

49TH-ANNUAL



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

Additive Manufacturing

Sunglass Bin

OEM/Vehicle

Ford Motor Co.
2020MY Ford Explorer

System Supplier

Methode Electronics, Inc.

Material Processor

Methode Electronics, Inc.

Material Supplier

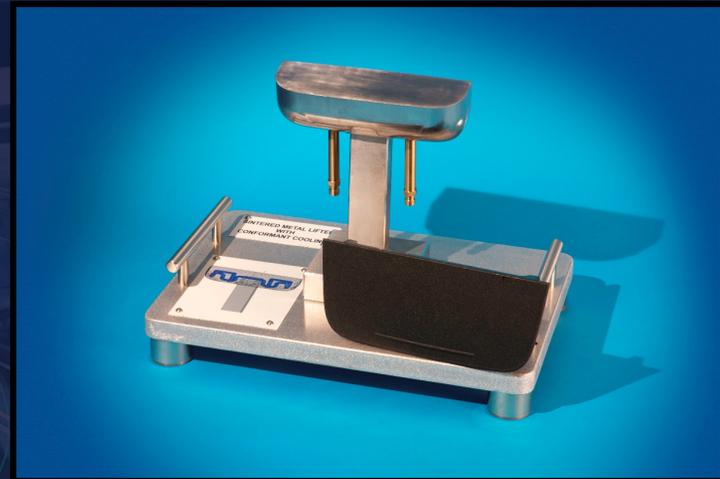
Celanese Corp.

Resin

Celstran PP-GF20-02 LFT-PP

Tooling/Equipment Supplier

RGM Tooling Consultants, Inc.



Additive manufacturing was used to produce a single tooling insert (lifter) that replaced 2 conventionally machined lifters to mold an injection molded sunglass stowage bin. That enabled design changes to produce a deeper pocket with a heavier undercut that still could be molded without hotspots, warpage, or demolding issues and without needing to switch to a more costly resin. The new deeper bin design also better meets customer requirements while reducing cycle time, molding scrap, tooling maintenance, and improving dimensional stability in the final part.

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Additive Manufacturing

Hinge Pillar Minomi Checking Fixture

OEM/Vehicle

General Motors Co.
2020MY Buick Excelle

System Supplier

Kuka AG

Material Processor

General Motors Co.

Material Supplier

Stratasys Ltd.

Resin

ASA

Tooling/Equipment Supplier

Kuka AG



By changing a lean-manufacturing conveyor pallet from metal to ASA parts produced via 3D printing, pallet weight was lowered 72%, direct costs were reduced 66%, and lead times were shortened from 6-8 weeks to 4 days, making design changes faster and easier. Additionally, 1 of 2 operators usually required to lift the old pallets was reassigned, ergonomics for the remaining operator were improved, offline checks can now be conducted faster, there is now less wear and tear on equipment, and no coolant or grease is required.

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Additive Manufacturing Rear Wheelhouse Hemming Tool

OEM/Vehicle

General Motors Co.
2020MY Chevrolet Equinox

System Supplier

General Motors Tech Center – PPO
North

Material Processor

General Motors Co.

Material Supplier

Stratasys Ltd.

Resin

M30 ABS



A rear wheelhouse hemming tool that is used to join fender inner and outer panels was 3D printed in ABS. Versus incumbent machined aluminum, the ABS tool weighed 50 and 70% less (depending on vehicle size), costs reduced 75%, lead times were shortened from 10-13 weeks to 2 weeks, making it much faster to order replacements, labor costs were lowered, and design changes were easier to make.

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

Additive Manufacturing

Lug Nut Starter

OEM/Vehicle

General Motors Co.
2019MY Chevrolet Silverado

System Supplier

Stratasys Ltd.

Material Processor

Eckhart

Material Supplier

Stratasys Ltd.

Resin

PA 12

Tooling/Equipment Supplier

Eckhart



This patent-pending lug-nut starter tool the need for a lug wrench or Jemms head tool, battery drive, and charger. User ergonomics are improved and all lug nuts can be started at once on a given wheel rather than starting them individually. Since torque output is reduced, there is far less chance of cross-threading nuts. Additionally, tooling cost is reduced \$2,000-\$3,000 USD/tool, no additional equipment is needed, and the design can be adapted to any circular bolt pattern.

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Additive Manufacturing

Instrument Panel Delete Plug

OEM/Vehicle

Ford Motor Co.
2019MY China F-150 Raptor

System Supplier

Detroit Manufacturing Systems LLC

Material Processor

Ford Motor Co.

Material Supplier

Carbon, Inc.

Resin

EPX82 2K epoxy



This 3D printed production part with Class A appearance passed all relevant requirements, including UV exposure. It expedited design, testing, and production, eliminated \$70,000 in tooling costs, and saved 3 months' time. The aesthetically pleasing delete plug with logo is preferred over a non-functional button.

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HONORING THE BEST IN AUTOMOTIVE PLASTICS

Aftermarket & Limited-Edition/Specialty

Full-Length Side Storage Box

OEM/Vehicle

General Motors Co.
2020MY GMC Sierra & Chevrolet Silverado

System Supplier

Gemini Group-Regency Plastics, Inc.

Material Processors

Hutchinson, Eberhard Mfg. Co.,
Gemini Plastics Inc., Sierra Plastics Inc.,
GPM Profile Extrusion

Material Supplier

Washington Penn Plastics Co., Inc.

Resin

PPC1GF15-UV YZ9A 15% GR-PP

Tooling/Equipment Supplier

Midwest Mold Builders, Inc.



These full-length (77-in./196-cm) side storage boxes attach via the D-ring tie downs and sit on the wheel wells of a full-size pickup, eliminating customer-visible fasteners and brackets as well the need to drill new holes for attachments. The MIC, grained blow-molded boxes and lids are 25-30% lighter than comparable steel or aluminum boxes and easy to install/remove. Lockable lids open into the bed, facilitating access to contents while keeping smaller items out of the main bed and securing valuable items. Injection molded latch cover, latch bezel, and handle and extruded weather seals complete the units.

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Aftermarket & Limited-Edition/Specialty

Flow-Through Letter Grille

OEM/Vehicle

General Motors Co.
2019MY Chevrolet Colorado

System Supplier

SRG Global

Material Processor

SRG Global

Material Supplier

Lotte Advanced Materials Co., Ltd.

Resin

Starex MP-0160R ABS

Tooling/Equipment Supplier

Integrity Tool and Mold Inc.



This visually-distinctive front grille preserves the “Chevrolet look” while reducing part complexity and allowing for higher airflow to accommodate diesel or gasoline engine requirements. An injection molded ABS outer frame in painted, high-gloss black snap-fits together with an injection molded low-gloss, MIC anthracite grey ASA bezel. Versus the standard grille it replaced, mass was reduced 14% and direct costs 7.5%, while significant indirect tooling savings also were realized, all while keeping the aftermarket price point affordable.

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Aftermarket & Limited-Edition/Specialty

Heavy Duty Tailgate Gap Flap

OEM/Vehicle

General Motors Co.
2020MY Chevrolet Silverado / GMC Sierra

System Supplier

Ground Effects Ltd.

Material Processor

Vintech Industries Inc.

Material Suppliers

ExxonMobil Corp., Teknor Apex Co.
LyondellBasell Industries N.V.

Resin

Santopresne TPV, Profax 7823 HHC PP,
Sarlink 5750 DB TPV

Tooling/Equipment Supplier

Vintech Industries Inc.



This pickup end-gate gap spacer helps keep debris out of the space between the end of the pickup bed and the tailgate thanks to a tri-durometer, multi-material extrusion with injection molded end caps and a slip coating that prevents premature wear. The fully recyclable spacer is easily installed with supplied double-sided fastening tape. Its living hinge allows the part to stay in place when the tailgate is closed as well as open, it won't pinch the wire harness, and it helps reduce pinch hazards when owners try to manually clear debris.

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Aftermarket & Limited-Edition/Specialty

Illuminated Emblem Light Guide

OEM/Vehicle

General Motors Co.
2020MY GMC Sierra & Yukon

System Supplier

Windsor Mold Group

Material Processor

Global Lighting Technologies Inc.

Material Supplier

Idemitsu Kosan Co., Ltd.

Resin

Tarflon LC1500 PC

Tooling/Equipment Supplier

Global Lighting Technologies Inc.



Both size and shape of this emblem made it difficult to use traditional radial design with a single LED on the light guide to ensure consistent light output along the entire path. Placing an LED behind each letter would have increased costs significantly and complexity and impacted mating components. By laser etching the perimeter of the light guide tool, a high degree of control over light intensity was achieved, lowering costs 20%. Highest etch density is used at the extremes to maximize light output, while lightest etch density is required near the light source.

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Aftermarket & Limited-Edition/Specialty

Multiple Additively Manufactured Components

OEM/Vehicle

Jaguar Land Rover Ltd.
2020MY Jaguar XE SV Project 8

System Supplier

HP, Inc.

Material Processor

Jaguar Land Rover Ltd.

Material Suppliers

HP, Inc., DyeMansion GmbH

Resin

PA 12



Additive manufacturing proved the most efficient and cost-effective method for producing 19 parts on this high-performance sedan whose total build volume will be limited to 300 cars. Both development and production parts were produced on the same printer platform, which eliminated significant tooling investment (est. at \$123,000 USD), as well as storage and maintenance costs. All 19 parts print at one time in a kit, and multiple kits can be produced at the same time. Additionally, parts offer better bonding adhesion than conventionally produced parts and passed paint adhesion tests.

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Aftermarket & Limited-Edition/Specialty

Squab Release Handle

OEM/Vehicle

Jaguar Land Rover Ltd.
1998MY Discovery 2

System Supplier

HP, Inc

Material Processor

Jaguar Land Rover Ltd.

Material Suppliers

HP, Inc., DyeMansion GmbH

Resin

PA 12



The supplier of these parts recently went out of business. With only 50 replacement handles needed per year, and the vehicle out of production for 15 years, spending \$37,000 USD to cut a new tool couldn't be justified. Additive manufacturing provided the opportunity to redesign handles with a more aggressive rib pattern that increased strength but that, in traditional tools, would have created undercuts (in a location where lifters would have been impossible to position) and stress risers. Final parts passed all OEM requirements, are fully recyclable, and extend the use-life of older vehicles.

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Body Exterior

TPO Spoiler

OEM/Vehicle

Ford Motor Co.
2020MY Ford Escape & Lincoln Corsair

System Supplier

Magna Exteriors

Material Processor

Magna Exteriors - Nascote

Material Supplier

LyondellBasell Industries N.V.

Resin

Hifax TYC1235X TPO

Tooling/Equipment Supplier

Concours Mold



By switching from PC/ABS to body-panel-grade TPO for an injection molded, ultrasonically welded spoiler assembly, mass was lowered 7-10%, wallstock was thinner, a better CLTE match with liftgate outer panels was achieved, which improved dimensionality and fit & finish, and cost was reduced \$2 USD/assembly. The material can be painted on most paint lines (high or low bake), achieves a quality appearance, and met OEM durability and thermal/solar load requirements.

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Body Exterior

Structural Reinforcement for Liftgates

OEM/Vehicle

Toyota Motor Corp.
2020MY Toyota Supra

System Supplier

Magna International Inc.

Material Processor

Magna International Inc.

Material Suppliers

BASF Polyurethanes GmbH, Johns Manville

Resins

Elastolit Ds 8790-101 PUR cores, StarRov
PR440 2400 090 fiberglass, Elastolit
R8819/104/LT PUR skins

Tooling/Equipment Supplier

Modelárna Liaz spol. s.r.o.



A lightweight, high-performance integral composite spaceframe replaced steel in the liftgate of a performance sports car. Mass was reduced 10% while boosting stiffness/weight ratios, CLTE was lowered, dimensional stability was improved, and a continuous load path between hinges and latches was provided. Produced using continuous glass fibers filament wound around PUR foam cores and then impregnated with PUR resin, the frame can be designed with variable diameter, shape, and wall thicknesses for difficult packaging situations and load cases.

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Body Exterior

Composite Pickup Box

OEM/Vehicle

General Motors Co.
2020MY GMC Sierra LD FST

System Supplier

Continental Structural Plastics

Material Processor

Continental Structural Plastics

Material Supplier

Teijin Ltd.

Resin

Serebo A235Y carbon fiber-reinf. PA 6

Tooling/Equipment Suppliers

Paragon D&E, Model Die & Mold, Inc.,
Altron Automation, Legacy Industries



This is industry's first pickup box in thermoplastic composite and carbon composite. It saved 62 lb/28 kg, provided best-in-class impact resistance/durability, the unpainted UV-stable material eliminated need for a bedliner (saving another 40 lb/18 kg), and numerous customer features were molded in, including functional compartment dividers and motorcycle tire pockets. The ability to achieve a deeper draw during molding increased cargo capacity. Significant technical challenges were overcome due to use of novel materials, processes, coatings, and joining methods. The box is fully recyclable and some scrap is reused on the vehicle.

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Body Exterior

Active Air Deflector

OEM/Vehicle

FCA NA LLC
2019MY Ram Pickup

System Supplier

Magna Exteriors

Material Processors

US Farathane Corp., Prism Plastics, Inc.

Material Suppliers

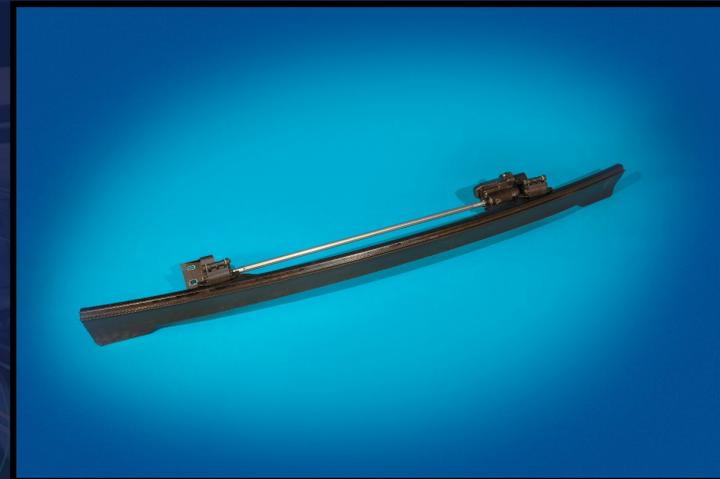
BASF Corp., DSM Engineering Plastics,
Ascend Performance Materials, RTP Co.

Resins

Ultramid B3WG7BK, Akulon K224-HG6,
Nylabond 6091-85A, Vydyne R533H BK02,
KTPE 85A

Tooling/Equipment Suppliers

Plastic Mold Technology Inc., Precision Die &
Machine Co., Quest Industries, Inc.



This frame-mounted active air deflector is located forward of the vehicle, below the bumper, and activates/stows at set speeds to reduce drag, improve aerodynamics, and boost fuel economy. It would take a vehicle mass reduction of 100 lb/45 kg to achieve the same 0.7 mpg fuel-efficiency improvement. The system is designed to withstand high-energy impacts thanks to a unique actuator containing a mechanical clutch and a 2-shot injection molded blade.

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Body Exterior

eApplique

OEM/Vehicle

Ford Motor Co.
2020MY Ford Explorer / Lincoln Aviator

System Supplier

Magna Exteriors

Material Processor

Co-Ex-Tec Div. of Magna International

Material Suppliers

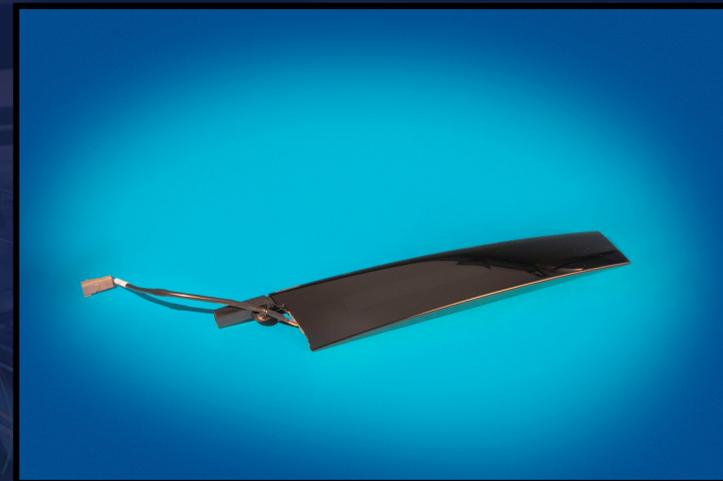
Evonik Industries AG, Ineos AG, AsahiKasei
Plastics NA, Kraiburg TPE

Resins

WSS-M4D776-B5 PMMA, WSS-M4D690-B1
ABS, 20% GR-PP, SuperSoft TFOSTOL0999
TPE

Tooling/Equipment Suppliers

Windsor Mold Inc., Redoe Group



This multi-material, co-molded keyless-entry applique uses a flexible printed-circuit board and unique electronics attachment methods to better match the crown and sweep of the pillar's Class A surface. The unit features an intelligent, touch-sensitive plastic control panel/keypad with improved rain sensor for fewer false inputs, Bluetooth authentication for greater security, and illuminated lock switch and lock status indicators. It provides uniform airgap and improved sealing, wire attachment, and stress relief vs. earlier systems while reducing cost, weight, and warranty issues. The design already has received 3 US patents.

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Body Exterior

Front End Module with Structural Bolster

OEM/Vehicle

Ford Motor Co.
2020MY Ford Explorer / Lincoln Aviator

System Supplier

Flex-n-Gate Corp.

Material Processor

Flex-n-Gate Corp.

Material Supplier

Celanese Corp.

Resin

Celstran PPGF40-20 AD3004 LGT-PP

Tooling/Equipment Supplier

Integrity Tool & Mold



The largest known and most fully integrated structural bolster/front-end module carrier to date, this system incorporates upper and lower active grille shutter housing structures, a direct-mounted crash sensor, an IIHS Small Offset structure in the impact beam, a lower cooling pack support structure, and latch reinforcement and mounting integration. The injection molded design with overmolded steel inserts eliminated a large metal reinforcement, reducing mass 10% and cost 20% vs. the prior model. Thanks to significant parts integration, material and fastener usage and assembly-plant line space and labor were reduced. It supports 300 build variations across 2 platforms.

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

Body Exterior

Glass Run Sealing System

OEM/Vehicle

Ford Motor Co.
2020MY Ford Explorer

System Supplier

Cooper Standard

Material Processor

Cooper Standard

Material Supplier

Cooper Standard & ExxonMobil Corp.

Resin

Fortex TPV

Tooling/Equipment Supplier

Cooper Standard



A new class of elastomer combines the best of EPDM and TPV materials typically used in automotive weatherseals without their negatives. It is lighter, offers best-in-class compression set, weathering, and chemical resistance while maintaining high elasticity and improved NVH and scratch resistance. The non-conductive elastomer is plasticizer-free, low VOC, contains no nitrosamines, and is non-blooming and non-fogging. It also offers broad color matching and improved color/gloss finish for enhanced aesthetics and is much easier for operators to install on the assembly line.

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

Body Exterior

Rear Bulkhead Window Frame

OEM/Vehicle

General Motors Co.
2020MY Chevrolet Corvette

System Supplier

Molded Fiberglass Companies

Material Processor

Molded Fiberglass Companies

Material Supplier

Molded Fiberglass Companies

Resin

4437 polyester/vinyl ester SMC with
beryllium graphite filler

Tooling/Equipment Supplier

Century Tool & Gage



Made from a custom-blended unsaturated polyester/vinyl ester resin system using beryllium graphite fillers to deaden sound on the rear bulkhead window frame, the part meets twin thermal and acoustic challenges seen when moving to a mid-engine architecture on the new Corvette. This 2.2 SG, low-VOC, compression moldable SMC eliminates the need for secondary stampings/baffles, die-cut foam, lofted fabrics, gaskets, and other sound deadeners, reducing costs while increasing interior package space and improving body sealing and NVH.

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

Body Exterior

Rear Fascia Assembly

OEM/Vehicle

General Motors Co.
2020MY Chevrolet Corvette

System Supplier

Molded Fiberglass Companies

Material Processor

Molded Fiberglass Companies

Material Supplier

MFG Research

Resin

4514 polyester/vinyl ester Class A SMC

Tooling/Equipment Supplier

Century Tool & Gage



This is the first use of a low-density (1.2 SG), Class A SMC for a rear fascia on vehicles with high production volumes. Versus TPO, the SMC's superior thermal stability enables it to be used next to hot exhaust tips. Its higher mechanical performance allows for the design of a short rear overhang and larger spacings between attachments. The SMC also does a better job of spreading loads over a larger area in low-speed rear crashes. Brackets and rear-parking assist sensors were bonded to the SMC.

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

Body Exterior

Rear Surround Frame

OEM/Vehicle

General Motors Co.
2020MY Chevrolet Corvette

System Supplier

Molded Fiberglass Companies

Material Processor

Molded Fiberglass Companies

Material Supplier

Molded Fiberglass Companies

Resin

4259 polyester/vinyl ester toughened
SMC

Tooling/Equipment Supplier

Century Tool & Gage



A 1.2 SG toughened structural SMC with carbon/glass fiber reinforcement enabled a large rear-surround frame assembly to be compression molded for mass savings of 15% vs. previously used structural SMC and cost savings due to parts consolidation. The pigmented, low-VOC formulation survives engine-compartment heat, eliminated secondary attachments, increased interior packaging space, reduced NVH, provided better body structure and sealing performance, and improved rear-hatch visibility. The assembly is the dimensional foundation for all rear exterior/interior panels and provides the flexibility for multiple model variants from a single design.

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

Body Exterior

Brow Reinforcement

OEM/Vehicle

Ford Motor Co.
2019MY Ford Ranger

System Supplier

Flex-n-Gate Corp.

Material Processor

Flex-n-Gate Corp.

Material Supplier

SABIC

Resin

Valox HT 4031 polyester



Development of a novel thermoplastic polyester that could be molded in the same tools as the previous PA 6/6 / MPPO resin reduced material costs 30%, injection pressures 20%, reduced clamp tonnage needs, and improved dimensional stability. With higher modulus and thermal stability, mechanical performance increased and moisture absorption was decreased. The high-flow grade also permitted cycle times to be lowered.

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

Body Interior

Integrated Button Carrier Modular Strategy

OEM/Vehicle

Ford Motor Co.
2020MY Ford Explorer / Aviator / Corsair

System Supplier

Methode Electronics, Inc.

Material Processor

Methode Electronics, Inc.

Material Supplier

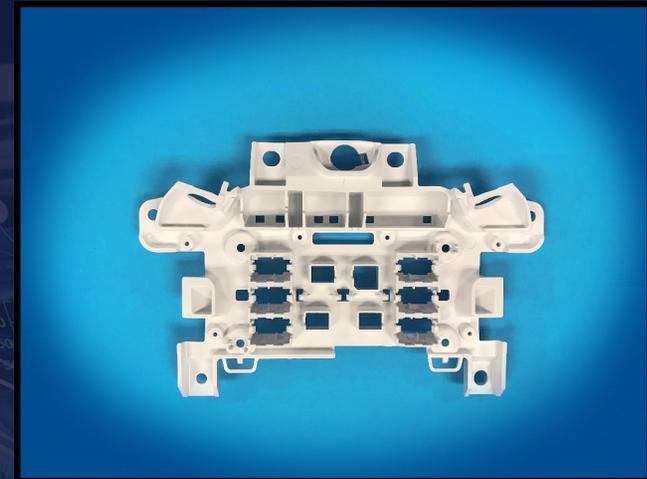
The Materials Group

Resin

Opticarb 8085SE PC/ABS

Tooling/Equipment Supplier

RGM Tooling Consultants, Inc.



To reduce overhead console complexity, a new design was developed that integrated mechanical, lighting, electrical, and safety functions into a single modular button carrier injection molded from MIC PC/ABS. With all program variants, this reduced part count from 70 to 17/vehicle, achieved a \$7 USD cost savings/vehicle and \$1.42-million USD program savings for tooling and testing. No button binding issues have been seen, BSR was improved, and the headliner fit better. To date, 2 patents have been filed and one has been granted on this technology.

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Body Interior

Multifunctional Plastic Seat Bracket

OEM/Vehicle

Ford Motor Co.
2020MY Ford Explorer / Lincoln Aviator

System Supplier

Lear Co.

Material Processor

Engineered Plastic Components Inc.

Material Supplier

BASF Corp.

Resin

Ultramid 30% GR-PA 6/6

Tooling/Equipment Supplier

Technical Molding Management
Systems Inc.



With the goal of reducing complexity, labor, and costs, a single, multifunctional seat bracket was designed to secure 3 different control modules, while ensuring the modules, wiring, brackets and clips, and J retainers provide secure attachment of components during a crash. The patent-pending design reduced 4 components to 1, lowered tooling investment, labor, and packaging costs, improved seat maintenance, and achieved a small weight savings (0.7 lb/0.3 kg per vehicle).

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Body Interior

Glove-Box Latch

OEM/Vehicle

Ford Motor Co.
2020MY Ford Explorer

System Supplier

Detroit Manufacturing Systems LLC

Material Processor

Piolax Corp.

Material Supplier

BASF Corp., Trinseo, Polyplastics Co., Ltd.,
Ashtabula Rubber Co.

Resins

Ultramid B3EG6 30% GR-PA 6, Pulse 2000ez
PC/ABS, Ultraform M90-44 POM, ARC PN
43181 70 durometer polychloroprene

Tooling/Equipment Supplier

Lamko Tool and Mold



A patent-pending glove-box latch redesign featured 5 innovations that improved fit & finish, reduced NVH, lowered costs 30%, and allowed for automated assembly. First, both housing halves are identical, eliminating an injection molding tool. Second, a molded-in L-shape elastic element replaces the small gap normally left to ensure latch-pawl engagement, eliminating movement and noise. Third, an interlocking design replaces a snap-fit, making the latch more robust. Fourth, a double torsion spring reduces twist on latch components and facilitates automated assembly. Fifth, locators in each mold half function as the stop feature.

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Body Interior

Tailgate Inner Structure

OEM/Vehicle

SAIC Motor Corp. Ltd.
2018MY Marvel X

System Supplier

Yanfeng Plastic Omnium Automotive Exterior
Systems Co. Ltd.

Material Processor

Yanfeng Plastic Omnium Automotive Exterior
Systems Co. Ltd.

Material Suppliers

SABIC, Clariant AG

Resin

Stamax 40YM240E LFT-PP

Tooling/Equipment Supplier

Yanfeng Plastic Omnium Automotive Exterior
Systems Co. Ltd.



Through integration of a liftgate structural reinforcement/inner panel with a garnish trim, improved surface aesthetics and passenger comfort were achieved while eliminating paint. The 1-piece, low-emissions/odor MIC 40% LFT-PP part also reduced weight 20%, saved 5% in direct costs and an additional 40% in indirect costs by eliminating tooling and welding fixtures.

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

Body Interior

Console Armrest Hinge

OEM/Vehicle

Ford Motor Co.
2020MY Lincoln Aviator

System Supplier

Summit Polymers, Inc.

Material Processor

Summit Polymers, Inc.

Material Supplier

Toyobo U.S.A., Inc.

Resin

Glamide TY-791HQ 60% glass/mineral
PA 6

Tooling/Equipment Supplier

Commercial Tool & Die Inc.



The goals were to replace a metal hinge for a console armrest and to consolidate both hinge and armrest substrate into a single MIC part, eliminating an assembly step and paint. The challenges were meeting deflection and mechanical requirements with an aesthetically pleasing material that was highly loaded. A special formulation of 60% glass/mineral-reinforced PA 6 met all requirements, including passing an 11,000-cycle lifecycle performance test without breakage. The part also cut 2.1 lb/0.95 kg and \$2 USD of cost out of each vehicle.

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AUTOMOTIVE
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COMPETITION & GALA
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Body Interior

Web Guide

OEM/Vehicle

Ford Motor Co.
2020MY Ford Escape & Lincoln Corsair

System Supplier

Innotech Precision Inc.

Material Processor

Innotech Precision Inc.

Material Supplier

Celanese Corp.

Resin

Celcon UV90Z POM

Tooling/Equipment Supplier

Innotech Precision Inc.



An important safety component, the web guide keeps seatbelt travel in position and secures passengers against high forces during crashes. The earlier design, which featured 3 stamped steel brackets and 2 overmolded plastic parts, was complex, heavy, and costly. The new lean design features a single bracket overmolded with UV-stabilized, MIC POM. Not only does the part meet high (14 kN) dynamic impact requirements, and its inherent lubricity facilitates seatbelt retraction efforts, but its appearance also is improved. Additionally, mass was reduced 15% and direct costs 30%.

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

Body Interior

Seatback Suspension System

OEM/Vehicle

Ford Motor Co.
2019MY Lincoln Aviator

System Supplier

Leggett & Platt, Inc.

Material Processor

Sle-Co Plastics

Material Supplier

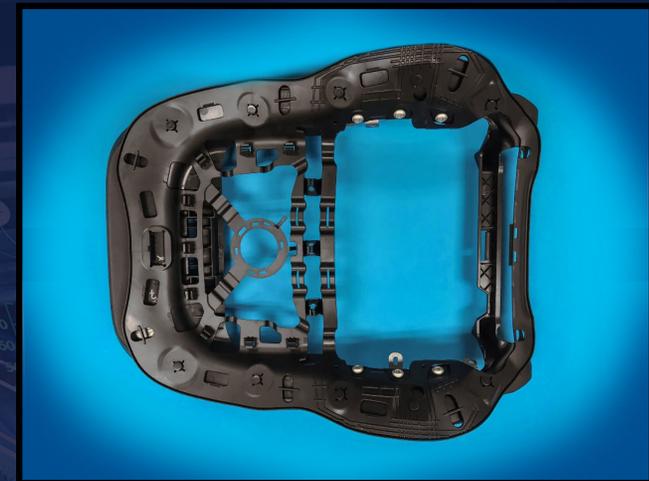
Advanced Composites

Resins

ADX 5017 18% talc-filled/UV-stabilized/0°
TPO, ADX 5028M 15% talc-filled/-40° TPO

Tooling/Equipment Supplier

Sle-Co Plastics



Two grades of injection molded TPO are key to achieving iconic styling and flexible bolster comfort and support to accommodate different-size seat occupants in front row seats. The 3-piece seat back system — inner closeout, flex-arch bolster and carrier support, and comfort carrier — snap together to form a unique floating style and a comfort-optimized suspension system with improved craftsmanship and safety. The final seat assembly is over 2.2 lb/1 kg lighter and 10-13% less costly than traditional seating and has had 7 patents granted to date.

49TH-ANNUAL



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

Body Interior

Modular Seat-Cushion Pan Nose

OEM/Vehicle

Ford Motor Co.
2019MY Lincoln Aviator

System Supplier

Leggett & Platt, Inc.

Material Processor

Summit Plastic Molding

Material Supplier

BASF Corp.

Resin

Ultramid B3ZG7 OSI 35% GF PA 6

Tooling/Equipment Supplier

MacLean-Fogg Co.



Injection molded, impact modified GR-PA 6 replaced steel on front-row seat-cushion pan and nose components, saving 1.1 lb/0.5 kg per vehicle and lowering direct costs 4-5%. Additionally, the new design handles front dynamic crash loads, enables floating style and comfort-optimized seat cushions, includes MIC A surfaces that improve craftsmanship, and provides more efficient modular assembly, eliminating assembly steps and saving labor. To date, 5 patents have been granted on this development.

49TH-ANNUAL



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

Chassis/Hardware

Rear-Differential Module - Front Bracket

OEM/Vehicle

FCA NA LLC

2020MY Jeep Cherokee

System Supplier

Boge Rubber & Plastics

Material Processor

Boge Rubber & Plastics

Material Supplier

BASF Corp.

Resin

Ultramid A3WG10CR 50% GF PA 6/6



A critical diecast and machined aluminum bracket was replaced by an injection molded bracket in 50% GR-PA 6/6 in this demanding rear differential module. The composite material was not only 30% lighter and saved \$1 USD/car direct costs vs. the benchmark aluminum, but its matrix provided 10x higher damping, improving NVH performance, and it fit current packaging space for this running change. The part passed all performance and durability requirements, eliminated corrosion issues, and will significantly reduce tooling costs over the life of the program.

49TH-ANNUAL



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

Chassis/Hardware

CVJ Boot

OEM/Vehicle

Hyundai Motor Co.
2020MY Hyundai Sonata HEV

System Supplier

SeoHan Group

Material Processor

KunHwa ENG Co., Ltd.

Material Supplier

DuPont de Nemours, Inc.

Resin

HytreI HTR8895 BK320 TPC-ET

Tooling/Equipment Supplier

Ossberger GmbH + Co. KG



An OEM-supplier team worked to identify factors suspected of causing wet squeaking problems on CVJ boots on quiet electric cars. A new test protocol that better simulates real driving conditions and generates data for more accurate material cards was developed, leading to design and material modifications and a new tool. A dual-wax system in the polymer, coupled with elimination of a knitline in the molded part were key to solving the problem, which eliminated \$1.5-million USD/year in field claims and up to \$5-million USD/year in repair costs.

49TH-ANNUAL



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

Chassis/Hardware

Window Regulator Plastic Fastener

OEM/Vehicle

Ford Motor Co.
2020MY Ford Explorer / Lincoln Aviator

System Supplier

Hi-Lex Corp.

Material Processor

Hi-Lex Corp.

Material Suppliers

Celanese Corp. & ExxonMobil Corp.

Resins

Hostaform S9363 POM,
Santoprene 101-55 TPV

Tooling/Equipment Supplier

ITW Automotive



A new and more efficient design for window-regulator retention fasteners was developed using dual-shot injection molded LFT-PP overmolded with a TPV seal. The patent-pending design, industry's first to provide quick assembly of integrated window regulators, works with hex or Torx tools for greater flexibility and reduced assembly time and effort. It eliminated the need for grease, lowered mass 1.65 lb/0.75 kg per vehicle, and reduced cost 20%. The fastener already is being used on 33-million vehicles with another 10-million expected to be added as the application spreads to other regions.

49TH-ANNUAL



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

Chassis/Hardware

Precision Wheel Balance System

OEM/Vehicle

General Motors Co.
2019MY Chevrolet Corvette

System Supplier

The 3M Co.

Material Processor

The 3M Co.

Material Supplier

The 3M Co.

Resin

Dyneon THV Fluoropolymer



A unique composite with high density (5.8 SG) has replaced traditional metallic wheel weights in steel, zinc, or lead. The extruded fluoropolymer contains 67% by volume post-industrial, corrosion-resistant steel alloy and can be recycled again. Supplied as a continuous tape, and with tailored magnetic properties, the weights can be precisely dispensed using a fully automated wheel-balance system in smaller increments for improved ride and less tire wear. The weights reduce assembly time up to 50%, lower costs 10%, significantly reduce and simplify inventory, and offer a broader range of colors.

49TH-ANNUAL



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

Chassis/Hardware

Composite Brake Pedal

OEM/Vehicle

Volkswagen AG
2020MY Porsche 911 & Taycan

System Supplier

Boge Rubber & Plastics

Material Processor

Boge Rubber & Plastics

Material Supplier

Celanese Corp.

Resins

Celstran 60% GR PA6, organosheet

Tooling/Equipment Supplier

Boge Rubber & Plastics



By selectively adding UD thermoplastic tapes to key locations of a brake pedal compression molded in fabric-reinforced GMT (organosheet) and overmolded with injection-molded short fiber compound — all in glass/PA 6 — ≈30% less organosheet was needed, failure mode was ductile, and mass was reduced 50-55% vs. the incumbent steel design. The lighter pedal improves driving haptics, the entire assembly is fully recyclable, and costs are neutral or lower than those for steel pedals that were replaced.

49TH-ANNUAL



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

Chassis/Hardware

Underbody Tunnel Structural Closeout

OEM/Vehicle

General Motors Co.
2020MY Chevrolet Corvette

System Supplier

Molded Fiberglass Companies

Material Processor

Molded Fiberglass Companies

Material Supplier

Molded Fiberglass Companies

Resin

Patch 767 CF/GF-vinyl ester SMC

Tooling/Equipment Supplier

Penco Products



Liquid compression molding (LCM) was used to form a structural composite reinforced with 2 layers of carbon and 3 layers of glass fiber impregnated with a low-VOC vinyl ester matrix. The resulting composite closeout provides better body structure and chassis performance and contributes 10% or more torsional stiffness to this tunnel-dominated vehicle architecture, while reducing mass 4.2 lb/1.9 kg and cost vs. aluminum. Secondary attachments also were eliminated, reducing labor, tooling, and capital expenditures.

49TH-ANNUAL



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

Chassis/Hardware

Particulate Matter Air Sensor

OEM/Vehicle

Ford Motor Co.
2020MY Lincoln Aviator

System Supplier

Amphenol Corp.

Material Processor

Ga Hyeon Enpla Co., Ltd.

Material Supplier

LG Chem, Ltd.

Resin

Lupoy EU5000G PC/ASA

Tooling/Equipment Supplier

Ga Hyeon Enpla Co., Ltd.



This highly accurate (PM 2.5/fine dust) air sensor provides the sensitivity of costly lab equipment with the compactness, durability, and cost-effectiveness required in the auto industry. Five of the maintenance-free sensor's 6 components are molded in PC/ASA, selected for its ability to mold complex geometries, hold tight tolerances, provide smooth interior surfaces, and function at temperatures between -40F/-40C and 185F/85C. Owing to its light weight, compact design, and nearly-silent operation, the sensor was able to be packaged in the overhead console.

49TH-ANNUAL



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

Environmental

Biobased PUR Foam for Air Filters

OEM/Vehicle

Ford Motor Co.
2019MY Ford F-150

System Supplier

Mann+Hummel Group

Material Processor

Mann+Hummel Group

Material Supplier

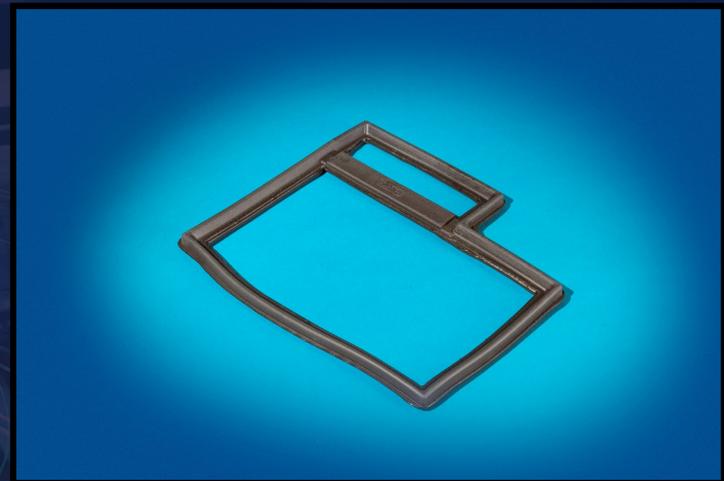
Cargill Inc.

Resin

BiOH soy-based polyol

Tooling/Equipment Supplier

Mann+Hummel Group



Containing the highest amount of bio-based (soy oil) polyol in the automotive industry (33%), this also is the first bio-based PUR foam used in the demanding underhood environment. The self-extinguishing foam molds identical to the full-petroleum-based foam it replaced and fared slightly better on the microbial-growth tests than the benchmark. The application is cost neutral, but offers higher sustainability.

49TH-ANNUAL



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

Environmental

100% PCR Carbon Canister

OEM/Vehicle

Ford Motor Co.
2019MY Ford Mustang

System Supplier

Delphi Technologies PLC

Material Processor

MGS Mfg. Group

Material Supplier

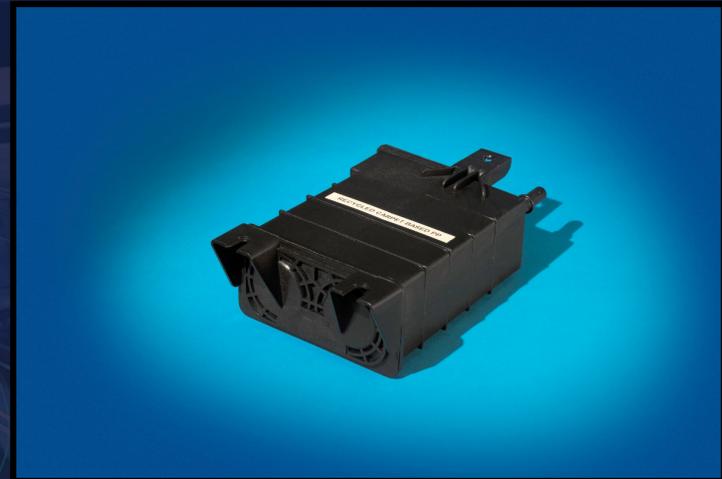
Wellman Advanced Materials

Resin

Ecolene PP8004-BK1 20% GR-PP

Tooling/Equipment Supplier

MGS Mfg. Group



The PP backing from PCR carpeting is given another use life by being recycled back into the injection molded carbon canister housing for passenger cars. This is the first 100% PCR PP-based carbon cannister. By replacing virgin PP, the recycled resin reduces cost 25% with no sacrifice to processing or molded-part performance, but increases sustainability. It is currently being rolled out on more than 20 Ford programs globally.

49TH-ANNUAL



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

Environmental

Rice Hull-Filled PP

OEM/Vehicle

Ford Motor Co.
2019MY Ford Edge

System Supplier

ARaymond

Material Processor

ARaymond

Material Suppliers

RheTech, A HEXPOL Co.

Resin

RH10P325-01 10% rice-hull-filled PP

Tooling/Equipment Supplier

ARaymond



One of 8 types of renewable materials in Ford vehicles, rice hulls are used as reinforcement for injection molded PP wiring channels, replacing 20% talc-filled PP without loss of properties. The high silica content of rice hulls provides high resistance to mildew and fungal growth, and offers better flame retardance and lower moisture absorption than cellulose-reinforced plastics. Versus outgoing talc-filled PP, the application also is 10% lighter and 10% less costly, yet meets all OEM specs. It also offers an additional revenue stream to farmers.

49TH-ANNUAL



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

Materials

LED Front Fog Lamp

OEM/Vehicle

Ford Motor Co.
2020MY Ford F-150

System Supplier

Flex-n-Gate Corp.

Material Processor

Ventra Plastics

Material Supplier

Covestro LLC

Resin

Makrolon TC8030 thermally
conductive PC

Tooling/Equipment Supplier

Krieger Craftsmen Inc.



A thermally and electrically conductive PC housing reduced weight and complexity and improved light output on this front fog-lamp assembly. Replacing die cast aluminum, the injection molded part reduces weight 46%, component count 12%, and direct costs 20% vs. the incumbent design. The material's high thermal conductivity manages heat well, its high modulus handles structural loads, its low CLTE provides dimensional stability, its electrical conductivity dissipates static charge, and its low EMI shielding helps with electronic integration. The material is fully recyclable and supports high production rates.

49TH-ANNUAL



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

Materials

Galvanic-Corrosion Coating

OEM/Vehicle

General Motors Co.
2020MY GMC Sierra / Chevrolet Silverado

System Supplier

Nylok, LLC

Material Processor

Nylok, LLC

Material Supplier

Nylok, LLC

Resin

NyShield epoxy



A special epoxy powder coating has been developed to coat fasteners, clips, and other small connectors in a high-speed process. The coated components eliminate the need for costly and exotic galvanic corrosion mitigation strategies when mixed-material components are connected, helping reduce overall vehicle mass. Compared with competitive PA 11 coatings, the epoxy coating provides uniform flow across irregular surfaces, very-good chemical and corrosion resistance, and has low creep under compressive forces – even at elevated temperatures – which otherwise can lead to joint loosening. It also provides an electrical barrier.

49TH-ANNUAL



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

Materials

High-Gloss Black MIC Wiper-Motor Cover

OEM/Vehicle

General Motors Co.
2020MY Chevrolet Suburban

System Supplier

ABC Inoac Exterior Systems

Material Processor

ABC Technologies

Material Supplier

Lotte Advanced Materials Co., Ltd.

Resin

Starex WX-9950UV ASA/PMMA

Tooling/Equipment Supplier

Delta Mold, Inc.



A novel ASA/PMMA blend overcame challenges on a MIC high-gloss black wiper motor cover that the individual resins could not. While ASA provides good impact, ductility, and weatherability (in low gloss), it scratches easily and has retention issues in high gloss. And PMMA offers high gloss and brilliant color, scratch resistance, and good weatherability in high gloss, but suffers from poor impact strength and ductility. The new blend offers both color and gloss retention, scratch resistance, weatherability (regardless of gloss level), plus impact strength and ductility. Fully recyclable, it eliminates paint and saves \$4 USD/vehicle.

49TH-ANNUAL



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

Materials

Steering-Wheel Bezel

OEM/Vehicle

Ford Motor Co.

2020MY Ford F-250 / F-350

System Supplier

ZF Friedrichshafen AG

Material Processor

Eclipse Mold, Inc.

Material Supplier

Celanese Corp.

Resin

Celanyl NKX-101 PA 6

Tooling/Equipment Supplier

Eclipse Mold, Inc.



A multipronged approach eliminated paint on a PA 6 steering-wheel bezel. First, a special pigment package, which achieved the desired color, flop, pop, and depth of color to match the benchmark painted metallic grey, was developed. Second, a knitline issue was resolved by thinning out 3 areas of the part that are hidden under the steering-wheel cover in the final assembly and adding overflows. The MIC PA 6 met all performance and aesthetic requirements while eliminating the cost and environmental impact of paint and reducing warranty issues in this high-touch area.

49TH-ANNUAL



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

Materials

Door-Trim Panels

OEM/Vehicle

Ford Motor Co.
2020MY Ford Police Interceptor

System Supplier

Yanfeng Automotive Interiors

Material Processor

Yanfeng Automotive Interiors

Material Supplier

Advanced Composites

Resin

ADX-5393 talc-filled TPO

Tooling/Equipment Supplier

ToolPlas Systems Inc.



For this police vehicle, front and rear door-panel inners were reformulated with lighter weight, lower cost talc-filled TPO. By cutting filler levels from 20 to 10%, mass was reduced 7.3% and cost \$0.18/vehicle without any compromise to durability. Density dropped, melt flow index increased, and tensile strength at yield also went up. Instrumented impact stayed the same and, while there was a small drop in flexural modulus, the door panels met all OEM requirements.

49TH-ANNUAL



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

Materials

Instrument Carrier

OEM/Vehicle

BMW AG

2020MY BMW 3-Series

System Supplier

Dräxlmaier Automotive

Material Processor

Dräxlmaier Automotive

Material Supplier

Trinseo

Resin

Enlite LGF2601 LFT-ABS



Replacing die cast magnesium with a new injection molded LFT-ABS composite reduced mass 28% and simplified production processes for this instrument panel carrier while offering comparable resonant frequency. At 185F/85C, the new material offers similar stiffness/density ratios vs. LFT-PP and higher stiffness at lower density than LFT-PA. Additionally, warpage is lower than comparably gated LFT-PP materials in test plaques. The material is said to be low VOC, low odor, and offer high dimensional stability.

49TH-ANNUAL



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

Materials

Low-CLTE PC/ABS Roof Rail

OEM/Vehicle

Toyota Motor Corp.
2020MY Toyota RAV4

System Supplier

JAC Products

Material Processor

Plastic Mold Technology

Material Supplier

Trinseo

Resin

Pulse XT7215 PC/ABS

Tooling/Equipment Supplier

Plastic Mold Technology



An unnamed mineral fiber and a reformulated resin system helped achieve a low CLTE and higher dimensional stability on a roof rail injection molded in PC/ABS. The fiber's specific aspect ratio was key to improving flow on such a long part. The resulting high gloss, lower density, thermally stable and paintable polymer system is an alternative to mineral-filled PC/PET and PC/SAN at lower cost.

49TH-ANNUAL



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

Materials

Front End Module

OEM/Vehicle

Volkswagen AG

2018MY Volkswagen Atlas

System Supplier

Arkal Automotive

Material Processor

Arkal Automotive

Material Supplier

Lanxess Corp.

Resin

Tepex 104RG600 PP / organosheet

Tooling/Equipment Supplier

M.C.S. Morandi S.r.l.



Strategically placed strips of continuous glass-fabric-reinforced GMT (organosheet) with a PP matrix eliminated the need for several heavy stamped steel brackets on the sides of this front-end module. A hybrid injection/compression process was used to produce the part, which features 2 metal stampings on the core side and 3 preheated strips of organosheet on the cavity side that are backfilled with 30% LFT-PP. No additional secondary operations are required. The substitution lowered mass ≈ 0.82 lb/0.37 kg, reduced cost 15%, while still meeting front crash requirements and engine hood-latch load constraints.

49TH-ANNUAL



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

Materials

Glass Wool-Reinforced Composites

OEM/Vehicle

Hyundai Motor Co.
2017MY Elantra

System Supplier

Seoyon E-Wha

Material Processor

Seoyon E-Wha

Material Supplier

Daehacom Co. Ltd.

Resin

SW920 SA glass wool / PP

Tooling/Equipment Supplier

Seoyon E-Wha



To improve both long-term scratch resistance and dimensional stability in injection molded PP interior trim panels, glass wool (crushed glass + sand produced from reclaimed/PIR building insulation) was used to replace talc, whiskers, and fiberglass. Because glass wool boosts mechanical properties vs. talc, filler content was reduced 5%, leading to lighter, less costly parts. Since it helps maintain surface finish longer, it should lower warranty claims. A unique process was developed to incorporate glass wool into the resin compound. Glass wool is difficult to dispose of, so this application gives it another use life.

49TH-ANNUAL



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

Materials

SMC / LMC Rear Trunk Components

OEM/Vehicle

General Motors Co.
2020MY Chevrolet Corvette

System Supplier

Molded Fiberglass Companies

Material Processor

Molded Fiberglass Companies

Material Supplier

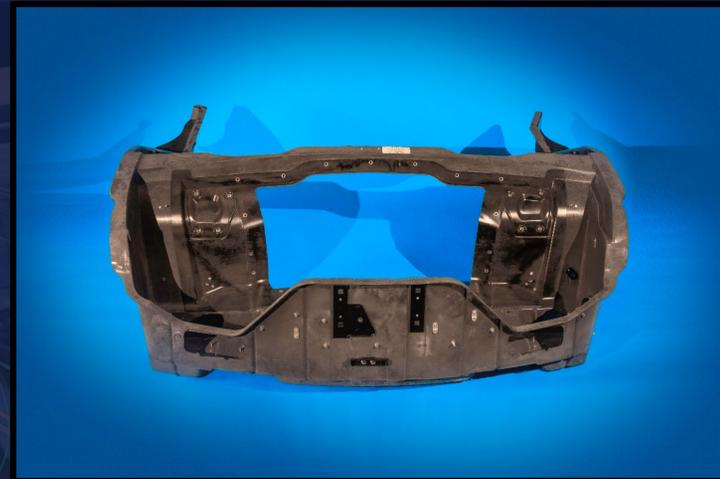
Molded Fiberglass Companies

Resin

LCM Float 758 polyester / vinyl ester SMC

Tooling/Equipment Supplier

Century Tool & Gage



A lower density (0.9 SG), structural composite, which literally floats on water, was developed to replace standard low-density SMC (1.25 SG), injection molded composite, and multipiece metallic structures for the vehicle's rear and front trunks. Compared with metals, the new LCM material reduces mass approximately 10 lb/4.5 kg and direct costs while offering the flexibility of two storage trunks, lower NVH, and higher parts-consolidation opportunities. The material/process combination, with a low-VOC unsaturated polyester/vinyl ester matrix, also made it possible to successfully mold both front and rear trunks with tall walls and deep-draw sides.

49TH-ANNUAL



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

Materials

Instrument-Panel Bracket

OEM/Vehicle

Ford Motor Co.
2020MY Lincoln Corsair

System Supplier

Summit Polymers, Inc.

Material Processor

Summit Polymers, Inc.

Material Supplier

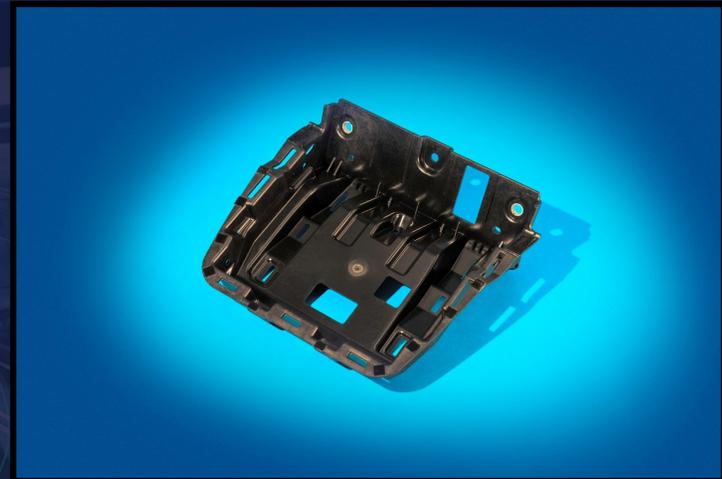
Toyobo U.S.A., Inc.

Resin

Glamide JF-30G MXD6
70% GR-aliphatic PA

Tooling/Equipment Supplier

Commercial Tool & Die, Inc.



The design team wished to create an A/C and heat controller that cantilevered off the IP, adding a sleek, minimalist look to the cockpit. However, it also was highly desirable to replace metal and lower weight and cost. Eventually, a 70% GR-aliphatic PA provided the strength to resist downward loads on the controller. The high-strength, low-warpage injection molded grade eliminated metal brackets while providing better design flexibility for fastening. It also reduced weight 12% vs. aluminum and 72% vs. steel while lowering costs 18% and improving NVH and wear issues.

49TH-ANNUAL



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

Materials

Multifunctional Control Valve

OEM/Vehicle

FCA NA LLC
2019MY Ram 3500

System Supplier

Continental AG

Material Processor

Stant Corp.

Material Supplier

Polyplastics Co, Ltd.

Resin

Duracon H140ARCF2001 POM

Tooling/Equipment Supplier

Poly-Nova Technologies, Corp.



A new POM with improved acid tolerance (pH \approx 1) and superior stress-crack resistance replaced standard POM on injection molded fuel flanges for multifunctional control valve assemblies. Through a combination of additives and tighter crystalline structure, the specialized polymer provides 30x higher acid resistance than standard POM, it flows more easily to produce parts with less stress, shrink is similar so tool changes were unnecessary, and it offers comparable mechanical properties. Although higher cost than standard POM, it avoided the need to upgrade to a much more costly resin and lowers warranty claims.

49TH-ANNUAL



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

Powertrain

Transmission Gear Shroud

OEM/Vehicle

Ford Motor Co.
2017MY Ford F-150

System Supplier

Stackpole International

Material Processor

MacLean-Fogg Co., Engineered Plastic
Components Inc.

Material Supplier

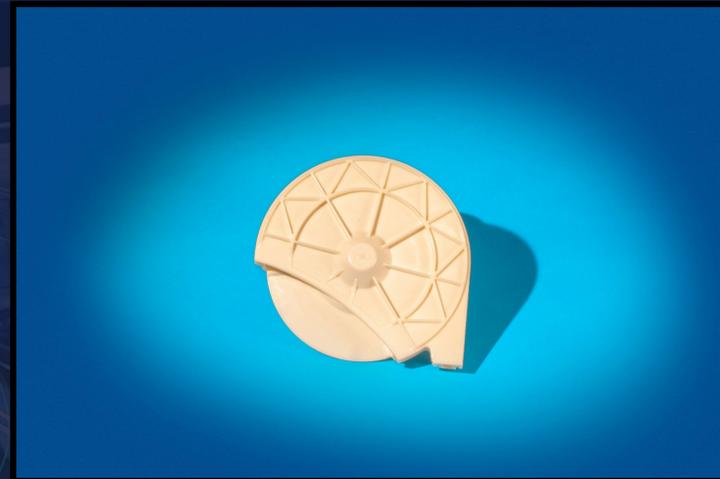
DuPont de Nemours, Inc.

Resin

Hytrel 8238 TPC-ET

Tooling/Equipment Supplier

Gibson Automation



A new transmission gear shroud cover and base protect the drive gear so it rotates freely without needing to push through transmission fluid, lowering effort, improving pump efficiency, and increasing vehicle MPG and the effective life of the transmission fluid. Injection molded TPC-ET replaced earlier steel covers with rubber seals that were heavier, more complex and costly, and suffered from more variation. Very aggressive snap fits permanently join cover to base once the assembly is completed. The same material molded very thin provides a ductile seal. Costs were reduced 22%, weight lowered 65%, and NVH was improved.

49TH-ANNUAL



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

Powertrain

In-Wheel Motor Thermally Conductive Insulation

OEM/Vehicle

IBM & Local Motors
2020MY Pujil

System Supplier

Protean Electric

Material Processor

Puju Plastics Technology

Material Supplier

Celanese Corp.

Resin

Coolpoly D5120 PPS

Tooling/Equipment Supplier

Puju Plastics Technology



A thermally conductive but electrically insulative PPS provided improved performance and reliability to encapsulate stators used on in-wheel motors for an autonomous electric bus. The polymer, which is injection overmolded to form a single-piece design, was selected for its high mechanical strength and CUT, tight tolerances, and good adhesion to steel. It replaced a multipiece bonded design, increasing torque capabilities of the motors, lowering mass 10% and direct costs 12%, reducing part count from 4 to 1 per stator, and improving water ingress.

49TH-ANNUAL



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

Powertrain

High Voltage Connectors

OEM/Vehicle

Volkswagen AG

2020MY Volkswagen Passat

System Supplier

Aptiv PLC

Material Processor

Aptiv PLC

Material Supplier

Ascend Performance Materials

Resin

Vydyne R535J 35% GR-PA 6/6

Tooling/Equipment Supplier

Suzhou Jiahong



The desire to create a safe, reliable connection with a high-voltage EV connector brought together German specifications, Chinese design, and U.S. materials. The new design features a two-step, finger-proof and touch-safe connect/disconnect feature that assures proper attachment via molded-in ribs and slots. Connectors are hermetically sealed for reliable performance under harsh operating conditions. The injection molded, heat-stabilized 35% GR PA 6/6 resin offers high EMI shielding to minimize interference, best-in-class comparative tracking index, excellent stiffness/strength yet with sufficient ductility to survive 3.3-ft/1-meter drop tests without fracture.

49TH-ANNUAL



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

Powertrain

Air Intake Assembly

OEM/Vehicle

Ford Motor Co.
2017MY Ford F-150

System Supplier

Mann+Hummel Group

Material Processor

Mann+Hummel Group

Material Supplier

Washington Penn Plastics Co., Inc.

Resin

PPH1TF2 blow-molded PP

Tooling/Equipment Supplier

Product and Tooling Technologies, Inc.



NVH was reduced on a twin-turbo engine's clean-side air-intake duct thanks to development of an innovative method for inserting the acoustic silencer. The silencer cage plus foam was first inserted into the body of the duct's blow molded bellows, then injection overmolded to create a robust seal that is low cost, low scrap, and lower in weight, while also eliminating the need for a resonator housing. The design reduces mass 2.7-4.2%, costs 8.3%, and component count. All openings are produced burr-free, reducing risk of turbo damage.

49TH-ANNUAL



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

Powertrain

OEM/Vehicle

Ford Motor Co.
2019MY Ford F-150 Raptor

System Supplier

Eagle Industries

Material Processor

Tribar Manufacturing, LLC

Material Supplier

Celanese Corp.

Resin

Celanyl NKX-101 PA 6

Engine Badge



The first completely molded-in-color engine badge assembly replaced a previously unrecyclable and costly assembly combining painted and plated plastic and metal produced in 3 separate processes. In the new design, a single base resin (PA 6) was used to produce the entire badge. Three separate MIC pigment packages matched the benchmark part without color deviation. Unique metallic silver and color-stable red pigment packages replaced chrome-plated and painted PC/ABS, while a bronze pigment package replaced brushed aluminum. The final assembly reduces cost, environmental burden, and is slightly lighter.

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

Powertrain

Fuel-Vapor Pump Assembly

OEM/Vehicle

General Motors Co.
2019MY Cadillac XT4

System Supplier

Pierburg GmbH

Material Processor

Swoboda Inc.

Material Supplier

BASF Corp.

Resins

Ultramid A3WG6 LS/A3EG6 PA 6/6 &
LT/B3WG6 PA 6

Tooling/Equipment Supplier

Swoboda Inc.



The first all-plastic fuel-vapor pump reduces VOCs and improves evaporative emissions control (EVAP) system efficiency while protecting against thermal shocks and holding rotors in place at high rotational speeds in a corrosive environment. Tough injection molded PA 6 and 6/6 provide parts consolidation and hold dimensional tolerances on key parts to 0.002 in./0.05 mm. An integrated pressure sensor offers real-time performance feedback. Overmolding and laser welding eliminate separate seals and fasteners, creating a leak-proof seal. Multiple tooling and process innovations were required to produce the complex assembly.

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

Powertrain

Rear Induction Duct

OEM/Vehicle

General Motors Co.
2020MY Chevrolet Corvette

System Supplier

Molded Fiberglass Companies

Material Processor

Molded Fiberglass Companies

Material Supplier

Molded Fiberglass Companies

Resin

Float 4281 polyester/vinyl ester SMC

Tooling/Equipment Supplier

Century Tool & Gage



Made from a special toughened, low-density SMC (SG 0.95), which was developed to reduce noise as well as mass without needing resonators on rear induction ducts, these parts are the first to be fully integral to the body frame. The low-VOC, low-styrene polyester/vinyl ester SMC formulation reduces emissions while providing required mechanicals at approximate 5.2 lb/2.4 kg mass savings plus delivered cost savings vs. alternative technologies. A unique duct design is required to funnel air from the rear air intake vents into the mid-mounted engine.

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

Powertrain

Plastic Coolant Tubes

OEM/Vehicle

Volkswagen AG
2019MY Audi A8

System Supplier

Teklas

Material Processors

PASS GmbH & Co. KG, ContiTech AG,
Tristone Flowtech

Material Supplier

Solvay Specialty Polymers

Resin

Ryton XE 3500 and 5430 PPS

Tooling/Equipment Suppliers

AFT Automotive GmbH,
MKS-Kunststoffspritzguss GmbH



Three grades of PPS with graduated flexural modulus values were used to develop unique powertrain fluid delivery tubes that provide mechanical retention values for 3,000 hr in coolant fluid at 275F/135C and at underhood operating temperatures of 338F/170C. The new design, which combines extruded tubes and injection molded connectors, simplifies the very complex, multi-step, multi-material incumbent assemblies of metal, plastics, elastomers, and fittings. The final assembly halved weight and reduced costs 20%, and eliminated secondary operations necessary with metal designs, yet met all performance requirements.

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

Powertrain

Traction-Motor Connection Ring

OEM/Vehicle

General Motors Co.
2017MY Chevrolet Bolt EV

System Supplier

VC Company

Material Processor

Ecorea Industrial Co., Ltd.

Material Supplier

DuPont de Nemours, Inc.

Resin

Zytel HTN 51G35EF BK083 25% GR-PPA

Tooling/Equipment Supplier

Ecorea Industrial Co., Ltd.



An integrated connection ring for EV traction motors provides electrical connections from stator windings, integrates and insulates stator leads, and provides ease of assembly for component connections. The novel multi-lead integrated connection design can be used with rigid or flexible leads, which are individually insulated and assembled. By reducing packaging space while maintaining electrical isolation to prevent discharge breakthrough, it contributed to optimized motor design. PPA was selected for its high temperature, high dielectric strength, 600-V comparative tracking index, and volume resistivity at operating temperatures, helping reduce mass and create more reliable motor connections.

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

Process/Assembly/Enabling Technologies

OEM/Vehicle

**General Motors Co.
2020MY Chevrolet Corvette**

System Supplier

Shape Corp.

Material Processor

Shape Corp.

Material Suppliers

**SGL Carbon SE, VectorPly Corp.,
Scott Bader Co. Ltd.**

Resin

Crestapol 1250 CF-reinf. PUR/acrylate

Tooling/Equipment Supplier

**Thomas GmbH + Co. Technik +
Innovation KG**

Rear Bumper Beam



The auto industry's first pultruded curved bumper beam uses the unique radius-pultrusion process and equipment to achieve a hollow beam with central web in carbon fiber fabric-reinforced polyurethane/acrylate resin. The curved geometry was desired to better match rear styling and vehicle package space. The beam features an integral tow hook mounting and is assembled to the body-in-white (BIW), requiring excellent mechanicals at elevated temperature. The beam meets low-speed crash requirements while cutting mass by 4.9 lb/2.2 kg vs. a metal-inert gas (MIG) welded aluminum extrusion. 3D printing was used to produce mandrels to maintain the hollow interior.

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

Process/Assembly/Enabling Technologies

Textured Surface w/ Film on Console & Door

OEM/Vehicle

Ford Motor Co.
2021MY Lincoln Corsair

System Supplier

International Automotive Components
(IAC) Group

Material Processor

Summit Polymers, Inc.

Material Suppliers

SABIC , AkzoNobel, Wavelock Advanced
Technology Co., Ltd.

Resin

XCY620S PC/ABS

Tooling/Equipment Supplier

Commercial Tool Group



Engineering was challenged to create a 1-piece console top finish panel featuring both high-gloss black and low gloss with texture, plus chrome accent rings without painting or plating. Two conventional thermoformable films — one in high gloss and one chrome — were back injection molded in a tool with selective texturing and de-gloss surfaces. The technique improves fit & finish, increases B-side package space, reduces tooling and mass, and eliminates paint and plating while creating a final assembly with multiple film appliques, different textures, colors, gloss, and patterns that even can be selectively backlit.

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

Process/Assembly/Enabling Technologies

Hybrid Bobbin for Traction Motor

OEM/Vehicle

Hyundai Motor Co.
2020MY Hyundai Sonata HEV

System Supplier

Hyundai MOBIS

Material Processor

Woosung High-Tech Co., Ltd.

Material Supplier

DuPont (Korea) Inc.

Resin

Zytel HTN HTN 51G35EF BK083 35% GR-PPA, Nomex meta-aramid core

Tooling/Equipment Supplier

Woosung High-Tech Co., Ltd.



Insert molding was used to combine bobbin and stator core for an HEV traction motor replacing a multipiece assembly requiring post-mold hand-assembly. The one-step/one-piece assembly relies on an FR meta-aramid core and high-temperature PPA resin. Motor efficiency and durability were improved thanks to improvements to coil space and heat transfer, while reducing mass 25%, wall thickness 50%, as well as lowering direct costs 30% and indirect costs an additional 10%. Three patents have been filed on the innovation.

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

Process/Assembly/Enabling Technologies

Artificial Intelligence Assembly

OEM/Vehicle

Ford Motor Co.
2018MY Ford Ranger

System Supplier

Grupo Antolin

Material Processor

Grupo Antolin

Material Supplier

Multiple

Resin

Multiple



As headliner producers face increasingly tight vehicle packaging restrictions, the challenge to maintain tight tolerances increases. To meet these requirements, an innovative assembly cell equipped with single-coordinate referencing and artificial intelligence and deep-learning visual inspection was used for positional inspection, validating, and troubleshooting process variation to predict failures, and determining future preventative-maintenance actions. The result was increased dimensional accuracy, reduced costs, increased efficiency, and the ability to take preemptive field actions. Inspection times were reduced and rework costs were lowered an estimated \$50,000-\$150,000 USD/month.

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

Process/Assembly/Enabling Technologies

Rear Service Doors

OEM/Vehicle

General Motors Co.
2020MY Chevrolet Corvette

System Supplier

Molded Fiberglass Companies

Material Processor

Molded Fiberglass Companies

Material Supplier

The Dow Chemical Co.

Resin

Silastic Mar-86 thixotropic elastomeric
silicone foam

Tooling/Equipment Supplier

Century Tool & Gage



A one-part silicone thixotropic elastomeric foam was key to creating durable seals on rear service doors, permitting customer access to trunk space and the air-filter system. The high-temperature elastomer can handle engine-bay temperatures in excess of 392F/200C. Most other die-cut foams and gaskets would melt or break down under such temperatures. Additionally, the elastomer provides excellent durability and compression-set resistance to withstand repeated open/close cycles during normal use. After dispensing, the applied gasket material is heat treated (167F/75C for 10 min) to expand the foam, eliminating the cost and waste of die cutting foam/gaskets.

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

Process/Assembly/Enabling Technologies

Direct Back Foaming

OEM/Vehicle

Ford Motor Co.
2020MY Ford Kuga Vignale

System Supplier

Yangfeng Automotive Systems

Material Processor

Yanfeng Automotive Interior Systems

Material Suppliers

Mondi Group, Benecke-Kaliko AG, BASF Corp., Celanese Corp., Jowat SE

Resins

PP foil, PUR coverstock, Biogen 3 foam, 30% LFT-PP, & PUR adhesive

Tooling/Equipment Supplier

AKE Knebel GmbH & Co. KG



With an estimated \$24-million USD lifetime program savings, direct back foaming eliminates 83 minutes of time and 11 of the typical 16 process steps needed to produce a foamed and skinned IP pad. Interestingly, the same process can be used for base-model and higher-trim levels (including faux and real leather), eliminating multiple tools. It also eliminates PVC and reduces mass 3.3 lb/1.5 kg, while improving cabin NVH and creating a Class A surface.

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

Process/Assembly/Enabling Technologies

Laser Technology For Decorative Panels

OEM/Vehicle

Ford Motor Co.
2020MY Lincoln Aviator

System Supplier

Summit Polymers, Inc.

Material Processors

Summit Polymers, Inc.,
Spectrum Industries, Inc.

Material Suppliers

SABIC, Techno Polymers Co., Ltd.,
Covestro AG

Resins

Lexan 121R PC, Cycolac MG37EPX ABS,
Cycloyl XCY620S PC/ABS, Hushlloy HS210,
Texin 288 LW TPU



Lasers were key for part cutting and pattern etching on the tambour door and top finish panel of this center console. This creates a continuous, holographic pattern on a discontinuous surface, giving the appearance of a single-piece door. Additionally, the dynamic pattern changes with viewing angle, hides smudges in high-touch areas, and is 30-50% less costly than films. Top finish panels are injection molded, then painted and laser etched, while tambour doors are injection molded, laser cut apart, painted, and then laser etched. The result is better fit and finish and a unique look.

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

Process/Assembly/Enabling Technologies

Lightweight Vehicle Brackets

OEM/Vehicle

Daimler AG
2020MY Mercedes-Benz GLS-Class

System Supplier

Pöppelmann GmbH & Co. KG

Material Processor

Pöppelmann GmbH & Co. KG

Material Supplier

SABIC

Resin

SABIC G3230AE 30% GR PP



Microcellular foaming of emissions-optimized, heat-stabilized injection molded 30% GR-PP was used to produce 15 different brackets for various areas of the vehicle. The foamed brackets are 10% lighter and 10% less costly than solid brackets in the same material. Because the polymer is heat stabilized, brackets can be used in hotter areas of the car and because it is low-VOC, brackets also are appropriate for vehicle interiors.

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

Process/Assembly/Enabling Technologies

High Gloss Black TPO

OEM/Vehicle

Ford Motor Co.
2020MY Lincoln Aviator

System Supplier

Tribar Manufacturing, LLC

Material Processor

Tribar Manufacturing, LLC

Material Supplier

LyondellBasell Industries N.V.

Resin

Indure X76 K9WA LC black TPO

Tooling/Equipment Supplier

Superior Design & Engineering, Inc.



This unique front grille features a 2-tone finish with both high gloss/piano black and bright chrome sections. What was most unusual is that this look was achieved via 2-shot MIC TPO, which eliminated the need for more costly engineering thermoplastics and for painting, filming, and chroming. The result is a premium look achieved at lower weight and cost using an easier processing material that is equally adept at handling part complexity. Piece price dropped \$25-\$30 USD/part. Additional program savings of \$30K-\$50K accrued from eliminating paint racks and another \$300K from eliminating paint.