52ND-ANNUAL

spe

AUTOMOTIVE INNOVATION AWARDS COMPETITION & GALA HONORING THE BEST IN AUTOMOTIVE PLASTICS

NOVEMBER 8, 2023

PLASTICS: CHARG⁴NG INTO THE AUTOMOTIVE REVOLUTION

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To learn more contact Gina Oliver at Gina-Marie_Oliver@americanchemistry.com

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AUTOMOTIVE INNOVATION AWARDS COMPETITION & GALA HONORING THE BEST IN AUTOMOTIVE PLASTICS

NOVEMBER 8, 2023

Welcome to the 52nd annual SPE[®] Automotive Innovation Awards Gala, produced by the Automotive Division of the Society of Plastics Engineers and sponsored by leaders in the automotive plastics industry. I am honored to once again lead this annual program, the world's oldest and largest recognition event in the automotive and plastics industries. Each year we recognize and celebrate the latest and best results of cooperative innovation by automotive engineers, designers, and their suppliers whose combined ingenuity and creativity enhance and advance the automotive industry. My colleagues in the SPE Automotive Division are excited to offer this tribute to the latest innovation in plastics and composites in ground transportation.

This year's theme **Plastics: Charging Into The Automotive Revolution,** underscores the importance of plastics technologies and the innovative minds of our industry to enabling the innovative transition to electric vehicles today and into the future. Plastics are key to delivering design intent, comfort and capability to the end customer; meeting societal and environmental needs for all of us through varying degrees of electrification, efficiency, and sustainable material use; and delivering products that provide value in the market while also delivering sustainable business models. The automotive design and engineering teams, including their partner supply base, continue to explore and deliver new ways of engineering components that deliver on the intended function at lower cost and weight than the preceding technologies, while meeting or exceeding the performance of yesterday's solutions.

The 2023 program includes 50 nominations across 8 categories. Tonight, we will recognize the accomplishments of the people and companies involved in this year's **Most Innovative Use of Plastics** with awards in the following areas:

- Aftermarket and Limited Edition/Specialty Vehicles
- Body Exterior
- Body Interior
- Electric and Autonomous Vehicle Systems

We will also recognize four other award recipients for our:

- Hall of Fame Award, recognizing plastic innovation that has been in continuous service in some form for at least 15 years and broadly adopted in the automotive industry,
- Lifetime Achievement Award, an honor that recognizes the technical achievements of an individual whose work in research, design, and/or engineering has led to significant integration of polymeric materials on passenger vehicles,
- Vehicle Engineering Team Award recognizing the contributions of an entire vehicle engineering team based on both the total plastics/composites content of the platform, the innovation of individual applications and how well received the vehicle has been by both consumers and media,
- And finally, our 2023 Program Grand Award, representing the most impactful nomination across all categories for this year's
 program as selected by our Blue Ribbon Judges panel. Before we begin tonight's program, I would like to thank the many volunteers,
 sponsors, and judges who make this event possible. It is their dedication and commitment their passion for innovation that enable
 the SPE Automotive Division to recognize the industry's most innovative use of plastics and composites in automotive applications.

Once again, welcome to the 2023 SPE Automotive Innovation Awards Gala. Thank you for joining us and we hope you enjoy the event.

Sincerely,

Jeffrey Helms

Jeffrey Helms Innovation Awards Chair 2010-2023 Automotive Director Engineered Materials Celanese

Honoring the Best in Automotive Plastics

- Materials
- Process, Assembly & Enabling Technologies
- Safety and
- Sustainability

BLUE RIBBON JUDGES

Peggy Malnati, CompositesWorld Deborah Mielewski, Ford Motor Co. (retired) Rose Ryntz, Rose Ryntz and Associates, LLC Drew Winter, Ward's Automotive Lilli Sherman, Plastics Technology Magazine David Mattis, General Motors Co. (retired) Al Murray, SPE Emeritus Gary Kogowski, Ravago Holdings Americas John Fillion, Chrysler (retired) Ramesh lyer, ICIS Norm Kakarala, SPE Automotive Division Subi Dinda, Chrysler Oakland University (retired) Bob Eller, Robert Eller & Associates Probir Guha, CSP/Teijin (retired) Jay Raisoni, Inteva Products, LLC (retired) Thilo Stier, SPE Europe Dale Gerard, General Motors Co. (retired) Roy Sjoberg, Chrysler (retired) Nick Vitelli, Penn State Lyle Beadle, SPE Detroit Section Conrad Zumhagen, The Zumhagen Company LLC Dale Brosius, IACMI Fred Deans, Allied Composite Technologies LLC Suresh Shah, Delphi (retired) David Reed, David B Reed Consulting LLC Natalia Ortega, Plastics Technology Mexico Scott Francis, CompositesWorld Sarah Kominek, Plastics News Kevin Smith, Decoma (retired)

SPECIAL THANKS TO: Design: JPI Creative Group Signage: Graphic Services Printing: PrintComm A/V Support: Concept Productions Flowers: Dynamic Flowers of Royal Oak

SCHEDULE OF EVENTS

4:00-6:00 PM VIP RECEPTION 4:30-6:00 PM RECEPTION / PREVIEW **OF NOMINATED PARTS** & VEHICLE DISPLAYS 6:00 PM SEATING BEGINS 6:15-7:00 PM WELCOME / DINNER Jeffrey Helms, Celanese, Innovation Awards Chair Teri Chouinard, Intuit Group 7:00-9:00 PM GALA PROGRAM **AFTERMARKET AND LIMITED EDITION /** SPECIALTY VEHI Martin Popella, MP2 HALL OF FAM David Reed, David B Reed Consulting LLC BODY IN Yvonne Merritt, Ford Motor Co. SUSTAINABILITY Joel Myers, Hyundai-Kia America Technical Center, Inc. TERIAL Suresh Shah, Delphi Corp. (retired) LIFETIME A Fred Deans, Allied Composite Technologies LLC PROCESS, A Steven VanLoozen, Lotte Chemical **ELECTRIC & AUTONOMOUS** VEHICLE SYSTEMS Josh McIlvaine, Celanese SAFETY Kurt Dickmann, INEOS Styrolution VEHICLE ENGINEERING TEAM AWARD Jeffrey Helms, Celanese Jeffrey Helms, Celanese 9:00-11:00 PM AFTERGLOW RECEPTION Everyone Invited to Attend

| PLASTIC | S TERMS |
|---------|--|
| 1K, 2K | 1- or 2-component resin system |
| ABS | acrylonitrile butadiene styrene |
| ACM | alkyl acrylate copolymer |
| ASA | acrylic-styrene-acrylonitrile |
| BMC | bulk molding compound |
| CF | carbon fiber |
| CFRP | carbon fiber-reinforced plastic |
| CLTE | coefficient of (linear) |
| or CTE | thermal expansion |
| CUT | continuous-use temperature |
| D-LFT | direct-(ILC) long-fiber thermoplastic |
| EPP | expanded polypropylene foam |
| EVA | ethylene vinyl acetate |
| FR | flame retarded or flame retardant |
| FVF | fiber volume fraction |
| GF | glass fiber (reinforced) |
| GMT | glass-mat thermoplastic |
| GR | glass (fiber) reinforced |
| HDT | heat-deflection temperature |
| ILC | inline compounded |
| ITR | isophthalate terephthalate resorcinol |
| LCM | liquid composite molding |
| LCP | liquid crystal polymer |
| LFT | long-fiber thermoplastic |
| MFI | melt flow index |
| MFR | melt flow rate |
| MIC | molded-in-color |
| MPPE | modified-polyphenylene ether |
| | (also called MPPO, modified- |
| | out of autoclave (process) |
| | |
| | |
| | |
| | |
| | |
| PC/ABS | butadiene styrene |
| PC/ASA | polycarbonate/acrylic-styrene- |
| PC/PRT | |
| | polybutylene terephthalate |
| PCR | post-consumer recyclate |
| PE | polyethylene |
| PEI | polyetherimide |
| PET | polyethylene terephthalate |
| PIR | post-industrial recyclate |
| PMMA | polymethyl methacrylate (also called acrylic) |
| POM | polyoxymethylene (also called acetal) |

| PP | polypropylene |
|------------------|---|
| PPA | polyphthalamide |
| PPS | polyphenylene sulfide |
| PTFE | polytetrafluoroethylene |
| PUR | polyurethane |
| PVC | polyvinyl chloride (also called vinyl) |
| PVB | polyvinyl butyral |
| PVDF | polyvinylidene fluoride or polyvinylidene difluoride |
| rPtA | recycled polyamide |
| SMA | styrene maleic anhydride |
| SMC | sheet-molding compound |
| TIO ₂ | titanium dioxide |
| TPC-ET | thermoplastic copolyester elastomer |
| TPE | thermoplastic elastomer |
| TPO | thermoplastic polyolefin |
| TPU | thermoplastic polyurethane |
| TPV | thermoplastic vulcanizate |
| UD | unidirectional |
| UP | unsaturated polyester |

AUTOMOTIVE TERMS

| A/C | air conditioning (also AC) |
|---------|---|
| ADAS | advanced driver-assistance system |
| AGS | active grille shutter |
| BDU | battery disconnect unit |
| BEV | battery-electric vehicle |
| BIW | body in white |
| BSR | buzz/squeak/rattle |
| CAD | computer-aided design |
| CAE | computer-aided engineering |
| CLTE | coefficient of linear thermal expansion |
| CNC | computer-numerical control |
| CUV | cross-over (sport-) utility vehicle |
| CVJ | constant velocity joint |
| EA/EAs | energy absorber(s) |
| EGR | exhaust gas recirculating/recirculation |
| EMI/RFI | electromagnetic/radio-frequency interference |
| EPA | U.S. Environmental Protection Agency |
| FEM | front-end module |
| EU | European Union |
| FIP | foam-in-place |
| FMVSS | U.S. Federal Motor Vehicle Safety Standard |
| GOR | grille-opening reinforcement |
| HDT | heat-deflection temperature |
| HEV | hybrid-electric vehicle |
| HIC | head-injury criterion |

| HID | high-intensity discharge |
|---------|--|
| ICE | internal combustion engine |
| IIHS | Insurance Institute for Highway Safety |
| IP | instrument panel |
| LED | light-emitting diode |
| Li-Ion | lithium-ion |
| MPV | multi-purpose vehicle |
| NVH | noise/vibration/harshness |
| OEM | original-equipment manufacturer |
| PCR | post-consumer recyclate |
| ped-pro | pedestrian protection (requirement) |
| PHEV | plug-in hybrid-electric vehicle |
| PIR | post-industrial recyclate |
| SUV | sport-utility vehicle |
| TPC-ET | thermoplastic copolyester elastomer |
| VOCs | volatile organic compounds |

OTHER TERMS

| 2D | two-dimensional |
|-------|--|
| 3D | three-dimensional |
| cm | centimeter |
| CO2 | carbon dioxide |
| dB | decibels |
| DFAM | design for additive manufacturing |
| ft | foot |
| FTQ | first-time quality |
| g | gram |
| in | inch |
| IR | infrared |
| kg | kilograms |
| lb | pound |
| LCA | life cycle analysis |
| КМРН | kilometers/hour |
| km/h | kilometers/hour |
| m | meter(s) |
| mm | millimeter |
| MM | million(s) |
| MPG | miles/gallon |
| MPH | miles/hour |
| N | Newtons |
| NIOSH | National Institute for Occupational Safety & Health |
| PPE | personal protective equipment |
| RPM | revolutions/minute |
| sec | second |
| SG | specific gravity |
| USD | U.S. dollars |
| | |



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AFTERMARKET & LIMITED EDITION/ SPECIALTY VEHICLES



Carbon Fiber Wheels 2024MY General Motors Co. Chevrolet Corvette Z06 & E-Ray



| System Supplier: | Carbon Revolution |
|--------------------|-------------------|
| Material Processor | Carbon Revolution |
| Material Supplier | Not available |
| Resin: | Woven CF/epoxy |
| Tooling Supplier: | Not available |

This 5th-generation carbon fiber-reinforced epoxy wheel features new diamond weave technology and satin-finish paint to achieve a Class A finish and is produced in a patented process that is scalable and reproducible. Versus aluminum wheels, mass is 30-50% lower yet meets stringent OEM durability and performance requirements. With lower unsprung mass, the composite wheels improve traction and braking, suspension responsiveness and dynamic steering, plus acceleration. Lighter, yet with higher stiffness and resonant frequency and better damping, the wheels also reduce noise transmission to the driver.

Hybrid Battery Interconnect Board 2024MY General Motors Co. Chevrolet Corvette E-Ray

| System Supplier: | Sun Microstamping Technologies |
|---------------------|--------------------------------|
| Material Processor: | Sun Microstamping Technologies |
| Material Supplier: | BASF Corp. |
| Resin: | Ultramid B3UG4 PA 6 |
| Tooling Supplier: | Sun Microstamping Technologies |

This patented hybrid battery interconnect board features small and delicate metal current collectors, buss bars, and sensing lines in a very compact design to fit in limited packaging space. The 20% GR/PA6 grade was selected for its ability to offer high levels of functional integration in limited space plus be compatible with snapfits, heat staking, ultrasonic welding, and adhesive bonding. The material also is heat stabilized and flame retardant. Laminated core-block inserts are used in rotary injection tooling for venting and to control stampings during overmolding.

Plastic Oil Cooling Lines 2024MY General Motors Co. Chevrolet Corvette E-Ray

| System Supplier: | Automotive Veritas de México, S.A. de C.V. |
|---------------------|--|
| Material Processor: | Automotive Veritas de México, S.A. de C.V. |
| Material Supplier: | EMS-Grivoy |
| Resin: | Grilamid XE3975 PA6 & Grilamid 2S25WHLX /10-HIP |

Tooling Supplier:Automotive Veritas de México, S.A. de C.V.Replacing aluminum with flexible rubber hose, for the first time an injectedplastic fitting is laser welded to plastic tubing and assembled to an aluminumblock with a steel plate for structural rigidity while permitting the currentsystem interfaces to be used in limited packaging space. Mass was reduced30% and direct cost 23% while improving the oil cooling circuit pressure dropby 51% vs. benchmark technology. The neat, semi-flexible PA6/10 polymercontains62% bio-based monomer and offers good cold-temperatureimpact, chemical resistance, and short-term temperature peaks.

Swappable Battery Cell Holder 2024MY Sun Mobility Pvt. Ltd. Gen 2 Ph II



| System Supplier: | Sun Mobility Pvt. Ltd. |
|---------------------|------------------------------|
| Material Processor: | Sanko Gosei |
| Material Supplier: | SABIC |
| Resin: | Stamax 30YH570 FR PP 30% LGF |
| Tooling Supplier: | Sanko Gosei |

This swappable battery-cell holder meets stringent regulatory standards and requirements. It features an injection molded LFT-PP with an intumescent, halogen-free flame-retardant package selected for safety, mechanical performance, and compliance with environmental regulations.



BODY EXTERIOR

Composite Cross-Members 2022MY Hyundai Motor Group Genesis GV70 & G80 High-Gloss Weatherable Exterior Trim 2023MY General Motors Co. GMC Hummer EV



A novel hybrid pultrusion process can cost effectively produce up to 20-million load-bearing and e-coat-capable structural composite beams annually thanks to a fully automated process. Beams provide the primary load path to pass IIHS Side & Pole Impact tests, protecting occupants and on onboard battery packs while achieving a 30% increase in impact resistance vs. roll-formed steel. An injection box added to the pultrusion line infuses high-performance epoxy into unidirectional carbon fiber and woven fiberglass reinforcements, reducing mass/vehicle 12 kg and tool cost 30% vs. metallic benchmarks. Beams are attached to the BIW via structural adhesives and blind rivets.

MIC Grillette 2024MY General Motors Co. Chevrolet Silverado HD 2500/3500



| System Supplier: | SRG Global Inc. |
|--------------------|-----------------------------|
| Material Processor | SRG Global Inc. |
| Material Supplier | SABIC |
| Resin: | Lexan SLX2271T PC copolymer |
| Tooling Supplier: | Arlen Tool Co. Ltd. |

This high-gloss, piano black MIC injection molded part offers paint-like aesthetics but eliminates the cost and environmental burden of painting. A weatherable PC copolymer with self-renewing UV protection provides improved performance and aesthetics vs. painted ABS or PC/ABS. The material molds in the same tool designed for ABS, which also eliminates tool-modification costs.



| ABC Technologies Inc. |
|-----------------------|
| ABC Technologies Inc. |
| LG Chem Ltd. |
| PMMA/ASA blend |
| Not available |
| |

This MIC, highly weatherable and scratch-resistant PMMA/ASA blend was developed for Class A exterior trim applications. The durable, highgloss piano black part is achieved without paint right out of the mold. Technical expertise was used to eliminate knitlines. Direct cost was reduced 30%.

Integrated Tailgate Storage Compartment 2024MY General Motors Co. Chevrolet Colorado



| System Supplier: | Teijin Automotive Technologies | |
|--------------------|-----------------------------------|--|
| Material Processor | Teijin Automotive Technologies | |
| Material Supplier | Ineos Group | |
| Resin: | CSP-006 UV Stable, DLFT 30% GR/PP | |
| Tooling Supplier: | WM Tool Inc. | |

This is the first integrated tailgate storage compartment produced in compression molded 30% GR/DLFT-PP that provides secure storage space without reducing the usable volume of the pickup box. A unique welding process joins inner and outer panels to create a double-sided show surface plastic lid assembly with increased structural strength without need for mechanical fasteners and without witness marks left by processes like sonic welding. Versus metallic alternatives, paint is eliminated and mass is 40 kg lower. A UV stable, weatherable, MIC grade was used.

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BODY EXTERIOR



Flush Sealing System 2024MY NIO Ltd. NIO EC7, ES8, EC6 & ES6

| System Supplier: | Cooper Standard |
|--------------------|--------------------------|
| Material Processor | Cooper Standard |
| Material Supplier | Celanese Corp. |
| Resin: | Santoprene123-50W175 TPV |
| Tooling Supplier: | Cooper Standard |

This patented sealing system enables separation of the glass guidance rails/ sliders from the weatherstrip/seal on framed doors, permitting improved aesthetics similar to frameless doors at lower mass, better NVH, reduced complexity, faster assembly. The cost-neutral system also permits window regulators on framed doors and some competitive flush-glazing options to be converted from dual to single rails for both front and rear doors. A combination of injection molding and extrusion are used to produce the thermoplastic system, which maintains ±0.1 mm tolerances. Virtual validation technology was used to eliminate the need for physical prototypes.



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| System Supplier: | Magna International |
|--------------------|---------------------------|
| Material Processor | Magna International |
| Material Supplier | Advanced Composites, Inc. |
| Resin: | LGF-PP & TPO |
| Tooling Supplier: | Tycos Tool & Die Co. |

RIVIAN

This is the world's first all-thermoplastic split gate rear-closure system, which is delivered to the assembly line as a ready-to-install module. The complex, deep draw (>80 mm) design offers improved perceived quality at lower mass, NVH, and cost vs. metals, and is offered in a 2-tone execution. By commonizing grades between the liftgate and the benchgate and focusing on sustainability, parts were reduced from 9 to 3 and just 2 materials are used (injection molded LFT-PP and TPO). The CHMSL and taillamps were carried over from the pickup model.

Uniformly Lit Animated Tail Lamps 2023MY General Motors Co. GMC Sierra & Chevrolet Silverado HD 2500/3500



| System Supplier: | Magna Lighting |
|--------------------|-------------------------|
| Material Processor | Magna Lighting |
| Material Supplier | Trinseo PLC |
| Resin: | Plexiglas V825-100 PMMA |
| Tooling Supplier: | DBM Reflex |

Key to the crisp and uniformly lit appearance of these animated taillamps are micro-optical features on injection molded light guides produced via a specialized manufacturing technique. Using an algorithm, the process starts by generating a pseudo-randomized topology that is machined into a master that is then used to create an electroform nickel insert. The technology produces a smooth appearance with far fewer LEDs, eliminates hot spots from point light sources, and permits crisper animation in tighter packaging depths vs. traditional approaches.



AUTOMOTIVE INNOVATION AWARDS COMPETITION & GALA HONORING THE BEST IN AUTOMOTIVE PLASTICS

SPE® AUTOMOTIVE INNOVATION AWARDS NAMES FIRST ACRYLIC REAR LENS 2023 Flall of Fame

The industry's first Acrylic Rear Lens, used on the 1948 General Motors Co. Cadillac Series 60, 61 and 62 models, has been named the 2023 Hall of Fame Winner by the Automotive Division of the Society of Plastics Engineers (SPE®). This is being celebrated today by honoring the technology and the companies and people affiliated with this application during SPE's 52nd Annual Automotive Innovation Awards Gala. The Acrylic (also known as PMMA) Rear Lens, made possible with the invention of the polymer called polymethylmethacrylate by Dr. Otto Röhm in 1932, was a gamechanger replacing ground glass and enabling a renaissance of new lighting designs for all OEMs.



2023 HALL OF FAME

To be considered for a Hall of Fame Award, an automotive plastic or composite component must have been in continuous service in some form for at least 15 years and broadly adopted in the automotive industry. This application certainly qualifies as PMMA lenses are an industry standard known for glass-like optical properties while being about half the weight of glass. PMMA offers numerous design and quality benefits making it the premier material for lighting applications and more on all automotive vehicles and on numerous other products in industry.

General Motors pioneered a revolution in automotive lighting by using PMMA on the 1948 Cadillac rear lamp lens and other OEMs followed. From the perennial "50's shark fins" to the modern "coast-to-coast" light bars, PMMA has played an integral role in the advancement of automotive lighting designs in both form and function. There are currently a variety of specialty PMMA grades designed for OEM-specific styling and applications designs including: Non-transparent high gloss black versions (for paint replacement/exterior trim), various diffusive types (for LED edge/back lighting) and even infrared transparent variations designed for laser welding and Radar/Lidar covers. PMMA resin is acclaimed for its excellent balance of properties that lens applications require, including UV resistance, (Non-yellowing), flexible colorability, chemical resistance, hardness, and scratch resistance. It is also fully recyclable via chemical depolymerization. PMMA is well positioned for emerging new vehicle designs where industry has coined "light is the new chrome" ensuring its role as a key to innovative lighting and more into the future.

The companies involved in developing the first Acrylic Rear Lens include: OEM – General Motors; Molder/Processor – Fisher Body Division; Material Supplier – Röhm & Haas OHG (Germany), now known as Röhm GmbH. General Motors will accept the SPE Automotive Hall of Fame Award on behalf of the original team that worked to develop this application.



The SPE Automotive Innovation Awards is the oldest and largest competition of its kind in the world. Dozens of teams made up of OEMs, tier suppliers, and polymer producers submit nominations describing their part, system, or complete vehicle and why it merits the claim as the Year's Most Innovative Use of Plastics. This annual event typically draws over 800 OEM engineers, automotive and plastics industry zexecutives, and media. As is customary, funds raised from the event are used to support SPE educational programs and technical conferences, which help to secure the role of plastics in the advancement of the automobile.

THE MISSION OF SPE is to promote scientific and engineering knowledge relating to plastics worldwide and to educate industry, academia, and the public about these advances. SPE's Automotive Division is active in educating, promoting, recognizing, and communicating technical accomplishments in all phases of plastics and plastic-based composite developments in the global transportation industry. Topic areas include applications, materials, processing, equipment, tooling, design, and development.



BODY INTERIOR

Backlit Wrapped Interior Trim 2023MY SAIC General Motors Corp. Ltd. Buick Century IP Topper with Rib Features 2024MY Ford Motor Co. Ford F-150

| Yanfeng Automotive Interior Systems Co., Ltd. |
|---|
| Yanfeng Automotive Interior Systems Co., Ltd. |
| Benecke Changshun Auto Trim |
| (Zhangjiagang) Co., Ltd. |
| BB2CAC-ZZZZ TPO |
| Yanfeng Automotive Interior Systems Co., Ltd. |
| |

This interior lighting system is hidden until lit, yet provides these backlit wrapped interior parts with the feel of leather and vibrant special lighting effects in limited design space. Key to the execution is a special translucent TPO extrusion molding process and a precise ink coating layer between surface and translucent 3D mesh backing fabric. Light transmission and emitted colors are controlled by colorant concentration. Versus TPE injection molding and PVC with punched holes filled with adhesive, cost and weight are reduced, while recyclability is improved vs. PVC.

Foamed Door Panel <u>2024MY</u> Renault Group

Renault Espace



| System Supplier: | Forvia |
|--------------------|---------------------------|
| Material Processor | Forvia |
| Material Supplier | Advanced Composites, Inc. |
| Resin: | ADX5017 20% talc/TPO |
| Tooling Supplier: | Lamko Tool and Mould Inc. |
| - · · | |

This special MIC saw-tooth rib pattern could not be achieved in a Class A surface via standard cavity mold graining. Instead, multiple textures were achieved by machining a 3D geometric surface (rib pattern) into the mold cavity and texturing via a hybrid laser-ablation graining process. The hybrid process shortened delivery timing 3-4 weeks, achieved styling objectives in a customer-cleanable part with improved scratch/mar. Also, paint was eliminated, reducing cost and improving recyclability. Moldfilling analysis, tool planning, and part design were key to success.

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Together with our customers and suppliers, we are creating solutions in the automotive market through a polymer portfolio dedicated to innovation and sustainability.

Congratulations to this year's Finalists and Winners!

| System Supplier: | Antolin |
|--------------------|-------------------------------|
| Material Processor | Antolin |
| Material Supplier | LyondellBasell & Avient Corp. |
| Resin: | TPO |
| Tooling Supplier: | Antolin |

Up to a 25% weight reduction with no loss of stiffness and 25% CO₂ reduction were achieved in this MIC, Class A TPO door panel (carrier + map pocket) by combining core-back molding and chemical foaming in a multicavity tool with significant volumetric differences between cavities. A key enabler was use of a proprietary pressure regulation system with in-mold sensors, a TPO material specially developed for core-back/ foaming, and a chemical foaming technology that achieved uniform and well-defined cell structure in both parts.

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BODY INTERIOR



Mega Bin / Frunk 2024MY Ford Motor Co. Ford F-150 Lightning

Mechanized Cupholder 2023MY General Motors Co. Cadillac Lyriq

System Supplier: Cascade Engineering Material Processor Cascade Engineering Celanese Corp. Material Supplier Celstran PP-GF40 AD3004 (PP-LFT 40%) Resin: Tooling Supplier: Commercial Tool Group

By converting from compression molded painted SMC to injection molded MIC LFT-PP to produce this large Class A composite frunk - currently industry's largest - mass was reduced 48%, productivity was increased owing to a 37% cycle time reduction, the cost and environmental burden of paint were eliminated, seal interfaces were improved, secondary routering of holes is no longer needed, and the frunk is fully recyclable at end of life. A 4,000 ton injection press and a tool equipped with a 16-drop hot runner system are used to mold parts.



| System Supplier: | ABC Technologies Inc. |
|--------------------|-----------------------|
| Material Processor | ABC Technologies Inc. |
| Material Supplier | multiple |
| Resin: | multiple |
| Tooling Supplier: | Shuai Te Long |
| | |

An innovative cupholder mechanism that accommodates the handle of a mug via pressure activation and is deactivated via a hidden push-button maintains the clean visual appearance of a traditional cupholder and console with added functionality in limited packaging space. Injection tooling with complex slides and lifters were used to mold this complex part design.



Cascade Engineering Specializes in Large Tonnage Injection Molding



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Product Capabilities:

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SUSTAINABILITY

Basalt Fiber-Reinforced ADAS Bracket 2024MY Ford Motor Co. Ford F-150



By replacing E-glass with basalt fiber in this injection molded ADAS bracket, which also contained 60% PIR PA6, cost and weight were neutral, the part met all performance requirements, no tooling changes were needed, but a CO_2 reduction of 74% was achieved and 180,000 kg of material annually is kept from landfills. The drop-in change is more sustainable, addresses issues with glass shortage, and provides the same performance as virgin.

One-Piece Thermoplastic Frunk 2024MY Ford Motor Co. Ford Mustang Mach E

| System Supplier: | IAC Group |
|--------------------|---------------------------|
| Material Processor | IAC Group |
| Material Supplier | Advanced Composites, Inc. |
| Resin: | ADX8327 20% PCR TPO |
| Tooling Supplier: | HS Inc. |

This is the first time a 20% PCR recycled material has been used in a colormatched, MIC, Class A structural funk application. Versus virgin TPO, the more sustainable grade lowered density slightly and offered better impact at -15°C. Concurrent redesign reduced component count from 6 to 1, including eliminating 2 metal brackets, saving 3 kg of mass, increasing cargo volume and functionality, improving water management, reducing cost and labor, and saving an estimated 1,125 tons of CO₂ annually. PCR content is sourced from yogurt cups and packaging materials. Bracket from Recycled BMC 2023MY General Motors Co. Chevrolet Silverado LD

| System Supplier: | Valeo Lighting Systems |
|--------------------|------------------------------------|
| Material Processor | Techniplas |
| Material Supplier | LyondellBasell |
| Resin: | Dura BMC 304UP |
| Tooling Supplier | Chicago Mold Engineering Co., Inc. |

Replacing magnesium with unsaturated polyester BMC yielded structural brackets meeting high dimensional requirements at comparable or improved mechanical performance – especially toughness. The bracket was made more sustainable with inclusion of 6% PIR PMMA and 5% PIR BMC scrap, which replaced calcium carbonate filler. It took 2 years of work to develop the process to recover and reclaim thermoset BMC scrap and reuse it in new parts with a lower CO_2 footprint. Key to the success of the program were grinding, sizing, and formulation strategies. No tooling changes were required vs. virgin BMC.



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SUSTAINABILITY



Eco-Friendly Cable Control 2024MY Ford Motor Co. Ford Mustang

INALIS

Center Console Structures 2022MY General Motors Co. Chevrolet Traverse & Buick Enclave



 Resin:
 Redefyne IAI2H BK0858 PA66

 Tooling Supplier:
 Not available

 This is the first broad-scale shift from virgin to PIR PA6/6 in cable management parts, a drop-in-change offering comparable performance, activation and processing at lower cost and 35% lower carbon footprint

aesthetics, and processing at lower cost and 35% lower carbon footprint without any part design or tooling changes. Although the parts are small, they are produced in high-cavitation injection tooling and offer best-inclass mechanical, thermal, and chemical performance. In just the first year, the change removed 138,000 kg of $\rm CO_2$ and saved 70,000 kg of coal and 144 billion barrels of crude oil from being used.



| System Supplier: | NYX, Inc. |
|--------------------|-------------------------|
| Material Processor | NYX, Inc. |
| Material Supplier | Not available |
| Resin: | PRC100G2.5M1.5 black PP |
| Tooling Supplier: | HS Inc. |
| | |

Short-glass and mineral/PIR PP replaced virgin LFT-PP in this MIC injection molded structural application without any part design or tool changes. Since 100% of the resin is PIR, the carbon footprint was reduced by \sim 50% and cost was lowered 46%, yet the part met all the performance requirements of the benchmark virgin material with longer fiberglass without deviation.

Sustainable Instrument Panel 2024MY Fisker Inc. Fisker Ocean



| System Supplier: | Magna International |
|--------------------|--------------------------|
| Material Processor | IAC Group |
| Material Supplier | Covestro AG |
| Resin: | Bayblend T85X R25 PC/ABS |
| Tooling Supplier: | IAC Group |

Every injection molded PC/ABS part on this IP (24), including Class A surfaces, or 38% of the total mass of the IP is produced using 25% PIR PC/ABS resin. This shift reduces the carbon footprint by 15% and diverts 34,019 kg of material from the landfill each year. All PIR PC/ABS parts are MIC, eliminating the cost and environmental burden of paint, which contributes further to CO_2 reductions. No compromise in performance or aesthetics was seen and no part or tooling modifications were needed for this drop-in-change.

Mechanically Recycled Dashboard Carrier 2023MY Fisker Inc. Fisker Ocean



| System Supplier: | IAC Group |
|--------------------|----------------------------|
| Material Processor | IAC Group |
| Material Supplier | SABIC |
| Resin: | Stamax T5E-40YR270E LFT-PP |
| Tooling Supplier: | Not available |

This injection molded dashboard carrier is produced using 25% PIR LFT-PP. The recycled polymer is cost neutral and provides similar properties to virgin with no performance compromise or drop in lot-to-lot consistency. However, sustainability of the application was increased significantly, with 13% lower global-warming potential and 25% lower cumulative energy demand. The drop in solution required only minor changes in gate location.



MATERIALS

INALIS

Moon Pattern Load Floor 2024MY General Motors Co. GMC Hummer EV



| System Supplier: | Valley Enterprises Int'l., LLC |
|--------------------|--------------------------------|
| Material Processor | Valley Enterprises Int'l, LLC |
| Material Supplier | Celanese Corp. |
| Resin: | USKIN W2 PUR |
| Tooling Supplier: | Reed City Group |
| | |

This innovative load floor is lower cost and lighter weight (eliminating the need for extra rubber mats often purchased to cover carpeted load floors), offers improved appearance and cleanability, provides better wear resistance and a waterproof surface, and improved design flexibility (permitting a lunar pattern in keeping with vehicle's offroad theme). In addition, a molded hinge feature plus embedded metallic brackets that remain hidden but permit attachment of plastic mounting brackets add extra functionality. The multilayer component is comprised of a sandwich of honeycomb core, fiberglass-reinforced PUR skins and a non-woven carpet layer.

Low-Friction Rotor-Shaft Seal 2021MY BMW AG BMW iX3



| System Supplier: | SKF Sealing Solutions GmbH |
|--------------------|----------------------------|
| Material Processor | SKF Sealing Solutions GmbH |
| Material Supplier | Solvay SA |
| Resin: | Tecnoflon P457 / P757 FKM |
| Tooling Supplier: | Not available |

By replacing PTFE with FKM seals in this rotor-shaft application, eccentricity and dynamic runout capabilities were improved, lower friction losses were seen, and excellent wear resistance was achieved, which should translate to longer service life for the part. The injection molded seals, which are PFAS-free and therefore greener, also provided excellent resistance to hot oil and required minimal power consumption even at high speeds. Cost is neutral and compression set is equivalent to the benchmark material.

Console Hinge Bracket 2024MY Ford Motor Co. Lincoln Corsair

| System Supplier: | IAC Group |
|--------------------|--------------------------|
| Material Processor | IAC Group |
| Material Supplier | The Materials Group |
| Resin: | Optilon N6 50BFM HSL PA6 |
| Tooling Supplier: | Not available |
| | |

This high-fiber, MIC, injection molded, Class A console hinge bracket features more sustainable basalt rather than E-glass fiber reinforcement. No reduction in performance or durability was seen in these colormatched 50% basalt/PA6 parts, but the switch addressed fiberglass shortages, reduced costs, and improved CO₂ footprint.

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MATERIALS



Dash Inner 2024MY General Motors Co. Chevrolet Silverado & GMC Sierra



| System Supplier: | Cascade Engineering |
|--------------------|------------------------------|
| Material Processor | Cascade Engineering |
| Material Supplier | Noble Polymers, Inc. |
| Resin: | Ecobarrier 2016 flexible TPO |
| Tooling Supplier: | Commercial Tool Group |

By switching from vacuum formed EVA to injection molded TPO on this part, cost and mass were reduced, since retainers were eliminated, saving on tooling costs, stiffness was improved as was NVH, and it was easy to incorporate fixtures to attach harness brackets. A new flexible TPO material was specifically developed for the application.

Battery Module Side Plates 2024MY General Motors Co. Chevrolet Corvette E-Ray

| System Supplier: | Novares Group |
|--------------------|----------------------------|
| Material Processor | Novares Group |
| Material Supplier | RTP Co. |
| Resin: | RTP 299 K X 138337 E BLACK |
| Tooling Supplier: | Liberty Molds, Inc. |

By replacing metals with RTP 299 K X 138337 E BLACK PAA material to injection mold the side plates for this battery module, extremely flat parts with high dimensional accuracy, stiffness, and strength were achieved in a complex geometry. The high-modulus, creep-resistant FR polymer eliminated the need for compression limiters and electrical isolation films, yet withstands extreme pressures from cell expansion and met all mechanical requirements. Additionally, 4 components were reduced to 1 and many functional features were incorporated in the patented side plates that would not have been possible in metals. Mass was reduced 37% and cost 55%.



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CHEMISTRY THAT MATTERS"

Roof Vent Cover 2023MY Rivian LLC RSV & RCV

| System Supplier: | SRG Global |
|--------------------|-------------------|
| Material Processor | SRG Global |
| Material Supplier | SABIC |
| Resin: | LEXAN SLX2271T PC |
| Tooling Supplier: | Not available |

This high-gloss, MIC PC block copolymer with self-healing capabilities offers better UV stability, scratch resistance, and thermal performance than painted ABS or PC/ABS, while reducing cost significantly owing to elimination of paint. No tooling changes were required, the $\rm CO_2$ footprint was reduced, parts are now recyclable at end of life (owing to elimination of paint), and multiple color options are available.



MATERIALS

2021MY Battery Casing 2021MY Mercedes-Benz Group AG Daimler S-Class Front Light Bezel 2023MY Volkswagen AG Volkswagen Polo





| System Supplier: | Valeo |
|--------------------|--|
| Material Processor | Valeo |
| Material Supplier | Envalior |
| Resin: | Tepex dynalite organosheet & Durethan 102-RG600 BKV 60 EF PA6 overmolding compound |
| Tooling Supplier: | Christian Karl Siebenwurst GmbH & Co. KG |

This high stiffness and strength thermoplastic composite battery case is 40% lighter than metallic solutions with comparable mechanical performance and lower CO₂ impact. Tooling and process development were important to ensure moldability of the complex shape deep-draw part, which incorporates features to position and hold the organosheet during overmolding to prevent wrinkling. Additionally, thermal isolation, and functional integration were key enablers as was water tightness of the one-piece, net-shape design molded in a single process step. The product is cost-competitive with metallic solutions.



| System Supplier: | Arteb Group |
|--------------------|-------------------|
| Material Processor | Arteb Group |
| Material Supplier | SABIC |
| Resin: | Lexan HF4010SR PC |
| Tooling Supplier: | Not available |

To solve the triple challenge of complex bezel geometry in a large but thin molding, cost sensitivity, and an existing injection press with limited clamping force, a new PC material was developed that offered enhanced flow while maintaining key properties and featured an internal mold release. Better flow enabled molding on the existing press at reduced clamping force and injection pressure while also reducing mass and cost. Internal mold release aided demolding efforts with the design's tighter draft angles.





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SPE® ANNOUNCES LIFETIME ACHIEVEMENT AWARD WINNER -*Kevin N. Pageau* HONORED AT SPE AUTOMOTIVE INNOVATION AWARDS GALA

KEVIN N. PAGEAU, owner and president of International Marketing Alliance and a major contributor to the SPE Automotive Division Innovation Awards Program for many years, has been named the 2023 Lifetime Achievement Award winner by the Automotive Division of the Society of Plastics Engineers (SPE®). For over 40 years, Pageau has led key advancements in the automotive plastics industry including being an early pioneer in the application of CAE technologies – Pageau ran GE Plastics first 3D finite element moldflow analysis, and provided technical analysis of numerous leading edge applications at GE. He also developed one of the first warp analysis tools, where the melt flow angle for each element was calculated and used to predict fiber orientation in glass filled materials – leading to additional roles at GE as Project Engineer, Business Development Specialist and

Business Development Manager; As Director of Engineering at Plastics Engineering & Technical Services (PETS) he developed proprietary methods, computer programs and algorithms to optimize the analysis of hot and cold runner systems for complex automotive molds, as well as implementing some of the first commercial "mold cooling" analysis projects.

Pageau has also led a team of tooling engineers, project engineers, and quality engineers in the development of decorative plastics molds and processes as Director of Advanced Engineering at Dott Industries. As a Manufacturer's Representative at Mayne-McKenney, he built significant business for Principals in the areas of satellite radio antennas, engineered foam and injection molding.

Pageau joined International Marketing Alliance (IMA) in 2003 and helped build it into a leading sales and marketing firm for automotive components. IMA represents seven domestic and international companies, with product areas including injection molding, decorative plastics of all types, engineered foam, LED lighting systems, and advanced seat comfort systems, generating revenues of approximately \$100 million dollars annually. His involvement in SPE goes back to his GE Plastics days, where he was on the development team that won an SPE award for the Chrysler 1990 Eagle Premier Azdel bolster. He became active in the Automotive Division in 1992 as Newsletter Editor, where he upgraded the quality of the newsletter, and increased ad revenue to make the newsletter break even for the first time in years. He then held other positions in the Automotive Division leadership, including Secretary, Treasurer, Vice-Chair and Chairman. He was recognized as an Honored Service Member of SPE in 2004.

The SPE Automotive Innovation Awards Competition and Gala has grown over the years to become known as the Academy Awards of the Automotive Industry with Pageau's leadership.

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Kevin N. Pageau

In addition to being Awards Program Chair for a few years, he has managed and streamlined the nomination and judging process, worked with the team to upgrade the audio visual and other program features, and reduced the "run of show" time to two hours, while still recognizing all winners and finalists in a very professional event. He continues to manage the nomination and judging process, write the script for the show and produce the presentation files for the event.

His formal education includes a Bachelor of Science degree in Mechanical Engineering from Michigan Technological University in Houghton, Michigan.

'I am humbled and grateful to be honored with the SPE Automotive Division Lifetime Achievement award and especially thankful to my friends in the industry and to my family for their incredible support over the years,' said Pageau.

KEVIN N. PAGEAU - WORK EXPERIENCE:

- International Marketing Alliance (IMA), Owner and President (2003 – Present), representing:
 - Sonoco Protective Solutions
 - Hirosawa Automotive Trim
 - Hirotai Automotive Trim S.A. de C.V.
 - Sunway Precision Industries
 - Tangtring Seating Technologies
 - E-Lan Car Components (USA) Inc.
 - Ichia Technologies
- Mayne-McKenney, Account Manager (2001-2003)
- BP Amoco, Account Manager (1999 2001)
- Dott Industries, Account Manager/Director of Advanced Engineering (1993 – 1999)
- Plastics Engineering & Technical Services (PETS), Director of Engineering (1991 – 1993)
- GE Plastics, Project Engineer/Business Development Specialist/ Business Development Manager (1981 – 1991)

Kevin is the smartest guy I know in this industry,' said **Frederick Deans**, P.E. owner, Allied Composites Technology and SPE Lifetime Achievement Award recipient in 2015. 'Many of the plastics tooling analysis programs used in industry today are a result of Kevin's ingenuity.'

'Kevin's long career in automotive plastics has been filled with many significant achievements, and commercially,' both technically said Mark Lapain, senior business development manager at Advanced Composites and SPE Lifetime Achievement Award Chair. 'Kevin's involvement in SPE, where he served as the Automotive Division Chairman and as a key organizer for the Innovation Awards, are truly noteworthy,' continued Lapain. 'The SPE Automotive Innovation Awards would not be the same without Kevin's many contributions, which date back to the early 1990s.'

'I greatly appreciate Kevin's leadership and support enhancing the SPE Automotive Innovations Awards program over the years,' said **Dr. Jeffrey Helms,** global automotive director, Celanese and SPE Automotive Innovation Awards Gala Chair. 'Honoring Kevin with our 2023 Lifetime Achievement Award will be a highlight of this year's event.'

SPE's Automotive Innovation Awards Program is the oldest and largest competition of its kind in the world. Dozens of teams made up of OEMs, tier suppliers, and polymer producers submit nominations describing their part, system, or complete vehicle and why it merits the claim as the Year's Most Innovative Use of Plastics. This annual event typically draws over 800 OEM engineers, automotive and plastics industry executives, and media. As is customary, funds raised from this event are used to support SPE educational efforts and technical seminars, which help educate and secure the role of plastics in the advancement of the automobile.

PAST LIFETIME ACHIEVEMENT AWARD WINNERS

First given in 2001, the SPE Automotive Lifetime Achievement Award recognizes the technical achievements of individuals whose work – in research, design, and/or engineering – has led to significant integration of polymeric materials on passenger vehicles. Past winners include:

- J.T. Battenberg III, then chairman and chief-executive officer of Delphi Corp. (2001)
- · Bernard Robertson, then executive vice-president of DaimlerChrysler (2002)
- · Robert Schaad, chairman of Husky Injection Molding Systems, Ltd. (2003)
- Tom Moore, retired vice-president, Liberty and Technical Affairs at then DaimlerChrysler (2004)
- Mr. Shigeki Suzuki, general manager Materials Division, Toyota Motor Co. (2005)
- Barbara Sanders, then director-Advanced Development & Engineering Processes, Delphi Corp. (2006)
- Josh Madden, retired executive at General Motors Corp. (GM) & Volkswagen of America (2007)
- Frank Macher, former CEO of Collins & Aikman Corp., Federal Mogul Corp., and ITT Automotive (2008)
- Irv Poston, retired head of the Plastics (Composites) Development-Technical Center, General Motors Corp. (2009)
- · Allan Murray, Ph.D., retired technology director, Ford Motor Co. (2010)
- David B. Reed, P.E., retired staff engineer, Product Engineering, General Motors Co. (2011)
- Gary Lownsdale, P.E., retired chief technology officer, Plasan Carbon Composites (2012)
- Roy Sjöberg, P.E., retired executive engineer-Viper Project, Chrysler Corp. (2013)
- · Dr. Norm Kakarala, retired senior technical fellow, Inteva Products, LLC (2014)
- Fredrick Deans, P.E., chief marketing officer, Allied Composite Technologies LLC (2015)
- Dr. Lawrence T. Drzal, university distinguished professor of Chemical Engineering and director-Composite Materials and Structures Center at Michigan State University College of Engineering (2016)
- Dr. Suresh Shah, retired senior technical fellow at Delphi Corp. (2017)
- Dr. Rose A. Ryntz, retired vice-president, Global Advanced Development and Material Engineering at International Automotive Components (IAC) Group (2018)
- Michael Whiten, retired global director Vehicle & Enterprise Sciences, Ford Motor Co. (2019)
- Nippani R. Rao, (1939-2021) president, RAO Associates (2009-2021); technology manager, Asahi Kasei North America (2008-2010); materials engineering supervisor, Chrysler (1986 – 2008) Awarded Posthumously in 2021
- Probir Guha, president and founder, Composites Innovations Inc. (2022)

The SPE Automotive Division Lifetime Achievement Award committee was chaired by Mark Lapain, Advanced Composites. Other committee members include:

- Mark Lapain, Advanced Composites Mark.Lapain@advcmp.com
- Fred Deans, Allied Composite Technologies LLC fdeans@alliedcomptech.com
- Teri Chouinard, Intuit Group, LLC
 teri@intuitgroup.com
- Tom Pickett, General Motors Co. thomas.pickett@gm.com
- Norm Kakarala, Inteva Products LLC (retired) sriman.kakarala@gmail.com
 - Suresh Shah, Delphi (Retired) sbshah356@gmail.com
- Alper Kiziltas, Amazon kiziltasalper@gmail.com
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PROCESS/ASSEMBLY/ ENABLING TECHNOLOGIES

Seat Module 2024MY Toyota Motor Corp. Toyota Grand Highlander Alternative Attachment Method for HVAC Ducts 2021MY General Motors Co. Buick Envision



This patented injection molded module for seats incorporates both temporary and permanent holding features to control cables and dramatically reduce both components and labor at the seat manufacturer. Cables are delivered to the Tier 1 pre-routed on the module plate, eliminating the brackets, cable ties, and clips typically used to control seat cables, and greatly reducing labor for an assembly operator. The module also reduces rework and scrap due to cable misalignments. Additionally, lever pull effort for consumers is reduced since direct cable routing enables use of shorter cables.

Roof Module Sensor-Pod Camera Baffles 2024MY General Motors Co. Cruise Origin



| System Supplier: | GKN Additive (Forecast3D) |
|--------------------|------------------------------|
| Material Processor | GKN Additive (Forecast3D) |
| Material Supplier | HP Inc. |
| Resin: | HP 3D High Reusability PA 12 |
| Tooling Supplier: | Not available |

Use of additively manufactured baffles to hold the 16 cameras mounted on each of these low-volume, autonomous vehicles enabled a fast-tomarket development approach that permitted baffles to be tuned to sensor requirements quickly as designs evolved. Baffle geometry could not have been achieved via conventional subtractive manufacturing methods. Additive manufacturing completely eliminated the cost of hard tooling and engineering changes to that tooling. Baffles are dyed black after printing and depowdering.



| System Supplier: | Jiangsu Olive Sensing High Tech Co. Ltd. |
|--------------------|--|
| Material Processor | Jiangsu Olive Sensing High Tech Co. Ltd. |
| Material Supplier | Shanghai Jinfei |
| Resin: | HHM5502BN HDPE |
| Tooling Supplier: | Jiangsu Olive Sensing High Tech Co. Ltd. |

Use of new "alligator tail" retention features eliminated the need for fastener attachments between blow molded cabin ducts and surrounding components. Not only did this reduce component count and improve NVH, but it facilitated positioning and reduced assembly time. The integral strap with height-adjustment features is located on the parting line of the part and produced from extra material that would otherwise be cut away after demolding.



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PROCESS/ASSEMBLY/ ENABLING TECHNOLOGIES

AUTOMOTIVE

EGR Actuator 2015MY Ford Motor Co. Ford F-150



| System Supplier: | Korens |
|--------------------|---|
| Material Processor | Alps Electric Korea Co., Ltd. |
| Material Supplier | Solvay SA |
| Resin: | Amodel A-1145HS LZT, AS-1566HS, & A-1130FW PPA |
| Tooling Supplier: | Alps Electric Korea Co.,Ltd. |

This laser-transparent, injection moldable, black PPA grade not only facilitates laser welding of cover to body using different materials but it boosts thermal resistance to 270°C and improves friction wear properties due to a lower coefficient of friction. Furthermore, its mineral/glass reinforcement package provides excellent dimensional stability for strong laser welds. The material/welding combo met performance requirements and increased productivity, contributed more efficient engine operation, and was significantly lighter than aluminum. Gate location optimization via CAE and DOE were key during molding trials.



| Nifco America Corp. |
|---------------------|
| Not available |
| Celanese Corp. |
| Zytel 45HSB PA6/6 |
| Not available |
| |

Moving from drilled metal to molded plastic tubes on spray bars can reduce mass and cost and reduce contamination concerns involving the presence of metal shavings from drilling operations. To create an enclosed structure with the holes needed to spray fluid via injection molding, parts must be molded in 2 complex, contoured halves and joined. The cleanest joining process proved to be laser welding. The high-flow, heat-stabilized PA6/6 grade was selected for its high thermal resistance, low contamination, consistent quality, and resistance to automatic transmission fluid.



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| System Supplier: | HP Inc. & Carbon, Inc. |
|--------------------|---------------------------------|
| Material Processor | GKN Additive (Forecast3D) |
| Material Supplier | HP Inc. & Carbon, Inc. |
| Resin: | HP PA12 HR & Carbon EPX82 epoxy |
| Tooling Supplier: | Not available |

To meet application specifications and very-tight timing requirements, 2 different polymer additive manufacturing processes (MJF and SLA) and 2 different polymers (PA12 and epoxy) were combined to produce the compressor housing for this low-volume, autonomous vehicle. MJF offered high throughput and cost effectiveness for the bulk of the compressor housing while SLA offered higher dimensional tolerances and smoother surface finish on the connector, which facilitated passing USCAR push/pull requirements. By using each process' strength and bonding parts together, cost and performance were optimized, tooling was eliminated, and program delays were avoided.



PROCESS/ASSEMBLY/ ENABLING TECHNOLOGIES



Battery Module Structure 2024MY General Motors Co. Chevrolet Corvette E-Ray Headlamp Bezel 2023MY Stellantis Jeep Wrangler



| System Supplier: | General Motors Co. | |
|--------------------|---|--|
| Material Processor | Novares Group | |
| Material Supplier | RTP Co. & Solvay SA | |
| Resin: | RTP 299 KX133837E PARA & Amodel A-1145 HS BK 324 PPA | |
| Tooling Supplier: | Liberty Molds, Inc. | |

This all-thermoplastic battery structure combines 2 side plates and 45 repeating spacers bolted together to hold pouch-style batteries. The patented, volumetrically efficient design withstands high cell expansion forces during battery use while eliminating the need for 55 compression limiters plus isolation countermeasures necessary with metals. Side plates are injection molded with 50% GR/PARA while spacers are injection molded with 45% GR/PPA. Both materials required high molding precision, dimensional accuracy, flame retardance, and the ability to integrate a variety of functional features that facilitate assembly. Versus aluminum, both mass and cost are reduced.

Valence Panel Tooling 2024MY General Motors Co. Chevrolet Colorado & GMC Canyon



| System Supplier: | Forvia |
|--------------------|----------------------------------|
| Material Processor | CS Manufacturing, Inc. |
| Material Supplier | Advanced Composites, Inc. |
| Resin: | ADX5377 15% talc/TPO |
| Tooling Supplier: | Hi-Tech Mold & Engineering, Inc. |

Unique features like Class A ribs and thin-wall visible vanes on this MIC injection molded valence panel meant to meet studio objectives and air handling requirements made it challenging to mold, leading to flow lines and gas traps on the A surface. Replacing 18 EDM'd mold inserts with 2 metal additive inserts incorporating both conformal cooling channels and engineered venting addressed molding issues, provided excellent aesthetics and stronger knitlines, simplified tool maintenance, and was cost neutral.



| System Supplier: | Marelli Holdings Co., Ltd. |
|--------------------|----------------------------|
| Material Processor | Marelli Pulaski,TN |
| Material Supplier | Celanese Corp. |
| Resin: | Vectra e531iD black LCP |
| Tooling Supplier: | A.N.T. Co., Ltd. |

By switching from die cast magnesium to injection molded MIC LCP on these headlamp bezels, higher cavitation tooling that lasts significantly longer can be used. The fast cycling polymer adds additional molding productivity. Furthermore, secondary finishing operations, including the anodizing process, are eliminated, and the manufacturing $\rm CO_2$ footprint is lowered. Weight savings of 20% and finished bezel cost savings of 56% were achieved.

Console Structural Carrier Tooling 2024MY General Motors Co. Cadillac Lyriq



| System Supplier: | ABC Technologies Inc. |
|--------------------|------------------------------------|
| Material Processor | ABC Technologies Inc. |
| Material Supplier | Celanese Corp. |
| Resin: | Celstran PP-GF40-0453 (40% LFT-PP) |
| Tooling Supplier: | Integrity Tool and Mold Inc |

Very-tight packaging space and the for space for an HVAC outlet in the console meant a traditional through-pin-type hinge could not be used on the armrest to keep it latched during a crash. A friction hinge with inertial lock — previously only used in the furniture industry — solved the problem, but required unique tooling innovation to be feasible. The first triple-action, two-stage slide featuring a horn-pin driven slide with collapsible lifters on top of a hydraulic main bottom slide was developed, enabling direct edge gating on top of the slide to optimize filling conditions.

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ELECTRIC AND AUTONOMOUS VEHICLE SYSTEMS

E-Crate Battery Enclosure 2024MY General Motors Co. E-Crate Engine



Battery Disconnect Unit 2023MY General Motors Co. GMC Hummer EV



| System Supplier: | SGL Carbon SE |
|--------------------|---------------|
| Material Processor | SGL Carbon SE |
| Material Supplier | SGL Carbon SE |
| Resin: | GR/epoxy |
| Tooling Supplier: | SGL Carbon SE |

Battery enclosures for these electric tugs are produced via wet compression molding using unidirectional, quasi-isotropic E-glass/epoxy composite. Low-cost tooling produces 4 L-shaped parts, which are riveted together. The assembly fixture is also the check fixture. Replacing sand-cast aluminum, tooling complexity was decreased, mass was lowered 25%, and cost was reduced 75%. Elimination of multiple secondary operations wiped out 3 weeks of work-in-progress inventory, plus production assembly time was shortened 40+ minutes. The FR epoxy performs well in thermal runaway events. Scrap loss and dimensional tolerance issues were also eliminated vs. cast aluminum.

Interconnect Board Cover 2023MY General Motors Co. Cadillac Lyriq & GMC Hummer EV



| System Supplier: | Grand Traverse Plastics Corp. |
|--------------------|----------------------------------|
| Material Processor | Grand Traverse Plastics Corp. |
| Material Supplier | Asahi Kasei Engineering Plastics |
| Resin: | Thermylene P4-20TC-0520 NT101 PP |
| Tooling Supplier: | Quest Industries, Inc. |

This FR PP cover was designed to finger-proof human contact with busbars and exposed busbar cell tabs for safe handling during manufacturing and servicing. It also helps electrically isolate the module when placed in the battery pack. Additionally, an ultrasonically staked mica barrier (comprised of a mica patch with silicone binder resin and a mica laminate impregnated with a high-temperature resin) attached to the cover significantly improves performance in a thermal runaway event, enabling the module to withstand high temperatures from neighboring modules while permitting venting of superheated gases.

| System Supplier: | Lear Corporation |
|--------------------|---|
| Material Processor | Lear Corporation |
| Material Supplier | BASF Corp. |
| Resin: | Ultramid 66 H2 G25 V0KB1 Ultradur B4450G5 HR |
| Tooling Supplier: | Lear Corporation |

Two BDUs have been integrated into a single system supporting two 400V systems, which enable fast and safe recharging of EVs and disconnects power in an over-current situation to protect passengers. The meter-long parts feature a complex design that offers improved thermal management and reduced component mass. Two UL94 VO halogen-free materials—one with very-high CTI—replaced die-cast aluminum while maintaining superior physical properties and ease of processing. Complex simulation and process optimization were also key to success.



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ELECTRIC AND AUTONOMOUS VEHICLE SYSTEMS

INALIST



Interconnect Board 2023MY General Motors Co. Cadillac Lyriq & GMC Hummer EV Battery Module Component 2023MY Hyundai Motor Group Ioniq 6

| System Supplier: | Korea Electric Terminal Co., Ltd. |
|--------------------|-----------------------------------|
| Material Processor | Korea Electric Terminal Co., Ltd. |
| Material Supplier | Lumid GN2251BF PA66-GF25 |
| Tooling Supplier: | Not available |

FINALIST

This patented interconnect board (ICB) design supports, cools, and isolates cell tabs/busbars, provides support and structure to the module between the top cover and cold plates, and aids assembly by guiding, supporting, and constraining cell tabs. The overmolded busbar design, which reduces copper usage ~25%, allows cooling through the frames from the cold plate. Honeycomb and rib features on the back reduce mass, increase clearance to cells, improving structure, especially during critical manufacturing processes, and contribute to finger-proofing requirements. Additionally, the hinged ICB ships flat, reducing shipping space 78%, then folds for assembly.

| System Supplier: | Hyundai Mobis Co., Ltd. |
|--------------------|---------------------------------------|
| Material Processor | Infac Corp. |
| Material Supplier | SABIC Korea |
| Resin: | SABIC [®] PPc H1030 PP-SGF30 |
| Tooling Supplier: | Not available |

Use of a 30% GR/PP material with intumescent FR package reduces weight 10% and cost 20% while improving fire safety vs. FR 30% GR/PA6. This is also the first thermoplastic to pass China's GB/T 41467.3-2015 fire safety regulation for EVs surviving 5 minutes at 1,000°C. Improved flow properties vs. PA6 permitted higher cavitation tooling to be used, doubling productivity in the same cycle time, while also lowering molding temperatures for energy and CO₂ improvements. Versus metals, mass reduction of 18 kg/vehicle is achieved. The design also features an integral overmolded busbar.

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SAFETY



Battery Disconnect Unit Finger-Safe Covers 2023MY General Motors Co. GMC Hummer EV

| System Supplier: | Grand Traverse Plastics Corp. |
|--------------------|--|
| Material Processor | Grand Traverse Plastics Corp. |
| Material Supplier | RTP Co. |
| Resin: | RTP 199 X 137777 D S-481951 Safety Orange FR-PP |
| Tooling Supplier: | Quest Industries, Inc. |

To increase safety and prevent accidental contact with high voltage connections during assembly and service, and to reduce warpage that could cause manufacturing concerns, the component was redesigned to include alternating coring patterns along the top and bottom surfaces, which reduced warpage 81%. The component also features slots to permit use of forward-looking infrared (FLIR) cameras to view busbar connections below the component surface. The FR UL94 VO material is supplied in safety orange.



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Intumescent Terminal Covers 2023MY General Motors Co. Cadillac Lyriq & GMC Hummer EV

| System Supplier: | Auto-Kabel Group |
|--------------------|-----------------------------|
| Material Processor | Molded Precision Components |
| Material Supplier | Pyrophobic Systems Ltd. |
| Resin: | Lithium Prevent 200 PVC |
| Tooling Supplier: | Not available |

A specially formulated flexible and intumescent PVC is designed to prevent arcing during thermal runaway events in high-voltage EV batteries. The high-temperature, high-voltage insulator is used to injection mold various terminal caps and barriers. Safety is increased during thermal runaway since the material maintains high dielectric strength, reducing arcing risk and ignition of gases, and forms a structured char barrier, helping reduce spread of fire from one module to another.



| System Supplier. | Detroit Manufacturing Systems LLC |
|--------------------|--|
| Material Processor | Forvia |
| Material Supplier | Mitsubishi Chemical Performance Polymers, Inc. |
| Resin: | Thermorun TT850N TPE |
| Tooling Supplier: | King Mold |

Owing to the vehicle's shallow sloped windshield, it was necessary to modify the typical U or Y design on the PAB chute door and hinge design to facilitate proper airbag deployment and prevent inadvertent cracking of the windshield. A combination of injection molding, vibration welding, in-mold grain lamination, and laser scoring are used to create a modified U/Y door/hinge design that opens as a U shape and then folds during windshield contact. After opening, momentum of the door is slowed via the hinge design.

CHEVROLET CORVETTE E-RAY WINS 2023 *Vehicle Engineering Team Award*

The **2024 MY Chevrolet Corvette E-Ray** and a team from **General Motors** and its suppliers that developed the electrified, all-wheel drive (eAWD) sports car have been named the winners of this year's **Vehicle Engineering Team Award (VETA).** First given in 2004, the VETA award recognizes the technical achievements of entire teams – comprised of automotive designers and engineers, tier integrators, materials suppliers, toolmakers, and others – whose work in research, design, engineering, and manufacturing has led to significant integration of polymeric materials on notable vehicles.

The **eAWD Corvette E-Ray**, whose formidable torque enables it to accelerate from 0-60 miles/hour in a mere 2.5 seconds, is the quickest accelerating Corvette in Chevrolet history. Described as not a plug-in-hybrid, the E-Ray utilizes two separate propulsion systems: a naturally aspirated 6.2-liter, small-block V-8 engine, which powers the rear wheels and turns out 495 horsepower and 470 foot-pounds of torque, plus an electric motor, which contributes an additional 160 horsepower and 125 foot-pounds of torque to the front wheels via a 1.9-kilowatt battery pack positioned in the tunnel area between the seats. In the E-Ray's case, electrification is used to enhance performance, although it still offers respectable fuel-efficiency for such a high-performance package. No need to plug in to recharge battery packs, which replenish their charge via regenerative energy during coasting and braking as well as normal driving. The battery packs provide the vehicle with an electric-only, stealth driving mode at startup that provides top speeds of 45 miles/hour and limited range used to exit a neighborhood quietly before the engine kicks in. Standard carbon ceramic brakes and magnetic ride control complement the vehicle's staggered 20- and 21-inch Michelin all-season tires when not racing, making it all-season capable. The vehicle vehicle with out a 2020 MV

wider overall than the 2020 MY Corvette Stingray. Not surprising, the 2024 MY E-Ray features numerous plastic and composite innovations that support the multi-patented electrified propulsion system. Many of these technologies were nominated in other categories of SPE's 2023 Automotive Innovation Awards Competition, including:

AFTERMARKET & LIMITED EDITION / SPECIALTY VEHICLES CATEGORY:

Carbon Fiber Wheel; Hybrid Battery Interconnect Board (ICB) and Plastic Oil Cooling Lines;

MATERIALS CATEGORY:

Battery Module Side Plates;

PROCESS/ASSEMBLY / ENABLING TECHNOLOGY CATEGORY:

Battery Module Structure.

Additionally, the Corvette E-Ray also features many carryover composites parts from the 2020MY Corvette Stingray, a 2019 VETA winner, including:

BODY EXTERIOR CATEGORY:

Rear Bulkhead Window Frame; Rear Fascia Assembly and Rear Surround Frame;

CHASSIS & HARDWARE CATEGORY:

Precision Wheel-Balance System and Underbody Tunnel Structural Closeout;

MATERIALS CATEGORY:

SMC/LMC Front & Rear Trunk Components;

POWERTRAIN CATEGORY:

Rear Induction Duct;

PROCESS/ASSEMBLY / ENABLING TECHNOLOGY CATEGORY:

Pultruded Rear Bumper and Rear Service Doors.

Corvette E-Ray

"We're incredibly proud to offer the first electrified and first all-wheel drive Corvette to customers," Josh Holder, Chevrolet Corvette chief engineer said. "For more than 70 years now, mixed material construction has been a cornerstone of Corvette's strength and speed. We're grateful to win a VETA award and we plan to continue to push the boundaries."

– Josh Holder, General Motors



PAST VETA WINNERS

Given periodically since 2004, earlier VETA winners include the teams that developed the:

- 2004 MY Porsche Carrera GT supercar,
- 2009 MY Ford Flex crossover utility vehicle (CUV),
- 2010 MY Ford Taurus sedan,
- 2011 MY Ford Explorer sport utility vehicle (SUV),
- 2011 MY Chrysler 200 & Dodge Avenger sedans,
- 2013 MY SRT Viper supercar,
- 2018 MY Chevrolet Traverse SUV,
- 2020 MY Chevrolet Corvette sports car,
- 2021 MY Ford F-150 pickup, and
- 2022 MY Cadillac Lyriq electric SUV.

Hall of Fame By Year

The Hall of Fame Award is given annually for an application that has been in continuous use for 15 years or more, and has made a significant and lasting contribution to the application of plastics in automobiles.

In 2021, we recognized the TOP FIVE PAST HALL OF FAME WINNERS (in no particular order): HDPE (High-Density Polyethylene) Fuel Tank awarded to Volkswagon AG in 2000; Front & Rear TPO (Thermoplastic Polyolefin) Bumper Fascias awarded to Generals Motors Co. in 2010; PVB (Polyvinyl Butyral) Windshield Interlayer awarded to Ford Motor Co. in 1988; PA (Nylon) Thermoplastic Intake Manifold awarded to Porsche AG in 2005; and PC (Polycarbonate) Headlamp Assembly awarded to Ford Motor Co. in 2007.

MATERIA

The awards banquet was not held in 2020 due to COVID retrictions.

YEAR RECOGNIZED OEM

APPLICATION

| 2022 | Volkswagen Group | Mold In Color (MIC) Weatherable Grill | Acrylonitrile Styrene Acrylate (ASA) poly |
|------|-----------------------|---|---|
| 2019 | Ford Motor Co. | Plastic-Metal Hybrid (PMH) Front End Structure | Urethane Mastic and/or PA |
| 2018 | Honda Motor Co. | Injection Molded Thermoplastic Energy Absorber | PC/PBT |
| 2017 | General Motors Co. | Thermoplastics Polyolefin Skin Instrument Panel | ТРО |
| 2016 | Ford Motor Co. | Polycarbonate Instrument Panel | PC /PC blends |
| 2015 | General Motors Co. | GMT Composite Bumper | PP/Glass GMT |
| 2014 | General Motors Co. | Blow-Molded CVJ Half-Shaft Drive-Axle Boot | TPE |
| 2013 | Ford Motor Co. | Integrated Front-End Module System | SMC |
| 2012 | General Motors Co. | First Publicly Accessible Airbag System | multiple |
| 2011 | General Motors Co. | Integrated Door Hardware Module | PC/PBT |
| 2010 | General Motors Co. | Front & Rear TPO Bumper Fascias | ТРО |
| 2009 | General Motors Co. | Thermoplastic Vertical Body Panel | MPPE/PA |
| 2008 | Chrysler LLC | Rear Seat Cushion | PUR Foam |
| 2007 | Ford Motor Co. | Radiator End Tank | PA 6/6 |
| 2006 | General Motors Corp. | Thermoplastic Front Grille | ABS |
| 2005 | Porsche AG | Thermoplastic Intake Manifold | PA |
| 2004 | Ford Motor Co. | Box Beam Bumper | PC/PBT |
| 2003 | General Motors Corp. | Dual-Density Energy Absorbing Bumper System | PP |
| 2002 | General Motors Corp. | Mini-Wedge Latch and Door-Lock Actuator | PA |
| 2002 | General Motors Corp. | Wiper-System Transmission Housing | PA |
| 2001 | General Motors Corp. | Instrument-Panel Retainer | SMA |
| 2000 | Volkswagon AG | Fuel Tank | HDPE |
| 1999 | Ford Motor Co. | Hydraulic Clutch Actuator | РА |
| 1998 | Peugeot Citroën Group | Fan Shroud | РА |
| 1997 | Ford Motor Co. | Transmission Seal | PPS |
| 1996 | General Motors Corp. | Front Fenders | RIM-PUR |
| 1995 | General Motors Corp. | Guide-Flex Energy Absorbers | EVA |
| 1994 | Ford Motor Co. | Headlamp Assembly | PC |
| 1993 | General Motors Corp. | Front/Rear Bumper Covers | RIM-PUR |
| 1992 | General Motors Corp. | Composite Exterior Body Panels | SMC |
| 1991 | General Motors Corp. | Tilt Steering-Wheel Centering Sphere | Acetal |
| 1990 | General Motors Corp. | Transverse Leaf Spring | Ероху |
| 1989 | American Motors Corp. | Battery Case | PP |
| 1988 | Ford Motor Co. | Windshield Interlayer | PVB |
| 1987 | General Motors Corp. | Grill-Opening Panel | SMC |
| 1986 | Chrysler Corp. | Heater Housing | PP |
| 1985 | Chrysler Corp. | Disc-Brake Piston | Phenolic |
| 1984 | General Motors Corp. | Front-Fender Wheel Liner | PP |
| 1983 | General Motors Corp | Emissions Control Canister | PA |

Grand Award By Year

| YEAR | OEM | APPLICATION | MATERIAL |
|------|-----------------------|---|-----------------------------|
| 2022 | General Motors Co. | Tension Leaf Spring | Ероху |
| 2021 | Ford Motor Co. | Multi-Material Rear Leaf Spring | HP-RTM fiberglass-reinforce |
| 2019 | General Motors Co | Composite Pickup Box | Carbon Fiber Reinforced PA |
| 2018 | Ford Motor Co. | Vacuum Generation System for Brake Assist | multiple |
| 2017 | Ford Motor Co. | Structural Active Grill Shutter (AGS) with Integrated Loose Layer Construction | PP GF |
| 2016 | Ford Motor Co. | Composite Suspensions for Upper and Lower Seat Backs | PA/TPO |
| 2015 | General Motors Co. | Ultralight Class A Body Panels | SMC |
| 2014 | Ford Motor Co. | Active Glove Box | TPO |
| 2013 | Nissan Motor Co. | All-Olefinic Liftgate | TPO/PP |
| 2012 | General Motors Co. | All-Olefin, Soft Skin, Stitched Full IP System | TPO |
| 2011 | Ford Motor Co. | Microcellular-Foam Instrument Panel | PP |
| 2010 | Ford Motor Co. | Diesel-Exhaust Fluid (DEF) System | multiple |
| 2009 | General Motors Co. | Shielded Plastic Case Radio | PC/ABS |
| 2008 | BMW AG | Twin-Sheet Blow-Molded Fuel System | HDPE |
| 2007 | General Motors Corp. | Backlighting with Color-Converting Plastic | PC |
| 2006 | DaimlerChrysler | Blow-Molded Front- & Rear-Bumper System | TPO |
| 2005 | Honda Motor Co. | Composite In-Bed Trunk | SMC |
| 2004 | Ford Motor Co. | Door Trim with Integrated Acoustic Chamber and Subwoofer | РР |
| 2003 | DaimlerChrysler | Roof Module | PC Copolymer |
| 2002 | DaimlerChrysler | Extruded Polymer Film Fascia | Multi-Layer Ionomer |
| 2001 | General Motors Corp. | Nanocomposite TPO | Nanocomposite TPO |
| 2000 | Ford Motor Co. | Controlled Energy Management Bumper Isolator | HDPE |
| 1999 | DaimlerChrysler | Fan Shroud and Reservoir Assembly | PP |
| 1998 | Mitsubishi Motors | "I" Section Bumper Beam | PP-GMT |
| 1997 | Ford Motor Co. | "Carpet to Car Parts" | PA |
| 1996 | General Motors Corp. | Structural Battery Tray | PP-GMT |
| 1995 | Ford Motor Co. | Integrated Front-End System | SMC |
| 1994 | General Motors Corp. | Thermoplastic Air-Intake Manifold | PA Copolymer |
| 1993 | Ford Motor Co. | Front-Suspension Stabilizer Link | POM |
| 1992 | Chrysler Corp. | Instrument-Panel System | PP-GMT, MPPE, PP & PU |
| 1991 | Chrysler Corp. | Integrated Child's Seat and Top Impact Pad | PP-GMT, Expanded MPPE |
| 1990 | General Motors Corp. | Exterior Door Panel | PC/ABS |
| 1989 | Chrysler Corp. | Composite Wheel | SMC/XMC |
| 1988 | General Motors Corp. | Front Fender | MPPE/PA |
| 1987 | General Motors Corp. | Quarter-Panel Assembly – Sportside | SMC |
| 1986 | General Motors Corp. | Quarter Window | PMMA |
| 1985 | General Motors Corp. | Windshield with Anti-Lacerative Layer | Polyvinyl Butyral/PE Film |
| 1984 | Ford Motor Co. | Drive Shaft | Vinylester/Graphite/Glass |
| 1983 | General Motors Corp. | Exterior Body Panels | SMC, RIM, RRIM, & TPO |
| 1982 | General Motors Corp. | Tailgate Assembly | SMC |
| 1981 | Ford Motor Co. | Radiator-Core End Caps | PA |
| 1980 | General Motors Corp. | Rear-Axle Leaf Spring | Ероху |
| 1979 | Ford Motor Co. | Grille-Opening Panel Assembly | SMC |
| 1978 | General Motors Corp. | Bucket-Seat Frame | SMC |
| 1977 | Ford Motor Co. | Instrument Panel | |
| 1976 | Ford Motor Co. | Fender Aprons | PP |
| 1975 | American Motors Corp. | One-Piece Jeep Top | PC |
| 1974 | General Motors Corp. | Fascia and Rear Bumper Cover | RIM-PUR |
| 1973 | Ford Motor Co. | Block-Heater Motor Housing | |
| 1972 | General Motors Corp. | Radiator Fan-Shroud Assembly | PP |
| 1971 | Ford Motor Co. | Transmission Reactor | Phenolic |

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Dr. Norm Kakarala +1. 248.840.6747

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The Automotive Division also sponsors our flagship **PlastiVan**[®] program, so hundreds of students get a classroom experience that includes lively demonstrations and hands-on activities, designed to excite students about the opportunities in science and engineering in the plastics industry. Students are educated about the chemistry, history, processing, manufacturing, and sustainability of plastics and how the science and real-world applications relate to their everyday lives.

Positive Plastics Education is an important step in changing the "plastics" narrative to reflect the science and innovative culture of our industry. The SPE Foundation relies on partners like the SPE Automotive Division to get our job done. If you or your company would like to support our efforts, please email **Eve Vitale** at **foundation@4spe.org**. The SPE Foundation and its partners utilize Positive Plastics Education in three areas of influence and impact. For Emerging Workforce, it awards scholarships and grants. To Create Opportunities for Historically Under-represented Populations in the plastics industry, including students of color, women, and students of lower socio-economic backgrounds, the Foundation collaborates with community partners to deliver multi-touch STEM education, engage students in after-school SPE STEM clubs, and collaborates with the Girl Scouts to engage girls in polymer science STEM activities. The PlastiVan® and PlastiVideo® programs engage students in the discussions and sciencebased evidence surrounding the Sustainability of Plastics and exposes students to the many career pathways available to them in the plastics industry.





PlastiVan[®] has shifted gears to PlastiVideo™!

If you'd like to sponsor a visit or bring virtual plastics education to your community contact us.

Julie Proctor, PlastiVan Program Coordinator jproctor@4spe.org

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PARTS

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Dr. Rodrigo Orozco Celanese Corp. +1.248.660.1325

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Tom Pickett General Motors Co. +1.248.432.9724

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Armando Sardianopoli BASF (retired) +1.734.895.5875

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Dr. Leonardo Simon University of Waterloo +1.519.888.4567 x33301

Dr. Soydan Ozcan Oak Ridge National Laboratories +1.865.456.5055

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Mark Lapain Advanced Composites +1.248.567.5455

Jeremy Lee Faurecia +1.248.409.3584

Jeff Mayville Ford Motor Co. +1.313.805.9500

Dhanendra Nagwanshi SABIC 1.248.760.3860

Dr. Suresh Shah General Motors Co. /Delphi (retired) +1 248.635.2482

Keith Siopes EMS CHEMIE N.A. Inc. +1.248.797.4607

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Suzanne Cole Miller Cole LLC +1 248.990.5277

Dr. Arash Kiani Alterra Holdings +1.812.271.1891

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Benefits:

- 8 Conference tickets
- Main hall 8' W x 6' D x 10' H booth space
- Half page advertisement in the conference proceedings
- Logo display in the SPE Automotive Division website
- Meeting room reservation during the conference

Platinum Sponsorship Fee:

- \$15,000 to be paid to SPE Automotive Division

2024 EAV Platinum Sponsorship

Benefits:

- 10 Conference tickets
- Premium 8' W x 6' D x 10' H booth space
- Full page advertisement in the conference proceedings
- Logo display in the SPE Automotive Division website
- Meeting room reservation priority during the conference

2 minutes podium time on Monday 4/8

Platinum Sponsorship Fees:

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- Must pay for a Reception or a Lunch Working directly with Marriott (\$25K cap)

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| 1/4 Page | \$1,000 | Available | Pens/Pencils | \$500 |
| Program Book Cover Options | | | Hotel room key advertisement | \$500 |
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| Inside Cover \$1,500 | | Tote Bags with Logo | \$500 | |

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- 8' W x 6' D x 10' H booth space
- Half page advertisement in the conference proceedings
- Logo display in the SPE Automotive Division website
- Meeting room reservation during the conference

Platinum Sponsorship Fees:

\$8,000 to be paid to SPE Automotive Division

2024 EAV Breakfast Sponsorship

Benefits:

4 Conference tickets
 Quarter page advertisement in the conference proceeding

Breakfast Sponsorship Fees:

\$4,000 to be paid to SPE Automotive Division

2024 EAV AM or PM Break Sponsorship

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3 Conference tickets Half page advertisement in the conference proceeding

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Benefits:

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- beginning of every presentation
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- Break Sponsorship Fees:

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