

Developments in Thermal Management and Plastic Powertrain Components 2021

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when technology matters

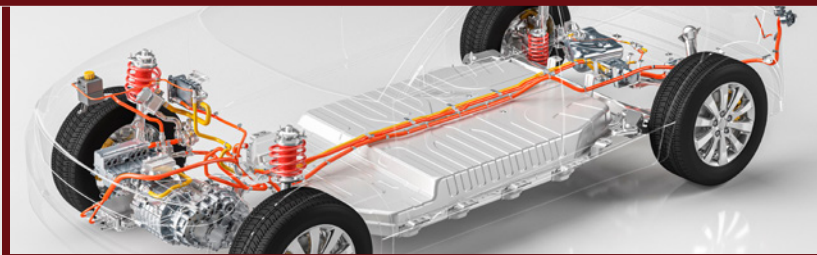
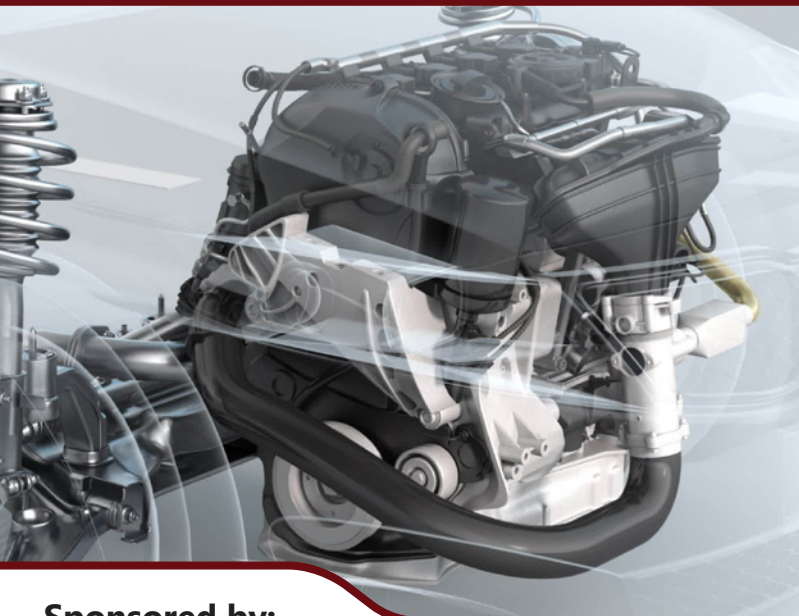
Final Program



In-Person September 29 and 30, 2021



Sheraton Detroit Novi Hotel - Novi, MI USA



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ARKEMA
INNOVATIVE CHEMISTRY

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7:30 a.m. Registration, Networking and Continental Breakfast

8:30 a.m. Welcome and Introductory Remarks
*Mr. Sean Osborne, Vice President
The ITB Group*

Battery Thermal Solutions

8:45 a.m. Thermal Management System Design Using the Cell Cooling Coefficient
*Research Associate, Research Fellow, and Reader in Mechanical Engineering
Imperial College London*
The Cell Cooling Coefficient metric defines a lithium-ion battery cell's ability to be thermally managed and quantifies the temperature gradient expected across the cell due to internal heat generation. Imperial College London investigates battery cell designs and effects on thermal transfer, including how cell geometry can impact the Cell Cooling Coefficient. Research results show how surface cooling limits cell performance, and how thermal design changes can improve battery pack safety and energy density.

9:15 a.m. Engineering the Thermal and Safety Challenges in Next-Generation Battery Packs
*Application Engineering Manager
NeoGraf Solutions*

Thermal management improvement is a key factor in extending electric vehicle driving range and achieving faster charge rates. In addition to improving charge rate and energy density, graphite heat spreaders make battery packs smaller and lighter. This presentation will show how flexible graphite heat spreaders reduce battery pack thermal management material thickness by half, and weight by one third, compared to aluminum.

9:45 a.m. Changing BEV Thermal Systems
*Sean Osborne, Vice President
The ITB Group*
This presentation will highlight key thermal system cost and performance challenges for BEVs plus solutions being developed over the next ten years. Changes in thermal system architectures and integration will be presented. Additionally, battery cell and pack thermal system design changes will be explored as the industry moves toward solid-state chemistries and rapid charging capability.

10:15 a.m. Networking Break
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Material Innovations

11:00 a.m. Advances in High Performance Thermal Management
*Thermal Technology Leader
W.L. Gore*

This presentation will highlight advanced ultra-thin thermal insulators, heat spreading composites, as well as commercial electronic component application examples. A high-level roadmap will be shared, highlighting the potential automotive technology applications such as batteries, power electronics and other high heat generating components for new vehicle architectures.

11:30 a.m. Engineering Plastics Developed for EV Thermal Management System
*Senior Application Development Engineer
DSM Engineering Materials*

Vehicle drivetrain electrification brings unique challenges and opportunities for thermal management system material selection. This presentation will provide a perspective for engineered plastic material selection. Additionally, the latest DSM PPS material developments for EV thermal management systems will be reviewed. A PPS material performance update will include insights for coolant system application engineering.

12:00 p.m. New Approaches to Material Selection and Heat Stabilization for Future Powertrains
*Market Segment Manager, Automotive Powertrain
BASF Corporation*

Transformation from pure ICE to electric propulsion challenges the conventional approaches for material selection and positioning of engineering plastics. How can the diverging material requirements for ICE downsizing, and new requirements for hybrid and electric propulsion systems be managed? This presentation will explore a new approach in heat stabilized polyamide 6 solutions that bridges this divide.

12:30 p.m. Lunch

1:45 p.m. Solutions for Thermal Management Systems in E-Mobility

Transportation Marketing Manager

Solvay Specialty Polymers

Electrified vehicles, particularly full electric vehicles, have challenging thermal management requirements. The unique chemical, electrical, and thermal environments of electric vehicles must be considered when designing thermal system components. This presentation discusses materials used in electrified vehicle thermal systems with an emphasis on electrified pumps, electrified valves, and coolant lines.

3:45 p.m.

**Networking Break
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TI Fluid Systems

4:15 p.m.

Heat Pumps: Challenges in Design, Operation, and Controls

CTO and Thermal Systems Lead

CSEG

Heat pumps systems are becoming common in electric vehicles to reduce cabin energy consumption and increase vehicle range in cold conditions. However, heat pump systems have complicated operation with performance and cost challenges. CSEG's work quantifies the impact of the challenges using a physics-based system model. The model quantifies energy savings and identifies the right operating zones for system components. Additionally, this integrated physics-based model and control system enables component operating point optimization and development of a feed-forward control system for optimal performance.

4:45 p.m.

Electric Actuators for Expansion Valves

Technical Specialist, Business Development Manager

Moving Magnet Technologies

Stricter vehicle CO₂ regulations and increasing electric vehicle range require more efficient solutions. Precise control of the refrigeration loop enables better vehicle efficiency. A new generation of actuator, Electronic Expansion Valves (EXV), has progressively been replacing purely mechanical Thermostatic Expansion Valves (TXV). A new linear EXV solution has been designed based on non-parallel gears to achieve the high force density needed/required for high flow or to reduce the size of low flow valves by drastically reducing electric motor size.

5:15 p.m.

Closing Remarks and Cocktail Hour

Waste Heat and Fluid Systems

2:15 p.m. Cooling System Component Design for Efficiency and Reliability

CEO

Advanced Test & Automation

This presentation explores successful and unsuccessful thermal component designs. Key attributes will be highlighted using real-world test data at corner case conditions (such as -40C, pulsation and cavitation). Pump, valve, and heat exchanger design decisions will be compared in a case study format. Thermal design, innovation and validation engineers will benefit from an overview of key issues and opportunities.

2:45 p.m. New Integrated Thermal Manifold Assemblies for EVs

Global Director, Thermal Products Advance Technology

TI Fluid Systems

An innovative Integrated Thermal Manifold assembly for EV coolant fluid management will be presented. The design is a one-piece, light-weight, blow-molded plastic manifold which optimizes complex line design and replaces multiple line assemblies for heating and cooling of next generation EVs. This approach has significant OEM value of improved flow performance for efficiency gains, lower part count for sub and final vehicle assembly, lower weight, and reduced tooling cost.

3:15 p.m. Quantifying Uncertainty from Design Concepts to Manufacturing for Thermal Components

Director

Kepstrum

This presentation will describe analytical algorithms to understand design limits and avoid product failures. Analytical models are more effective than traditional specification-based

8:00 a.m. **Registration, Networking and Continental Breakfast**

9:00 a.m. **Welcome and Introductory Remarks**
Dr. Joel Kopinsky, Managing Director & Co-Founder
The ITB Group

Innovations in Cooling Lines

9:30 a.m. **Elastomeric Performance When in Contact with FR Plastics and in EV Coolant(s)**
NA Technical Service Specialist
-Vamac® and Market Development Manager
DuPont

The transition from internal combustion engines to include BEV/EV/Hybrid vehicles has altered material requirements. One trend is the need for high CTI (Comparative Tracking Index) resins to manufacture high voltage connectors including miniaturization that must be flame retardant rated. Changes in these plastic based components leads to the demand for elastomeric solutions that have excellent sealing capabilities but are also compatible with NHFR resins.


10:00 a.m. **Material Solutions for ICE & EV Cooling Line Applications**
Business Development Engineer
Arkema

A broad and unique portfolio of long-chain polyamides (LCPA), including PA 11, PA 12 and others, has been developed for under-the-hood applications. These LCPAs offer superior long-term thermal and hydrolysis resistance, cold temperature impact performance, flexibility, and zinc chloride resistance. Specific grades have been formulated to meet the demands inside and outside the battery pack as well as near the engine and other high temperature routing environments.

10:30 a.m. **Plastic Multilayer Tubing for Cooling Lines: Efficient Solutions for Current and Novel Powertrains**

Senior Business Development Manager
Evonik

Globally the share of plastic solutions for cooling lines has been increasing over the past few decades based on weight, packaging and economic benefits. Originally monolayer tubing solutions were predominantly used but now multilayer tubing solutions are playing the major role. The combination of the performance of different materials in one multilayer provides higher performance and competitiveness. This trend has been further accelerated with the introduction of electrified powertrains.

11:00 a.m. **Networking Break**  **TI Fluid Systems**
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11:45 a.m. **KEYNOTE PRESENTATION**

Market Trends and Developments Driving the Future of e-Mobility
CEO

BASF Toda America

A key driver of the e-mobility market is battery performance, which in turn depends on the cathode active material used to make the battery. As a leading cathode active material supplier to battery producers, BASF has unique insights into this fast-changing market. This presentation highlights BASF's view of the key market trends and developments/materials for vehicle electrification. In addition to the global perspective, a regional view of opportunities and challenges with North American value chain development will be discussed.





Innovations in Powertrain Components

12:30 p.m. New Electronic Methods of Quick Connector Verification

Fluid Carrying Systems Regional Director, Americas

TI Fluid Systems

With the increasing complexity of vehicle systems, the number of critical fluid connections is growing rapidly. To minimize warranty and enhance safety, a new 'operator independent' electronic connection verification solutions for a wide range of quick connector (QC) designs has been developed. These optical and RF-based systems confirm joint integrity with options for traceability and automated reading.

1:00 p.m. High Aspect Ratio Graphites for Light-Weighting

Field Application Engineer Polymers

Imerys Graphite & Carbon

The benefits of high aspect ratio graphites for light-weighting and greater formulation flexibility will be showcased. For automotive thermal management, these provide high thermal conductivity at low loadings. They exhibit high electrical conductivity which makes them light-weighting additives of choice for EMI shielding. Their high thermal conductivity is beneficial to remove the frictional heat in lubrication and wear applications.

1:30 p.m. Lunch

2:30 p.m.

Innovative Motorbike Air Box

Manager Product Portfolio Americas

Roechling Automotive

A motorbike air box with movable trumpets is described. This includes a full plastic application with integrated components that include a resonator, a filter box and an intake manifold.

3:00 p.m.

Fast Track Development of Automotive Degas (Surge) Tank via Hybrid Weld Techniques

Senior Application Development Engineer

BASF

Advanced Product Manager Fluid Systems

ABC Technologies

This presentation will describe the fast-track design development, and global level support for launching an automotive degas tank. Extensive knowledge and experience on various joining techniques including a global ULTRAJOIN team umbrella were utilized for this launch. During the design phase, CAE Simulation Techniques and Burst Failure Index were relied upon. This presentation will describe the hybrid welding techniques (vibration welding/IR pre-heat) for developing the surge tank application.

3:30 p.m.

Closing Remarks

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Presentations from both conference days will be made available to conference attendees two weeks after the conference has concluded AND when provided permission by the speaker

Exhibitors:

■ Arkema

■ Evonik

■ Kepstrum

■ Kuraray

■ TI Fluid Systems

■ Zeon Chemicals

Developments in Thermal Management and Plastic Powertrain Components 2021 - List of Sponsors and Exhibitors

Arkema

Arkema will proudly attend, sponsor and present at the ITB Group's Developments in Thermal Management and Plastic Powertrain Components 2021 Conference. Arkema is a leading material supplier to the automotive market. The High Performance Polymers group is constantly advancing in extrusion and injection molding thermoplastic materials for thermal management in under-the-hood and cooling system applications. Our solutions feature an outstanding balance between performance, cost and secure supply, always anticipating the new trends and constraints of the automotive market.

Contact: Desiree Maurer, Business Development Engineer

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BASF

BASF is the #1 chemical supplier to the automotive industry and a leader in composites innovation. We have solutions that can address trends in electromobility, lightweighting, NVH to name a few. We can do this because we have the most extensive product portfolio in the automotive industry. Contact us to learn how we can help you drive forward solutions in thermal management.

Contact: Lenar Abbasov, Market Segment Manager, Powertrain

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EVONIK Corporation

Evonik is one of the world's leading specialty chemicals companies for over 50 years. Evonik's high-performance polymers portfolio encompasses its range of VESTAMID® polyamides, which have been the material of choice in the automotive industry and used extensively in fluid handling systems. Worldwide, VESTAMID® polyamide 12 and polyamide 612 are the most widely used polyamides for automotive tubing in applications such as fuel, airbrake, system cooling etc. Evonik's roughly €450 million investment increases the company's total capacity for polyamide 12 by over 50 percent between now and 2022. With the largest PA12 capacity in the world and innovative tubing solutions Evonik continues to invest and retain its position as one of the leading solution provider for the Automotive Industry.

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TI Fluid Systems

Global automotive manufacturers turn to TI Fluid Systems to develop and produce award-winning, industry-leading automotive fluid systems. For nearly 100 years, TI Fluid Systems has provided its technology to vehicles around the world. With 107 manufacturing locations in 28 countries, our strength lies in our ability to creatively meet the ever-changing needs of the global automotive industry.

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Kepstrum

Kepstrum is an engineering software company based in Toronto, Ontario. Our DNA Structured Platform (DSP) empowers advanced engineering teams to generate analytical life models without data using extensive multi-physics libraries in hydrotronics, mechatronics, electronics, drives and controls. Our focus is rapidly changing, high volume industries with critical end-of-line.

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Kuraray America Inc.

Kuraray is a globally recognized specialty materials company that creates quality, sustainable solutions that strengthen products throughout a diverse range of industries. As part of Kuraray's ongoing commitment to the automotive industry, in May 2019 we opened an office in Novi, MI. Kuraray's GENESTAR™ resin, a high heat resistant polyamide (PA9T), is particularly suited for tough automotive applications requiring heat resistance, chemical resistance, low wear/low friction, and even excellent electrical insulation properties.

Contact: Brad Lovett, Application Development Manager
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Zeon Chemicals L.P.

ZEON Makes the Future Today Through the Power of Chemistry

Producing innovative elastomers since 1950, ZEON is a world leader in specialty elastomers, polymers, and chemicals. Zeon Corporation employs over 3,000 people worldwide, with global headquarters in Tokyo and regional headquarters in the United States, Singapore, and Germany.

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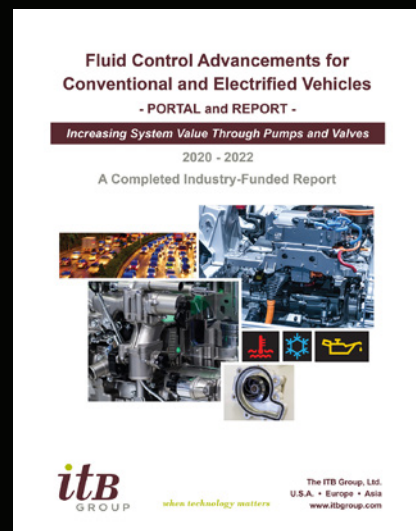
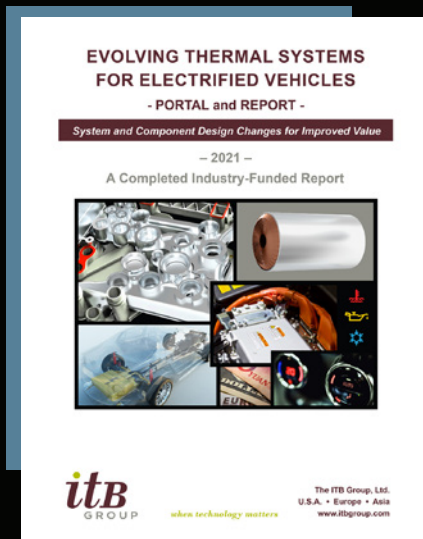
The ITB Group

The ITB Group was established in 1992 with a simple premise: to bridge the gap between developing a suitable technology and building a successful business. We are a specialized consulting firm with strategy, data, and insight for energy storage, powertrain, thermal management, body, and cabin evolution.

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ITB Fluid Control and Thermal Management Reports



Contact The ITB Group for more information