines, Co-authors: Jürgen Lehmann, Dr. Peter Kožuch, all Daimler Truck AG, Prof. Dr. Thomas Koch, Institute for Piston Engines (IFKM), Karlsruhe Institute of Technology (KIT)

15:30

# HD diesel engine – exhaust gas temperature management and advanced exhaust gas aftertreatment technology for ultra low $NO_x$ emission legislation

**Jonas Edvardsson,** Technical Coordinator, Johnson Matthey, Sweden, Co-author: Dr. Hannes Noll, AVL List GmbH, Austria

#### Innovative fuels

Kongress-Saal I (1st Floor)



#### **EFFICIENCY OF FUELS AND ENGINES**

Moderation: Wolfgang Maus, WM Engineering & Consulting GmbH

11:15

#### Just a drop in the fuel tank? The potential of synthetic fuels

**Prof. Dr. André Bardow,** Director of the Institute, Chair of Technical Thermodynamics and Institute for Thermodynamics (LTT), RWTH Aachen University

11:45

#### Liquid fuels as chemical batteries

**Prof. Dr. Robert Schlögl,** Director of Inorganic Chemistry at FHI, Director of Heterogeneous Reactions at CEC, Fritz Haber Institute of the Max Planck Society

12:15

## Super lean burn technology for a 50 % thermal efficiency SI engine

**Prof. em. Norimasa lida,** Super Lean Burn Engine Laboratory, Co-author: Prof./Ph.D. Takeshi Yokomori, both Keio University, Japan



#### PATHS TOWARD PTX INDUSTRIALIZATION

Moderation: Dr. Wolfgang Warnecke, Shell Global Solutions (Deutschland) GmbH

14:30

#### Processes for the production of OME fuels

**Prof. Dr. Jakob Burger,** Professor of Chemical and Thermal Process Engineering, TU Munich, Co-authors: Dr. Eckhard Ströfer, OME Technologies GmbH, Prof. Dr. Hans Hasse, Laboratory of Engineering Thermodynamics, TU Kaiserslautern

15:00

#### Roadmap to an OME specification

**Dr. Thomas Wilharm,** CEO, Co-authors: Dr. Hendrik Stein, both ASG Analytik-Service GmbH, Innokentij Bogatykh, Faculty of Mechanical and Process Engineering, Augsburg University of Applied Sciences

15:30

#### Cost-efficient and sustainable cars

**Dr. Hermann Pengg-Bührlen,** Managing Director, Audi e-gas Betreibergesellschaft m.b.H., AUDI AG, Co-authors: Martin Zapf, Prof. Christian Weindl, both Coburg University, Dr. Thomas Bütler, Dr. Christian Bach, both Eidgenössische Materialprüfungsanstalt (EMPA), Switzerland



## **Presentations**

parallel sessions

## Wednesday, 19 February 2020



#### PC engine technology

Auditorium (Basement)



## INTERNAL COMBUSTION ENGINE OPTIMIZATION

Moderation: Prof. Dr. Uwe Dieter Grebe, AVL List GmbH

08:30

The polyvalent internal combustion engine – technologies and combinations of those as a basis for future engine families

Marc Sens, Senior Vice President Advanced Development Powertrain, Co-authors: Michael Günther, Torsten Tietze, Mirko Leesch, Wolfgang Wukisiewitsch, Christoph Danzer, all IAV GmbH

09:00

The new 4 cylinder engine for the DRM – a blueprint for motorsport in the future?

**Ulrich Baretzky,** Director Engine Development AUDI Motorsport, AUDI AG



#### **EMISSIONS II**

Moderation: Prof. Dr. Helmut Eichlseder, TU Graz

12.20

#### Emissions and fuel consumption in real driving

**Dr. Thomas Hametner,** Head of Engineering, Test and Safety, Österreichischer Automobil-, Motorrad- und Touringclub (ÖAMTC), Austria, Co-authors: Dr. Reinhard Kolke, ADAC e. V., Anton Keller, Touring Club Schweiz (TCS), Switzerland, Lone Otto, FDM, Denmark

14:00

Interaction and influence of HVO-based fuels on diesel combustion – characteristics of PM, emission performance, efficiency and  ${\rm CO_2}$  potential

**Paul Lagaly,** Scientific Assistant, Co-authors: Daniel Erforth, Dr. Heiko Kubach, Dr. Olaf Toedter, Prof. Dr. Thomas Koch, all Institute for Piston Engines (IFKM), Karlsruhe Institute of Technology (KIT)



#### CV engine technology

Forum (Ground Floor)



#### **SUPERCHARGING**

Moderation: Dr. Markus Schwaderlapp, DEUTZ AG

08:30

# The second-generation electrically driven compressor – more power for more possibilities

**Dr. Hermann Breitbach,** Vice President Global Engineering and Innovation, Co-authors: Dr. Ralf Christmann, Dietmar Metz, all BorgWarner Turbo Systems Engineering GmbH

09:00

# Electrified turbomachinery for reduced emissions and fuel usage in internal combustion engines

**Dr. Shinri Szymko,** Advanced Engineering Director, Bowman Power Group Ltd, UK



#### THE ENGINE IN THE HYBRID POWERTRAIN

Moderation: Jürgen Lehmann, Daimler AG

13:30

## 48V hybrid system based on a switched reluctance motor for city busses

Markus Lampalzer, Teamleader Engine Mechatronics, Michael Lechner, Teamleader Testing Inverter E-Machine, both MAN Truck & Bus SE

14:00

# Electrified efficiency – diesel hybrid powertrain concepts for light commercial vehicles

**Dr. Joschka Schaub,** Department Manager Diesel Powertrain Concept and Controls, Co-authors: Dr. Markus Ehrly, Matthias Uebbing, all FEV Europe GmbH, Dr. Thorsten Schmidt, Volkswagen AG

#### Innovative fuels

Kongress-Saal I (1st Floor)



#### PTX PRODUCTION AND USE

Moderation: Dr. David Bothe, Frontier Economics Limited

08:30

## Hydrogen as an option to manage power generation intermittency

Martin Rothbart, Senior Product Manager, Co-authors: Jürgen Rechberger, Richard Schauperl, David Reichholf, all AVL List GmbH, Austria

09:00

## Hydrogen as a fuel – production, distribution and outlook

**Paul Karzel,** OEM Interface Manager – Hydrogen, Co-authors: Dr. Wolfgang Warnecke, Dr. Andreas Kolbeck, all Shell Deutschland Oil GmbH



#### **PTX APPLICATION**

Moderation: Dr. Werner Willems, Ford Forschungszentrum Aachen GmbH

13:30

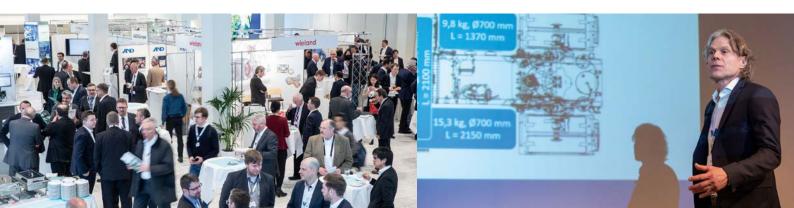
# Renewable drop-in fuels as an immediate measure to reduce CO<sub>2</sub> emissions of heavy-duty applications

**Dr. Barbara Graziano,** Project Manager Emissions & Performance, Diesel Powertrains, Co-authors: Avnish Dhongde, both FEV Europe GmbH, Jaykumar Yadav, Vikram Betgeri, both Institute for Combustion Engines (VKA), RWTH Aachen University

14.00

## Sustained CO<sub>2</sub> reduction in car traffic with renewable fuels

**Karl Dums,** Director Advanced Engineering Powertrain & Powertrain Strategy, Co-authors: Hans-Peter Deeg, Marcos Remedios Marques, Dietmar Schwarzenthal, all Dr. Ing. h.c. F. Porsche AG





#### **EXHIBITION AND SPONSORSHIP**

## ALREADY REGISTERED EXHIBITORS FOR 2020

- A&D Europe GmbH
- ACTech GmbH
- ELTRO GmbH
- FEV Europe GmbH
- FKFS
- Keyou
- KST-Motorenversuch GmbH & Co. KG
- Materion Brush GmbH
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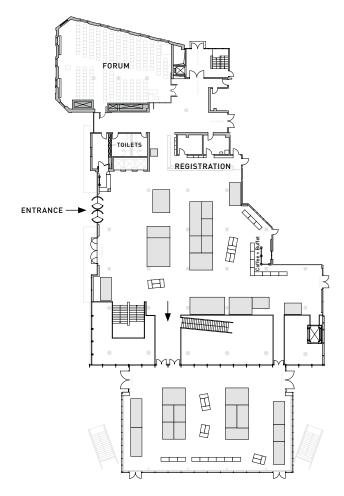
The exhibition provides the ideal presentation platform for companies that supply components for internal combustion engines or that develop and optimize engines and engine parts. These include suppliers of components, systems, and modules for diesel and gasoline engines, companies that produce measuring and testing equipment, and development service providers.

If you would like to make contact with prominent congress participants and present your products and services effectively to a selected specialist audience, then you should become involved in the congress as an exhibitor or sponsor. This industry meeting place gives you the ideal opportunity to take part in technical discussions with the participants and to make new contacts within the industry. We offer individual sponsorship and exhibition packages tailored to your specific needs. Take your pick from a variety of options.

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#### **VENUE**

Kongresshaus Baden-Baden Augustaplatz 10 | 76530 Baden-Baden | Germany Phone +49 7221 304-0 www.kongresshaus.de/en

#### **HOTELS**

Various hotels in Baden-Baden – all centrally located – have room blocks at reduced rates for participants.

The complete list of hotels can be found on the event home page at www.ATZlive.com.

Conference participants may book rooms either online or directly at Baden-Baden Kur & Tourismus GmbH.

Your contact person at Baden-Baden Kur & Tourismus GmbH is: Barbara Schantl Phone +49 7221 275-271 schantl@baden-baden.com

Please make your reservation by 20 January 2020 at the latest.

#### **REGISTRATION FEE**

Passenger car engine technology, commercial vehicle engine technology or innovative fuels € 1,495.– plus VAT € 1,395.– plus VAT for VDI members

This includes the congress documents, coffee breaks, drinks, two lunches and the evening event. Participants may move between different lectures at any time.

#### Mode of payment

By bank transfer after receipt of an invoice or by credit card [MasterCard, Visa].

Participants with a billing address outside Germany, Austria and Switzerland are requested to pay by credit card.

#### **TERMS & CONDITIONS**

Cancelations are possible until 27 January 2020. If a cancelation is made after this date, the full registration fee will be charged. Cancelations must be made in writing. The date of the postmark will determine whether the deadline has been met. If you are unable to attend, we will be happy to accept a substitute participant.

Should a speaker be unable to attend at short notice because of force majeure, illness, accident or other circumstances for which ATZlive and VDI Wissensforum cannot be held responsible, another qualified person will, wherever possible, be appointed to the exclusion of any claim for compensation. Should the event be canceled altogether, we will of course refund the registration fee.

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Family name		VDI membership numb	per * plus VAT	
First name		Please choose your main subject focus:  PC engine technology CV engine technology		
Acad. title		☐ Innovative fuels		
Company / Institute		Participation in the evening event on 18 February 2020		
epartment		☐ yes ☐ no		
Department		I am interested in exhibition and		
Function		sponsoring opportunities		
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Vat No.		Credit card valid until		
		You will receive confirmation of participation upon receipt of your registration and be invoiced three weeks before the congress.  You will receive your congress documents when registering at the venue. Please register one person per form only.		
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