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## **SPE® AUTOMOTIVE DIV. NAMES FINALISTS OF 44TH-ANNUAL AUTOMOTIVE INNOVATION AWARDS COMPETITION**

**TROY, (DETROIT) MICH.** – The Automotive Division of the Society of Plastics Engineers (SPE®) today announced the finalists for its 44th-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 October 2-3, 2014; that panel sent forward the most innovative nominations (category *finalists*) to the Blue Ribbon judging. Finalists from this year's competition are listed below in category and submission order.

### **CATEGORY: Body Exterior**

#### **• PANORAMIC SUNROOF FRAME**

- **OEM Make & Model:** 2015 Hyundai Motor Group Kia\* Sorento\* cross-over utility vehicle (CUV)
- **Tier Supplier/Processor:** Inalfa Roof Systems Korea
- **Material Supplier / Toolmaker:** GS Caltex Corp./ Hyundai Motor Group
- **Material / Process:** Hiprene\* ALC12B polyamide 6 (PA 6) / injection molding
- **Description:** This large but very light panoramic sunroof frame utilizes carbon fiber-reinforced thermoplastic, which has been optimized for density, mechanical properties, and reasonable cost. This is the first carbon fiber-reinforced thermoplastic application in a sunroof frame. It allowed 33 steel parts to be integrated into just four reinforced plastic ones.

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- **ROOF DITCH MOLDING**

- **OEM Make & Model:** 2014 Daimler AG Mercedes-Benz\* C-Class\* luxury sedan
- **Tier Supplier/Processor:** Kunststoff-Technik Scherer & Trier GmbH & Co. KG
- **Material Supplier / Toolmaker:** Karl Wörwag Lack- und Farbenfabrik GmbH & Co. KG / Kunststoff-Technik Scherer & Trier GmbH & Co. KG
- **Material / Process:** multiple / transfer paint system
- **Description:** An innovative film transfer paint system on this roof-ditch molding provides a Class A surface with the same high performance as wet body paint systems and the processing of plastic film technology. Combining a metal carrier, a thermoplastic adhesive, and the transfer paint system (made up of a base and clear coat), the system provides high scratch resistance and sufficient elongation for stretch bending.

- **TRANSPARENT PLASTIC FIN**

- **OEM Make & Model:** 2014 General Motors Co. Chevrolet\* Corvette\* Stingray\* Z06 sports car
- **Tier Supplier/Processor:** 3-Dimensional Services Group
- **Material Supplier / Toolmaker:** SABIC / 3-Dimensional Services Group
- **Material / Process:** Lexan\* SLX1432 polycarbonate (PC) copolymer / injection molding
- **Description:** This is the first transparent adjustable fin on a commercial vehicle that allows rear visibility through the fin. Using a combination of PC/ABS (acrylonitrile butadiene styrene) on opaque sections of the fin and PC/ITR (isophthalate terephthalate resorcinol) on the transparent section, the unique look also improves vehicle handling and control by increasing downforce without impeding or blocking the driver's line of sight through the rear-view mirror. In addition, special resin technology provides resistance to impacts, weather, and chemicals while reducing mass 40% and costs 60% vs. more common metal fins.

- **LIGHT ELEMENT FOR ARTICULATING ASSIST STEP**

- **OEM Make & Model:** 2015 General Motors Co. Cadillac\* Escalade\* sport-utility vehicle (SUV)
- **Tier Supplier/Processor:** Magna International Inc. / 3M Co.
- **Material Supplier / Toolmaker:** 3M Co.
- **Material / Process:** 3M PLE urethane / casting
- **Description:** A cast flexible polyurethane light bar with molded-in light dispersion/extraction geometry, coupled with a hard-coated extruded polycarbonate lens profile helps provide improved entry/egress into full-size SUVs equipped with articulating step assists. Unlike conventional light pipes with light-emitting diodes (LEDs), there are no "bright spots." The system achieves very uniform lighting for improved safety while sealing the light pipe against heat, water intrusion, stone throws, and shoe impacts.

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- **TRUNK LID**

- **OEM Make & Model:** 2014 Nissan Motor Co., Ltd. Nissan\* GT-R\* sports car
- **Tier Supplier/Processor:** Chiyoda Manufacturing Corp. / Challenge Co. Ltd.
- **Material Supplier / Toolmaker:** Mitsubishi Rayon Co., Ltd. / Yasuda Moldtec Inc.
- **Material / Process:** Pyrofil\* prepreg TR361 E250S rapid cure epoxy resin / prepreg compression molding
- **Description:** This is the first commercial application of the prepreg compression molding (PCM), a rapid (2-4 minute) out-of-autoclave processing option for carbon fiber-reinforced plastic (CFRP) composite parts that can be used on conventional compression-molding presses. The finished decklid inner and outer achieve excellent Class A surface quality right out of the tool and are bonded after molding. Parts provide excellent mechanical properties and save 40% of the mass of the previous aluminum parts and 50% of the cost of autoclave-cured CFRP parts.

- **BELLY PAN WITH MULTIPLE AIRDAM OPTIONS**

- **OEM Make & Model:** 2015 Ford Motor Co. Ford\* Mustang\* sports car
- **Tier Supplier/Processor:** US Farathane Corp.
- **Material Supplier / Toolmaker:** KW Plastics / not provided
- **Material / Process:** KW308 20% talc-filled polypropylene (PP) / injection molding & extrusion
- **Description:** A new design allows a single belly pan to accommodate multiple airdam profiles while meeting all program targets for low-speed impact, pedestrian protection, aerodynamic targets, ground clearance, and tooling costs. The resultant system features die-cut airdam extrusion profiles sonically welded to an injection-molded base belly pan saving \$1.2 MM USD in tooling, while providing either improved front-end lift or improved drag at speed depending on profile used while meeting all other program goals.

## **CATEGORY: Body Interior**

- **DOOR-TRIM LOCAL REINFORCEMENT WITH TAPES**

- **OEM Make & Model:** 2014 Ford Motor Co. Ford\* Transit Courier\* van
- **Tier Supplier/Processor:** Fompak
- **Material Supplier / Toolmaker:** Celanese / Zimmermann
- **Material / Process:** Celstran\* CFR-TP PP-GF 70-13 glass/PP tapes / injection molding
- **Description:** To improve mechanical properties in select locations on this door-trim panel, unidirectional glass/PP tapes were added locally late in the program. While contributing less than 1% to part mass, the tapes improved impact, stiffness, and strength by a factor of five without need to change tooling. Tapes are inserted into the tool via automatic fixation and held in place prior to overmolding via magnet or glue. The technique can be applied to either injection or compression molding; when the tapes are designed in earlier in the program, they provide opportunities for cost and mass reduction.

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- **IP TOP STORAGE BIN AND DEVICE DOCK**

- **OEM Make & Model:** 2015 Ford Motor Co. Ford\* Figo\* subcompact car
- **Tier Supplier/Processor:** Mitchell Plastics
- **Material Supplier / Toolmaker:** SABIC, Celanese, BASF, Comtrex LLC, Fiberfil S.p.A./ Acuway
- **Material / Process:** Cycloy\* LG8002 PC/ABS, Celcon\* UV90Z polyoxymethylene (POM) / Ultramid\* A3WG7 PA 6 / injection molding
- **Description:** This personal electronic device docking with spring clutch provides IP storage as well as charging capability and is a new feature for improved utility and customer satisfaction. The patent-pending device also facilitates hands-free phone usage for reduced driver distraction when having a conversation, listening to music, or using satellite navigation.

- **TEMPERATURE AVERAGING DISCHARGE AIR SENSOR**

- **OEM Make & Model:** 2014 Ford Motor Co. Ford\* Fusion\* mid-size car
- **Tier Supplier/Processor:** Epcos Inc. / TDK-EPC AG & Co. KG
- **Material Supplier / Toolmaker:** PolyOne Th. Bermann GmbH / TDK-EPC AG & Co. KG
- **Material / Process:** Bergamid\* A70H PA 6/6 & B70G30 PA 6 GF30 / injection molding
- **Description:** This all-plastic air sensor performs the averaging of duct-air temperature without use of a metal plate. By using an optimized "Christmas tree" mounting system, a wide range of duct wall thicknesses can be accommodated without need of a rubber O-ring, saving cost and weight. Since it directly measures air temperature, the patent-pending system offers faster sensor response time, which in turn translates to improved fuel savings. It also incorporates a poka-yoke feature to ensure proper installation.

- **SECOND-ROW SEAT BACK**

- **OEM Make & Model:** 2015 Ford Motor Co. Ford\* Mustang\* sports car
- **Tier Supplier/Processor:** Continental Structural Plastics Inc.
- **Material Supplier / Toolmaker:** Hanwha L&C / Century Tool & Gage
- **Material / Process:** glass-mat thermoplastic (GMT) composite 45% GF unidirectional / compression molding
- **Description:** This second-row seat back successfully meets the extremely challenging European safety regulations ECE luggage-retention load case through the use of unidirectional glass-reinforced GMT composite rather than typical steel. The compression-molded design, which required over 100 iterations of FEA to finalize, eliminates five parts from the earlier steel design and saves 3.1 kg/car in a thinner construction that also is easier to install.

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## CATEGORY: Chassis/Hardware

### • FLUSH GLASS POWER BACKLITE

- **OEM Make & Model:** 2014 Ford Motor Co. Ford\* F-150\* pickup
- **Tier Supplier/Processor:** Magna International Inc. - Engineered Glass Div.
- **Material Supplier / Toolmaker:** not stated / not stated
- **Material / Process:** polyvinyl chloride (PVC) / injection molding
- **Description:** This first-to-market hole-in-glass seamless sliding back window with engineered plastic framework addresses previous sealing and aesthetic issues with conventional complex multi-pane constructions for the pickup market. The result is improved appearance, styling, and operating performance that meet customer wants while providing best-in-class sealing and water management, plus significant weight and assembly savings vs. traditional designs at similar costs. Further, a heated version and flush design maximize line of sight for drivers while providing the studio greater design freedom.

### • SEAMLESS FLIPPER WINDOW

- **OEM Make & Model:** 2014 Ford Motor Co. Ford\* Transit\* van
- **Tier Supplier/Processor:** Magna International Inc. - Engineered Glass Div.
- **Material Supplier / Toolmaker:** not stated / not stated
- **Material / Process:** not stated / injection molding
- **Description:** To accommodate multiple roof heights and wheelbase length options on this van while providing customers with an uninterrupted glass appearance for both fixed and moveable windows (with no exposed hardware and a low-profile inside latch), a hole-in-glass, window-within-a-window concept was used. A separate flip-glass panel is bonded to glass and assembled to an injection-molded engineered plastic framework, which carries the sealing and water-management system. This enabled a single flange configuration to be used for either fixed or moveable window options. Significant weight and cost savings plus assembly time reductions were achieved vs. traditional designs while also improving fit-to-body and achieving best-in-class sealing and water management.

### • PLASTIC REINFORCEMENT FOR STEEL TRUCK BUMPER

- **OEM Make & Model:** 2014 Fiat Chrysler Automobiles Dodge\* Ram\* 1500 pickup
- **Tier Supplier/Processor:** Flex-N-Gate Corp.
- **Material Supplier / Toolmaker:** SABIC / Integrity Tool & Mold Inc.
- **Material / Process:** Stamax\* 30YM240 long-fiber thermoplastic (LFT) PP / injection molding
- **Description:** This is the first steel pickup truck bumper reinforced with an injection-molded composite support bracket. The part provides an excellent stiffness/weight ratio required for durability while reducing mass 4 lb/vehicle and yielding a small cost savings. Predictive engineering with advanced fiber-orientation modeling was used to properly set up the injection mold.

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- **TPE JOUNCE BUMPER**

- **OEM Make & Model:** 2015 Fiat Chrysler Automobiles Fiat\* Punto\* supermini car
- **Tier Supplier/Processor:** Insit
- **Material Supplier / Toolmaker:** DuPont Automotive / not stated
- **Material / Process:** Hytel\* HTR8724 thermoplastic copolyester elastomer (TPC-ET) / injection and blow molding
- **Description:** This is the first TPE jounce bumper that integrates several components into a single part to help deliver lower systems costs and better performance, including improved durability, noise, and mechanicals under demanding conditions such as low temperatures, high humidity, or high loads. The use of an injection / blow molded TPE to replace injected foam polyurethane eliminates the need for metal or PA saturation cups due to better saturation height control, which in turn allows total suspension height to be reduced. Additionally, 10% mass savings, shorter processing cycles, and lower systems costs were achieved.

- **CO-EXTRUDED THERMOPLASTIC COOLANT TUBE**

- **OEM Make & Model:** 2015 Renault Group Renault\* Twingo\* city car
- **Tier Supplier/Processor:** Tristone Flowtech
- **Material Supplier / Toolmaker:** DuPont Automotive / not stated
- **Material / Process:** Zytel\* LC6200 PA 6/12 / co-extrusion
- **Description:** This co-extruded coolant tube with patented bellows design replaced aluminum tubing and rubber hose while meeting all the high-temperature and high-pressure demands of the coolant system. The co-ex tube uses functionalized high-temperature PP with hydrolysis-resistant PA 6/12 to withstand internal temperatures to 125°C and external temperatures to 150°C. The application delivers a 60% weight reduction and enhanced flexibility and formability vs. previous technology.

## **CATEGORY: Environmental**

- **RECYCLED CMS GAP HIDER**

- **OEM Make & Model:** 2013 Ford Motor Co. Ford\* Escape\* CUV
- **Tier Supplier/Processor:** S Group Automotive
- **Material Supplier / Toolmaker:** NWP, Inc./ Precision Compression Mold
- **Material / Process:** recycled PP / compression vacuum forming and blow molding
- **Description:** By combining post-consumer inorganic manufacturing scrap, reclaimed polyester fiber from carpet, wood flour from post-consumer wood fiber scrap, and both virgin and reclaimed polypropylene, a gap-hider panel with 25% recycled content is produced. Additionally, the zero-waste vacuum forming blow molding manufacturing process returns all scrap and offal to the raw materials supplier to be re-recycled into raw material stock again. The resulting panel is thinner than alternatives, saves 5% weight and 10% costs vs. virgin material while reducing the waste stream and lowering the carbon footprint.

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- **CELLULOSE FIBER COMPOSITE CONSOLE ARMREST**
  - **OEM Make & Model:** 2013 Ford Motor Co. Lincoln\* MKX\* luxury CUV
  - **Tier Supplier/Processor:** Johnson Controls, Inc.
  - **Material Supplier / Toolmaker:** Weyerhaeuser NR Co./ not stated
  - **Material / Process:** Thrive\* 20DX235 PP / injection molding
  - **Description:** This application represents the first time glass fiber-reinforced PP has been replaced by a natural fiber-reinforced PP with equivalent performance but improved environmental impact. This armrest console uses 20% renewably sourced cellulose fiber obtained from sustainably harvested forestry by-products. The resulting part is cost neutral but 6% lighter, reduces tool abrasion, and lowers process energy 10% thanks to lower temperature and faster process cycles. From a lifecycle analysis standpoint, it reduces CO2 emissions by 11% and saves 2,500 gal of fuel over the vehicle's life.
- **LIGHTWEIGHT MATERIAL WITH UNIQUE SYNTHETIC & BIO-FILLERS**
  - **OEM Make & Model:** 2015 Ford Motor Co. Ford\* Mustang\* sports car
  - **Tier Supplier/Processor:** Tribar Manufacturing, LLC
  - **Material Supplier / Toolmaker:** Ford Motor Co. & Amplas Compounding Inc. / not stated
  - **Material / Process:** TAP01 thermoplastic polyolefin (TPO) / injection molding
  - **Description:** Use of a unique synthetic mineral-based fiber plus a bio-filler (coconut powder) that replaces talc and PP plus rubber from recycled battery cases provides a 5% density and 33% wall-thickness reduction in a rear decklid appliqué bracket and side-door cladding without sacrifice of properties. Further, the material provides a 30% reduction in injection-molding cycle time and a 15% material cost reduction.

## CATEGORY: Materials

- **BIO-TPO SHEET FOR INTERIOR TRIM**
  - **OEM Make & Model:** 2014 Hyundai Motor Group Kia\* Soul\* electric vehicle (EV)
  - **Tier Supplier/Processor:** Hyundai Mobis
  - **Material Supplier / Toolmaker:** LG Hausys / not stated
  - **Material / Process:** Biozen\* IP TPO (PP+bio polyethylene (PE)) / vacuum forming
  - **Description:** This award-winning application required the development of a manufacturing technology to produce a high (25 wt-%) bio-mass (from sugarcane waste) content TPO sheet material for the crash pad and door-trim skins. Development also required optimized use of electron beam to control TPO cross-link density as well as multi-head corona treatment equipment to improve adhesion between the bio-TPO and urethane coating. Although the new material represented a 10% direct-cost increase, because the cost of the bio-based TPO is not based on price fluctuations in petroleum inputs, long term it should save money while reducing carbon emissions and VOCs.

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- **METALLIC APPEARANCE FINISH PANELS**

- **OEM Make & Model:** 2015 Ford Motor Co. Ford\* Mondeo\* sedan
- **Tier Supplier/Processor:** International Automotive Components Group (IAC) / Key Plastics Löhne GmbH
- **Material Supplier / Toolmaker:** Samsung Chemical / Michael Tool & Mold Ltd.
- **Material / Process:** Luminous\* LX-1098 PC/ABS / injection molding
- **Description:** This MIC metallic-look part features a weldline-free surface around holes (despite complex geometry), and sports a lush gloss surface (without grain to hide surface imperfections) and eliminates the need for paint. Additionally, special gate/runner designs and a special tool finish technique were used in combination with the eMold process (to elevate resin temperature in key areas) with continuous venting. A new high-flow material with optimum flake size and amount was developed specifically for the parts. The result is improved part appearance that also reduces warranty claims vs. previous painted parts, plus a direct \$13 USD / vehicle cost savings with further indirect cost savings and environmental benefits owing to paint line avoidance.

- **A-GLOSS MIC GRILLE MESH**

- **OEM Make & Model:** 2015 Ford Motor Co. Ford\* Taurus\* SHO sedan
- **Tier Supplier/Processor:** Flex-N-Gate Corp. / SRG Global Inc.
- **Material Supplier / Toolmaker:** SABIC/ not stated
- **Material / Process:** Lexan\* SLX2271T PC copolymer / injection molding
- **Description:** Through use of a special PC/ITR copolymer, which provides long-term ultraviolet (UV) property retention and meets all exterior-durability requirements, this MIC "A" gloss piano black grille mesh no longer needs paint, secondary finishing, or the heating / cooling process technology. This saves \$10 USD / car through paint elimination, increases impact performance, eliminates the aesthetic challenges of paint chipping, and improves craftsmanship by permitting tighter radii to be molded. The part is fully recyclable at end of life, CO<sub>2</sub> emissions are reduced and VOCs are eliminated.

- **LOW SQUEAK ABS AND ABS/PC FOR INTERIORS**

- **OEM Make & Model:** 2014 Ford Motor Co. Ford\* Taurus\* sedan
- **Tier Supplier/Processor:** Summit Polymers, Inc.
- **Material Supplier / Toolmaker:** Techno Polymer America Inc./ not stated
- **Material / Process:** Hushlloy\* HS210 ABS/PC / injection molding
- **Description:** These special low-squeak ABS and ABS/PC grades for interiors rely on a special styrene copolymer rather than additives or special noise-abatement measures to reduce stick/slip noises that are often characteristics of these polymers. The new injection-molding grades process the same as conventional materials and save approximately \$1 USD/vehicle while significantly reducing interior noise.

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### HEADREST GUIDE SLEEVE

- **OEM Make & Model:** 2015 Ford Motor Co. Ford\* Fusion\* mid-size car
- **Tier Supplier/Processor:** Lear Corp. / ITW Deltar
- **Material Supplier / Toolmaker:** Celanese / not stated
- **Material / Process:** Hostaform\* SXT90Z-01 POM / injection molding
- **Description:** A new grade of impact-modified, UV-stable, color-matched POM copolymer was developed to manage EU impact safety requirements for seating and headrests. Without requiring any tooling changes, the new material corrects failures in non-impact-modified POM headrest sleeves while reducing weight 2% and providing greater safety in rear-impact collisions.

### CATEGORY: Powertrain

#### • CHARGE AIR COOLER DUCT AND RESONATOR

- **OEM Make & Model:** 2014 Fiat Chrysler Automobiles Jeep\* Cherokee\* SUV
- **Tier Supplier/Processor:** Hutchinson FTS
- **Material Supplier / Toolmaker:** DSM Engineering Plastics / Hutchinson FTS
- **Material / Process:** Stanyl\* Diablo\* OCD2100 PA 4/6 / injection molding
- **Description:** A super-stabilized PA 4/6 resin is used to mold a combination hot-side charge air cooler duct plus resonator in a unique shape that accommodates a difficult packaging environment. Doing so eliminates 1 sub-component, delivering corrosion-free performance for longer life, improved captive screw retention, enables improved seal design and retention, reduces weight 32% and cost 42% vs. the metal predecessor. It also allows the resonator to be incorporated as an insert for easier acoustic tuning and flexibility to use the same part in a similar package with different acoustic requirements.

#### • CRANKSHAFT COVER WITH INTEGRATED OIL SEAL

- **OEM Make & Model:** 2014 Volkswagen AG MDB engine platform
- **Tier Supplier/Processor:** Kaco GmbH + Co. KG / Engel Austria GmbH
- **Material Supplier / Toolmaker:** DSM Engineering Plastics B.V. / Elmet GmbH
- **Material / Process:** EcoPaXX\* Q-HG10 PA 4/10 50% GF / injection molding
- **Description:** This is the world's first sustainable crankshaft cover, which is molded in a PA 4/10 formulated from 70% renewable resources and certified to be 100% carbon neutral from cradle to grave. The design itself features a friction-optimized dynamic seal in polytetrafluoroethylene (PTFE), which replaced a wet chemistry surface treatment and is activated via a vacuum-plasma process. The entire production process is eco-driven with no net waste. The CAE-optimized design enables a plastic flange to be used as a torque support for assembly operations during vehicle manufacture. The resulting part is 40% lighter than the incumbent aluminum part it replaced.

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### SHAKER SCOOP

- **OEM Make & Model:** 2014 Fiat Chrysler Automobiles Dodge\* Challenger Shaker\* sports car
  - **Tier Supplier/Processor:** North American Assembly / Molding Technologies
  - **Material Supplier / Toolmaker:** Magna International Inc. / Penco Tool Inc.
  - **Material / Process:** sheet-molding compound (SMC) EB-323 Class A / compression molding
  - **Description:** This structural component had to meet Class A body panel styling requirements, increase horsepower, reduce acoustics, mass, and cost, and meet all the fatigue, impact, environmental, and thermal requirements of air-induction system components and still be moldable. The resulting assembly is an important visual focal point of the vehicle, yet is approximately 65% lighter and 60% lower cost than die-cast aluminum.
- **HIGH-LOAD, HIGH-SHEAR GEARED AXIAL POLYMER THRUST BEARING**
    - **OEM Make & Model:** 2014 General Motors Co. Cadillac\* ATS sports sedan, & Chevrolet\* Corvette\* sports car & Silverado\* pickup
    - **Tier Supplier/Processor:** General Motors Co. / Freudenberg-NOK Sealing Technologies
    - **Material Supplier / Toolmaker:** Solvay Specialty Polymers / Freudenberg-NOK Sealing Technologies
    - **Material / Process:** Torlon\* 4275 polyamideimide (PAI) / net-shape molding
    - **Description:** Novel design and processing, combined with high-performance PAI polymer reduced mass, improved performance, increased efficiency, and provided greater dimensional stability over time vs. powder-metal bearings (which were too heavy and costly) and aluminum bearings (which failed durability tests). Features of traditional thrust bearings as well as axial needle bearings were incorporated in a single part, which provides a benchmark for similar metal replacement.

### CATEGORY: Process/Assembly/Enabling Technologies

- **MIC METALLIC CONSOLE RAIL**
  - **OEM Make & Model:** 2014 Ford Motor Co. Ford\* Edge\* CUV
  - **Tier Supplier/Processor:** Johnson Controls Inc. / DT Manufacturing Co.
  - **Material Supplier / Toolmaker:** Celanese / Excel Global
  - **Material / Process:** Hostaform\* LX90Z XAP2 POM / injection molding
  - **Description:** This currently is the first molded-in-color (MIC) metallic-look console component as well as the longest MIC/metallic part in the industry. It increases interior harmony by having the same material on door trim and console rail vs. painted parts, which look different when placed side-by-side. Durability is increased because the color will not chip or wear off, which reduces warranty claims, assembly scrap, and costs. It also provides a better surface appearance and a silky feel while reducing cost 40% per vehicle.

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- **HIGH-GLOSS ENTERTAINMENT SYSTEM BEZEL**

- **OEM Make & Model:** 2013 Daimler AG Mercedes-Benz\* S-Class\* luxury sedan
- **Tier Supplier/Processor:** Johnson Controls Inc. (JCI) / Groupe Plastivaloire (PVL) & Trexel, Inc.
- **Material Supplier / Toolmaker:** Bayer MaterialScience / Groupe Plastivaloire (PVL)
- **Material / Process:** T65 XF ABS/PC / injection molding with Mucell\* foaming
- **Description:** This injection-molded frame for a DVD video bezel had to provide high dimensional stability, reduce warpage, lower weight and cost, and achieve a high-gloss Class A surface finish. Replacing an earlier 2-part design featuring multi-layer painting, a single-piece part met all performance requirements thanks to the combination of two process technologies: microcellular foaming and tool heating / cooling. This led to a 40% weight savings and a 20% cost savings as well as additional 10% product cost savings while improving global quality perceptions due to excellent appearance and lower noise / vibration / harshness (NVH).

- **LOUVERED SIDE WINDOW**

- **OEM Make & Model:** 2014 Ford Motor Co. Ford\* Mustang\* 50th-anniversary edition sports car
- **Tier Supplier/Processor:** Magna International Inc. - Engineered Glass Div.
- **Material Supplier / Toolmaker:** DSM Engineering Plastics / not stated
- **Material / Process:** PVC / injection molding
- **Description:** This first-to-market application features 3 glass panes encapsulated via PVC injection molding to create a louvered panel for the rear quarter window replacing metal. Glass panes are held in place with the rigid injection molding framework creating a high-tech appearance that can be seen through. It also reduces wind noise and drag, lowers mass and costs, and speeds assembly time. Low-pressure, multi-gate tooling and the ability to locate and retain the 3 glass panels during injection-molding process were all key to the success of this application.

- **SINGLE-COLLIMATOR MOLDED LED LENS**

- **OEM Make & Model:** 2015 Ford Motor Co. Ford\* F-150\* pickup
- **Tier Supplier/Processor:** Ventra Plastics Div. of Ventra Group Inc. & Flex-N-Gate Corp. / DBM Reflex
- **Material Supplier / Toolmaker:** Bayer MaterialScience / DBM Reflex
- **Material / Process:** Makrolon\* LED 22.4.5 PC / multi-shot injection molding
- **Description:** This is the first application of a single-collimator, all-plastic molded lens for both low and high beam LED headlamp applications replacing glass. The efficient optical lens provides stylists with a new level of design freedom and vs. multi-lens designs save approximately \$5 USD/vehicle. A special optical grade of PC material was used for optical efficiency; a multi-shot injection molding process forms the 45-mm thick lens, whose surface tolerances must be held within 40 microns. Cycle times vs. glass are significantly reduced as well.

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## CATEGORY: Safety

### • ACTIVE GLOVE BOX

- **OEM Make & Model:** 2015 Ford Motor Co. Ford\* Mustang\* sports car
- **Tier Supplier/Processor:** Faurecia
- **Material Supplier / Toolmaker:** Mitsubishi Chemical Corp. & Advanced Composites, Inc. / Extol, Inc.
- **Material / Process:** TP850N / ADX5028 / ADX5017 TPO / injection molding
- **Description:** This patented application is an industry first where an injection-molded knee airbag is integrated with the glove-box door, reducing weight 65% and space 75% vs. separate traditional knee airbags plus glove-box doors. Instead of a woven textile airbag, a special bladder is hot-plate welded to the door and then checked with a hydrostatic burst tester to ensure the strength of the resulting hermetic seal. This saves \$5-10 USD/car while providing consumers with more interior space and decreasing vehicle mass for better fuel efficiency.

### • BLIND-SPOT INFORMATION SYSTEM TAIL LAMP

- **OEM Make & Model:** 2015 Ford Motor Co. Ford\* F-150\* pickup
- **Tier Supplier/Processor:** Flex-N-Gate Corp.
- **Material Supplier / Toolmaker:** Arkema Group / Ventra Sandusky, LLC
- **Material / Process:** V826 1803/1808/18304 polymethyl methacrylate (PMMA) / injection molding
- **Description:** This blind-spot information system (BLIS) sensor has uniquely been integrated into the rear tail-lamp assembly because the vehicle's aluminum bumper does not permit normal installation behind the plastic fascia. The radar unit is housed behind 2 layers of plastic on a 3-color, 3-shot tail-lamp lens and features a cast-aluminum serviceable door, which also acts as a heat sink. By installing the BLIS system in the tail lamp, the lens cover also protects the module from direct impact, water, mud, or snow and the system saves \$10 USD/vehicle plus a \$15-million USD cost avoidance.

### • SPLIT-LINK INERTIAL SAFETY DEVICE

- **OEM Make & Model:** 2015 Ford Motor Co. Ford\* Transit\* van
- **Tier Supplier/Processor:** Magna International Inc. - Magna Closures Div.
- **Material Supplier / Toolmaker:** DuPont Automotive / not stated
- **Material / Process:** Delrin\* 100P POM / injection molding
- **Description:** This injection-molded POM-link mechanism is designed to perform 3 functions, depending on the state of the vehicle. It provides latch lock/unlock position, impatient-passenger feature, yet folds under inertial load and protects passenger during a crash by disconnecting the release portion of the latch so the door will not pop open. Implementing this part required no changes to the door panel or handle counterweights. It was easy to prototype and produce the plastic part, which can be molded into shapes steel cannot. This application demonstrates that plastic components can be used to solve high-impact energy problems.

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- **E.U. PEDESTRIAN PROTECTION AND PART 581 COMPLIANT ENERGY ABSORBER**

- **OEM Make & Model:** 2015 Ford Motor Co. Ford\* Mustang\* sports car
- **Tier Supplier/Processor:** Netshape International, LLC / Shape Corp.
- **Material Supplier / Toolmaker:** LyondellBasell Industries LLC / not stated
- **Material / Process:** Highfax\* 852X TPO / injection molding
- **Description:** When common bumper energy absorbers (EAs) are used in both North American and export markets like the European Union (E.U.), the same part must meet conflicting challenges. To meet U.S. impact requirements, a stiffer EA is needed; however, to meet E.U. pedestrian protection requirements, a softer system with predictable crush is needed. After three years of design work, a single EA has been developed that meets conflicting requirements in an injection-molded TPO part while saving \$250,000 USD in direct costs and \$300,000 in indirect costs by eliminating the need for two EAs.

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 on October 13, 2014 will be announced at the **Automotive Innovation Awards Gala** on **November 12, 2014** during the 44th-annual SPE **Automotive Innovation Awards Gala** at Burton Manor in the suburbs of Detroit. The event begins with the VIP Cocktail Reception at 4:30 p.m., generously sponsored by Celanese. At 5:00 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 6:30 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.

-more-

SPE Announces Finalists for 44th Auto Innovation Awards Competition  
14-14-14-14

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 for 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, see <http://speautomotive.com/inno> and <http://speautomotive.com/awa>.

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**ATTENTION EDITORS:** High-resolution digital part photography for all of the 2014 nominations will shortly be available at <http://www.flickr.com/photos/speautomotive/collections/>.