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SPE® AUTOMOTIVE DIV. NAMES FINALISTS FOR 46TH-ANNUAL AUTOMOTIVE INNOVATION AWARDS COMPETITION

TROY, (DETROIT) MICH. – The Automotive Division of the Society of Plastics Engineers (SPE®) today announced the finalists for its 46th-annual ***Automotive Innovation Awards Competition***, the oldest and largest recognition event in the automotive and plastics industries. Nominations were first subjected to a pre-qualification review and then were presented before a panel of industry experts on September 29-30, 2016; that panel sent forward the most innovative nominations (category *finalists*) to the Blue Ribbon judging round, which was held October 10, 2016. Category and Grand Award winners selected during the Blue Ribbon judging round will be announced on the evening of November 9, 2016 during the 46th ***SPE Automotive Innovation Awards Gala***. Finalists from this year's competition are listed below in category and submission order.

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CATEGORY: Aftermarket

• **DUAL-OPTION INSERT CARBON FIBER COMPOSITE FUEL-FILLER DOOR**

- **OEM Make & Model:** 2017 General Motors Co. Chevrolet Camaro sports car
- **Tier Supplier/Processor:** Polytec FOHA Inc. / NOVO Plastics Inc.
- **Material Supplier / Toolmaker:** Mitsubishi Rayon Co., Ltd., SABIC, & Basler / Integrity Tool & Mold Inc.
- **Material / Process:** Pyrofil carbon fiber, Noryl GTX modified-polyphenylene ether (MPPE)/ polyamide (PA 6); Urethane TR; clearcoat / injection or compression molding
- **Description:** This fuel-filler door design features inserts of either injection molded and painted MPPE/PA6 (in black, metallic silver, or red to match body paint) or compression molded and clear coated carbon fiber-reinforced composite with visible weave. The unique design of the system accommodates either the 2.0 mm-thick injection molded or the 1.0 mm-thick compression molded insert. The specially designed tool enables the Camaro name (with a 0.25 radius) on the fuel-filler door to be painted. Proprietary material is used for the visible-weave carbon composite version and a special clear coat on that insert offers 75% cost savings.

• **CARBON FIBER COMPOSITE SPOILER**

- **OEM Make & Model:** 2016 General Motors Co. Chevrolet Corvette sports car
- **Tier Supplier/Processor:** deBotech, Inc.
- **Material Supplier / Toolmaker:** Solvay / deBotech, Inc.
- **Material / Process:** Solvay MTM 57 epoxy
- **Description:** This 1-piece aftermarket epoxy/carbon fiber spoiler provides a premium carbon composite appearance and enables the same aerodynamic performance as production 3-piece spoilers with different aero variants while also reducing mass by 40%. The spoiler's unique design and proprietary tooling combines solid wickerbills and an open cavity blade plus integral threaded inserts to facilitate manufacturing and assembly. The 1-piece construction offers a cleaner appearance due to reduction of fasteners. The spoiler is offered in both clear coat with exposed weave and painted in carbon flash metallic paint.

CATEGORY: Body Exterior

• **STRUCTURAL FRONT END MODULE WITH ACTIVE GRILLE SHUTTER**

- **OEM Make & Model:** 2016 Ford Motor Co. Ford SuperDuty pickup
- **Tier Supplier/Processor:** Shape Corp.
- **Material Supplier / Toolmaker:** Celanese Corp. / Not stated
- **Material / Process:** Celstran 40-20 Black long-fiber thermoplastic (LFT) polypropylene (PP) / injection molding
- **Description:** This all-composite design without metallic reinforcement is the first active grille shutter (AGS)-capable, injection-molded LFT-PP front-end module (FEM) bolster used on a heavy-duty pickup platform. Replacing steel and plastic/metal hybrids at a 3 lb/1.4 kg and \$3 USD savings/vehicle, the design offers parts consolidation with locating features that aid fit & finish, improves airflow, while meeting structural requirements for part deflections of <1mm on this 8,500 lb/3,856 kg class vehicle.

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- **LIGHTWEIGHT GLASS**

- **OEM Make & Model:** 2017 Ford Motor Co. Ford GT40 supercar
- **Tier Supplier/Processor:** Pittsburgh Glass Works LLC
- **Material Supplier / Toolmaker:** Sekisui Chemical Co., Ltd. / Pittsburgh Glass Works LLC
- **Material / Process:** polyvinyl butyral (PVB) /multiple
- **Description:** Three of five glass positions on this vehicle feature chemically tempered glazing that is part of a thin, hybrid laminate solution with an interlayer of solar-control PVB film that reduces glazing weight approximately 37% while lowering heat transmittance to keep interiors cooler. Versus conventional 0.20 in./4.96 mm thick laminates featuring 2 layers of soda-lime glass (SLG) with a PVB interlayer, the new construction features standard-thickness layers of SLG and PVB plus a very-thin (0.03 in./0.7 mm) layer of chemically tempered glass for a total thickness of 0.14 in./3.56 mm. The resulting laminate is thinner, lighter, tougher, and offers optical advantages.

- **MIC HIGH GLOSS BODY COLOR TPO FASCIA**

- **OEM Make & Model:** 2017 Ford Motor Co. Ford Transit Connect van
- **Tier Supplier/Processor:** Magna Exteriors, Inc. / Magna Exteriors, Inc. - Nascote
- **Material Supplier / Toolmaker:** Advanced Composites, Inc. / Tycos Tool & Die
- **Material / Process:** ADX700 ADX70004WFA thermoplastic polyolefin (TPO) / injection molding
- **Description:** Painted fascias are prone to chip and peel, which leads to warranty costs and customer unhappiness. Additionally, painting adds significant cost with negative environmental impact. Instead, a high-gloss, weather- and mar-resistant, molded-in-color (MIC) TPO material matched to vehicle body panel color. Rigorous testing was conducted to assure the material was resistant to stone pecking and road chemicals and would not change shape when exposed to high heat. Additionally, a lens-grade mold with SP1 diamond polish and gating designed to minimize knitlines was used. The resulting part is 10% lighter, offers \$800,000 USD annualized savings, and harmonizes with exterior painted components.

- **3D RADIATOR GRILLE**

- **OEM Make & Model:** 2017 General Motors Co. Chevrolet Bolt electric vehicle (EV)
- **Tier Supplier/Processor:** Sam Shin Chemical Co.
- **Material Supplier / Toolmaker:** LG Chem Ltd. / A-Tech Solution Co., Ltd.
- **Material / Process:** Lupoy 1000MU polycarbonate (PC)
- **Description:** A new appearance is achieved for this front grille by using "varied contouring" (variable wall thicknesses) on the B side of this injection molded, tinted PC part, which subsequently is UV coated on the A side and receives a 3-coat paint system on the B side. The end result is a unique 3D look on a 2D surface.

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CATEGORY: Body Interior

• ULTRATHIN SEAT BACK

- **OEM Make & Model:** 2017 General Motors Co. Chevrolet Bolt EV
- **Tier Supplier/Processor:** General Motors Co. / USF
- **Material Supplier / Toolmaker:** Advanced Composites, Inc. / ToolPlas Systems Inc.
- **Material / Process:** GMW15548P-PP/polyethylene (PE)-M15-Type 6A, GMW15548P-PP/PE-M20 Type 4, GMW16582P-PA6-GF15 / injection molding
- **Description:** To solve the challenges of conventional seat construction, which limits console storage and rear-seat leg room, this product eliminates molded urethane foam from the seat back and replaces it with an all-plastic shell featuring a larger concave region that enables optimum occupant comfort. An innovative suspension system also is used that consists of a forward plastic seat back panel attached to the frame via spring joints. The technology can increase front console width by ≈ 0.8 in./20 mm and reduce seatback thickness by ≈ 2.1 in./52 mm while reducing overall vehicle cost \$35-\$40 USD and mass 3-4 kg.

• THIN-WALL IP SUBSTRATE

- **OEM Make & Model:** 2017 Ford Motor Co. Lincoln Continental luxury sedan
- **Tier Supplier/Processor:** Faurecia & Detroit Manufacturing Systems Ltd., LLC / Faurecia
- **Material Supplier / Toolmaker:** SABIC / Lamko Tool & Mold Inc.
- **Material / Process:** Stamax 30YK270E 30% LFT-PP / injection molding
- **Description:** Reportedly, this is the thinnest full-size, deep-draw injection molded instrument panel (IP) in North America at 1.9 mm/0.07 in. It was achieved by injection molding a 30% glass-reinforced LFT-PP. Versus the 2.4 mm/0.09 in. microcellular-foam molded benchmark, this design was 14% lighter, saved over \$1 USD in materials as well as the microcellular-foaming investment, and helped optimize packaging. Moldfilling analysis with fiber orientation was used for accurate warpage predictions and to develop tooling countermeasures to facilitate molding.

• COMPOSITE SUSPENSIONS FOR UPPER AND LOWER BACKS

- **OEM Make & Model:** 2017 Ford Motor Co. Lincoln Continental luxury sedan
- **Tier Supplier/Processor:** Leggett & Platt Inc. & Magna International / Summit Plastic Molding & Century Plastics
- **Material Supplier / Toolmaker:** BASF Corp., Advanced Composites, Inc., DuPont Automotive / Summit Plastic Molding & Mega Mold
- **Material / Process:** Ultramid B3ZG7 OSI PA; Ultramid B3EG3 PA; ADX 5017 TPO; Delrin 100 polyoxymethylene (POM) / Multiple
- **Description:** Thanks to integrated composite designs, this "perfect position seat" suspension system delivers tuned suspension to optimize occupant comfort by cradling the upper back and providing side-torso support, which flexes to accommodate various occupant sizes. Special attachment features facilitate assembly and service time. The design also creates a robust dynamic crash-energy management system for rear-impact protection. Molded-in-color is used for A surfaces and craftsmanship. The system, for which 83 patents have been filed, reduces total seat weight by 8% and cost by 15% despite adding more features.

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- **QUAD-BARREL CONVERTIBLE CUPHOLDER**

- **OEM Make & Model:** 2017 Ford Motor Co. Ford Super Duty pickup
- **Tier Supplier/Processor:** Summit Polymers, Inc.
- **Material Supplier / Toolmaker:** SABIC / Not stated
- **Material / Process:** Cyclic olefin copolymer (COC) / injection molding
- **Description:** This console design converts from 2 cupholders plus a bin to 4 cupholders with the help of a patented slider tray assembly for greater user flexibility without the need to remove and stow components when not in use. The design of the injection molded COC/ABS cupholders accommodates beverage containers ranging from small coffee cups and water bottles to large all-day beverage containers while reducing weight 70% vs. the outgoing model and lowering costs \$3 USD depending on content replaced.

CATEGORY: Chassis/Hardware

- **STRUT MOUNT**

- **OEM Make & Model:** 2016 General Motors Co. Cadillac CT6 luxury sedan
- **Tier Supplier/Processor:** ContiTech North America, Inc.
- **Material Supplier / Toolmaker:** BASF Corp. / Not stated
- **Material / Process:** Ultramid A3WG10CR 50% glass-reinforced (GR) PA 6/6 / injection molding
- **Description:** This is the first use of a glass-reinforced PA material for strut-mount housings on all 4 corners of a vehicle and the first application of polyamide housings on the front and rear suspension systems. The injection molded parts integrate common components for both front and rear mounts, and employ a special thread assembly method with a locking feature. They reduce mass 30% vs. typical steel and aluminum parts and reduce noise transmission through the suspension system. Thanks to modular assembly, the design also offers greater tuning flexibility.

- **REAR DIFFERENTIAL CROSS-MEMBER**

- **OEM Make & Model:** 2016 Daimler AG Mercedes S-Class luxury sedan
- **Tier Supplier/Processor:** ContiTech North America, Inc.
- **Material Supplier / Toolmaker:** BASF Corp. / Not stated
- **Material / Process:** Ultramid A3WG10CR 50% GR-PA 6/6 / injection molding
- **Description:** This is said to be the first application where a PA/glass composite has been used as a cross-member to support the rear differential and complete the rear cradle of a vehicle. By replacing traditional parts in steel or aluminum, the injection molded glass-reinforced PA 6/6 design offered parts integration opportunities, is cost neutral, reduces noise transmission from the driveshaft, and reduces mass 25%, helping improve fuel economy and reduce tailpipe emissions. The grade used has been optimized for dynamic loads and is controlled with tighter production specifications.

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- **LATCHING REFUELING VALVE**

- **OEM Make & Model:** 2017 Ford Motor Co. Ford Fusion & Lincoln MKZ hybrid EVs
- **Tier Supplier/Processor:** Continental Automotive / Advanced Molding Tech - USA
- **Material Supplier / Toolmaker:** DuPont Automotive / Xinpont
- **Material / Process:** Zytel HTNWR51G30 30% GR polyphthalamide (PPA) / injection molding
- **Description:** This challenging new design demanded a unique material with consistent properties after prolonged exposure to fuels, superior wear characteristics, stable coefficient of friction over a wide temperature range, superior fuel swell and exposure resistance, and superior molding capabilities to properly fill tight-tolerance micro-features. An injection molded 30% GR-PPA with polytetrafluoroethylene (PTFE) micro-powder (to enhance wear characteristics) met all requirements. The application saved over \$10 USD/vehicle and reduced energy consumption vs. the previous valve. The novel technology has led to 1 issued and 7 pending patents.

- **OUTER HANDLE**

- **OEM Make & Model:** 2017 Ford Motor Co. Lincoln Continental luxury sedan
- **Tier Supplier/Processor:** ADAC Automotive
- **Material Supplier / Toolmaker:** SABIC / not stated
- **Material / Process:** Cytel C1200HF PC/ABS / injection molded
- **Description:** This application is industry's first belt-integrated, outside door handle with switch activation to open both front and rear doors. The slender, minimalist, all-plastic, high-luster chrome-finish handle provides effortless operation, luxury feel, and quiet operation. The injection molded PC/ABS part with integrated zinc casting also features an e-handle with power-release switch to deliver a sleek, uninterrupted form that reduces mass 20% and cost 35% vs. conventional bond-on-bracket designs.

CATEGORY: Environmental

- **ELECTRONIC POWER-STEERING PULLEY**

- **OEM Make & Model:** 2017 General Motors Co. GMC Acadia sport-utility vehicle (SUV)
- **Tier Supplier/Processor:** Nexteer Automotive / PRISM Plastics
- **Material Supplier / Toolmaker:** DSM Engineering Plastics / Not stated
- **Material / Process:** Stanyl TW241F12 PA 4/6 / injection molding
- **Description:** Project goals were to find ways to reduce cost without reducing performance of the electric power-steering gear-assist mechanism by replacing a powdered metal pulley with an injection molded plastic one. A high-flow grade of 60% GR-PA 4/6 that produces a resin-rich surface for improved belt wear was selected. It offers significant cost savings and reduces mass over 50% vs. the metal pulley. Its assembly method eliminates 3 bolts, which are replaced by a retaining ring. The molded torque tooth provides secure orientation and excellent load-carrying capabilities.

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- **CLOSED-LOOP RECYCLING OF BOTTLES**

- **OEM Make & Model:** 2016 General Motors Co. (GM) Chevrolet Equinox & GMC Terrain cross-over utility vehicles (CUVs)
- **Tier Supplier/Processor:** Exo-s / Rogers Foam Co.
- **Material Supplier / Toolmaker:** Wm. T. Burnett & Co. / Not stated
- **Material / Process:** Nonwoven from recycled polyethylene terephthalate (PET) / Multiple
- **Description:** This innovative, multi-stakeholder, cost-neutral recycling project protects the environment, grows local economies, creates jobs, and helps people in a sustainable manner. Water bottles collected at GM operations and from the Flint, Michigan, U.S.A. area are directed into a supply chain that recycles the material into nonwoven fleece for specific applications including engine manifold cover insulation, insulation for coats that convert to sleeping bags for the homeless and are made by formerly homeless women as part of a jobs program, and air filters that purify the air at numerous GM and other manufacturing operations. Already 3.5-million water bottles have been repurposed.

- **BIOMASS-BASED POLYESTER BLEND**

- **OEM Make & Model:** 2015 Hyundai Motor Group IONIQ EV
- **Tier Supplier/Processor:** Seoyon E-Hwa Interior Systems Manufacturing
- **Material Supplier / Toolmaker:** SK Chemicals / Not stated
- **Material / Process:** Skytra bio polyester (PETG/ABS) / Not stated
- **Description:** The goals of this project were to develop a high-biomass-content thermoplastic polyester blend for window panels and steering-wheel bezels using biomass-based PETG -- reportedly the first application in the world. The optimized PETG/ABS composition was used to replace a PC/ABS blend. Benefits include a 57% reduction in carbon emissions (145 tons/year), an 88% reduction in VOCs, and a significant increase in molded part chemical resistance. By weight, the biomass content is 25% and by C₁₄, the biomass content is 14%.

CATEGORY: Materials

- **NVH Baffles**

- **OEM Make & Model:** 2016 Ford Motor Co. Ford F-150 pickup
- **Tier Supplier/Processor:** Henkel AG & Co. KGaA / Henkel AG & Co. KGaA & Wittmann Battenfeld, Inc.
- **Material Supplier / Toolmaker:** Henkel AG & Co. KGaA / Creative Die Mold Corp.
- **Material / Process:** EcoLon GF1960 PA 6/6 (100% post-consumer recycle (PCR)) & ethylene vinyl acetate (EVA) / injection molding
- **Description:** Because aluminum body panels expand at twice the rate that steel ones do, a new baffle sealing package was needed that would maintain adhesion to the substrate during thermal expansion of the aluminum. It also needed to reduce or eliminate noise/vibration/harshness (NVH) throughout the vehicle to improve driver comfort through a quieter interior. A EVA expandable sealer with a blowing agent that activates during e-coat and produces an innovative elastic cross-linking network was developed to improve hot-tear strength and elongation vs. previous materials. The EVA foam is injection overmolded onto a PA substrate.

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- **RHAPSODY BLUE MIC VEHICLE ENVIRONMENT**

- **OEM Make & Model:** 2016 Ford Motor Co. Lincoln Continental luxury sedan r
- **Tier Supplier/Processor:** Americhem Inc. / Multiple
- **Material Supplier / Toolmaker:** Americhem Inc. & Multiple / Multiple
- **Material / Process:** Multiple PP, TPO, ABS, PA, POM / Multiple
- **Description:** Project goals were to achieve a unique MIC color space that looks luxurious but appeals to today's generation. It involved using the first transparent pigment-based interior color deliverable across 76 base resins for the vehicle interior. Once the color was mastered, early attempts showed it was prone to metamerism with a red/green directional hue shift. Numerous attempts to achieve color consistency bidirectionally with standard pigment adjustments did not solve the problem. Finally, the color was remastered using a non-titanium dioxide (TiO₂) system that did not exhibit hue shift, eliminating the need to paint and creating a calming, cool color environment.

- **VACUUM BRAKE TUBES**

- **OEM Make & Model:** 2016 General Motors Co. Chevrolet Silverado & GMC Sierra pickups
- **Tier Supplier/Processor:** Cooper Standard
- **Material Supplier / Toolmaker:** DSM Engineering Plastics / Not stated
- **Material / Process:** Arnitel CM622 thermoplastic polyester elastomer (TPC-ET) /Not stated
- **Description:** A high-performance thermoplastic was needed for vacuum brake tubing to replace reinforced rubber. It needed broad temperature performance (-40-150C), chemical resistance, burst strength to 60 bar minimum and flexural strength to 50 N minimum. It also had to resist vacuum collapse after 2 hr @ 150C and provide impact retention after 336 hr @ 150C. The design was changed to use a smaller diameter, thinner wall to simplify engine / undercarriage routing and eliminate heat shields plus allow quick connects. A TPC-ET elastomer with high thermal oxidative stability was developed. It is 30% lighter, less costly, and eliminates brackets.

- **LIGHTWEIGHT TPO BUMPER COVER**

- **OEM Make & Model:** 2017 Hyundai Motor Group Hyundai Genesis G90 luxury sedan
- **Tier Supplier/Processor:** ECO Plastic
- **Material Supplier / Toolmaker:** Hanwha Total Petrochemicals Co., Ltd. / Hyundai Motor Group
- **Material / Process:** NB71 TPO / injection molding
- **Description:** A new, lighter weight TPO bumper cover was developed using high-crystallinity PP, ethylene-octane rubber, and a combination of nano-size talc and micron-size whisker fillers similar to magnesium oxysulfate. The material provides high mechanical performance, improved dimensional stability, and low coefficient of linear thermal expansion (CLTE) thanks to the high aspect ratio filler. Weight is reduced 7-10% and the material is cost neutral vs. the material it replaced. Additionally, 6 patents have been obtained on the development.

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CATEGORY: Powertrain

• **AIR INTAKE MANIFOLD**

- **OEM Make & Model:** 2015 Volkswagen AG EA21 1.6L engines
- **Tier Supplier/Processor:** Hua Tao Ltd.
- **Material Supplier / Toolmaker:** SABIC / Not stated
- **Material / Process:** SABIC G3135X PP / injection molding
- **Description:** This is the first air-intake manifold launched in China using 35% GR-PP to replace PA 6/6. The application provides 25-30% cost reduction and 15-20% molded-part weight reduction while retaining properties at high temperatures and improving weld strength, and NVH levels by 5 dB. Unique technology involving finer glass fibers and special sizing helps meet performance requirements. Parts are vibration welded.

• **ACTIVE FUEL-MANAGEMENT SYSTEM**

- **OEM Make & Model:** 2012 General Motors Co. 5.3L V8 LH6 engines
- **Tier Supplier/Processor:** Eaton Corp. Plc. / ITW Global Automotive
- **Material Supplier / Toolmaker:** SABIC / Not stated
- **Material / Process:** Ultem 2310 polyetherimide (PEI) / injection molding
- **Description:** To boost fuel efficiency and reduce emissions on classic small-block pushrod V8 engines, an inexpensive and simple technology called active fuel management (displacement on demand) was developed. The efficient and precise electro-mechanical hydraulic system deactivates cylinder valves when power is not needed, then reactivates them when power is called for again. An important component of the system's solenoid control valves is injection molded from 30% GR-PEI. The material is used for its high stiffness, creep resistance, thermal and chemical resistance, high knitline strength, and ability to be ultrasonically welded. The system improves fuel efficiency 5.5-7.5% and reduces cost 30% vs. metal.

• **2.0L GTDI TURBO COMPRESSOR OUTLET DUCT**

- **OEM Make & Model:** 2017 FCA Alpha Romeo Giulia luxury sedan
- **Tier Supplier/Processor:** ABC Group, Inc.
- **Material Supplier / Toolmaker:** BASF Corp. / ABC Group, Inc.
- **Material / Process:** Ultramid Endure D5G3 BM PA 6/6 / 3D flashless blow molding
- **Description:** To meet more stringent fuel efficiency and tailpipe emissions requirements, engines increasingly are being downsized and turbocharged, but that raises temperatures and pressures that underhood components see during operation. For example, charge air ducts, which take air from the turbocharger to the throttle body, can see continuous-use temps as high as 220C and pressures as high as 207 KPa. Further, compact packaging space requires efficient designs. Switching to a heat-stabilized PA 6/6 capable of being 3D flashless blow molded reduced mass 30-40% and cost 20-25% vs. metallic designs.

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CATEGORY: Process/Assembly/Enabling Technologies

• **ZIPPER CLIP**

- **OEM Make & Model:** 2017 General Motors Co. Chevrolet Malibu midsize sedan
- **Tier Supplier/Processor:** 3 Dimensional Services Group
- **Material Supplier / Toolmaker:** Celanese Corp. / 3 Dimensional Services Group
- **Material / Process:** Celcon M90 POM / injection molding
- **Description:** The zipper clip is a plastic solution that gives the holding benefits of a stud-and-nut combination while reducing production limitations. Ideal for use where a nut is desired but not feasible, this is the first stud insert with 4 ratcheting control features and a self-centering 2-way locator that holds over 120 lb/54.43 kg of weight while it requires low ergonomic effort (5.11 lb/2.32 kg) for assembly. The design reduces spring back as well as weight and cost and eliminates the need for assembly equipment as well as an isolator, since it protects the stud from corrosion.

• **HOT-GAS WELDED THERMOSTAT HOUSING ASSEMBLY**

- **OEM Make & Model:** 2017 Ford Motor Co. 3.5L V6 Cyclone TiVCT GTDI engines
- **Tier Supplier/Processor:** Plastic Tec - Bocar Group
- **Material Supplier / Toolmaker:** DuPont Automotive / Schweiger GmbH & Co. KG
- **Material / Process:** Zytel HTN HTN51G35HSLR BK420 PPA / injection molding & hot gas welding
- **Description:** Hot-gas welding joins both halves of this 35% GR-PPA thermostat housing assembly. The part has a small welding-flange footprint but high weld strength because there is no fiber/material degradation during the joining process. In fact, it is the only welding process that permits bridging of glass across the joint. The weld distance is held within 0.1 mm, enabling parts to package into very limited spaces with tight tolerances. Since the part is not touched during welding, there is no sticking. Versus previous aluminum solutions, the PPA assembly is 30% lighter and 40% less costly.

• **TWO-SHOT MAP LAMP LENS**

- **OEM Make & Model:** 2017 Ford Motor Co. Lincoln Continental luxury sedan
- **Tier Supplier/Processor:** Flex Auto (Flextronics)
- **Material Supplier / Toolmaker:** SABIC / Flex Auto (Flextronics)
- **Material / Process:** Lexan 143R HFD1830 PC / 2-shot injection molding
- **Description:** A redesigned capacitive touch lens produced via 2-shot molding eliminates molding defects while maintaining an ideal bonding surface and clear aperture for best light intensity. Eliminating a second tool, the Fresnel pattern is molded into the core of the first shot, which becomes the cavity of the second shot as the latter is layered over the former, keeping both outer surfaces smooth. Using 2 grades of PC with a 40° difference in heat-deflection temperature (HDT) eliminates the problem of the second shot melting the first during overmolding. Eliminating a tool reduced costs 25%.

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- **ROBOTIC LASER CUTTING AND WELDING OF TPO FASCIA**
 - **OEM Make & Model:** 2017 General Motors Co. Chevrolet Camaro ZL1 sports car
 - **Tier Supplier/Processor:** Magna Exteriors, Inc. / Magna Exterior - DexSys
 - **Material Supplier / Toolmaker:** LyondellBasell / Jenoptik AG
 - **Material / Process:** Hifax TYC1168X TPO / injection molding
 - **Description:** A hydraulic punch and sonic welding operation was replaced by robotic laser cutting and welding of a Class A exterior fascia. Unlike other welding processes, it is not necessary to thicken wallstock in weld areas to prevent readthrough with robotic laser welding of brackets on the backside of the part, and that reduces weight slightly. It also eliminates the need for contoured horns and punches. Clean cuts can be made in 1 sec on the painted side of the part. The dual-function process provides greater flexibility between programs and reduces floor space and tooling costs.
- **ASSISTED POSITIVE-LOCKING JUNCTION BOX**
 - **OEM Make & Model:** 2016 General Motors Co. Chevrolet Camaro sports cars
 - **Tier Supplier/Processor:** Yazaki North America Inc.
 - **Material Supplier / Toolmaker:** DuPont Automotive / Yazaki North America Inc.
 - **Material / Process:** Multiple / Multiple
 - **Description:** This tool-less, single-lever, self-locking underhood bussed electrical center (UBEC) guarantees proper connections for 4 connectors from 4 different wire harnesses using 1 hand and low assembly effort. There is no need to re-orient the UBEC to install mating connectors during OEM assembly. The result is a robust, high-circuit-capacity design that is ergonomically friendly to assembly-line workers. Additional benefits are a 7% weight savings, 8% additional spare electrical content, 10% reduction in overall footprint, better water-ingress protection, and 30% less assembly time.

CATEGORY: Safety

- **SEAT CUSHION FRAME AND STORAGE DOOR**
 - **OEM Make & Model:** 2016 Ford Motor Co. Ford Super Duty pickup
 - **Tier Supplier/Processor:** Royal Technologies Corp.
 - **Material Supplier / Toolmaker:** Celanese Corp. / Vortec Tooling Solutions, Inc.
 - **Material / Process:** Celstran GF40-20 LFT-PP / injection molding
 - **Description:** For the first time, a polymer composite has replaced magnesium in a structural seat-cushion frame and under-seat storage lid for a front center 20% seat with integrated restraint system. The application is weight neutral and lower cost (≈\$4 USD/unit), and satisfies all safety and crashworthiness requirements. Its flexible architecture allows for updates with future enhancements. Injection molded 40% LFT-PP is used to mold the frame, which also features an expanded polypropylene (EPP) antisubmarine foam block and a lockable ergo-latch. The assembly represents a significant reduction in carbon footprint vs. magnesium and has yielded 2 awarded and 2 pending patents.

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- **NEXT GENERATION ARMREST FOR SIDE IMPACT**
 - **OEM Make & Model:** 2016 Ford Motor Co. Ford Super Duty pickup
 - **Tier Supplier/Processor:** Yanfeng USA Automotive Trim Systems Company, Inc.
 - **Material Supplier / Toolmaker:** LyondellBasell / ToolPlas Systems Inc.
 - **Material / Process:** SG702 PP & multiple / injection molding
 - **Description:** Minimizing door intrusion during side impacts usually requires intensive body-structure countermeasures. Abdomen criteria for 5th and 50th percentile dummies are primarily driven by door-trim armrest stiffness during side impacts. This new door-trim armrest improves safety as a tuning component by acting as a load limiter and absorbing energy. Comprised of a skin, foam pad, PP-nonwoven trampoline fabric, ABS armrest substrate, and PP trampoline frame, the system is significantly softer than previous designs, substantially outperforming static and dynamic functional requirements without adding countermeasures, cost, or weight. Further, armrest durability improves 6 times, and costs and weight are reduced \$31.80 and 3.8 kg per vehicle.
- **MODULAR COMPOSITE FRONT-SEAT CUSHION PAN**
 - **OEM Make & Model:** 2017 Ford Motor Co. Lincoln Continental luxury sedan
 - **Tier Supplier/Processor:** Leggett & Platt, Great Lakes Trim & Grammer Industries / Engineered Plastics, Grand Traverse Plastics & Johnson Electric
 - **Material Supplier / Toolmaker:** BASF Corp., Advanced Composites, Inc. & DuPont Automotive / MacLean-Fog, Commercial Tool & Die & Johnson Electric
 - **Material / Process:** ULTRAMID B3ZG7 OSI PA, ADX 5017 TPO, Delrin 100P NC010 POM / injection molding
 - **Description:** This patent-pending, plastics-intensive, modular composite front seat-cushion pan (in impact-modified 35% GR PA), side-airbag deployment back panel (in talc-filled TPO), and power head-restraint drive nut (in POM) create a robust and dynamic crash-energy management system for front impact protection, side airbag deployment, and energy management for occupant impact protection. Further, the system enables modular assembly and scalable features for assembly ease. Already 83 patents have been filed and 12 granted on this innovative seat system.

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SPE Announces Finalists for 46th Auto Innovation Awards Competition
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Category and Grand Award winners selected from among these finalists during the Blue Ribbon judging by a group of journalists, academics, and retired industry chief engineers will be announced at the **Automotive Innovation Awards Gala** on **November 9, 2016** during the 46th-annual SPE **Automotive Innovation Awards Gala** at Burton Manor in the suburbs of Detroit. The event begins with the VIP Cocktail Reception at 4:00 p.m., generously sponsored by Celanese. At 4:30 p.m. the main exhibit area will open for general admission and guests can review all of this year's **Automotive Innovation Awards** part nominations, as well as enjoy the specialty and antique vehicles that are always a highlight of the show. Dinner will begin at 6:00 p.m. and the awards program itself will run from 7:00-9:00 p.m. For those who wish to extend merrymaking and networking activities, the ever-popular *Afterglow* – also sponsored by Celanese – will run from 9:00-11:00 p.m.

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 700 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.

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.

For more information about the **SPE Automotive Innovation Awards Competition and Gala** see <http://speautomotive.com/inno> and <http://speautomotive.com/awa>. For more information on the **Society of Plastics Engineers**, see www.4spe.org.

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Attn. Editors: A large collection of SPE Automotive Division digital photography is available for download at <http://www.flickr.com/photos/speautomotive/collections>. Photos of all of the parts nominated for this year's SPE Automotive Innovation Awards Competition (including these finalists) sorted by category will be found here: <https://www.flickr.com/photos/speautomotive/collections/72157673849255370/>.