

Automotive Fuel Systems



2008



Source: Inergy Automotive Systems

Final Program Thursday, March 6, 2008

Ford Motor Company Conference and Event Center
Dearborn, Michigan USA

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MORE PLASTICS WITH MORE PERFORMANCE



ITB's Ninth Annual Fuel Systems Forum

Recently, my colleague Mitra O'Malley remarked:

"These are *Hard Times* and it's no Charles Dickens novel"

It seems that storms are approaching us from all directions:

- Concerns about the global economy, and on a smaller scale, the Michigan economy, are no longer merely fears but reality. Drive through any local subdivision to find out or read the Chapter 11 listings.
- Global warming concerns are no longer merely scientific theories. Countless examples of global warming effects can be found from the warming of the oceans, to the migration of Edith's checkerspot butterfly in California, to the increasingly fragile state of South Africa's beautiful fynbos plants, often referred to as the Protea.
- Oil prices have reached \$100/barrel on several occasions.

Transportation has been estimated to account for about a third of greenhouse gas emissions. *While transportation gas emissions are a huge problem, their reduction represents opportunities for innovation and the potential for commercial success.* The automotive OEMs have started to latch onto these opportunities, starting most notably with the first introductions of the Honda Insight and Toyota Prius. Now GM is using the opportunity as one way to turn the company around. Just recently, Bob Lutz at 75 years old, was quoted in Newsweek magazine concerning General Motors' upcoming Volt vehicle:

"This is like JFK's call for the moon shot, I want to stick around to see the Volt come to market. Then I'll pack it in around 80."

There are expectations for upcoming OEM plug-in hybrids with reputed mileage ranges of 100 mpg. (Aftermarket conversion kits are already available.) Excitement over low emission vehicles will increase yet further over the next few years as the Automotive X PRIZE, an initiative by the X PRIZE Foundation, gets further media attention (<http://auto.xprize.org>). We now hear about start-up electric vehicle OEMs such as Tesla Motors and ZENN who are spurring the traditional OEMs to do something real. In fact, it was Tesla who woke Bob Lutz up to the fact that a speedy electric sports car is not unreasonable.

There have been significant reductions in evaporative fuel emissions from 2 grams/hour to 0.5 grams/24 hours for PZEV vehicles. Over the last eight years, ITB conferences have highlighted a number of new technologies used to enable these reductions. Today we are witnessing likewise improvements in diesel emissions as diesel-powered vehicles adopt new technologies such as particulate filters (DPF) and selective catalytic reduction (SCR) systems for reducing nitrous oxide emissions. Engine complexity continues to increase especially as high pressure, and perhaps low pressure, exhaust gas recirculation systems are further developed and fuel injection spray processes are fine tuned.

Today will be ITB's ninth Automotive Fuel System Forum. Welcome! Throughout the day and in visiting the different exhibits and speaking with your peers from around the globe, I am sure that you will hear about some of the exciting developments happening as a result of today's challenges of reducing cost, improving vehicle fuel efficiency and reducing emissions.

"Successful, long-lasting companies regularly redefine themselves. Environment-inspired innovation offers companies a new and exciting way to find fresh expressions for their capabilities."

Esty and Winston

Dr. Joel Kopinsky
Managing Director
The ITB Group



Automotive Fuel Systems 2008

AGENDA

Please note that conference proceedings are not available

7:00 a.m. -
8:15 a.m. **Registration and Continental Breakfast**

8:15 a.m. **WELCOME and OPENING REMARKS**
*Dr. Joel Kopinsky, Managing Director
The ITB Group (U.S.A.)*

Fuel Tank Innovations

8:30 a.m. **TSBM™ (Twin Sheet Blow Molding) - A New Production Process Optimized for a Wide Range of Architectures and Evaporative Emissions**

Inergy Automotive Systems (Belgium)

Plastic fuel tanks have to face increasingly severe emission regulations applicable to large production volumes. The TSBM tank technology combines PZEV performance with the integration of a large diverse set of components. By releasing the process constraints, this technology provides more freedom for fuel tank design. TSBM allows a wide range of architectures to be covered, embedding for instance, large modules. Validated and implemented into serial production this year, TSBM will be applied on new programs to address PZEV and high performance specifications.

9:00 a.m. **Barrier Characteristics of EVOH when Exposed to Ethanol and Diesel Fuels**
*Kuraray Co., LTD, EVAL Division (Japan) and
Kuraray America, EVAL Americas (U.S.A.)*

Laboratory data will be presented showing the permeation characteristics of multilayer structures containing EVOH when exposed to ethanol fuels. Results will be presented for both an industry standard grade and a new formulation EVOH designed for elevated ethanol levels. The second part of this presentation will focus on hydrocarbon emissions related to diesel fuel systems and multilayer structures. Data will be presented that shows the permeation characteristics using a variety of diesel and biodiesel fuels. Both parts of the presentation will discuss SHED tests results.

9:30 a.m. **Magnetic Sealed Level Sensing Unit for Fuel Systems**
TI Automotive (U.S.A.)

High content ethanol fuels require specific attention to protect the fuel sensing unit and electrical contacts from chemical degradation. An innovative design and process has been developed to protect the wiping unit from contact with fuel. Movement of a traditional float is coupled through the sealed body via a magnetic pair. Technical features are highlighted together with lessons learned from development, manufacturing and testing.

10:00 a.m. **Mid-Morning Break**

Simulation and Testing

10:30 a.m. **Carbon Canister Evolutionary Trends on On-board Diagnostics**
MAHLE Technology (U.S.A.)

A review of the methods used for vehicle on-board diagnostics for emissions control will be provided. The latest technologies will be identified along with the testing methodologies. The use of carbon canisters will be shown to maximize efficiency while minimizing cost.

10:50 a.m. **Development and Application of an Evaporation Model for an Automotive Refueling System with an Ethanol/Iso-Octane Binary Mixture**

Fluid Routing Solutions (U.S.A.)

An evaporation model for alcohol fuels is being developed. The first steps consider the fuel as a binary mixture of ethanol and iso-octane. Both experimental and theoretical methods have been developed to understand the evaporation of the binary mixture. The results have been used to simulate a refueling system.

11:10 a.m. **Gas, Vapor and Liquid Permeation Analysis Systems using Gas Chromatography**
GTR TEC (U.S.A.)

A system has been developed for determining permeation from different fuel components such as tubes, small resin tanks and gaskets. The system allows for the separation of the permeate into individual species with a qualitative and quantitative analysis.

11:30 a.m. **Fuel Tank Slosh Noise Simulation**
TI Automotive (Germany)

To-date, slosh noise solutions have been based mostly on experience together with trial and error. If the origin of the slosh noise is associated with the movement and contact of the fuel within the tank, tank designs can be improved prior to a physical part test. Cases have been developed that simulate fuel tank vibration due to fuel movement and analyze the frequency response on the tank wall to predict slosh noise.

11:50 a.m. **Lunch**



Alternative Fuels and Material's Resistance

- 1:00 p.m. Life Cycle Assessment of Biofuels — Well-to-Wheels Analysis**
Argonne National Laboratory (U.S.A.)
The U.S. has positioned itself as the world's leading user of biofuels, yet it needs about six times today's production to reach proposed 2017 levels. Argonne's life cycle assessment tool, GREET, may be used to assist decisions about biofuels by providing energy and emission estimates for fuel production pathways.
- 1:30 p.m. The Permeation Effect of Ethanol Containing Fuels on Fluoropolymers**
Dyneon (U.S.A.)
The permeation of fluoropolymers was determined using cup and weight loss methods. Additional techniques, including the determination of vapor pressure, are discussed. Weight and volume changes of materials are considered together with the crystallinity index and glass transition temperature.
- 1:50 p.m. HDPE with Biodiesel in Plastic Fuel Tanks**
LyondellBasell Industries (Germany)
New HDPE resins based on patented chemical technology have been developed that can accommodate emerging biodiesel fuels. Test data shows a significant increase in chemical resistance to biodiesel compared with current HDPE grades.
- 2:10 p.m. High Performance Barrier Materials for Fuel System Components**
Solvay Advanced Polymers (U.S.A.)
Higher performing materials are required to meet the challenges of emissions, temperature and the growing list of global fuels. Aromatic nylon compounds can be used for a variety of fuel system applications.
- 2:30 p.m. Next Generation of Low Temperature Fluoroelastomers**
Solvay Solexis (U.S.A.)
With the use of a new monomer technology, new fluoroelastomers have been developed that deliver superior fuel resistance and low temperature performance.
- 2:50 p.m. Electroless Nickel Plating of HDPE and Acetal for Alternative Fuels**
Rohm and Haas Electronic Materials (U.S.A.)
Surface Activation Technologies (U.S.A.)
A process that activates a plastic material's surface followed by metallization will be described. This provides fuel system components with improved chemical resistance to biofuels, reduced permeation and a conductive surface.
- 3:10 p.m. Afternoon Break**

Component Developments

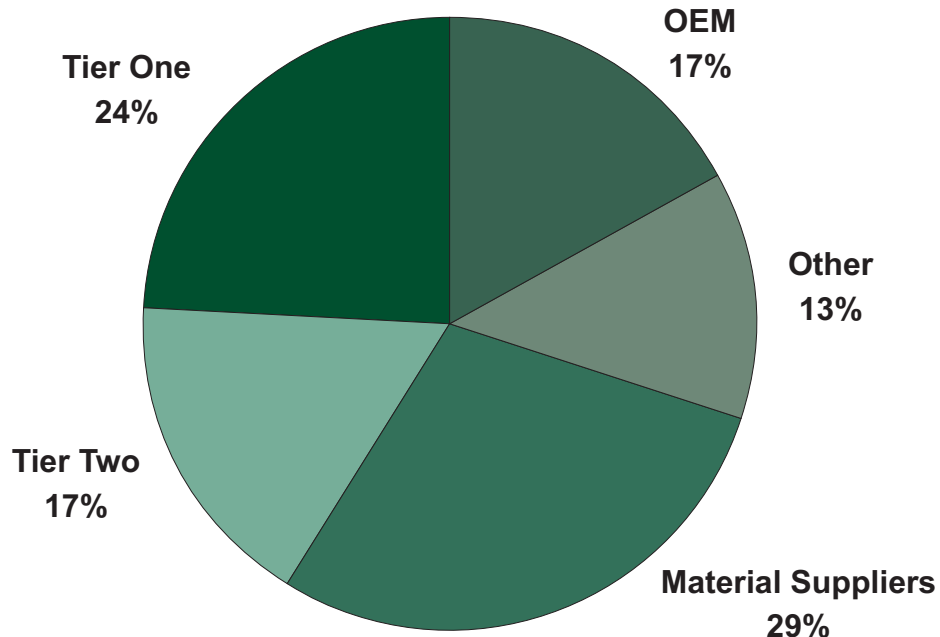
- 3:30 p.m. Tomorrow's Integrated Urea SCR System for the Passenger Car Market**
Inergy Automotive Systems (U.S.A.)
A first generation urea SCR system designed for 2008 applications offers excellent results in terms of performance and robustness. Performance has been demonstrated under hot and cold conditions. The development phase was concluded with two production and several pre-development awards. A second generation system, featuring fully integrated SCR components, is now being developed for 2010 applications.
- 4:00 p.m. Automatic Water Separation of a Diesel Fuel Filter System**
MAHLE Technology (Germany)
Water separation is an important task for diesel fuel filters. A new automatic water disposal system that does not need any service or maintenance by the driver of the vehicle has been developed. The filter module detects when the separated water needs to be released and then disposes the high quality water into the environment.
- 4:30 p.m. Purge Efficiency and Purge Boosting in EVAP Systems with Low Air Volume Purge**
Delphi (Poland)
Reduction of carbon dioxide emissions can be achieved if more efficient engine solutions such as turbocharging, direct injection and hybrid engines are used. However, low purge conditions are typical for such systems which complicates the control of evaporative emissions. An innovative approach is presented that comprises purge boosting together with a hydrocarbon sensing technique. A feed forward algorithm is used for engine fueling to improve purge control and engine combustion conditions.
- 5:00 p.m. Fuel Line Compatibility with Biofuels**
Cooper-Standard Automotive (U.S.A.)
Biofuel use is increasing and brings with it questions about material compatibility. There is a significant body of knowledge regarding ethanol and methanol compatibility with fuel system components. Biodiesel material compatibility is less well understood. This presentation will outline the standards and issues relevant to validating fuel line materials. Analyses will be shown regarding specific fuel line constructions which have been demonstrated to be compatible or not compatible with different types of biofuels.
- 5:30 p.m. Closing Remarks**
LyondellBasell Industries Cocktail Reception

Exhibitors

Alfmeier
Arkema
Asahi Kasei Plastics North America
Bekaert Fibre Technologies
Bulk Molding Compounds
Chevron Phillips
Cooper-Standard Automotive
CORELCO
Eaton
EVAL Company of America
Expert
Foamex Technical Products
GTR TEC
Hyperion Catalysis

Ideal
Inergy Automotive Systems
LyondellBasell Industries
Norma Products
Precix
RayConnect
RTP Company
Solvay Advanced Polymers
Solvay Solexis
Stant Manufacturing
Strategic Alliance for Steel Fuel Tanks
Surface Activation Technologies
Ticona Engineering Polymers

Estimated 2008 Attendance Breakdown



Consulting Expertise

Application and Market Development

Evaluate Product Strategies
Develop Marketing Plans
Identify Key Entry Points and Follow-up Requirements

Business Strategy

Identify Core Capabilities and Weaknesses
Evaluation of Manufacturing Facility and Functions
Competitive Environment
Customer Perceptions

Technology Assessment

Manufacturing Economics
Strategic Innovation Clinics
Design
Materials and Processes

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