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Now in its 16th year, the show is the world's leading automotive engineered polyolefins forum featuring 60+ technical presentations, keynote speakers, networking receptions, & exhibits that highlight advances in polyolefin materials, processes, and applications technologies as well as a growing range of thermoplastic elastomers (TPEs) and thermoplastic vulcanizates (TPVs). This year's show will be held Oct. 5-8, 2014 at the Troy-Marriott (Troy, Michigan) in the suburbs of Detroit.

PRESENT TO THE LARGEST GROUP OF DECISION MAKERS IN AUTOMOTIVE ENGINEERED POLYOLEFINS

The SPE TPO *Automotive Engineered Polyolefins Conference* typically draws over 600 attendees from 20 countries on 4 continents who are vitally interested in learning about the latest in rigid and elastomeric TPO as well as TPE and TPV technologies. Fully a third of conference attendees work for a transportation OEM, and roughly 20% work for a tier integrator. Few conferences of any size can provide this type of networking opportunity or connect you with such an engaged, global audience vitally interested in hearing the latest olefin advances.

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SPE DETROIT CONFERENCE.

TPO AUTOMOTIVE ENGINEERED POLYOLEFINS

Welcome to the 2014 SPE SPE Global TPO Conference

Since 1998, the Society of Plastics Engineers (SPE®), leading global OEMs and Tier Suppliers, as well as the TPO supply chain have pooled their resources to create the ***SPE® Automotive TPO Engineered Polyolefins Global Conference***, a dynamic, interactive, and cost-effective learning experience. The Conference highlights the importance of ***rigid and flexible polyolefins (TPOs) as well as a growing range of thermoplastic elastomers (TPEs) and thermoplastic vulcanizates (TPVs)*** throughout the automobile and in other forms of ground transportation.

The event has become the ***world's leading automotive polyolefins forum*** and typically draws over 700 key decision makers and some of the world's foremost authorities on transportation polyolefin applications, economics, and market trends. As such, it provides excellent networking opportunities with key members of the automotive TPO, TPE, & TPV supply chain, and the opportunity to learn about designing ***lighter, less costly automotive components*** using the latest technologies and applications for these versatile materials.

The conference draws global participants from across the entire transportation polyolefin value chain. Historically, 30% of attendees have indicated they worked for a transportation OEM; 20% said they worked for a tier integrator / molder, and the remaining 50% said their employer was a materials or reinforcements supplier, academic institution, laboratory, or that they were a consultant or member of the press.

To help attendees better understand current and emerging trends in interior, exterior and underhood applications we offer several technical sessions including Advances in Automotive Polyolefins, Rigid Polyolefin Compounds, Bio-Based Polyolefin Materials, Interior Soft Trim & Sealing Systems, Surface Enhancements, Lightweighting Polyolefin Parts, Adhesives & Coatings for TPOs and Thermoforming of TPO Materials.

In addition to the 8 technical sessions there are 5 keynote speakers this year covering topics from The Global Automotive Outlook, Impact of Shale Gas on the Industry, Meeting Current and Future Demands and ending with Future Trends in Vehicle Efficiency.

Thank you for attending this year's conference. We invite all attendees to visit our exhibitors and enjoy one on one dialogue with the presenters, exhibitors and your industry colleagues. We appreciate your comments and feedback as we continue to strive to meet your needs.

Jeff Valentage
Co-Chairman
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Bill Windscheif
Co-Chairman
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SPE TPO AUTOMOTIVE ENGINEERED POLYOLEFINS DETROIT CONFERENCE

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2014 Keynote Speakers

John Sousanis

Director-Information Content and Presentation
WardsAuto.com

Fuel Economy: Getting to 2025 as Efficiently as Possible

John Sousanis has worked for WardsAuto for nearly two decades, and has been instrumental in building the company's current offering of information products serving the needs of automakers, suppliers and professional industry observers around the world.

He is instrumental in the creation of WardsAuto's US Sales forecast and oversees all of the company's forward-looking automotive analysis offerings. John is the driving force behind the award-winning WardsAuto.com premium service, and he regularly speaks at gatherings of automotive analysts and other professionals to offer his unique take on where the industry is headed.

Kurt Aerts

Vice President Global Supply Chain
ExxonMobil Chemical Co.

The Changing Role of North America in Global Chemical Production Due to Shale Gas

Kurt Aerts is vice president of the Global Supply Chain organization of ExxonMobil Chemical Company in Houston, Texas. Mr. Aerts joined the company in 1992 as an engineer at the Antwerp Polymers Plant in Belgium, and moved to ExxonMobil Chemical's European headquarters in Brussels in 1995 as a polyethylene market planner. From 1998 to 2001, he served as a feedstock coordinator and later as feedstock and supply manager for the company's Basic Chemicals operations in Europe. He subsequently held various roles in polyethylene sales, business planning and marketing in the Netherlands, Houston and Belgium. In 2006, he moved to Shanghai, China, as the company's Asia Pacific regional polyethylene/polypropylene sales manager. He returned to ExxonMobil Chemical's headquarters in Houston in 2009 as a senior advisor in the Planning & Business Development organization. He was named vice president of the company's global Adhesion Industry Business in 2010. Following an assignment to lead a team to establish a global supply chain organization, he was appointed to his current position in 2013. Mr. Aerts received a master's degree in chemical engineering from the University of Leuven inBelgium. He is married, with two daughters, and enjoys spending time with family, traveling, exercising and reading.

2014 Keynote Speakers

Bart Bowser

Global Product and Asset Director Dow Elastomers, Electrical & Telecommunications

The Dow Chemical Co.

North America Plastics Industry Revival Fueled by Shale Gas

Bart Bowser is the Global Product and Asset Director for the Elastomers, Electrical & Telecommunications business at The Dow Chemical Company, overseeing Dow's assets and developing the long term asset strategy for the business. He also oversees the global product management team which is responsible for the daily operations of the business.

Bowser joined Dow in 1987 as a Plastics Sales Representative. Throughout his 26 years at Dow, he has worked in several business units, including Engineering Plastics, Specialty Films, Polyurethanes & Systems, and Dow Elastomers. He has held a variety of Commercial roles including Sales Management, Global Marketing, New Business Development, and Product and Asset Management. He joined the Dow Elastomers team in 2005 as North American Product Director. He then moved into the Global Product Director role for Elastomers in 2008 and added Electrical & Telecommunications Products & Assets in 2012.

Bowser holds a Bachelor of Science degree from Purdue University in West Lafayette, Indiana and he and his wife reside in Midland, Michigan.

Sergey Vasnetsov

Senior Vice President Strategic Planning & Transactions, Global Polypropylene Compounds

LyondellBasell

Materials Innovation - What it Takes to Meet the Current & Future Demands of the Global Automotive Market

Mr. Vasnetsov leads a team responsible for corporate strategy, capital allocation (CapEx, M&A, JVs), Investor Relations, competitive intelligence & benchmarking and special projects. In addition, he is responsible for the global polypropylene compounding business serving automotive and consumer durable markets.

From 1996 to 2010 Sergey worked at several leading investment banks, including Barclays and Lehman Brothers. He started his career at Union Carbide in 1990.

He graduated with a Masters of Science degree and was a George Soros Scholar at Oxford University (UK); later he earned MBA degree from Rutgers University.

2014 Keynote Speakers

Doug Pickett
Engineering Group Manager Product Development
General Motors Co.

Future Trends in Vehicle Efficiency - An Opportunity or Challenge to Future Growth of TPOs in Vehicle Interiors

Doug Pickett is currently an Engineering Group Manager for General Motors, LLC Product Development with responsibility for the development, selection and application of materials across vehicle interior components and systems.

Prior experiences over a 29 year career at GM include: development of automotive textile materials, seat system engineering release and materials engineering for vehicle exterior materials applications.

Doug has a B.S. in Textile Chemistry from North Carolina State University and M.B.A from University of Michigan.

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Sumitomo Chemical and our Sumika Polymers automotive group supports the global auto industry by creating innovative products that push the technology envelope. But we don't stop there. Our facilities located in every major region, support local economies, preserve the environment and focus on problems facing society.

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Interior Soft Trim: Skins and Foams

Session Co-Chairs

Bob Eller
Robert Eller Assoc. LLC
David Helmer
General Motors

Challenges for TPOs and Polyolefins in Automotive Interiors

Bob Eller
Robert Eller Associates LLC

Interiors challenges for TPOs and polyolefin compounds include:

- Mandated fuel economy requirements and greenhouse gas (GHG) emissions
- Globalization and high volume global platform implications
- Increased esthetic requirements
- Demand for and valuing of renewable solutions
- Insistence of global sourcing requirements
- Increased acoustic performance

This paper examines how technologies meet these current and anticipated future challenges.

Comfort Aspects for the Automotive Interior

Dr. Juergen Buehring
Benecke-Kaliko AG

Wellbeing in the automotive interior is commonly associated with aesthetic aspects, but haptics and other sensoric parameters such as smell and emissions are also defining factors. The market trend for automotive interior surface materials is strongly moving in the direction of softer materials and haptics.. In this presentation the variables that influence the softness of TPO foam laminates are discussed including the part specific restriction of the use of different foam types.

Advances in Synthetic Leather Interior Trim

Walter Robar
Haartz Corporation

Consumers are becoming more environmentally conscious, while maintaining a desire for a handcrafted appearance. To meet this demand, Haartz has engineered Alura® an automotive TPO synthetic leather, with a surface that feels and looks like real leather. Alura® has a unique construction with significant chemical resistance, enhanced physical properties and low VOCs. Produced via extrusion (a low energy process), Alura®, is a cost effective and environmentally friendly solution for any hand wrapped interior trim application

CAE–Assisted Design of Instrument Panels: Material Testing and Modeling for the Prediction of Laser Scoring Line Behavior in Airbag Deployment

Davide Brancadoro, Donato Marino
Fiat Group Automobiles

Mauro Olivero,
Maurizio Servetti Centro Ricerche Fiat

Massimo Nutini*, Mario Vitali
LyondellBasell

The engineering of the airbag door system is one of the most complex aspects in the instrument panel design phase: seamless systems are increasingly used. These systems include a tear seam, which may be obtained through laser scoring. Currently, numerous and time consuming experiments on full scale components are required to validate. Numerical simulation can provide benefits, allowing a reduction of experimental testing. A methodology for predicting the behavior of the laser scoring line is proposed, with a benchmark case on a variety of scoring profiles.

Interior Soft Trim: Skins and Foams

Ultra-High Flow TPV SUNVIEO™ for Automotive Interiors

Yukinori Nakajima
Asahi Kasei Chemicals Corporation

Asahi Kasei Chemicals has recently developed a family of innovative thermoplastic vulcanizates (TPV). This material overcomes the disadvantages of conventional thermoplastic elastomers, and has demonstrated outstanding properties such as excellent fluidity and mechanical properties, as well as the enhanced haptic feels. As a result, advancements in ultra-high flow TPV technology have enabled the replacement of slush molded instrument panel skins with injection molded. The paper will show the details of advantage and possibilities of SUNVIEOTM

Introduction of Highly Functionalized TPE (ESPOLEX® 7000 and WT537)

Hitoshi Kageyama, Ryosuke Kurokawa, Nobuhiro Natsuyama, Takeshi Tominaga*
Sumitomo Chemical Co.,Ltd.

ESPOLEX® 7000 series products are a brand-new series of fully cross-linked TPEs ranging in hardness from 65 Shore A to 95 Shore A, showing superior compression set and oil resistance, for use in automotive underhood applications, and sealing applications.

ESPOLEX® WT537 is a halogen-free flame resistant eco-friendly TPE for automotive and electrical products. WT537 is a cutting-edge product achieving good softness and flame resistance equal to V-0 without the use of halogen compounds.

New TPE's Based on Multiple Elastomeric Phases

Dr. Richard L. Rabe*, Bryan Kazmer*
Vi-Chem Corp

Traditional TPE's consist of domains of elastomeric material dispersed in a continuous thermoplastic matrix. By combining two or more elastomer phases in a "hybrid" TPE we are able to broaden the compound design space and achieve property combinations previously unattainable. We describe two examples of hybrid TPE compounds that developed to balance rheological and physical properties permitting designs which meet OEM and functional demands with rheological properties permitting processing to achieve cosmetic and productivity demands.

Expanded Thermoplastic Polyurethane Beads: Thermal, Foaming and Sintering Behaviors

Nemat Hossieny, Dr. Chul B. Park*
University of Toronto

In this study, a lab-scale autoclave system was used to produce expanded thermoplastic polyurethane (E-TPU) bead foams with CO_2 as blowing agent. The foam morphology was controlled by utilizing the phase-separated hard segment (HS) domains in the TPU microstructure as cell nucleating agents. Furthermore, to provide insight into the mechanism behind the sintering of the TPU beads, a lab-scale steam-chest molding machine was used processing parameters were examined and discussed.

Interior Soft Trim: Skins and Foams

Mistrocell®, a New Effective Nucleating Agent in TPO Foamed Formulation

Frederic Jouffret, Gilles Meli, Parashar Davé*
Imerys

With implementation of stricter fuel economy standards, light weighting trends in automotive continue to be an important area of research. Talc has been used as functional reinforcement filler in thermoplastic polyolefin (TPO) for several years. In this study we evaluated the nucleating effect of talc in polyolefin foam formulations. Several parameters such as talc morphology, particle size distribution, mean particle size, are assessed using MuCell® technology.

Next Generation of New and Improved Soft Foams for Automotive Interiors

Jesse Baldwin
Toray Plastics America

Current soft touch automotive interior trim is achieved via use of bilaminates of TPO or PVC skin bonded to crosslinked polypropylene foam formed into door panels, instrument panels, and other components. Fabrication can be via vacuum forming, low pressure molding, compression molding, or hand wrapping over a substrate. In 2011, Toray Plastics brought to market ToraSoft®, the first truly soft touch polypropylene foam with exceptional softness and tactile feel. The next generation of soft foam with enhanced toughness, shear strength, moldability, and foam adhesion to TPO while maintaining soft feel and haptics will be discussed.

New PP Development Combined with Advanced Foaming for State of the Art Light Weighting Developing Materials for Automotive Industry – Foamed Applications

Markus Kralicek
ENGEL

Michael Fischer
Borealis Polyolefine GmbH

Borealis will introduce new PP material overcoming the challenges in material design to provide excellent mechanical properties for foamed applications produced in the SGI process like an instrument panel. ENGEL presents MuCell foaming technology in combination with decompression foaming method, opening the fully volumetric filled cavity to wider clearance setting, enabling interesting weight saving potentials. Highly advanced control functions and high end two platen machinery concept are the basis supporting that method for industrialization.

Bonding Properties and Structure Between TPVs and EPDM Vulcanizates for Automotive Profile

Kobayashi Masato, Kentarou Kanae, Michio Morita*
JSR Corporation

Thermoplastic vulcanizates (i.e TPVs) are a special class of thermoplastic elastomer,produced by melt-mixing and crosslinking of EPDM with polypropylene simultaneously. Recently, TPV has been widely used in many industrial applications especially for cost reduction.

The significance of the understanding of the bonding properties between TPV and EPDM vulcanizates for Automotive profiles is increasing. We have been investigated the correlation between properties of polypropylene phase of TPV and bonding properties.

Advances in Automotive Polyolefins

Session Co-Chairs

Neil Fuenmayor, LyondellBasell
Laura Soreide, Ford Motor Co.

Advancements in Composite Structural Closures

David Lipka*,
Aaron Tenorio
Nissan Technical Center North America (NTCNA)

Composites provide weight reduction and design freedom in automotive closure applications versus traditional stamped metal assemblies. Challenges to widespread adoption of composite structures include: Recyclability of the end unit without disassembly, joining together panels, keeping up with high production volumes, limited structural strength without significant metal reinforcement, and total delivered cost. Utilizing thermoplastic olefin (TPO) resin can address many of these issues for the next generation of composite lift gates.

Elastomer Development for High Flow TPOs

Mary Ann Jones*
Dow Chemical Core R&D

Russell Barry
Dow Europe GmbH

Jim Hemphill
Dow Elastomers

The automotive market has a sustained interest in the use of plastics for reducing vehicle weight. TPOs have made large strides in processing and performance and are often the product of choice for many applications. Product developments continue to target enhanced toughness-stiffness balance, aesthetics, and processability. This presentation will focus on the role of polyolefin elastomers in the TPO formulary to achieve toughness-stiffness, while simultaneously improving mold-flow, and enabling thin-walling and lightweighting.

Development of Next Generation TPO Materials of High Mold Flowability

David Choi
LyondellBasell

This study is to provide generalized guidelines for the successful development of next generation TPO materials of high mold flowability beyond the technical limit with increasing MFR. We studied the correlations of TPO composition, rheological properties and structure development to the material flowability in a spiral flow tool.

The Challenges of Automotive Business in South America

Mariana Machado
LyondellBasell
(Basell Poliolefinas Ltd.)

As the world's seventh-largest economy, Brazil is perceived as having very promising potential for growth. However, it is important to understand that there are still many barriers and challenges to overcome. In this presentation, LyondellBasell reviews the challenges involved with doing business in Brazil and how they relate to the product development process of global compounds designed under the regional environment. Understanding them will assist in the planning and preparation which eventually will result in a more successful project.

Recycling Painted Polyolefin Parts in 2014

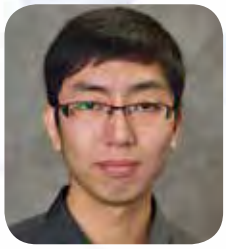
Paris K. Stetkiw
ACI Plastics

Removing paint from fascias and similar parts has changed dramatically over the last few years. Many systems previously used were not as "robust" as now. Many of our customers use MULTIPLE systems and mix these parts into their recycle stream. This can cause significant issues when we try to paint remove multiple paint systems from within a single commingled stream. We continue to be dedicated to overcoming the issues that such a commingled stream causes.

Advances in Automotive Polyolefins

Processing of Recycled Polypropylene-Clay Nanocomposites

Weijie Ren*, Krishnamurthy Jayaraman
Department of Chemical Engineering and Materials Science, Michigan State University



Degradation of performance in recycled polyolefin clay nanocomposites is typically associated with reduced entanglement density in the matrix PP and restacking of silicate nanolayers. A new approach to restoring properties and processability of recycled TPO-clay nanocomposites will be described. This involves preparing an additive that can strengthen linkages or interactions between the particle surface or edge and the compatibilizer to form a network of "physical crosslinks".

Enabling TPO to Meet New Automotive Needs

Dr. Andrea Landuzzi*, Jerry Eng, Brent Sanders, Fadi Khawam
Cytec

Thermoplastic PolyOlefin (TPO) offer many advantages over other materials, and this has led to increase their adoption in automotive applications. The industry demands TPO that exhibit excellent stability under both extreme ultraviolet (UV) and thermal conditions to ensure a long service life in any condition. To meet this need, an innovative stabilizer has been developed for TPO that provides superior UV and heat stability and exhibits very low odor, VOC emissions and fogging.

Advanced Halogen-Free Flame Retardant Technology for Polyolefins

Takahiro Horikoshi
ADEKA Corporation

The use of polypropylene based parts in automotive applications continues to grow. Recent demand to improve flame retardancy of polypropylene has increased dramatically. One of the promising ways to give flame retardancy to polypropylene is using flame retardant additives.

In order to address the deficiencies of the current systems, a halogen-free intumescent flame retardant system "ADK Stabilizer FP-2000" series has been developed for polyolefins. This paper describes the primary performance of this flame retardant.

Advanced Solutions in Haptics and Aesthetics for Automotive Applications

Linda Havermans
SABIC

Automotive manufacturers are developing and advancing new technologies, not only for light-weight solutions and enhanced safety, but also to enhance the perception of quality for the car owner. Development in interiors is increasingly focused on high scratch resistance, low organoleptics, and excellent haptics. Good paintability and high surface quality for exterior require attention, impact and stiffness should remain intact and processability should improve. This paper shares research on scratch resistance and corresponding failure mechanisms, developments towards pleasant haptics and deeper mechanisms in paintability.

Session Co-Chairs

Dr. Ellen Lee
Ford Motor Company
Susan Kozora
International Automotive Components

Greener Polypropylene Compounds for Automotive Interiors

Karen Stoeffler*, Mihaela Mihai, Minh-Tan Ton-That, Nathalie Legros
National Research Council of Canada

In this presentation, NRC will introduce greener plastics and composites having the potential to compete with petroleum-based PP compounds conventionally used for automotive applications. Compounds integrating up to 50 wt.% bio-based content and retaining good mechanical and thermal properties were developed. NRC will show how those materials can be designed to optimize cost, density and properties. Specific issues such as odor emissions and physical aging will also be discussed.

Biobased Fillers for Polypropylene for Interior Application

Ayse Ademuwagun, Joel Myers*
Hyundai-Kai America Technical Center

Coconut shells and torrefied wood are bio-sourced and renewable materials that can be used as fillers in various polymer matrices. The implementation of these biobased fillers would reduce the carbon footprint and improve sustainability of Hyundai and Kia vehicles. In this study, coconut and torrefied wood filled polypropylene properties are tested for a HVAC Case application. Weight savings (7-10%) achieved by replacing talc with coconut or torrefied wood.

Bio-Based Materials

Breaking All The Rules (and then some!!)

Jorge Cortes
Weyerhaeuser Company, Seattle, Washington

The use of THRIVE composites to reinforce polymers is enabling designers and engineers to break all the rules and extend the boundaries for new and existing products. Based on cellulose fibers from trees, THRIVE enhances both the sustainability and performance of a product. This presentation will explore the science behind THRIVE, examples that demonstrate the molding benefits of the material in diverse applications and its potential for use with a variety of polymers in the future.

Polyolefins Recovered from Shredded End-of-Life Vehicles

Brian Riise*, Peter Mackrell, Ron Rau, Ibrahim Patel
MBA Polymers UK Ltd., Workshop

Our industry leading separation technology enables us to recover polyolefin and styrenic plastics from complex mixed streams such as shredded end-of-life vehicles. Plastic flakes recovered using our process are compounded and sold as pellets suitable for use in injection molding and extrusion applications. This paper looks at the challenges and benefits of recovering polypropylene and modifying its properties for use in various injection molded parts in the horticultural, construction, packaging and automotive industries.

Concero™: Magna's WPC for Injection Moulded Automotive Applications

Dr. Alex Baltazar
Magna Exteriors

The automotive industry faces increasing pressure to reduce costs and comply with stringent environmental regulation. In this context, low density polymer composite materials and wall stock reduction are two viable solutions to achieve mass reduction and manage increasing vehicle function and content.

Wood fibers position themselves as an ideal reinforcement because of their low cost, density and specific properties. Typical properties of Concero™ are reported.

Utilizing Thermoplastic BioPolymers for Lightweighting Parts in the Transportation Industry

Robert Joyce
Innovative Plastics and Molding, Inc

Robert Joyce of Innovative Plastics and Molding, Inc. will discuss the challenges to lower vehicle weights with traditional filled polyolefin's and explore the advantages of using thermoplastic biopolymer compositions in the transportation industry. He will also explore the requirements for successful commercialization of a biopolymer resin in this industry. Injection molded biopolymer parts with FibreTuff and foaming agents will be shown, as well as, other types of processes to help with implementation.

Lightweighting Polyolefin Parts

Session Co-Chairs

John Haubert, Chrysler Group LLC
Normand Miron, Washington Penn Plastic

PLENARY TALK: Plastics and Polymer Composites Technology Roadmap for Automotive Markets

Matthew Marks
American Chemistry Council – Plastics Division

Under the direction of the American Chemistry Council (ACC) the automotive and polymer materials industries worked together to create a new strategic framework for collaborative progress. The Plastics and Polymer Composites Technology Roadmap for Automotive Markets is designed to help the automotive and plastics and composites industries maintain a strong foundation upon which to build partnerships that address changing market needs.

Newest Developments in Light Weighting, CLTE, Stiffness/Impact Performance and Shrinkage Control for Automotive PP Compounds Through Use of Additive & Filler Technologies

Melissa Copeland
Milliken & Company

This paper will focus on Milliken's newest reinforcement filler, Hyperform®HPR-803i, for PP automotive compounds, which provides light weighting and improved scratch resistance versus talc filled system. Commercial examples in foam and interior/exterior applications will be shared. The second focus will be Milliken's nucleating technology for PP: Hyperform®HPN-20E, which provides unique shrinkage and crystal orientation to improve CLTE, stiffness/impact balance, and warpage control in automotive PP.

Compounding with Mica to Reduce Noise and Vibration in TPOs

Jim Harper
Imerys

Mica has historically been used to dampen sound in coatings and asphaltic formulations, both in building construction and automotive applications. These applications usually involve metal to polymer interfaces or areas close to vibration. Mica has been shown to reduce noise much better than traditional minerals, such as calcium carbonate. We can apply these principles to TPO. Mica can reduce noise, resulting in down gauging and weight reduction. These parts maintain the performance requirements and processibility.

Lightweighting Polyolefin Parts

Mineral Filled Polypropylene for Lightweighting Automotive Compounds

Julie Ramone
Braskem

The mechanical, thermal and melt rheological properties of Polypropylene compounded with several minerals that vary in aspect ratio, surface area, morphological properties, etc. will be discussed. The potential to attain target properties at lower compound densities using polypropylene and certain fillers will be highlighted.

New Generation Light Weight PP Compounds Redefine Interior Performance and Weight Savings Potential

Neil Fuenmayor, Jane Horal
LyondellBasell

Polypropylene and polypropylene compounds such as TPO have been used to reduce component weight while offering known performances versus traditionally used engineering resins for vehicle interiors. For further fuel efficiency and new regulations looming, weight reduction has now become an even greater priority. New generation PP compounds from LyondellBasell offer technical breakthroughs in greater weight reductions vs. current PP compound technology, and further redefine the performance envelope in key areas of haptics, durability, and structure.

All-plastic Tailgate Design: Maximizing Weight Savings, Functionality and Styling Freedom

Matthew Delaney
SABIC

Previous all-plastic tailgate concepts have simply replaced conventional materials with plastic, resulting in less than desired weight savings and limited design freedom. This session will highlight a preferred approach – designing a tailgate with plastic in mind from the earliest stages of development. An all-plastic design, built with a long glass fiber reinforced polypropylene material and other thermoplastic materials, will be shown. Insights on the design process, material requirements and proof of concept will be presented.

Effect of Thin Walling and Foaming on TPO Part Performance

Jason Fincher
Advanced Composites Inc.

Two prominent means of decreasing injection molded part weight are reducing wall thickness of solid parts and foaming TPO via supercritical fluids or chemical blowing agents. However, these modifications lead to substantial changes in part performance. In order to characterize this phenomenon, Advanced Composites evaluated the effect of both of these strategies in a laboratory study. Each approach to weight reduction provided benefits and drawbacks in terms of expected part performance. Ramifications for both part design and material selection will be discussed.

Thermoforming of TPO Materials

Session Co-Chairs

Ed Bearse
Advanced Plastic Consulting
Rob Philp
A. Schulman

A New Glass Fiber Reinforced Thermoforming TPO

Ching Hui,
Dr. Eduardo Gonzalez*
Mytex Polymers

Thermoplastic polyolefin (TPOS) since commercialization in the late 1990's have improved through advances in raw material technology. Traditionally, TPOs were reinforced with mineral fillers which resulted in low performance of surface scratch and mar, HDT and flexural modulus, and higher density. Glass fiber (GF) filler offers provides reinforced TPO with unique structural properties and enhanced surface aesthetics. This paper presents new developments in GF reinforced thermoforming with a good balance of properties.

Enhance Heavy-Gauge Thermoformed Products with Solarkote® Acrylic Capstock T acrylic Capstock System

Nate Bachman,
Chuck Crabb, Steve Lacock,
Jack Reilly*, Tom Richards
Altuglas International

This high performance polyolefin capstock system was designed by the R&D team at Altuglas International to combine a Class A acrylic first surface with a durable TPO based sheet structure. Solarkote® applications that require excellent weathering and surface properties. Join us to learn how patented tie-layer technology can be used to create heavy-gauge sheet with a great balance of properties in one coextrusion process. T delivers cost effective performance for large part thermoforming.

Assessing the Thermoforming Performance of Thermoplastic Polyolefin (TPO) Materials Using a Thermoforming Index

Sunit Shah*,
D. Hylton
Equistar Chemicals LP
McConnell Company

As TPOs get specified in increasingly demanding thermoforming tools, the need for a test to predict the forming performance of the TPO sheet is ever greater. This paper shows the utility of such a test in defining a Thermoforming Index (TFI) as a measure of melt strength of the TPO sheet. Compared is the Thermoforming Index of various commercial TPO products, as well as the effect of regrind on the TFI of the extruded sheet.

Thermoformed Twin Sheet Parts for Transportation

Jon Novitt
Wilbert Plastics Inc

From concept to production, the benefits of twin sheet thermoforming with TPO will be presented in this discussion. The specific application is exterior doors on a truck refrigeration unit. The program was co-designed and manufactured at Wilbert Plastics, Inc.. The design cycle (as related to the end product performance), while encompassing tooling requirements and material selection will be discussed. Topics of discussion include the benefits of using TPO and a twin sheet process for this application and challenges that were overcome.

Thermoforming of TPO Materials

Advances in Thermo-Form Machinery

Steven Clark
Monark Equipment Technologies

Monark Equipment has been a part the evolution of the thermoforming industry since their establishment in 1966. From the beginning of their inception building thermoforming equipment along with application specific custom-built and process related equipment. Applications, innovations and first to market solutions have driven many of the changes that will be discussed, including application-specific heating systems and high-rate equipment designs for the processing of foams and other lite-weight materials.

High Gloss TPO Alternative to Acrylic Capped ABS Sheet

Fred Galle
A. Schulman

It is well known that ABS sheet coextruded with an Acrylic cap stock creates a product with a high gloss, scratch resistant, weatherable surface that can be utilized in a variety of outdoor market applications. This case study presents a high gloss TPO alternative which provides a durable "Class A" automotive finish with additional performance advantages when compared to the Acrylic/ABS sheet structure. Additional advantages include lower density, improved physical properties, and ease of rework.

Surface Enhancements

Session Co-Chairs

Dr. Rose Ryntz
IAC
Jim Keller
United Paint

Interaction of Colorants, Active Ingredients and Fillers in Thermoplastic Resins Part II

Dr. Steve Goldstein
Clariant

In the first part of the paper dealing with Interactions of Colorant, Active Ingredients and Fillers in Thermoplastic Resins, examples of positive and negative interactions that can occur in creating a stable formulation with a Thermoplastic resin were shown. In this paper more examples will be given and attempts to explain some of the root causes along with the consequences of the interactions.

TPO Scratch & Mar Predictability by Simulation

Dr. Sassan Tarahomi
IAC Group

Materials used in the automotive interior include many filled, unfilled PP and TPO grades. With increased competition and material improvement, customers expect much better performance on the interior materials used in their car. Traditional method of testing grained plaques for scratch and mar does provide directional performance data and is very time consuming. This paper discusses scratch and mar predictability of PP and TPO products by utilizing CAE analysis.

Novel Saturated Slip Additive with Superior Oxidative Stability

Aaron Huguet
Croda

Two years ago we presented initial data for an experimental saturated slip additive to give friction performance similar to erucamide and oleamide but with vastly improved oxidative stability. Since then a refined product has been developed and commercialised as Incroslip SL. This work illustrates the performance of this material in comparison with erucamide and behenamide in LDPE and PP film, HDPE and PP closures. The excellent oxidative stability and superior organoleptics are also demonstrated. The material also shows potential as a more UV stable anti-scratch additive for PP automotive compounds.

Polypropylene Impact Copolymers for Improved Surface Aesthetics: Rheological Characterization and Testing

Joel Carr*, Jeffrey Salek, Mark Chappell
Braskem

This talk will focus on Polypropylene Impact Copolymers (ICPs) aimed at reducing the surface aesthetic defect known as tiger marking which is formed during large part injection molding of compounded thermoplastic olefins. Emphasis will be placed on rheological predictive testing and how this translates to the final part aesthetic performance.

Surface Enhancements

The Use of OIT in Automotive

Eileen McCotter Gallihugh
IAC Group

OIT or the Oxidative Induction Time test using a Differential Scanning Calorimeter can tell us many things about a TPO material. This seminar will review what OIT is and how it can determine robustness of a material, whether the sample contains regrind, and compare the degradation point of one material vs. another.

Using Reactive Gas Technology® to Enhance Surface Properties of TPO

Prakash Iyer
Inhance Technologies

The need for surface activation to improve the adhesion properties of polymeric substrates is of vital importance in the automotive industry. Thermoplastic polyolefins (TPO) are excellent candidates for these initiatives in automotive applications. Properties such as non-polarity, low surface energy, and chemical inertness, however, limit their usability in automotive applications. An overview, using a novel process to modify the surface of TPO's for various automotive end uses, aided by Reactive Gas TechnologyTM (RGT), will be presented. RGT results in a permanent chemical modification of the surface of the polymer that leads to increased wettability and bonding mechanisms.

New TPO Surface Treatment Technologies for Adhesion

Andy F. Stecher
Plasmatreat North America, Inc.

Plasma surface treatment offers the most effective while lowest cost surface treatment method for thermoplastic olefins (TPO). TPO in automotive applications cannot be painted without surface cleaning and modification. Plasma treatment improves adhesion against performance tests such as humidity aging, thermal shock, chip resistance, tan lotion and fuel soak. Cycle time concerns have been addressed through advances in plasma technology, automation, and contract treatment options.

Emerging Technologies in Coatings

Dr. Jamil Baghdachi
Coatings Research Institute,
Eastern Michigan University

While maintaining long-term adhesion to polyolefin plastics still remains a challenge, decorative and functional properties of coatings are the macroscopic features that consumers are concerned at first site. Recent advances in materials science have provided tools for developing new coatings with novel properties. Automotive coatings in particular, are poised to benefit from Emerging Technology approaches. This presentation will discuss emerging technology-based products and processes, present pathways and highlight current global research and developmentthe surface of TPO's for various automotive end uses, aided by Reactive Gas TechnologyTM (RGT), will be presented. RGT results in a permanent chemical modification of the surface of the polymer that leads to increased wettability and bonding mechanisms.

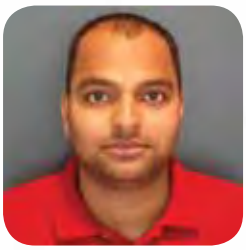
Rigid Polyolefin Compounds

Session Co-Chairs

Ermanno Ruccolo
Mitsui Plastic, Inc.
Mike Balow
Asahi Kasei Plastics North America Inc.

Mechanical Characterization Methodologies for TPOs: Is there Room for Improvement?

Abhiram Kannan
Georgia Institute of Technology



The mechanical testing toolbox is vital for TPOs to determine their operating conditions. This toolbox usually consists of Charpy and Izod impact tests along with conventional tensile and compression testing. While these are necessary tests, they offer little input into the molecular level design of the polyolefin itself. This research identifies characterization methodologies that offer more feedback than other conventional tools. These include in situ x ray diffraction and high strain rate mechanical testing.

Simulating the Effect of Processing Conditions on the Structural Performance of Glass Fiber Reinforced Composites

Daniel Dubiel
Asahi Kasei Plastics North America

The use of polypropylene based parts in automotive apThe effect of processing conditions on the structural performance of glass fiber reinforced polypropylene was studied using commercially available simulation software. Processing conditions such as gate locations were used evaluate the subsequent change in glass fiber orientation and its effect on structural performance on a demonstrative part. Results show that processing conditions play a critical role in the success of a structural composite and must be considered foremost in the design process.

Reducing Hazardous Substances in Passenger Cars

Colin Chen
LyondellBasell (Basell Advanced Polyolefins (Suzhou) Co., Ltd.

China State Environmental Protection Administration (SEPA) issued the Guideline for Air Quality Assessment of Passenger Car (GB /T 27630 – 2011). The Guideline defines the specifications and test methods for eight hazardous substances in passenger cars, including benzene, toluene, ethylbenzene, xylene, styrene, formaldehyde, acetaldehyde, and acroleine. This paper will discuss the impact of the Guideline on interior material suppliers and the test methods developed by LyondellBasell for measuring the hazardous substances in individual parts.

New Trend of Car Weight Reduction by Using Long Carbon Fiber

Seong (Simon) Min Cho
Lotte Chemical

Polypropylene based TPO compounds have been used for Light Weight of car has been focused among automobile industry due to high fuel price, environmental issues and resource depletion. Recently Long carbon fiber thermoplastics(LCFT) are getting attention by replacing steel parts with its unique and excellent high modulus and strength for higher fuel efficiency. Moreover, carbon fiber is also expanding its use from outer panels to structural parts. We reviewed general technology on LCFT and also introduce Lotte Chemical's unique LCFT material and applications.

Rigid Polyolefin Compounds

Value-Added and 100% Recycled Based Polyolefin Alloys, Blends and Compounds and their End Use Applications

Larry Berkowski, Bob Bogdewiecz, Deen Chundury*
Wellman Engineering Resins

The downstream polyolefin compounding businesses have been growing 2X GDP in NA. With advent of innovation tools including optimized interfacial adhesion (e.g. GF reinforced compounds), phase and crystalline morphology control (e.g. specialty alloys with light weighting), thermal and oxidative stability (e.g. filled compounds with long term high temperature performance), creative toughened polyolefin products using 100% post-consumer based polyolefin feed-streams will be highlighted along with their potential automotive end use applications.

Innovative Glass Fiber Applications – From the Pellet to the Part

Gisela Lehner
Borealis Polyolefine GmbH

Borealis has more than 20 years of experience in developing and producing glass fiber materials. Glass fiber reinforced polypropylene grades are by nature complex in structure and therefore require extended efforts from the pellet production, in the modelling and simulation, as well as processing support directly at the customer. An excellent example for a short glass fiber application is the foamed instrument panel carrier for the new Volkswagen Golf 2014 model, produced with Borealis Fibremod™ GE277AI.

Aspect Ratio Engineering to Enhance Polyolefin Performance Attributes for Structural Applications

Katie Shipley*, Sameer Mehta
Asahi Kasei Plastics North America, Inc.

Advancements in polypropylene reinforcement technology have enabled successful conversions from costly engineered materials. However, this transition is elusive for certain applications due to differences in polymer characteristics. This includes issues related to dimensional behavior and the balance of properties required. Asahi Kasei investigated reinforcement modes of polypropylene compounds to address such issues. Focusing on aspect ratio engineering and critical retention factor of reinforcements, Asahi Kasei will present new work on reinforced compounds.

Functional Additives for Polyolefins

Steve Amos, Dr. Baris Yalcin
3M Advanced Materials

The Advanced Material Division of 3M Company provides several additives for polyolefins used in transportation applications. 3MTM Glass Bubbles can provide light weighting. 3MTM Cooling Fillers can be used to provide high through plane thermal conductivity with no electrical conductivity. Polymer Processing Additives can be used to speed extrusion and prevent die lip build-up during masterbatch compounding or profile extrusion. PTFE micro and fine powders can be used for tribological and flame retardant applications.

Aluminum Tooling for High Volume Automotive Applications: Lessons Learned and Best Practices: Lessons Learned and Best Practices

Darcy King
Unique Tool

For many, but by no means all automotive applications where rigid polyolefins are utilized, aluminum tooling for high volume production offers the potential for operation on reduced clamp tonnage molding machines, and dramatic cycle time reductions of up to 50% or more versus traditional P-20 steel. This paper will discuss applications where aluminum works best, typical development times versus steel tooling, best practices and lessons learned over the course of several years of production usage.

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Adhesives & Coatings for TPOS

Session Co-Chairs

Hoa Pham
Avery Dennison
Dr. Pravin Sitaram
The Haartz Corporation

Latest Improvements in Hot Melt Adhesives

Dr. Thomas Hohberg
Jowat AG

TPO soft trim materials, polypropylene-based substrates, and polyolefin-based hot melt adhesives are an ideal match. 100% solid content hot melt adhesives are the key to highly efficient soft trim lamination. Critical and also challenging quality and performance aspects will be presented with a focus on technical understanding and problem solving solutions. The outstanding performance and cost benefits of the new VACFLOW technology (a joint development between Kiefel and Jowat) will be presented for the first time.

Hot Melt Polyolefin Adhesives Overview

Michael Vitrano
Bostik, Inc

Market forces are promoting the increased use of hot melt polyolefin adhesives for automotive applications. This white paper and presentation examines the numerous advantages hot melt polyolefin adhesives offer over traditional solvent, water-based and moisture cure adhesives. Some of these advantages are decreased VOCs, increased ease of handling, increased recycling, improved substrate compatibility, improved raw material availability and decreasing costs.

Pressure Sensitive Adhesive for Difficult Automotive Applications

Hoa Pham, Kevin Gofron*, Ulrike Steinfort, Kerstin Pape, Martin Burianek
Avery Dennison

It is known that automotive applications require unique adhesive characteristics to deliver desired performance. The innovative RHA technology from Avery Dennison offers a high performing adhesive that has seen successes in difficult automotive applications, including low surface energy materials such as polyolefins.

Primerless Adhesives for Low Surface Energy Substrates

Michael Pollock
Phibrochem

Current technology and processing of TPO and other non-polar substrates offer the opportunity for new adhesive technology. Information on substrates, processing and chemistry will be presented to allow for increased knowledge on currently available technology. Also industry trends will be reviewed to create an understanding of some changes that will impact the future needs of these applications.

Chemlok® Adhesive Systems for Bonding Lightweight Substrates

Emmanuel Pitia*, Jeffrey D. Means
Lord Corporation

Light weight substrates, such as engineering plastics and thermoplastic olefins (TPO) are becoming more prevalent in automotive, industrial, and aerospace applications. Bonding solutions that maintain a robust bond during the service life of the products is also a growing requirement. Adhesive solutions are available for these demanding and evolving applications. This paper summarizes product performance solutions for TPO substrates, and further focuses on adhesive performance data for bonding elastomers to engineering plastics.

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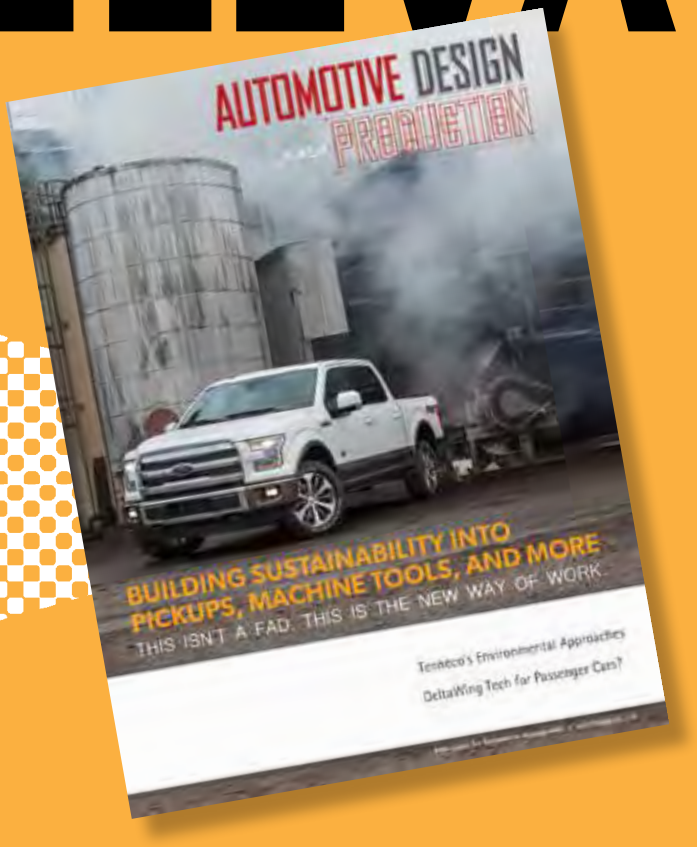

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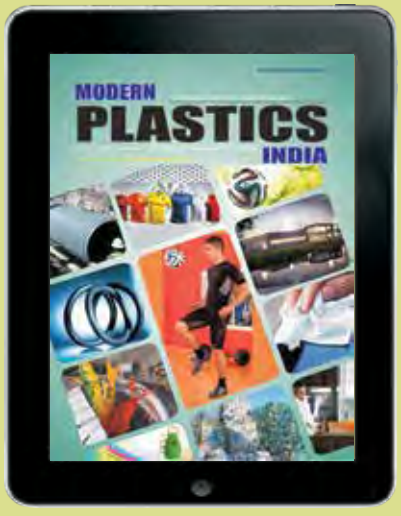

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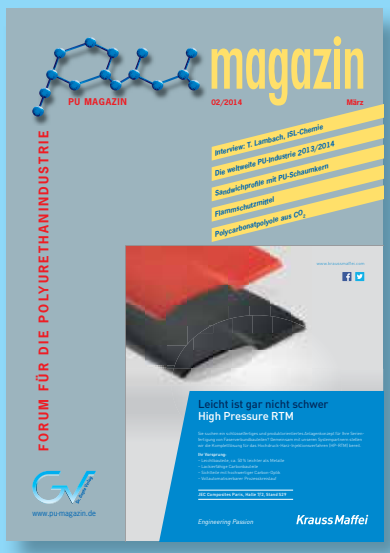

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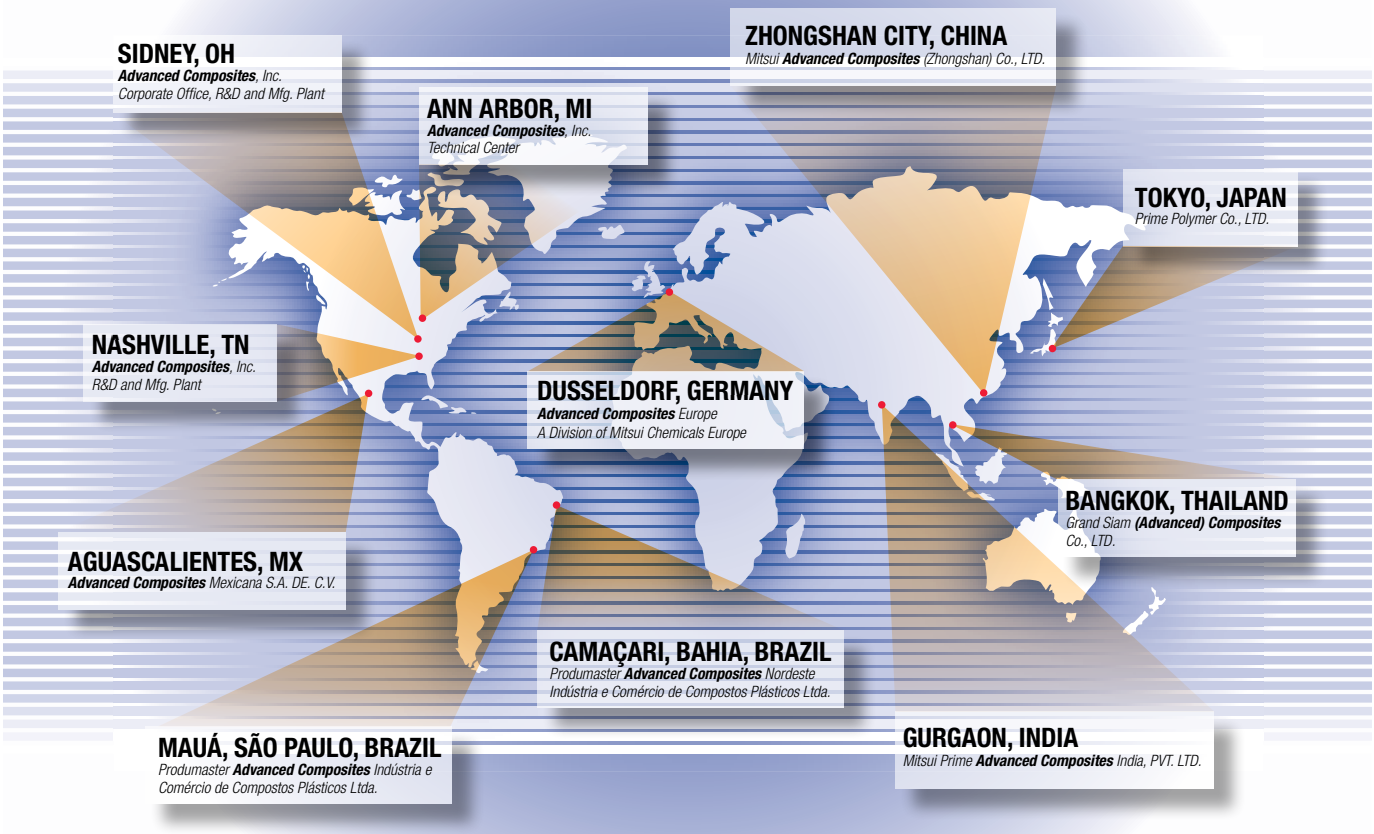

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