FOR IMMEDIATE RELEASE: 12 October 2013

Media Contact:

Peggy Malnati, SPE Auto. Div. Comm. Chair
Phone: +1.248.592.0765; eMail: media@speautomotive.com

SPE® AUTOMOTIVE DIV. NAMES FINALISTS OF 43RD-ANNUAL *AUTOMOTIVE INNOVATION AWARDS COMPETITION*

TROY, (DETROIT) MICH. – The Automotive Division of the Society of Plastics Engineers (SPE®) today announced the finalists for its 43rd-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 26-27, 2013. Nominations that were deemed innovative enough to advance to the next round of judging and qualify as *finalists* follow (listed by category and submission order).

CATEGORY: Body Exterior

- **INTEGRATED SEMI-CONVERTIBLE SUNROOF SYSTEM**
  - **OEM Make & Model**: 2014 PSA Citroën* DS 3 Cabrio supermini
  - **Tier Supplier/Processor**: Webasto Group / Shapers ARRK
  - **Material Supplier / Toolmaker:** Polyscope Polymers BV / Shapers ARRK
  - **Material / Process**: Xiran* SG230EB SMA/ABS / Injection molding
  - **Description:** This is the first all-thermoplastic, 1-piece glass-reinforced, styrene maleic anhydride (SMA)/acrylonitrile butadiene styrene (ABS) composite sunroof frame that is 2x1 meters in size. Large sunroof frames such as this are typically formed from aluminum extrusions or steel stampings, while smaller frames have been produced in sheet-molding compound (SMC) or hybrid polybutylene terephthalate (PBT)/acrylic-styrene-acrylonitrile (ASA) and metal. The integrated system combines 7 parts into 1 while incorporating both structural and customer-visible surfaces with an integrated textile canopy plus kinematics. The injection-molded frame is mounted to the upper-body structure and combines operating functionality for a sliding sunroof. Tooling was designed to simultaneously mold both sunroof frame plus rear-window frame via a sophisticated runner and hot-drop system that minimized part stresses. It also eliminates cooling fixtures, a second tool, and a second press, and provided repeatable manufacturing. The result is a durable system that is 100% recyclable, eliminates paint (lowering volatile organic compound (VOC) emissions), offers 40% lower weight than previous systems, and contributes 25% tooling savings.

-more-

- **WINDOW GLAZING SYSTEM**
  - **OEM Make & Model**: 2013 Volkswagen AG XL1* plug-in hybrid electric vehicle (PHEV)
  - **Tier Supplier/Processor**: Exatec LLC / SABIC
  - **Material Supplier / Toolmaker:** SABIC / Summerer Technologies GmbH & Co. KG
  - **Material / Process**: Lexan* GLX143 PC / Injection/compression molding
  - **Description:** This application is the first use of fully homologated polycarbonate (PC) glazing for series production, the first use of 2-component injection-molded PC glazing for roll-down and fixed windows with rail integration, and the largest 2-component injection/compression molded PC glazing for side windows. The glazing uses advanced 2-component injection/compression molding, whose long filling cycle reduces molded-in-stresses for superior optical quality and allows production (in a single molding cycle) of both transparent and overmolded blackout function integration. Additionally, Exatec* plasma coating is used to achieve the abrasion resistance required for a moving side window and to fulfill homologation requirements. Plasma coating enables PC glazing to be used for windows requiring advanced abrasion resistance for driver visibility. Use of PC window glazing with advanced coating technologies reduces weight by 33% vs. 3.2-mm glass solutions and sports aerodynamic features that improve fuel economy, while delivering improved scratch resistance and thermal insulation, reduced fogging, and a high-quality optical appearance.
- **FULLY RETRACTABLE PANORAMIC ROOF SYSTEM**
  - **OEM Make & Model**: 2014 Ford Motor Co. Lincoln* MKZ* luxury sedan
  - **Tier Supplier/Processor**: Webasto / Cooper-Standard Automotive, Inc. & A. Raymond
  - **Material Supplier / Toolmaker:** SABIC & Celanese Corp. / Delta Tooling Co. & Elite Plastic Products Inc.
  - **Material / Process**: Lexan* 143 PC & Hostaform* S9363 polyoxymethylene (POM) / Extrusion & lamination
  - **Description:** A stronger, tear-resistant polyethylene terephthalate (PET) film was developed to enable this retractable glass roof to meet all strength, noise/vibration/harshness (NVH), and performance requirement with thinner, lighter, high-strength fully tempered glass, achieving a 20% weight reduction. Unique plastic fasteners and retainers were used in place of steel clips for further cost and weight reduction. Hard-coated PC trim panels replaced acrylic for improved scratch / mar performance and improved dimensional stability. Proprietary extrusion process and a unique 3D laminating process were developed to produce this assembly without air bubbles. A composite outer panel offers improved strength and NVH performance at comparable costs but 20% lower weight and a hardware savings of $1 USD/vehicle.

-more-

- **ALL-OLEFINIC LIFTGATE**
  - **OEM Make & Model**: 2014 Nissan Motor Co. Nissan* Rogue* cross-over utility vehicle (CUV)
  - **Tier Supplier/Processor**: Hitachi Chemical / Magna-Decostar
  - **Material Supplier / Toolmaker:** LyondellBasell & Advanced Composites, Inc. / Kyowa Industrial Co., Ltd.
  - **Material / Process**: Hifax* TYC 1175P thermoplastic polyolefin (TPO, outer panel) & Mostran* L5091-P long-fiber thermoplastic polypropylene (LFT-PP, inner panel) / Injection molding
  - **Description:** This liftgate is unique in that all materials are fully olefinic (hence, fully recyclable at end of vehicle life) and it features North America's first TPO outer panel. The full assembly sports unique styling and is 30% lighter than comparable stamped steel systems, improving fuel efficiency by 10%. Lower weight also reduces CO_2 emissions and facilitates customer opening/closing of the lighter liftgate. Thanks to parts integration, low scrap, and reuse of offal possible with injection-molded thermoplastics, raw-material costs on the outer panel were reduced 35% vs SMC. Use of a high-flow, high-stiffness, high-impact TPO formulation reduced molding cycles vs. SMC and traditional TPO compounds for the painted Class A outer panel. Use of molded-in-color (MIC) LFT-PP met mechanical requirements and eliminated paint on the Class A inner panel, reducing VOC emissions. Both panels were joined via a structural adhesive for which they were formulated to have an affinity.

CATEGORY: Body Interior

- **OPTIMIZED INSTRUMENT PANEL FOR MASS REDUCTION**
  - **OEM Make & Model**: 2014 Chrysler Group LLC Jeep* Cherokee*sport-utility vehicle (SUV)
  - **Tier Supplier/Processor**: Intertec Systems
  - **Material Supplier / Toolmaker:** SABIC / Windsor Mold Group
  - **Material / Process**: Stamax* 30YK270 PP / Thinwall injection molding
  - **Description:** This application represents North America's first instrument-panel (IP) retainer molded at 2.0-mm walls in LFT-PP composite. Typical wallstock on conventional injection-molded olefin resin is 2.5-4.0 mm, meaning parts are heavier and have longer molding cycles. The 30% glass-reinforced (GR) LFT-PP resin provides required stiffness, strength, and impact performance to meet interior safety requirements at a great value. Thinwall molding helped reduce cycle times 30%, part weight 27%, and costs $3 USD/vehicle, contributing to better vehicle weight, fuel efficiency, and U.S. Corporate Average Fuel Economy (CAFE) targets. It also helped reduce plastics consumption by 2.5MM lb over the life of the program. Advanced fiber-orientation modeling was used to reduce warpage during mold design.

-more-

SPE Announces Finalists for 43rd Auto Innovation Awards Competition
4-4-4-4

- **DOOR-TRIM SMART FOIL TECHNOLOGY**
  - **OEM Make & Model**: 2014 General Motors Co. Chevrolet*Corvette* Stingray* sports car
  - **Tier Supplier/Processor**: International Automotive Components Group
  - **Material Supplier/Toolmaker:** Advanced Composites, Inc. & CGT / Hi-Tech Mold & Engr., Inc.
  - **Material / Process**: ADX5041 & WR-T4BAAC-600R TPO / Injection molding
  - **Description:** This innovative door-trim technology offers improved performance at lower cost than conventional in-mold grained, interior-trim components while reducing weight 5%, direct costs 7%, and indirect costs 3%. Thanks to a special TPO material specifically developed for this application and a proprietary in-mold process technology (where a skin is inserted into an injection mold before the tool is shut and a substrate is injected behind to create the trim panel), the need for adhesive and a secondary process step and fixture are eliminated. Further, this Smart Foil technology eliminates issue with projectiles during low-temperature side-impact events. The result is a door-trim skin/foil that offers lower abrasion and less scratch & mar, resulting in improved customer satisfaction while also lowering VOC emissions (by eliminating adhesive) as well as costs and weight.
- **LIVING HINGE IN A STEERING-COLUMN COVER**
  - **OEM Make & Model**: 2013 Ford Motor Co. Ford* Fusion* mid-size sedan
  - **Tier Supplier/Processor**: International Automotive Components Group
  - **Material Supplier / Toolmaker:** Advanced Composites, Inc. / Roush
  - **Material / Process**: ATX832N PP / Injection molding
  - **Description:** By molding a living hinge into a steering-column cover, parts are reduced (2 to 1) and greater functionality and increased visual appeal are achieved while reducing tooling costs $70,000 USD and piece price costs $1.10 USD/vehicle. The hinged cover can be joined to the instrument panel without exposing screw attachments, and it also permits much easier access to both the on-board diagnostics (OBD) connection and fuse-panel by service personnel or consumers without necessitating removal of the cover. During vehicle assembly, it is now easier to package electrical wiring and less wire is needed, contributing an additional $0.40 USD / vehicle savings owing to reduced wire lengths. The 20% talc-filled PP material is injection molded in a 2-cavity tool that uses large tooling action and localized gating. Each living hinge is flexed 3 times immediately after molding to ensure long service life for the part.

-more-

- **DECKLID TRIM WITH SELF-LOCKING FEATURE**
  - **OEM Make & Model**: 2013 Ford Motor Co. Ford*Fusion* mid-size sedan
  - **Tier Supplier/Processor**: Autoneum / Janesville Acoustics
  - **Material Supplier / Toolmaker:** Washington Penn Plastic Co. / RCO
  - **Material / Process**: PET / Multiple
  - **Description:** The initial design featured a straight slit on the decklid trim to allow a pass-through for installation over the trunk-lid hinges. However, this led to issues like visible sheet metal, poor retention, and poor appearance. Use of hook & loop fasteners to join the trim worked, but added cost and labor, was challenging to install, and potentially contributed to squeak & rattle. Use of button or clip attachments also worked, but again added cost, labor, and tooling, plus was visible and had potential fit issues. The patent-pending solution was to cut a puzzle-shape feature via water jet to make the trim cover self-locking. Now, appearance is improved and operator assembly is easier, plus no costs were added and implementation time was short. This led to 40-60 g weight savings, approx. $40,000-$50,000 USD primary and secondary tooling savings, plus a direct $1 USD/vehicle cost and $0.25 USD/vehicle labor savings, while achieving good fit & finish and great appearance.

CATEGORY: Chassis/Hardware

- **HIDDEN HANDLE-RELEASE MECHANISM**
  - **OEM Make & Model**: 2013 Ford Motor Co. Ford*Ecosport* SUV
  - **Tier Supplier/Processor**: ITW / Sain Tooling
  - **Material Supplier / Toolmaker:** Lanxess Corp. / ITW San Paulo
  - **Material / Process**: Durethan* BKV 50 polyamide (PA, also called nylon) / Injection molding
  - **Description:** This is the first time that an outside handle as been incorporated into a lamp (in this case, a hidden mechanical handle that articulates about the z-axis to release the rear swing gate). The patent-pending, multi-material system meets packaging and aesthetic objectives by integrating previously separate components. With fewer parts and assembly steps, the novel design's efficiency drives assembly improvements while reducing mass 800 g/vehicle and maintaining a sleek look. Tolerances are managed in a proprietary process development for subassembly components. Direct savings are estimated to be $1.2MM USD and indirect savings to be $800,000 USD annually with complete closure, hardware, and lighting cross-functional systems. The assembly is recyclable and since paint is eliminated, VOCs are reduced. Such a system could only be done in plastics.

-more-

SPE Announces Finalists for 43rd Auto Innovation Awards Competition
6-6-6-6

- **LOW-COST BUMPER ENERGY ABSORBER**
  - **OEM Make & Model**: 2013 Ford Motor Co. Ford* Fusion* & Mondeo* sedans
  - **Tier Supplier/Processor**: Magna Exteriors & Interiors
  - **Material Supplier / Toolmaker:** SABIC / not stated
  - **Material / Process**: Xenoy* 1103 PC/PBT / Injection molding
  - **Description:** Globally, this is the first single-piece front bumper energy absorber (EA) that simultaneously meets the conflicting requirements of both Part 581 bumper damageability (which tends to require a stiff EA) and Pedestrian Protection GTR lower-leg impact (which tends to require a soft EA). By developing a common EA that meets both sets of requirements and is tunable, the need for different EAs, bumper beams, and bumper fascias in different geographies with different impact requirements is eliminated. The injection molded PC/PBT blend offers excellent energy absorption properties during deformation (up to 100% strain) while retaining its structural integrity from -30 to 60C. The patent-pending system reduces complexity in design, manufacturing, and assembly, plus improves pedestrian safety while lowering replacement costs during low-speed impacts. It is 40% lighter and 10% less expensive than steel EAs, and 20% lighter than thicker PP EAs at comparable costs.

CATEGORY: Electrical Systems (*new category for 2013*)

- **LITHIUM-ION BATTERY PACK**
  - **OEM Make & Model**: 2013 Nissan Motor Co. LEAF* battery-electric vehicle (BEV)
  - **Tier Supplier/Processor**: Automotive Energy Supply Corporation (AESC) / Piolax Corp.
  - **Material Supplier / Toolmaker:** SABIC / not stated
  - **Material / Process**: Noryl* N1150 modified-polyphenylene ether (MPPE) / Injection molding
  - **Description:** The innovative design of this electric vehicle (EV) battery-pack system allowed for maximum energy density through a structural thinwall design and use of a space-saving passive air-cooling approach. This leads to greater battery-module package density by increasing battery cell count/pack, which in turn provides greater EV battery capacity and electric driving range. Safe passive cooling improves long-term durability of the battery, eliminates leak paths (associated with liquid-cooling approaches), and reduces cost ($500 USD/vehicle) and weight (15-20%) vs. forced-air or active liquid-cooled batteries. Conductive adhesive efficiently transfers heat from the battery to metal walls of each module. Pouches and adhesives are overmolded and supported by dimensionally precise spacers and holders injection molded from UL* 94 V-0 compliant, unreinforced MPPE, whose precise tolerances and snap-fit designs allow for automated process assembly. Halogen-free flame retardance helps improve passenger safety, and complements the environmental benefits of BEVs.

-more-

SPE Announces Finalists for 43rd Auto Innovation Awards Competition
7-7-7-7

- **ELECTRIC VEHICLE-BATTERY ENCLOSURE**
  - **OEM Make & Model**: 2014 General Motors Co. Chevrolet*Spark* EV
  - **Tier Supplier/Processor**: A123 Systems, LLC / Continental Structural Plastics
  - **Material Supplier / Toolmaker:** Cytec Industries Inc. / Century Tool & Gage
  - **Material / Process**: Vinyl ester / Compression molding
  - **Description:** This composite EV battery enclosure was required to meet a number of severe performance requirements, including 30° offset-barrier, side-impact, and rear-barrier crash; 50 G impulse shock (X, Y, Z); post-crash package integrity; fire-resistance testing; 3-m drop testing (bottom/end); 1-m water-submersion test; and vibration/shock testing. To satisfy all criteria, new material, production process, post-mold finishing, and non-destructive test methods were needed. The result is industry's first application of a VOC-free thermoset vinyl ester resin reinforced with a coarse basket-weave glass rove cloth to form a complex-shaped enclosure that protects the EV's battery components in the event of a catastrophic event. The tough compression-molded composite is 40% lighter than metallic solutions, helping the vehicle achieve extended range and enhanced performance. Since it is non-conductive, it protects occupants and first responders to an accident scene. Specially formulated resin is free of styrene emissions, making it safer for workers and the environment. Selective pattern layups allow for localized reinforcement. The application also features a large structural joint of composite to steel.

CATEGORY: Materials

- **ENGINE CYLINDER-BLOCK ACOUSTIC SHIELD**
  - **OEM Make & Model**: 2013 Hyundai Motor Co. Hyundai* Elantra* compact car
  - **Tier Supplier/Processor**: NVH Korea Co., Ltd.
  - **Material Supplier / Toolmaker:** DuPont Co., Ltd. / not stated
  - **Material / Process**: Nomex* N301 aramid fiber / Press forming
  - **Description:** This cylinder-block acoustic shield is non-flammable, lightweight, overcomes previous issues with other composites for durability at high-temperatures, and can be molded into any desired shape, permitting parts to be positioned close to the engine or exhaust system to maximize noise shielding vs. metal shields. A new epoxy binder system was developed to enable press-formed parts to maintain a three-dimensional (3D) shape. Further work was done to develop an impregnation process and to optimize the nonwoven aramid fabrics for this application. The part represents a 93% weight and 22% cost reduction vs. previous technology, and also reduced assembly operations and interior noise levels (max. 1.6 dB noise reductions with only 80 g of material). Thermal performance was also upped from 200C to 310C), and weight reductions contributed to improved fuel efficiency and CO_2 emissions.

-more-

SPE Announces Finalists for 43rd Auto Innovation Awards Competition
8-8-8-8

- **INSTRUMENT PANELS WITH INJECTION-MOLDED SKIN**
  - **OEM Make & Model**: 2013 Nissan Motor Co. Nissan* Sentra* compact car
  - **Tier Supplier/Processor**: Calsonic Kansei Corp.
  - **Material Supplier / Toolmaker:** Asahi Kasei Chemicals / Calsonic Kansei Corp.
  - **Material / Process**: Sunvieo* A7171 thermoplastic vulcanizate (TPV) / Injection molding
  - **Description:** This is the world's first instrument panel featuring an injection-molded thinwall skin in ultrahigh-flow TPV. With a melt-flow rate of 250 g/10 min and excellent mechanical properties, this specially formulated material made it possible to mold a 1-mm skin that could accommodate the IP's deep draws and uneven undercuts without tearing, thereby providing new levels of design and styling options. The TPV also provides superior visual appeal, distinctive elongation, and softer touch desired by consumers without compromising proper airbag deployment and function. Compared with polyvinyl chloride (PVC) slush molding, it offers good long-term appearance and gloss levels. Molded in a 60-sec cycle, the new skin material is 25% lighter and 10% less costly than PVC slush molding and also reduced tooling costs, plus scrap is reusable. Additionally, there also was a 58% CO_2 savings vs. PVC slush molding since the process is less energy intensive. The skin's good release characteristics help minimize the need for mold-release spray, reducing volatiles further.
- **HIGH-BRIGHTNESS LED HEAT SINK**
  - **OEM Make & Model**: 2014 Aftermarket
  - **Tier Supplier/Processor**: Ayfar Otomotiv / Mars Otomotiv
  - **Material Supplier / Toolmaker:** PolyOne Corp. / Mars Otomotiv
  - **Material / Process**: Therma-Tech* TT6600-5001EC thermally conductive PA 6/6 / Injection molding
  - **Description:** This aftermarket application is a good example of replacing die-cast aluminum with injection-molded conductive thermoplastic on heat sinks for high-brightness (HB) light-emitting diode (LED) transportation lamps. LED lighting is increasingly popular because it uses less energy but provides drivers with greater visibility and longer use life than standard halogen bulbs. However, as heat builds up, LED lighting performance and use go down, so the heat sink plays an important role in proper operation of the lighting. A special grade of high-conductivity (20 W/m-K) PA 6/6 resin was developed for the application, which reduced weight 39% and costs 20% vs. the die-cast aluminum it replaced. Interestingly, only minor modifications were required to reuse the aluminum die-cast tool to make it suitable for injection molding of the thermoplastic solution. And the customer now molds heat sinks in-house, simplifying logistics, reducing delays, freeing capital, and allowing the company to better capture the value of its products.

-more-

SPE Announces Finalists for 43rd Auto Innovation Awards Competition
9-9-9-9

- **RICE HULL-FILLED POLYPROPYLENE ELECTRICAL COWL BRACKET**
  - **OEM Make & Model**: 2104 Ford Motor Co. Ford*F-Series* pickup
  - **Tier Supplier/Processor**: Yazaki North America, Inc. / A. Raymond Tinnerman
  - **Material Supplier / Toolmaker:** Rhe Tech, Inc. / A. Raymond Tinnerman
  - **Material / Process**: RheVision* RH10P325-00 PP / Injection molding
  - **Description:** In this injection-molded cowl bracket, talc filler was replaced with rice hulls in a PP grade, which also features 25% post-consumer recyclate (PCR) content. Rice hulls (a by-product of domestic food processing) were selected to reinforce the resin because they were readily available, were derived from plants with a fast growing cycle, and had a consistent composition season-to-season and field-to-field vs. other natural reinforcements. No additional energy was required to produce the hulls (eliminating the cost and energy associated with mining minerals) and their reuse avoids costs otherwise associated with landfilling. The renewable and recyclable material was a direct drop in, speeding development time and eliminating tooling changes. It was weight and cost neutral, but opens up longer term cost opportunities by using both recycled and renewable materials.
- **MOLD-IN-COLOR METALLIC TO SIMULATE PAINTED PARTS**
  - **OEM Make & Model**: 2013 Ford Motor Co. Ford*Edge* CUV
  - **Tier Supplier/Processor**: Johnson Controls, Inc. / Royal Plastics Inc.
  - **Material Supplier / Toolmaker:** Celanese Corp. / Not stated
  - **Material / Process**: Hostaform* MetaLX LX90Z XAP2 POM / Injection molding
  - **Description:** This is the first time that MIC injection-molded interior trim parts have matched the satin look of light-silver paint while retaining its metallic sparkle. Although the part *looks* painted, it feels slick and smooth (owing to the inherent lubricity of the POM polymer) rather than having the dry, rough surface associated with painted parts. The grade uses a unique blend of metallic flake geometry and eliminates the cost, time, VOCs, and hazardous waste associated with painting while lowering costs 30%. Warranty issues are also expected to be reduced and this shows a trend of metallic-look MIC plastics being used on higher priced vehicles.

-more-

SPE Announces Finalists for 43rd Auto Innovation Awards Competition
10-10-10-10

CATEGORY: Powertrain

- **TURBOCHARGED AIR DUCT**
  - **OEM Make & Model**: 2011 Audi AG Audi A4* & A5* sedans with 2.0L TDI & TFSI engines
  - **Tier Supplier/Processor**: Röchling Automotive
  - **Material Supplier / Toolmaker:** ZEON Corp. / Röchling Automotive
  - **Material / Process**: PA 6 + alkyl acrylate copolymer (ACM, also called acrylic rubber) / Suction blow molding
  - **Description:** This application combines the air-intake duct with charge air cooler and integrates both into the intake manifold, reducing air-intake loop volume by up to 50% (for better engine response) while also lowering package space 40% and part count, weight, and costs by 20%. The resulting system reduces pressure losses so turbine work is reduced while keeping the same boost pressure at air-intake valves and helping reduce pumping work in the turbocharger 10% at high engine loads. Novel production technology (suction blow molding) and a new high-performance soft TPV (PA 6 + ACM), which can withstand 2.7 bars of overpressure at 125C were used. There was no need to design in bellows on this part, since the material was able to decouple engine movements from the intercooler by itself, and no internal protection layer was needed to shield the material from exposure to acidic blow-by fluids. Unlike conventional rubber, the part is fully recyclable at end of life. This led to 50% direct and 50% indirect cost savings. Thanks to acoustic improvements, interior cabin noise also is reduced for occupants.
- **HIGH-HEAT TURBO EGR SLEEVE**
  - **OEM Make & Model**: 2013 Daimler AG Daimler* & Mercedes* I-4 turbo-diesel engines (multiple platforms)
  - **Tier Supplier/Processor**: Montaplast GmbH
  - **Material Supplier / Toolmaker:** BASF SE / Not stated
  - **Material / Process**: Ultramid* D3G7 PA 6/6 / Injection molding
  - **Description:** This heat shield is integrated into the air-intake manifold inlet for high air-temperature applications like diesels. In this area of the manifold, hot exhaust gas is mixed with ambient-temperature (fresh) air without failure of adjacent components. The plastic heat shield offers several improvements vs. previous systems, including greater design flexibility (molded-in vs. machined geometry); improved air/exhaust gas recirculation (EGR) mixing (thanks to molded features, which increase turbulence); a 50% weight savings; enhanced component durability; and inherent corrosion resistance. A special heat-stabilized grade of 35% GR PA 6/6 is injection molded for the sleeve, replacing roll-formed aluminum and readily withstanding the continuous-service temperature of 220C and peak temperature of 240C. The application was cost neutral but reduced mass by 50%.

-more-

SPE Announces Finalists for 43rd Auto Innovation Awards Competition
11-11-11-11

CATEGORY: Process/Assembly/Enabling Technologies

- **PRESSURE PRESS TECHNOLOGY**
  - **OEM Make & Model**: 2014 General Motors Co. Corvette* Stingray*sports car
  - **Tier Supplier/Processor**: Globe Machine Manufacturing Co. / Plasan Carbon Composites
  - **Material Supplier / Toolmaker:** Toray North America / Weber Manufacturing Technologies Inc.
  - **Material / Process**: Epoxy carbon fiber prepreg / New out-of-autoclave molding process
  - **Description:** This is the first production use of a new rapid out-of-autoclave production process for carbon fiber-reinforced composites. It produces parts with equivalent mechanical properties and better aesthetics far faster than the traditional autoclave (in 17 vs. 150 min). This significantly reduces costs and makes carbon composites practical and affordable for the first time for medium-volume automotive production. Key to this significant technology breakthrough was R&D characterization of the autoclave cure cycle and resin cure kinetics, which led to several patent filings, a 66% reduction in cycle time, a 30% reduction in direct part costs, and a 75% reduction in the cost of process consumables. Additionally, the specially designed process and equipment prevents the traditional exothermic cure reaction, eliminating the need for nitrogen blanketing and release of volatiles. Nickel-vapor-deposition (NVD) tooling with embedded hot-oil heating/cooling lines moves heat quickly through the Z-axis for rapid curing. A reusable silicone rubber canopy (good for 400-500 parts) reduces the cost and hassle of traditional disposable bagging. Parts exit the tool with more consistent surfaces, reducing finishing operations by 35%.
- **LIGHTWEIGHT SEAT PAN**
  - **OEM Make & Model**: 2013 General Motors Co. Opel* Astra* OPC sports sedan
  - **Tier Supplier/Processor**: SeaTcon AG / Reinart
  - **Material Supplier / Toolmaker:** BASF SE / Not stated
  - **Material / Process**: Ultramid* B3S & B3ZG8 PA 6 / Hybrid injection molding
  - **Description:** In this seat pan, stamped steel is replaced by thermoplastic composite, which combines both discontinuous and continuous fiberglass reinforcement in a PA 6 matrix. The award-winning design features 18 adjustment options to more comfortably fit occupants. It meets all required safety requirements while improving crash and long-term fatigue performance, yet reduces mass 45% as well as wall thickness (increasing packaging space) without any cost increase. The part's design was extensively analyzed via a proprietary simulation tool, Ultrasim*, increasing confidence in the ability to accurately predict behavior of continuously reinforced thermoplastic composites. The part is produced in a hybrid injection-molding process that combines robotic handling of the pre-cut preimpregnated continuous-fiber insert and an infrared heater inside the injection molding tool that preheats and pre-forms the cold sheet prior to tool closure and overmolding with impact-modified, discontinuous short glass/PA 6, which is used to form ribs, edges, and other geometry that long fibers cannot fill.

-more-

SPE Announces Finalists for 43rd Auto Innovation Awards Competition
12-12-12-12

- **INTEGRATED COOLANT CROSS-OVER FOR 3.5/3.7 L V6 ENGINES**
  - **OEM Make & Model**: 2013 Ford Motor Co. Ford* Taurus*, Flex*, Edge*, & Explorer*plus & Lincoln MKZ*, MKS*, MKX*,& MKT* vehicles
  - **Tier Supplier/Processor**: ITW Tomco
  - **Material Supplier / Toolmaker:** DuPont Performance Polymers / Luttmann Mold
  - **Material / Process**: Zytel* HTN 51G35HSLR polyphthalamide (PPA) & PA 6 / Injection molding
  - **Description:** This integrated composite coolant cross-over tube eliminates corrosion associated with aggressive long-life coolants (LLCs) while taking 1 lb of weight and $1 USD cost out of each engine, thereby improving service life, fuel economy, and CO_2 emissions while saving money. Previous designs using overmolded brazed metal tubing were replaced by tubing injection molded of 35% GR PPA. Each molded tube is subsequently inserted into a second tool and overmolded with 30% GR PA 6 to form the rest of the intake manifold. Significant structural design work was performed to ensure the hollow PPA tube could survive the pressures of overmolding, and special mold-cavity pressure-sensing technology developed by RJG Inc. helps prevent damage during the process. The PPA material was already proven safe with LLC coolants, eliminating corrosion concerns while reducing development costs, and the combined system is now easier to recycle. Further, the intake-manifold supplier now makes its own cross-over tubes, reducing cost variations due to metals-market fluctuations.

CATEGORY: Safety

- **SIDE AIRBAG COVER**
  - **OEM Make & Model**: 2013 Ford Motor Co. Ford*Fusion* mid-size sedan
  - **Tier Supplier/Processor**: Autoliv Inc. / Atlantic Precision Products
  - **Material Supplier / Toolmaker:** Mitsubishi / Great Lakes Mold & Engineering
  - **Material / Process**: TT914 CNP TPO / Injection molding
  - **Description:** Replacing a conventional metal can and plastic cover, this is the first time that an insert-molded bracket/cover assembly has been designed to be both the mounting surface for the seat side airbag (SAB) as well as integral to the performance and cosmetic function of the cover. This unique design answered the challenge of meeting styling studio requests for a thin seat appearance, but providing packaging space for increasingly large side airbags, which now typically protect occupants from chest to pelvis. The insert-molded cantilevered metal bracket allows for efficient assembly at the airbag supplier, reducing part counts typically required for a Class A side airbag module and saving 300 g of weight. Extensive filling and tooling development was used to ensure proper bracket encapsulation by the tough TPO resin, which maintains a Class A appearance during normal usage, but delivers proper airbag deployment in a side impact event. The design also virtually eliminates craftsmanship fit concerns that can be an issue with conventional "can & cover" SAB designs.

-more-

- **COLLAPSIBLE ARMREST FOR SIDE IMPACT**
  - **OEM Make & Model**: 2013 Ford Motor Co. Ford* Edge*& Lincoln* MKX*CUVs
  - **Tier Supplier/Processor**: Johnson Controls Inc.
  - **Material Supplier / Toolmaker:** Styron / Toolplas Systems Inc.
  - **Material / Process**: Magnum* 3325MT ABS / Injection molding
  - **Description:** This injection-molded armrest has been specially designed to maintain full integrity for NVH, comfort, aesthetics, and durability during normal service life yet to detach and collapse during lateral loading from a side impact. Using PVC and ABS materials, the design features a single-piece insert and armrest with molded-in slots, which create a slip plane that is rigid enough for normal use but creates a failure path that provides for reduced occupant injury numbers in a crash. It also reduces material usage and costs 25% and assembly costs by 15%.

Category and Grand Award winners selected from these finalists during the Blue Ribbon judging on October 7, 2013 will be announced on **November 6** during the 43rd-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 Corp. 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 Y*ear's Most Innovative Use of Plastics*. This annual event typically draws 700 to 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.

-more-

SPE Announces Finalists for 43rd 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** .

# # # # #

ATTENTION EDITORS: High-resolution digital part photography for all of the 2013 nominations will shortly be available at http://www.flickr.com/photos/speautomotive/collections/.