



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

Additive Manufacturing

OEM/Vehicle

Ford Motor Co.

2005 Ford Mustang GT

System Supplier

Ford Performance Parts

Material Processor

Ford Advanced Manufacturing Center

Material Supplier

BASF Corp.

Resin

Ultrasint TPU01

Chassis Spring Sleeve



Replacing extruded rubber moldings with 3D printed TPU and post-process vapor smoothing, these aftermarket polymeric spring sleeves were designed with DFAM principles, eliminating the adhesive normally used to bond rubber sleeves to springs. The unique design balances assembly feasibility, performance, weight, and material usage and provides an interesting aesthetic not typically seen in such applications. When the traditional supplier no longer could provide parts, Ford designed and produced the kits in house, reducing mass, cost and material usage, improving water-shedding capabilities, and saving \$150,000 through tooling avoidance.



AUTOMOTIVE
INNOVATION AWARDS
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HONORING THE BEST IN AUTOMOTIVE PLASTICS

OEM/Vehicle

Ford Motor Co.

2021 Ford Maverick

System Supplier

IAC Group

Material Processor

IAC Group

Additive Manufacturing

Integrated Tether System



In an industry first, customers can select, download NPTL files, and 3D print their own swappable accessories (e.g. cupholders, trash bins, etc.) that fit in storage slots of their vehicle across the entire Maverick series. Initial designs were developed by Ford and its supply teams, but future ones could be suggested by customers. A variety of printer types and suggested materials can be used. This provides customers with flexible, customizable storage and use features or the option to maximize cabin space while avoiding significant tooling investment.

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50 YEARS OF
PLASTICS INNOVATION



AUTOMOTIVE
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Body Exterior

OEM/Vehicle

**Ford Motor Co.
2020 Ford F150**

System Supplier

US Farathane

Material Processor

US Farathane

Material Supplier

The Materials Group

Resin

**Optipro CP47GB Post Industrial
Recycle PP**

Cowl Vent Grille



This is the first exterior, weatherable, MIC application to use low-density microspheres plus PP from PCR carpet. The application lowered mass 0.2 kg/ and cost \$0.50-1.00/vehicle while offering enhanced weatherability, excellent dimensional stability, and surface aesthetics in a more environmentally friendly form. The drop-in application required minimal tooling modifications yet was 16% less dense than talc-filled prime PP while offering better processing, mechanicals, surface finish, scratch & mar, weatherability, and a shorter cycle time. It contributes to 680,000 kg of potential landfill avoidance and reduces carbon emissions 83%.

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**50 YEARS OF
PLASTICS INNOVATION**



AUTOMOTIVE
INNOVATION AWARDS
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HONORING THE BEST IN AUTOMOTIVE PLASTICS

Body Exterior

OEM/Vehicle

Ford Motor Co.

2021 Ford Transit

System Supplier

Ficosa International S.A.

Material Processor

Ficosa International S.A.

Material Supplier

BASF Corp.

Resin

Ultramid D3WG12 HMG PA66

Lightweight Structural Mirror Housing Bracket



A short-arm mirror bracket was converted from cast aluminum to 60% GR PA6/6 on this commercial van, reducing lateral mirror blur, lowering mirror assembly weight 15% and costs 37%, providing a more robust assembly with fewer parts, no corrosion, and better durability, and contributing to future tooling cost avoidance, since injection molding tools last longer than aluminum casting dies. In addition to careful material selection and rib pattern optimization, new CAE tools were developed to model mirror rotational displacement causing mirror blur.



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Body Exterior

OEM/Vehicle

Ford Motor Co.

2021 Ford Mustang Mach E GT

System Supplier

Magna Exteriors

Material Processor

LexaMar Div. of Magna Exteriors

Material Supplier

Convestro LLC

Resin

PC

Tooling/Equipment Supplier

Inevo Group

Grille with Integrated Lit Emblem



This hardcoated and painted front grille with lit emblem provides a 3D, futuristic effect in a single part. Injection/compression molding forms the large-format clear PC grille with variable wall thicknesses (ranging from 3-5 mm) in a lower-tonnage press that helped minimize or eliminate flow lines and stress marks. After molding, the optical-quality part undergoes hardcoat silicone dip to provide excellent weathering and abrasion resistance, the pony emblem is milled out, and primer and paint are selectively applied to the B side of the part—the first use of paint-over-hardcoat for an auto exterior trim application.

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**AUTOMOTIVE
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Body Exterior

Bumper with Park-Aid Sensor Integration

OEM/Vehicle

**Ford Motor Co.
2021 Ford Bronco**

System Supplier

ABC Technologies

Material Processor

ABC Technologies

Material Supplier

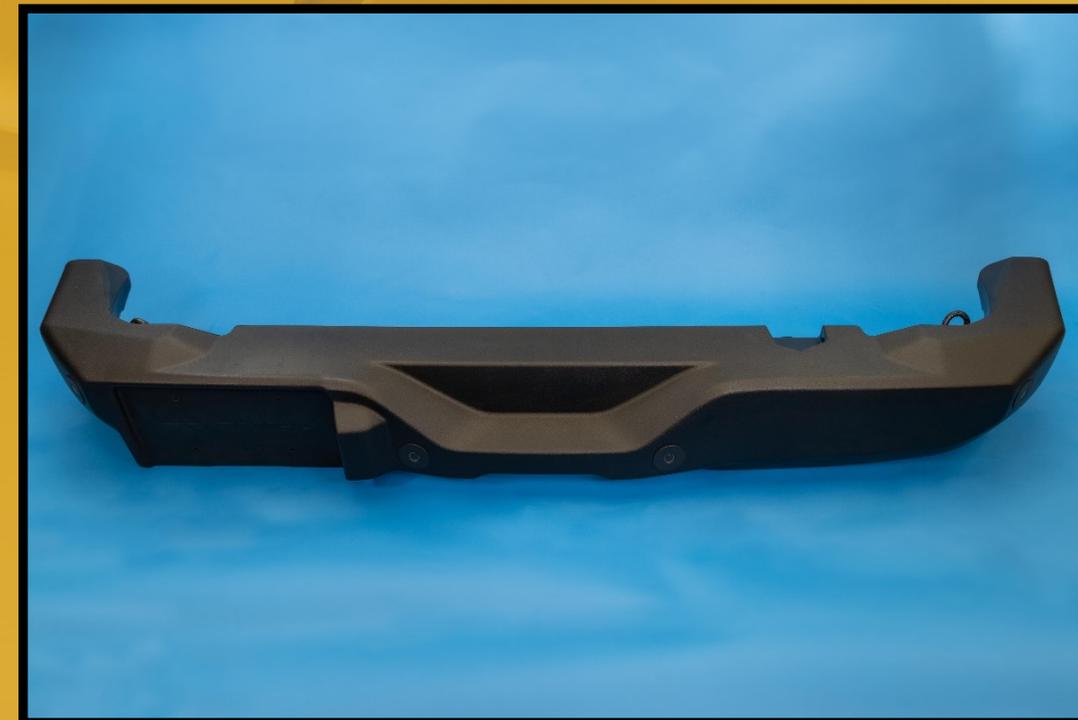
Salflex Polymers Ltd

Resin

Salflex 615 PP

Tooling/Equipment Supplier

Rocand Inc.



This is the first-time integrated park-assist sensors have been successfully incorporated into production blow-molded bumper assemblies. Versus stamped steel, blow-molded PP beams are lighter, lower cost, and offer greater design freedom and versus injection molded beams, they offer excellent structural rigidity, reduced assembly complexity, and lower-cost tooling. The resulting fully capable, lightweight bumper system makes use of snap-fit features that eliminate additional hardware to retain the sensors in place.



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Body Exterior

Door Hardware Water- Protection-Device

OEM/Vehicle

Ford Motor Co.

2021 Ford Mustang Mach-E

System Supplier

Standard Profil

Material Processor

MGS Manufacturing

Material Supplier

Entech Inc.

Resin

Hylon N1040HL PA66 GF40

Tooling/Equipment Supplier

MGS Manufacturing



A multicomponent plastic system comprised of 40% GR PA6/6, 20% talc-filled PP, and 70 Durometer EPDM is used to channel water away from door hardware electronics. The system meets crash performance without BSR issues, does not interfere with window opening/closing speeds even in cold temperatures, and can easily be assembled or serviced using common tools. The patent-pending water protection device features a cup sonically welded to a bracket that accommodates an adaptive retention ring that connects to the 100-mm diverter hose.



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Body Interior

OEM/Vehicle

**Toyota Motor Corp.
2021 Toyota Sienna**

System Supplier

Toyota Boshoku Corp.

Material Processor

Flex-N-Gate Corp

Material Supplier

BASF Corp.

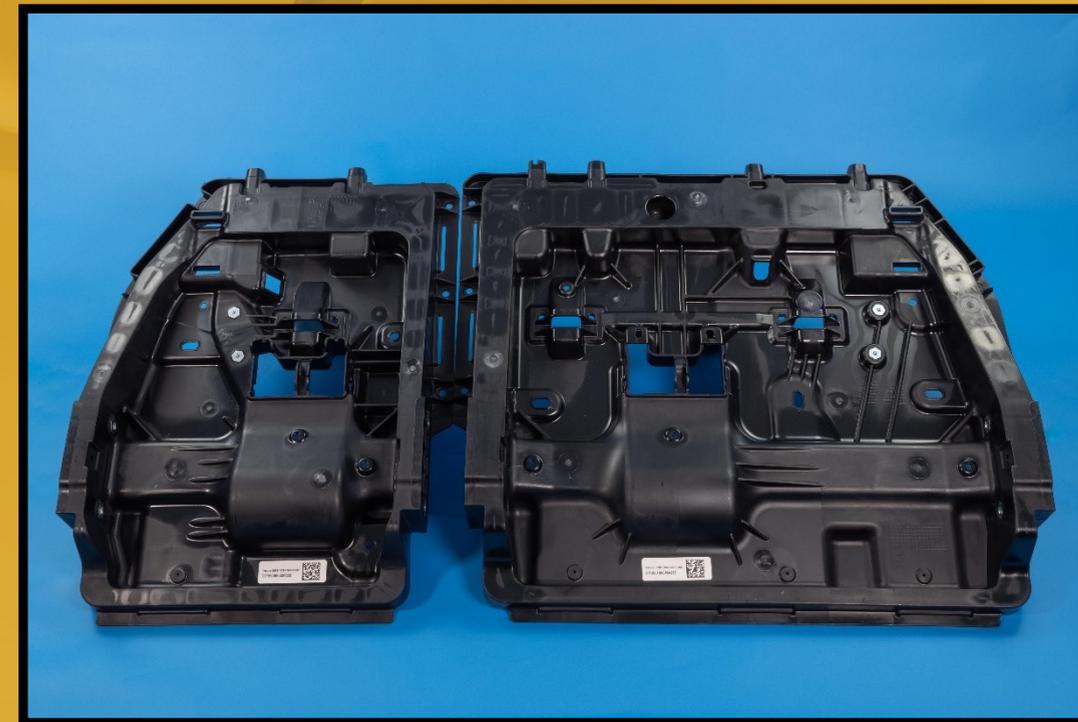
Resin

Ultramid B3ZG7 CR PA6

Tooling/Equipment Supplier

Concours Technologies, Inc.

3rd Row Seatback



A 16-piece steel assembly was replaced with a single, shoot & ship plastic assembly for this 3rd-row seatback that reduced mass 30%, cost 15%, represented a 2x improvement in crash performance, and takes 63% less effort for occupants to raise the seat to its upright position, eliminating the need for a seat motor. This is industry's first fully-plastic freestanding seatback offering excellent energy absorption without need for metal support brackets. A new 35% short-glass, impact-modified PA6 resin was developed for this sequentially injected application.

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Body Interior

Center Console Integrated Bin Structure

OEM/Vehicle

Ford Motor Co.
2002 Ford Maverick

System Supplier

IAC Group

Material Processor

IAC Group

Material Supplier

Advanced Composites

Resin

TPO-(PP+EPM)-TD20 PP

Tooling/Equipment Supplier

Lamko



This patented design integrated a previously separate hinge assembly within the bin console body structure, creating a new end-panel/console-body interface that permitted required access. The only tooling change made was modification of the shape of an existing drop-out lifter, but no changes were necessary to the overall tool construction or movement. The result saved \$1-3/console and a 0.1 kg weight, while the same material was used for both the console body with show surface and the hinge structure.



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Body Interior

OEM/Vehicle

Great Wall Motor

2020

System Supplier

Nobo Automotive Systems Co., Ltd.

Material Processor

Nobo Automotive Systems Co., Ltd.

Material Supplier

Celanese

Resin

Celstran PP-GF20-0553-Black PP

Tooling/Equipment Supplier

Basis Mold India Pvt. Ltd.

Integration of Hard and Soft Instrument Panel



This is the first integration of an unpainted defroster grille with hard and soft IP elements joined in a single foaming process. The split IP features a molded front skin attached to the integrated IP substrate, lowering mass 1.5 kg and saving \$10/vehicle plus an additional \$125,000 in tooling avoidance. Custom-colored 20% LFT-PP replaced talc-filled PP, allowing the substrate wallstock to be reduced from 3.0 to 2.0 mm and providing good aesthetics in the textured defroster grille so that paint could be eliminated.

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Body Interior

OEM/Vehicle

Ford Motor Co.

2020 Ford F150

System Supplier

Motus Integrated Technologies

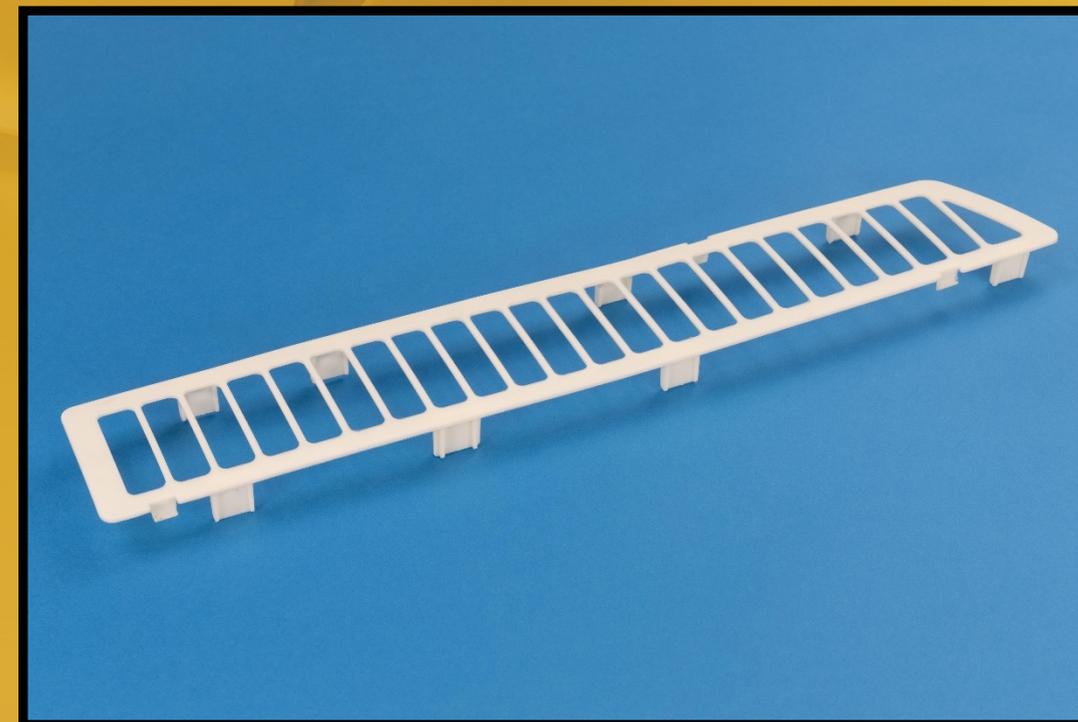
Material Supplier

DuPont

Resin

Hytrel 7246 TPE

Armrest Insert



Armrests may look simple, but they must meet competing requirements for safety, durability, and comfort. A single injection molded TPC-ET part replaced a 2-piece PP / fabric assembly, lowering mass 1 g and costs 50% while meeting or exceeding all safety and comfort requirements and simplifying assembly. And now the part can easily be recycled since it no longer contains adhesives or thread.

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Body Interior

OEM/Vehicle

Ford Motor Co.

2020 Ford Bronco Sport

System Supplier

Lear Corp.

Material Processor

Poliuretanos SW Leon SA de CV

Material Supplier

JSP

Resin

ARPRO EPP

Tooling/Equipment Supplier

Soluciones para el sector automotriz SA de CV

Rear Seat Under Storage System



To meet customer requests for more storage space to stow shoes, clothes, and first-aid kits, an under-seat area was modified to add an integrated but hidden storage space. The compartment was created in a rear seat using EPP foam, which normally supports the occupant but here also provides the bin structure. EPP foam is lighter, less costly, and offers better energy management performance than hard plastic. The hidden bin, which also is equipped with a rubberized mat, does not impact customer seat usage.

50

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Body Interior

OEM/Vehicle

**Ford Motor Co.
2021 Ford F150**

System Supplier

Adient PLC

Material Processors

Leggett & Platt

Windsor Machine Group

Material Suppliers

DuPont, BASF Corp.

Advanced Composites, Inc.

Resins

Delrin POM / Zytel PA

Ultramid PA / ADX TPO

Max Recline Seat



A helpful feature in this entry-level model are special front driver and passenger seats that recline fully yet support both neck and chest (via a special thoracic bolster with 5 lockable positions) as well as hip and lower back (via a cushion-lift mechanism). Plastics were key to achieving the proper balance of support and flexibility for comfort and to provide a durable solution without BSR concerns in the cushion-lift assembly. To date, 6 patents/innovations have been granted on this design.



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AUTOMOTIVE
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Body Interior

1st Row Center Seat Mobile Workstation

OEM/Vehicle

Ford Motor Co.
2021 Ford F150

System Supplier

Mitchell Plastics

Material Processor

Mitchell Plastics

Material Suppliers

Celanese, Techno-Polymer Co., Ltd.

Resins

Hostaform POM, SlideX POM,
Celstran LFT-PP, Hushlloy PC + ABS.

Tooling/Equipment Supplier

Acuway Molds Ltd.



To offer truck owners a weather-safe workspace inside the vehicle, a multipurpose, multiposition flat work surface on the back side of the middle front jump seat (on models with bench seats) can be used for writing, computer work, etc., while leaving access to cupholders and power to recharge electronics. The unit offers 121 lockable positions every 4.5 and stands up to rough customer use, yet stows away when no needed. Plastic is used on $\approx 95\%$ of the assembly. Four patents have been granted on the design.

50

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Body Interior

Cantilever Spring Based Carabiner Hook

OEM/Vehicle

Ford Motor Co.

2021 Ford Bronco Sport

System Supplier

IAC Group

Material Processor

IAC Group - Hermosillo

Material Suppliers

Trinseo / BASF Corp.

Resin

375HP ABS / N2320-U017 POM

Tooling/Equipment Supplier

Bluestar Mould Group



Two-piece injection molded hooks with fixed bodies and moveable gates (based on cantilever spring principle but without need of springs) are integrated into the rear quarter trim panels, offering greater versatility than cargo tie-downs or grocery hooks alone. Lighter and less costly than metal hooks, the patented design can handle high loads yet required low investment to provide more flexible storage and cargo area versatility.



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Body Interior

Upper Glove Box with a Remote Release

OEM/Vehicle

Ford Motor Co.
2021 Ford F150

System Supplier

DMS

Material Processor

Faurecia

Material Suppliers

BASF Crop. / Trinseo / Polyplastics

Resins

PA6 + GF30, PC/ABS, POM

Tooling/Equipment Supplier

ESS-TEC



This upper glovebox with remote “floating” door release uses a simple latch and door-pivot arm design that minimizes bending deformation in the arm and requires little effort to unlatch the bin. The patented system gives the design studio greater flexibility in terms of where the release latch is positioned and significantly improves fit & finish while reducing costs \$2/vehicle.



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COMPETITION & GALA
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Body Interior

OEM/Vehicle

Ford Motor Co.
2021 Ford F150

System Supplier

Motus Integrated Technology

Material Processor

Motus Integrated Technology

Material Supplier

BASF Corp.

Resin

Ultramid B3EG6 PA6 30%GF

Tooling/Equipment Supplier

Lamko Tool & Mold Inc.

Work Surface Fold Out Armrest



This foldout work surface with injection molded double-pivot hinge produces a completely flat 56 x 34 cm work surface that deploys along the center console but stores in the armrest. A new two layer ultrasoft-touch paint system on the ABS panel provides pleasing haptics. Versus a metal piano-style hinge, the plastic hinge is 30% lighter and an estimated 15% less costly.



50 YEARS OF
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AUTOMOTIVE
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COMPETITION & GALA
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OEM/Vehicle

Stellantis

2021 Jeep Grand Cherokee L

System Supplier

L&L Products, Inc.

Material Processor

L&L Products, Inc.

Material Supplier

BASF Corp.

Resins

Elastocoat 8350 PUR / Ultramid 74850 PA

Tooling/Equipment Supplier

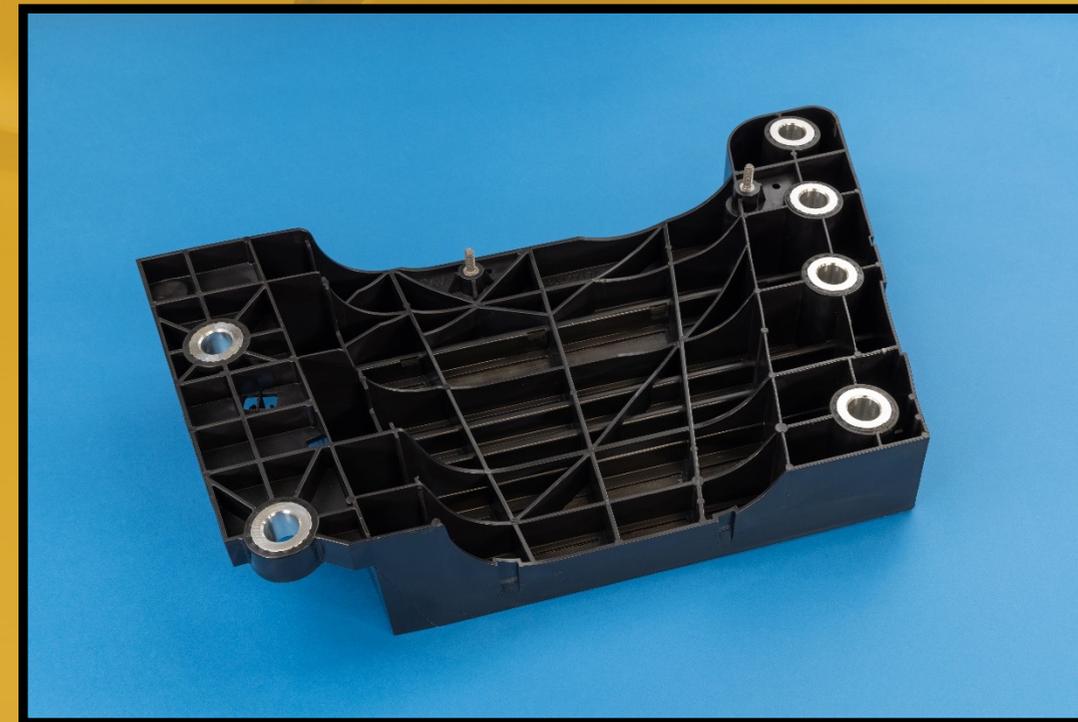
Multiple



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PLASTICS INNOVATION

Chassis/Hardware

Composite Tunnel Reinforcement



Replacing a multipiece stamped and welded ultrahigh-strength steel (UHSS) assembly with a hybrid composite construction consisting of a PUR pultrusion (80% FVF fiberglass) injection overmolded with high-impact GR PA6 and integral mounting hardware, this tunnel reinforcement reduced component mass 40% and subsystem weight another 20%, lowered systems cost 2.9% and tooling costs 18.5%, while meeting or exceeding all functional requirements. The application featured new materials, new simulation tools, and a new method for mechanically bonding thermoset and thermoplastic composites with integral hardware. Although lightweight, the structure carries very-high loads, and is easier to assemble.



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OEM/Vehicle

Ford Motor Co.
2021 Ford F150

System Supplier

Rassini Suspensiones

Material Processors

Rassini Suspensiones
SGL Carbon

Material Suppliers

Hexion Inc.
SGL Carbon

Resins

EPIKOTE Resin TRAC 06150
EPIKURE Curing Agent TRAC 06150
HELOXY Additive TRAC 06805

Chassis/Hardware

Multi-Material Rear Leaf Spring



This new hybrid rear leaf spring combines a high-strength steel main pack plus an HP-RTM fiberglass-reinforced epoxy composite helper that reduces mass 30% while providing the same stiffness and durability as a conventional steel leaf spring system. Additional benefits include increased payload capability, lower part count, decreased interleaf friction, smoother engagement, lower noise, and lower carbon footprint.



50 YEARS OF
PLASTICS INNOVATION



AUTOMOTIVE
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COMPETITION & GALA
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Chassis/Hardware

OEM/Vehicle

Stellantis

2021 Ram 1500

System Supplier

Hutchinson SA

Material Supplier

BASF Corp

Resin

Ultramid A3ZG3 BK23325 PA66+IM+GF

Active Tuned Mass Module



This drop-in solution for reducing engine vibration with any “cylinder on demand” methodology provides closed-loop vibration control. Versus passive mass dampers that are largely metal, the new system offers greater design flexibility, is tunable to a wider range of low-frequency vibrations, reduces mass 27%, improves fuel efficiency >1%, simplifies assembly, and increases occupant comfort. The composite housing and bracket were key to the success of the device.

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AUTOMOTIVE
INNOVATION AWARDS
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OEM/Vehicle

**Ford Motor Co.
2021 Ford Explorer**

System Supplier

Vintech Industries, Inc.

Material Processor

Vintech Industries, Inc.

Material Supplier

Washington Penn

Resin

PPH1TF2UVBLK PP-20TF PP

Tooling/Equipment Supplier

Vintech Industries, Inc.

Chassis/Hardware

Rocker Panel With Integrated Fasteners



This rocker panel seal with integrated hardware fasteners facilitates assembly to hard trim on the rocker molding by providing a tighter tolerance fit while improving vehicle appearance, BSR, water management, and servicing. By eliminating manually installed fastener pins, costs are reduced, quality is improved, and rebuilds at the assembly line to fix seals whose fasteners have fallen out during transport are eliminated. Two patents have been issued for this system.



50 YEARS OF
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AUTOMOTIVE
INNOVATION AWARDS
COMPETITION & GALA
HONORING THE BEST IN AUTOMOTIVE PLASTICS

OEM/Vehicle

Ford Motor Co.

2021 Ford Mustang Mach-E

System Supplier

Hutchinson SA

Material Processor

Hutchinson SA

Material Supplier

Dupont

Resin

Zytel 70G50 HSLR PA66-GF50%



Chassis/Hardware

E-compressor Isolation Bracket



This is the first time a composite solution has been used for a body-mounted AC compressor isolator bracket on a BEV. Designed to address competing requirements of NVH and durability, the modular injection molded 50% GR-PA6/6 bracket fits in available package space, will not corrode, perform up to 150°C, and provide effective damping across the entire RPM operating range, improving occupant comfort. Additionally, the composite bracket was lighter, less costly, featured fewer parts, and provided better NVH performance than previous metal systems.



AUTOMOTIVE
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OEM/Vehicle

Honda

2021 CR-V pHEV

System Supplier

SANKO GOSEI

Material Processor

Minghsiang

Material Supplier

SABIC

Resin

SABIC FR PPc H1030 PP

Tooling/Equipment Supplier

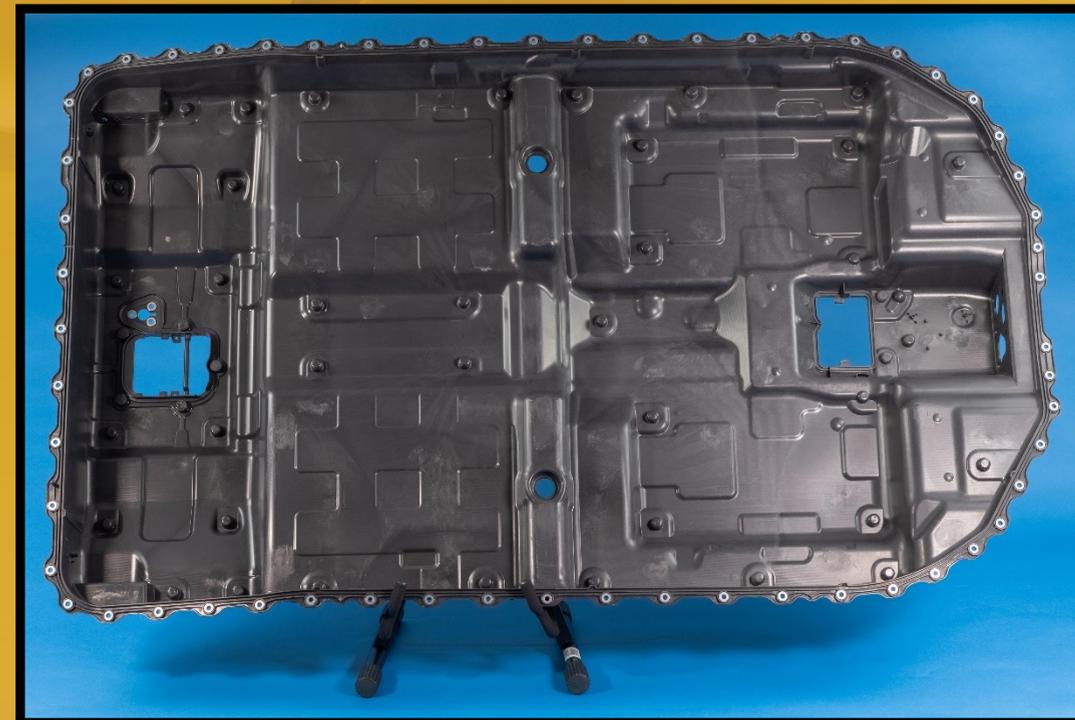
S-VANCE LTD



50 YEARS OF
PLASTICS INNOVATION

Chassis/Hardware

Plug-in Hybrid EV Battery Cover



This is the first thermoplastic solution for a battery cover that meets stringent new fire safety requirements that went into effect earlier this year in China. The non-halogenated FR 30% GR polypropylene copolymer (PPc) is 40% lighter than the outgoing metal solution, offers inherent electrical insulation, seals against moisture intrusion, and will not corrode. The 1.6 m long injection molded part is 2.0 mm thick and reduces cost and mass, increases safety, and contributes to extended driving range and sustainability.



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

Chassis/Hardware

OEM/Vehicle

**Ford Motor Co.
2021 Ford F150**

System Supplier

SL America

Material Processor

Daeoh Science

Material Supplier

Solvay SA

Resin

Amodel A-1130 FW PPA+GF30%+PTFE

Tooling/Equipment Supplier

Daeoh Science

Folding Shifter



This folding console gear shifter is key to the function of another application, the flat work surface. The shifter stows with the push of a button. Novel park-by-wire technology provides automatic return-to-park function. The plastic/metal hybrid features sintered metal gears overmolded with 30% GR PPA with PTFE, which reduced mass, noise, CLTE, and friction.

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50 YEARS OF
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AUTOMOTIVE
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Environmental

OEM/Vehicles

General Motors Co.

**2021 Chevrolet Silverado & GMC
Sierra**

System Supplier

Inteva Products, LLC

Material Processor

Inteva Products, LLC

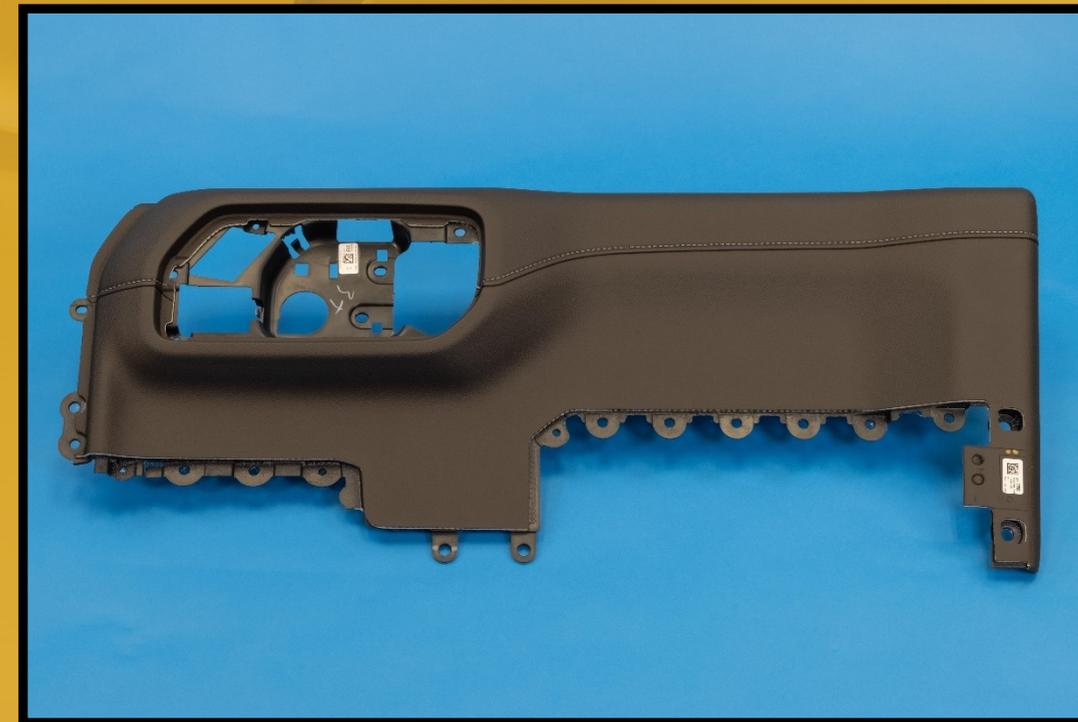
Material Supplier

Inteva Products, LLC

Resin

Inteather ECO TPO

Door Bolster



After the normal back-foaming process during interior trim panel production, 50% of the foam material is scrapped and sent to the landfill. Now, a patented technology allows offal comprised of thermoplastic cover stock and the cross-linked polymer foam to be recycled to produce new bilaminate TPO film for interior trim panels with no sacrifice in properties or performance. By recycling rather than landfilling the scrap, 88% is spared the landfill, reducing both energy usage and the process' carbon footprint 49%, while also lowering cost. Perfecting the process involved resin formulation and reprocessing optimization work.

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50 YEARS OF
PLASTICS INNOVATION



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Environmental

OEM/Vehicles

General Motors Co.

2021 Small Block Engines

System Supplier

Parker Hannifin Corp.

Material Processor

Parker Hannifin Corp.

Material Supplier

PRET Advanced Materials, LLC

Resin

Ecolon GF1985-HRBK PA66

Tooling/Equipment Supplier

Mid States Tool & Machine, Inc.

Engine Port Carrier



This is the first time a demanding engine sealing application has used 100% recycled materials at GM. The injection molded 33% GR PA6/6 engine port carrier must prevent motor oil leakage at 150°C inside the internal combustion engine. Industry shortages of virgin PA6/6 led to the opportunity to study the viability of using reclaimed resin from old carpet and post-industrial scrap under demanding validation testing. The material passed and opened the door to using additional recycled material in future engine sealing applications. Besides landfill avoidance, a material cost savings of 20% was seen.

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50 YEARS OF
PLASTICS INNOVATION



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COMPETITION & GALA**
HONORING THE BEST IN AUTOMOTIVE PLASTICS

Environmental

Positive Crankcase Vent Tube

OEM/Vehicles

General Motors Co.

2018 Small Block & CSS Engines

System Supplier

dIhBOWLES

Material Processor

dIhBOWLES

Material Supplier

Arkema SA

Resin

Rilsan HT CESV Black P010 TL PPA



This is the first use of PA11 produced from monomer derived from castor bean oil in a positive crankshaft vent tube. The bio-monomer based resin provides high thermal stability (1000 hr @ 160°C), chemical resistance, and flexibility. Castor beans are grown in soil that supports little else, providing an additional income source for poor farmers in India without competition with food/feed crops or deforestation. Versus steel/rubber assemblies, the PA11 vent tube is 50% lighter, \$5/part less costly, and more flexible, facilitating assembly, while helping decarbonize the supply chain.



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HONORING THE BEST IN AUTOMOTIVE PLASTICS

OEM/Vehicles

Ford Motor Co.

2022 Lincoln Navigator and Ford Expedition

System Supplier

Lear Corp.

Material Processor

Robin Industries

Material Supplier

Bolder Industries

Resin

EPDM

Environmental

Grommet for Liftgate Applications



These liftgate grommets represents the first use of recycled carbon black (CB) from old tires in an application seeing dynamic (rather than static) loads. A quarter of the virgin CB in this 50 Durometer EPDM was replaced with reclaimed CB without any sacrifice to processing, performance or cost. While recycled CB is cost and weight neutral versus virgin product, it uses 61% less energy, 98% less water, and generates 96% fewer CO2 emissions while addressing global production constraints on CB supplies. It also provides opportunities to reuse some portion of the billions of landfilled tires.



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Environmental

OEM/Vehicle

Ford Motor Co.

2020 Lincoln Continental

System Supplier

Varroc Lighting Systems

Material Processor

Varroc Lighting Systems

Material Supplier

Competitive Green Technologies

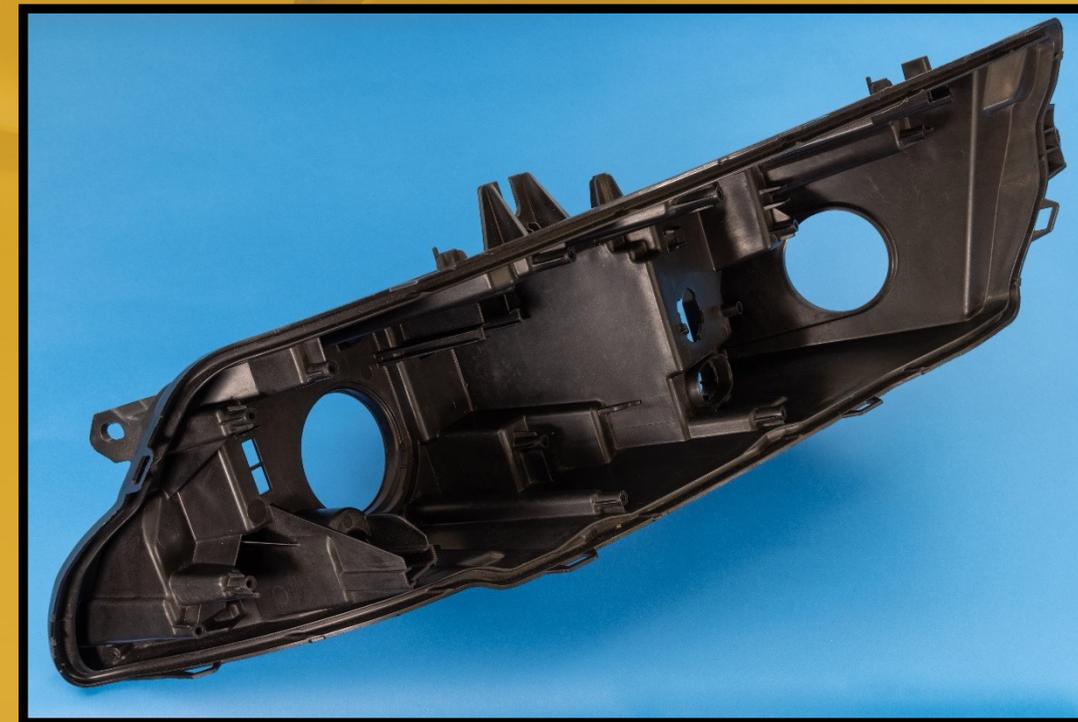
Resin

CGTECH BCR-HMS30-40 PP

Tooling/Equipment Supplier

Varroc Lighting Systems

Headlamp Housing



In this PP headlamp housing, 20% biochar from coffee chaff replaced 40% talc while offering better mechanicals (including better impact strength), higher HDT, tighter dimensions, lighter weight (SG 17% lower), no odor/outgassing, and a lower carbon footprint—meeting or exceeding all of Ford's performance requirements. Additionally, cycle time was lowered, cost was reduced, 25% less energy was required to manufacture the headlamp housing, and no modifications were needed to existing tooling on this drop-in application.



50 YEARS OF
PLASTICS INNOVATION



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

Environmental

OEM/Vehicle

**Ford Motor Co.
2020 Ford F250**

System Supplier

ARaymond

Material Processor

ARaymond

Material Supplier

Lavergne Inc.

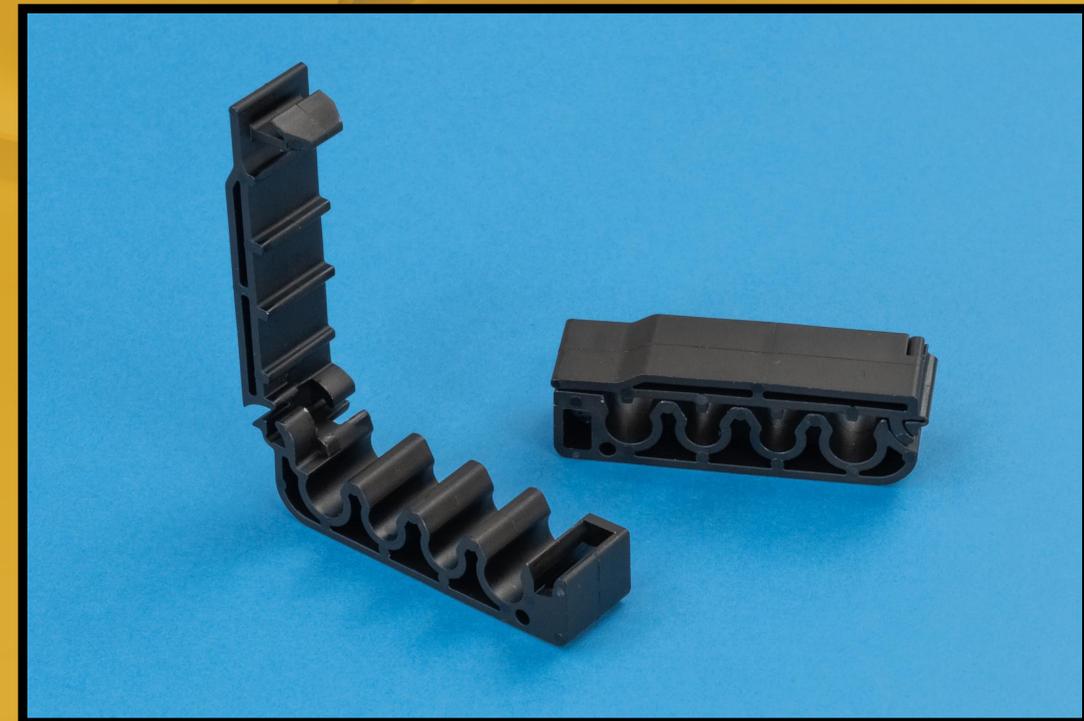
Resin

VYLON PA12 BK

Tooling/Equipment Supplier

ARaymond

Fuel Line Clip



For these fuel-line clips, waste PA12 powder from polymer additive manufacturing was captured, reformulated and used to replace high-value injection molded virgin PA6/6, then difficult to source owing to global supply constraints. Versus prime PA6/6, rPA12 resin offers better moisture and chemical stability, is 7% lighter, 10% less costly, and produces 30% fewer emissions during production. No tool changes were needed and the only process change was lowering molding temps 55°C, reducing energy requirements to produce the clips, which now divert 2,722 kg of material from landfills annually.



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

Environmental

OEM/Vehicle

Ford Motor Co.

2021 Ford Bronco Sport

System Supplier

Lear Corp.

Material Processor

HellermannTyton North America

Material Supplier

DSM

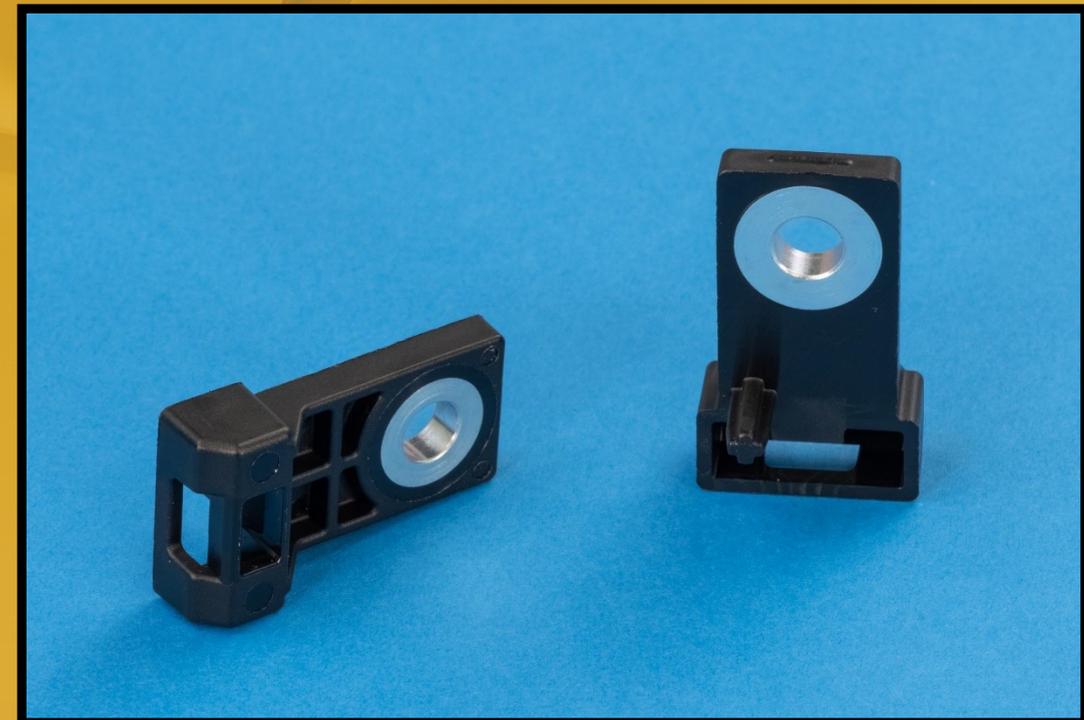
Resin

Akulon RePurposed PA6

Tooling/Equipment Supplier

HellermannTyton North America

Wiring Harness Clip



These 15% GR rPA6 wire-harness clips are injection molded from 100% PCR ocean plastics. Ghost gear (fishing nets) are collected by fishermen in the Indian Ocean and Arabian Sea, providing jobs, more sustainable livelihoods, and healthier marine life. The material provides comparable performance to petroleum-based prime resin at 10% cost savings, lower energy, improved supply-chain stability, and LCA benefits. No tooling changes and minimal process changes were needed for this drop-in change.

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50 YEARS OF
PLASTICS INNOVATION



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

Industry Solutions for Covid-19

Ventilator Main Chassis Production

OEM/Vehicle

**General Motors Co. / Ventec Life Systems
2020 V+Pro Emergency Ventilator**

System Supplier

Hi-Tech Mold & Engineering, Inc.

Material Processor

Hi-Tech Mold & Engineering, Inc.

Material Supplier

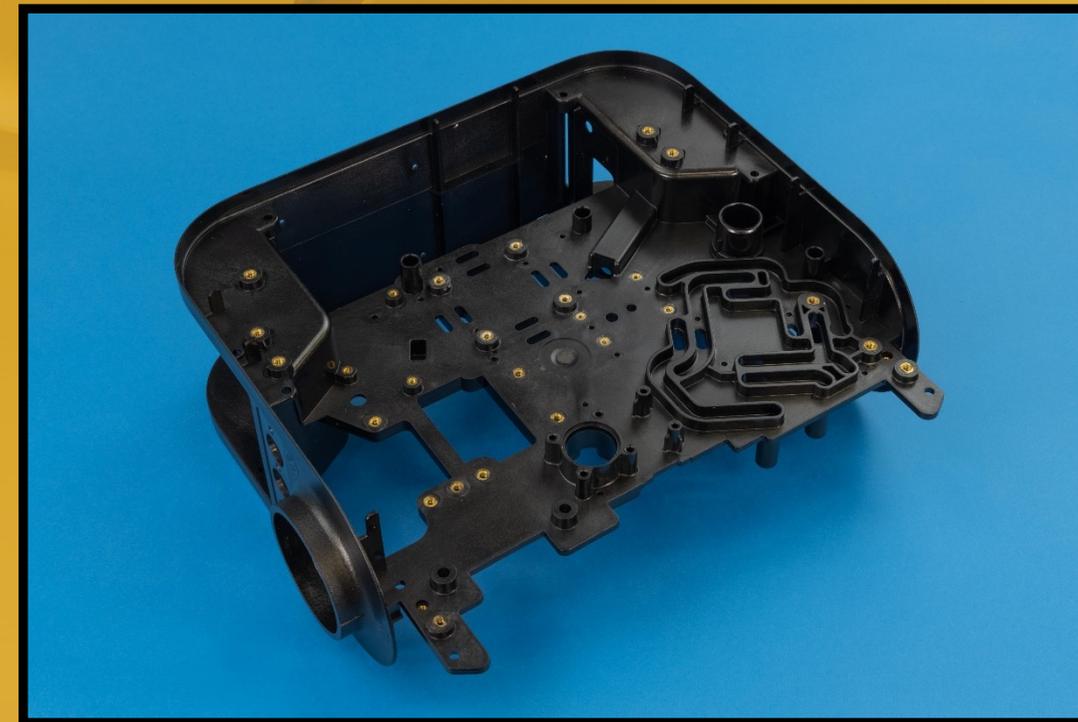
SABIC

Resin

Lexan 500R 10% GF PC

Tooling/Equipment Supplier

Hi-Tech Mold & Engineering, Inc.



In less than 18 days, the team sourced materials, built tooling, brought dimensional quality into spec, automated installation of 48 brass insert nuts (verified by vision systems), converted a manufacturing facility, trained a workforce, and scaled up production of tight-tolerance ventilator chassis components from thousands/year to thousands/week, eventually delivering 30,000 over 154 days. Whereas the previous supplier had struggled to meet accuracy, FTQ was raised to 98.7 at faster production times.



**50 YEARS OF
PLASTICS INNOVATION**



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

Industry Solutions for Covid-19

OEM/Vehicle

**General Motors Co. / Ventec Life Systems
2020 V+Pro Emergency Ventilator**

System Supplier

Cascadia Custom Molding

Material Processor

West Michigan Molding, Inc.

Material Supplier

Avient Corp.

Resin

Versollan OM1262NX-1 TPE

Tooling/Equipment Supplier

Proper Group International, Inc.

Emergency Ventilator



The team developed a unique TPE—offering modified flow, high adhesion to the PC/ABS substrate, and excellent chemical resistance—and shipped it within 24 hr. High-cavitation tooling was rapidly produced to ensure sufficient supply. A solid supply chain was established that met demand throughout 2020.



**50 YEARS OF
PLASTICS INNOVATION**



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

Industry Solutions for Covid-19

Warpage Correction in Ventilator O2 Bracket

OEM/Vehicle

**General Motors Co. / Ventec Life Systems
2020 V+Pro Emergency Ventilator**

System Supplier

PTI Engineered Plastics

Material Processor

PTI Engineered Plastics

Material Supplier

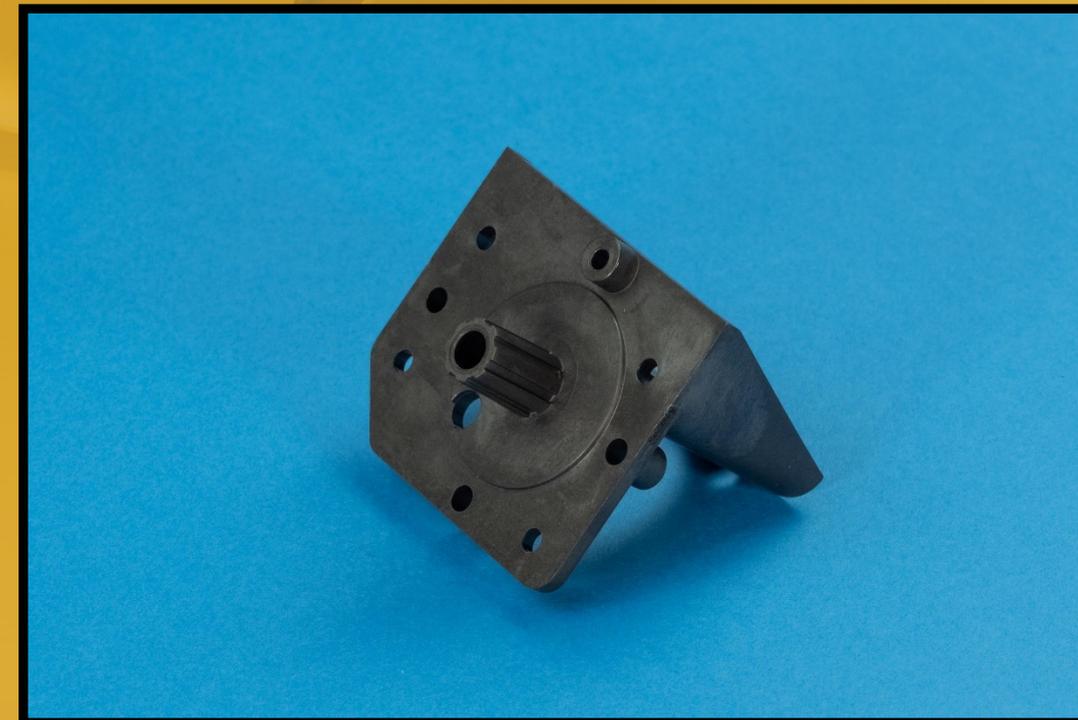
Victrex PLC

Resin

Vitrex 450FC30 PEEK

Tooling/Equipment Supplier

PTI Engineered Plastics



In less than 1 week, the PEEK resin was fully characterized for CAE material cards and tooling for a key ventilator component was redesigned using mold morphing/windage techniques to address warpage issues that had previously required post-mold fixturing and machining. New tooling was produced and first parts were shot 9 days later. This allowed the team to hold extremely tight tolerances without post-mold countermeasures. This enabled production to be scaled from thousands/year to thousands/week to meet high demand. Costs were reduced 30-40% by eliminating post-mold machining.



**50 YEARS OF
PLASTICS INNOVATION**



**AUTOMOTIVE
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Industry Solutions for Covid-19

OEM/Vehicle

Ventec Life Systems

2020 V+Pro Emergency Ventilator

System Supplier

Ventec Life Systems

Material Processor

Lumenflow Corp.

Material Supplier

Wacker Chemical Corp.

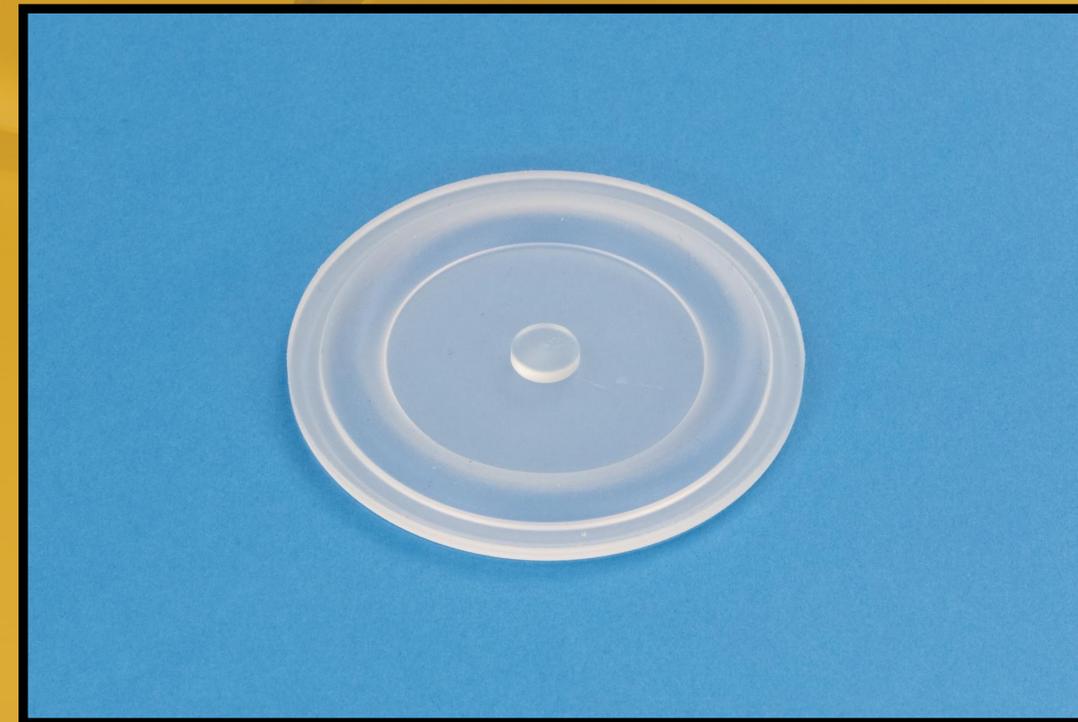
Resin

Elastosil LR 3003/50 Silicone Rubber

Tooling/Equipment Supplier

2K Tool

Ventilator Diaphragm



The team used its automotive skillset to retrofit processing equipment to switch from optical-grade silicone to conventional liquid silicone rubber, solve a void issue, build new tooling in just 19 days, and ramp up production of a critical ventilator diaphragm from 1,000/year to 4,000/week.



**50 YEARS OF
PLASTICS INNOVATION**



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

Industry Solutions for Covid-19

Powered Air Purifying Respirator

OEM/Vehicle

Ford Motor Co.

2020 Limited Use PAPR

System Supplier

Ford Motor Company

Material Processor

Denso Corp.

Material Suppliers

Asahi Kasei America, Inc., Celanese

Resins

Asahi P-40TC-1102 NT101 PP

Celanese M90 CF2001 POM

Tooling/Equipment Supplier

3Dimensional Services, Protolabs



The team produced the first all-plastic PAPR, converting previously metal components to plastic to reduce mass and costs and improve user comfort for this personal protective equipment used by medical workers caring for COVID patients. The lighter, more efficient design improved battery life, enabling workers to complete a 12-hr shift without needing to recharge the battery. NIOSH certification was achieved in just 3 days on the first try. Production was increased to 8,500 units/week from the 650/week the previous supplier achieved. All profits from sales were donated to COVID-19 relief funds and 4 patents are pending on the unit.



50 YEARS OF
PLASTICS INNOVATION



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

Industry Solutions for Covid-19

Flexible Air Breathing Tube for Powered Air Purifying Respirator

OEM/Vehicle

Ford Motor Co.

2021 Powered Air Purifying Respirator

System Supplier

TI Fluids Systems

Material Processor

Flexaust

Material Suppliers

Celanese, AT Polymers, TechmerPM,
INEOS Styrolution Group GmbH, DuPont

Resins

EVA, LDPE, PE, ABS, PA6/6



To meet NIOSH certification requirements, the team used automotive tools to deliver on all project objectives in less than 30 days. A new breathing tube design was developed where one size fits bodies ranging from 5th percentile female to 95th percentile male in a variety of postures. The design features quick connects to ensure a robust connection and offers 25% greater airflow but consumes 24% less current for extended battery life. It also is lighter and 8 dB quieter. The team delivered 42,000 breathing tubes during the program.



50 YEARS OF
PLASTICS INNOVATION



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

Industry Solutions for Covid-19

PPE Production through #TyvekTogether and Project Airbridge

Material Supplier

DuPont

Resin

Tyvek



Two different programs—Operation Airbridge and #TyvekTogether—dramatically increased production capacity for hospital gowns and coveralls for healthcare workers and first responders. Additionally, a new fabric was formulated in just 3 weeks to optimize utilization and increase downstream production. Idle capacity and resources at 15 U.S.-based partners were used. In total, the team produced and shipped 17.6-million garments to replenish the National Stockpile.

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50 YEARS OF
PLASTICS INNOVATION



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

Industry Solutions for Covid-19

OEM/Vehicle

Ford Motor Co

2020 Isolation Gown

System Suppliers

Joyson

Windsor Machine Group

Material Suppliers

Highland Industries

Aunde

Resin

PA66 / PET

Multi-Use Isolation Gown



Responding to the scarcity of PPE early in the pandemic, the team repurposed airbag and seat trim materials and used idle cut & sew facilities to produce 50x washable isolation gowns for frontline workers. Two different fabrics were developed and approved in less than 2 weeks (PA6/6 with silicone coating and PET with paraffin/C6 fluorocarbon coating) and gown designs were modified to prevent sleeves from riding up when workers were gloved. A total of 1.32-million gowns have been shipped to date. Efforts were made to reduce gown cost to health-care providers.



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

Industry Solutions for Covid-19

OEM/Vehicle

Ford Motor Co.

2020 PPE Face Shield

System Supplier

Troy Design Manufacturing

Material Processor

Placon

Material Supplier

Ex-Tech

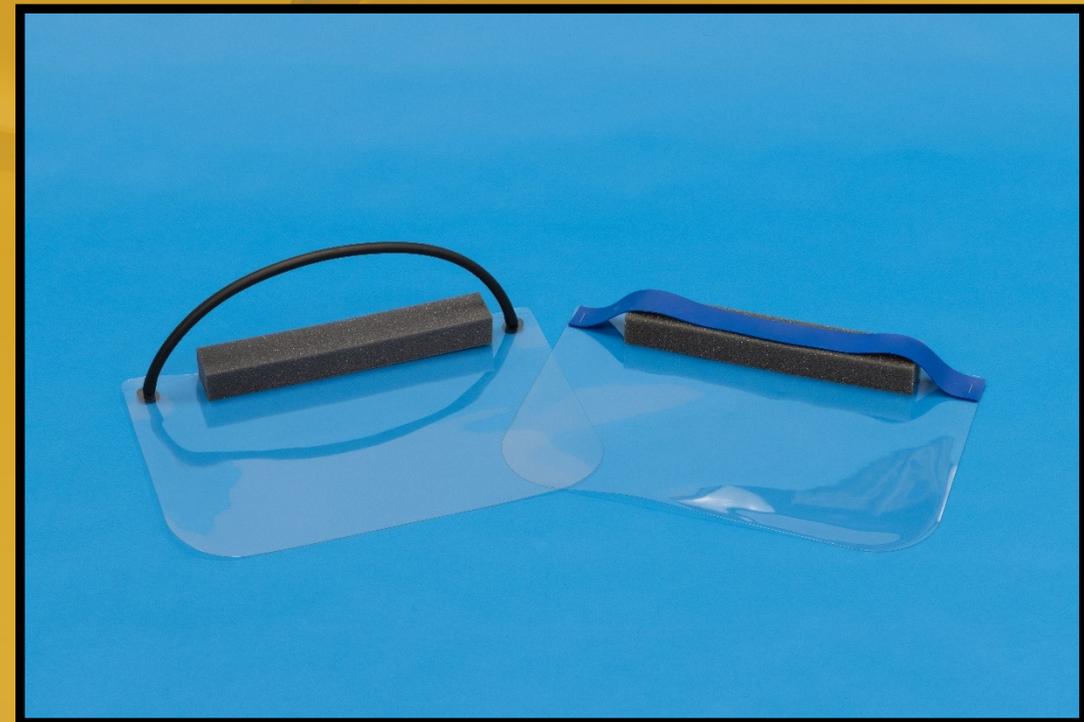
Resins

APET & RPET PET

Tooling/Equipment Supplier

Placon

Apollo PPE Face Shield



This is the first time this type of PPE equipment has been produced at extremely high volumes. Within 2 days' time, the team developed its first clear face shields and within 13 days, 1.1-million units had been produced and delivered. To address supply constraints and potential failure modes, material was changed from RPET to APET and pushpin attachments replaced stapling. Supply streams and manufacturing teams were capacitated to over 5-million pieces/week. In total, over 21-million units were shipped to protect frontline workers.

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50 YEARS OF
PLASTICS INNOVATION



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

Industry Solutions for Covid-19

Acteev Technology

Material Supplier

Ascend Performance Materials



A new low-odor fabric introduced in Nov. 2019 was repurposed to produce washable and reusable nonwoven face masks for the pandemic. Key to the material's efficacy is the fact that zinc ions are embedded in the polymer matrix during polymerization, so the antibacterial treatment doesn't wash or wear off and remains active for the life of the product. The technology also can be used for knits, woven fabrics, and engineering plastics and is covered by more than 100 patents to date.

50

50 YEARS OF
PLASTICS INNOVATION



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

Materials

OEM/Vehicle

Stellantis

2021 Jeep Wrangler and Jeep Gladiator

System Supplier

Stellantis

Material Supplier

Mitsubishi Chemical Advanced Materials

Resin

KyronMAX S-4330 PPA w/ 30% USCF

Tooling/Equipment Supplier

Maple Mold Technology

Composite Roof Receivers



Six brackets for removeable hardtop and soft top roofs were converted from investment cast steel to 30% ultrashort carbon fiber (USCF)-reinforced PPA, providing comparable part strength while reducing costs 38% and mass 79%. Powder coating was eliminated and scratch & mar improved while providing a weatherable, MIC, Class A finish that allowed for mid-program replacement and backwards service compatibility. The USCF composite molds like neat polymers but outperforms LFT materials, is fully recyclable, and has a lower carbon footprint than metal/alloy parts. Direct-drop valve gates and T-nut fasteners also were key enablers.

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**50 YEARS OF
PLASTICS INNOVATION**



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

Materials

OEM/Vehicle

General Motors Co.

2022 Cadillac LYRIQ

System Supplier

DTR Automotive Corp.

Material Supplier

DuPont Mobility & Materials

Resin

Zytel NVH70G35HSL

Electric Drive Unit Mount Bracket



A new PA resin formulated for enhanced damping/NVH without loss of mechanical properties was developed for the EV's drive unit mounting brackets. This enabled the structural support brackets to be tuned, along with elastomeric bushings, to provide broad vibrational filtering, while reducing mass 34% and costs 19.5%. The material must provide stable performance under high stresses and varying ambient and loading conditions.

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50 YEARS OF
PLASTICS INNOVATION



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

Materials

OEM/Vehicle

**Ford Motor Co.
2021 Ford Maverick**

System Supplier

IAC Group

Material Processor

IAC Group

Material Supplier

LyondellBasell Industries Holdings B.V.

Resin

Hostacom TRC 483N NA TPO

Tooling/Equipment Supplier

Lamko Tool & Mold Inc.

Speckled Plastic Door Trim



Careful part design and tooling considerations, coupled with a uniform-distribution carbon fiber-based speckled filler provides a unique appearance for interior TPO parts vs. solid colors. This eliminates the need for stiffer polymers required for painting / filming, eliminates paint's environmental impacts, reduces costs \$12/vehicle, and saves \$400,000 in painting/filming equipment avoidance. Only a single tool is needed for both solid and speckled colors on the program.



**50 YEARS OF
PLASTICS INNOVATION**



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

Materials

Graphene Reinforced Brake Lines

OEM/Vehicle

**Ford Motor Co.
2020 Ford Explorer**

System Supplier

Martinrea International Inc.

Material Processor

Eagle Industries, Inc.

Material Suppliers

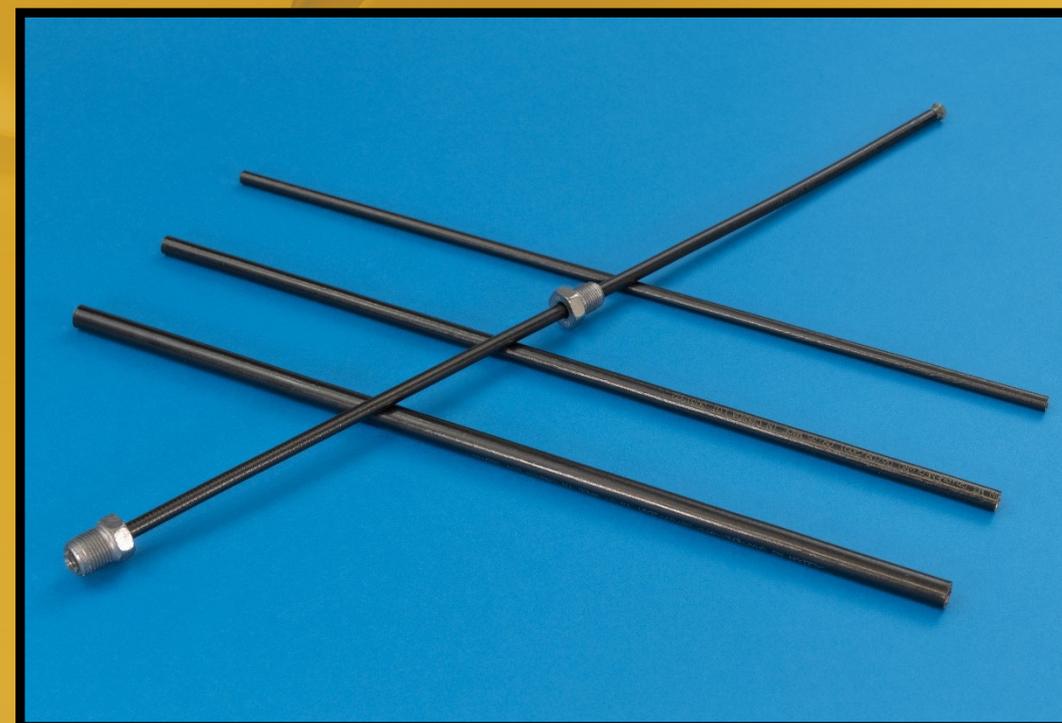
Nanoxplore / XG Sciences

Resin

EagleZorb SA-04G PA612/PU Foam

Tooling/Equipment Suppliers

**Martinrea International Inc.,
Eagle Industries, Inc.**



Advanced coating technology featuring graphene-enhanced PA 6/12 has been used to significantly improve the abrasion and corrosion resistance, thermal performance, and NVH of brake lines. Whereas metal was exposed after only 8,000 cycles when a PA 6/12 coating was used alone, the graphene enhanced coating showed no exposed metal after 400,000 cycles, eliminating the need for additional protective coatings. Tube outer diameter did not change, although total tube weight was reduced 25%.



**50 YEARS OF
PLASTICS INNOVATION**



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

Materials

OEM/Vehicles

Ford Motor Co.

**2020 Ford Explorer, Ford F-150 and
Lincoln Aviator**

System Supplier

Schaeffler Group USA Inc.

Material Processor

Allegheny Performance Plastics

Material Supplier

DuPont Mobility & Materials

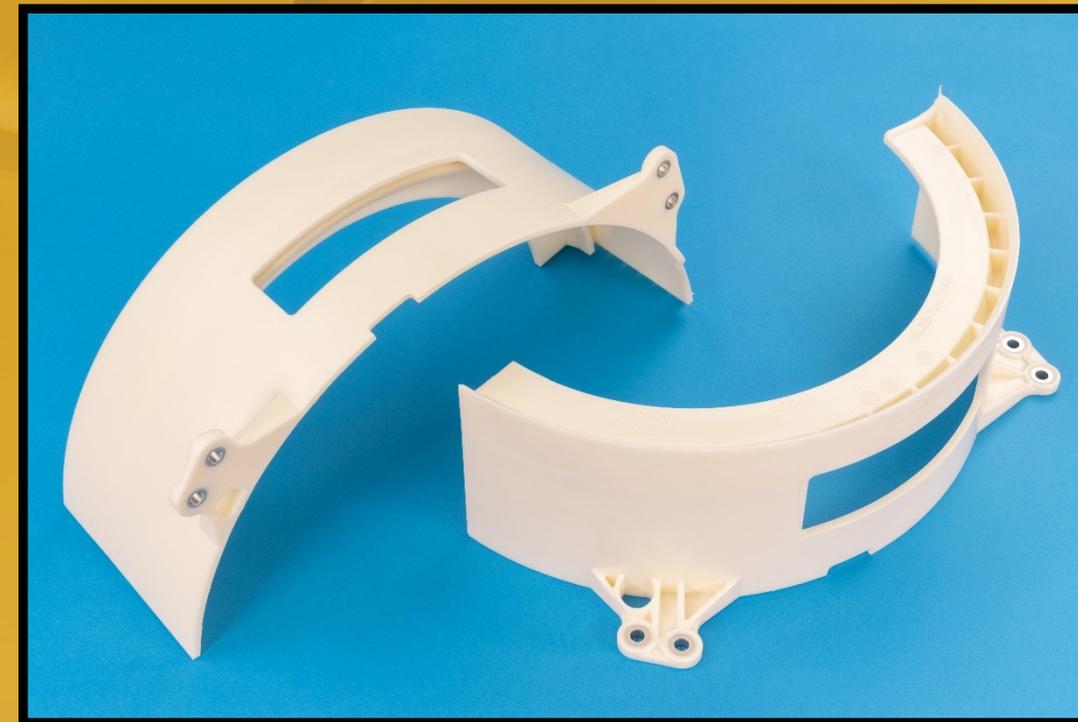
Resin

Hytrel 7246 COPE

Tooling/Equipment Supplier

Quality Tool and Die

Coolant Flow Management Baffle for Hybrid Transmission



Offering rigidity and flexibility TPC-ET proved to be a cost-competitive, weight-efficient option to mold coolant flow-management baffles with integral seals for hybrid transmissions without sacrificing fuel economy or power. By compartmentalizing the motor/generator from the torque converter, transmission oil to be used for cooling as well as lubrication without needing a separate water jacket, reducing mass 0.9 kg and costs up to \$10/unit vs. fabricated metal baffles with separate seals. Additionally, 12 mm of space was freed up, enabling a larger rotor/stator that is less costly to produce to be used.

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**50 YEARS OF
PLASTICS INNOVATION**



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

Process/Assembly/Enabling Technologies

Active Air Intake Manifold Holder/Tuning Plates

OEM/Vehicle

Nissan Motor Co. Ltd.
2021 Nissan Frontier

System Supplier

Mahle GMBH

Material Processor

MacLean-Fogg, EPC

Material Supplier

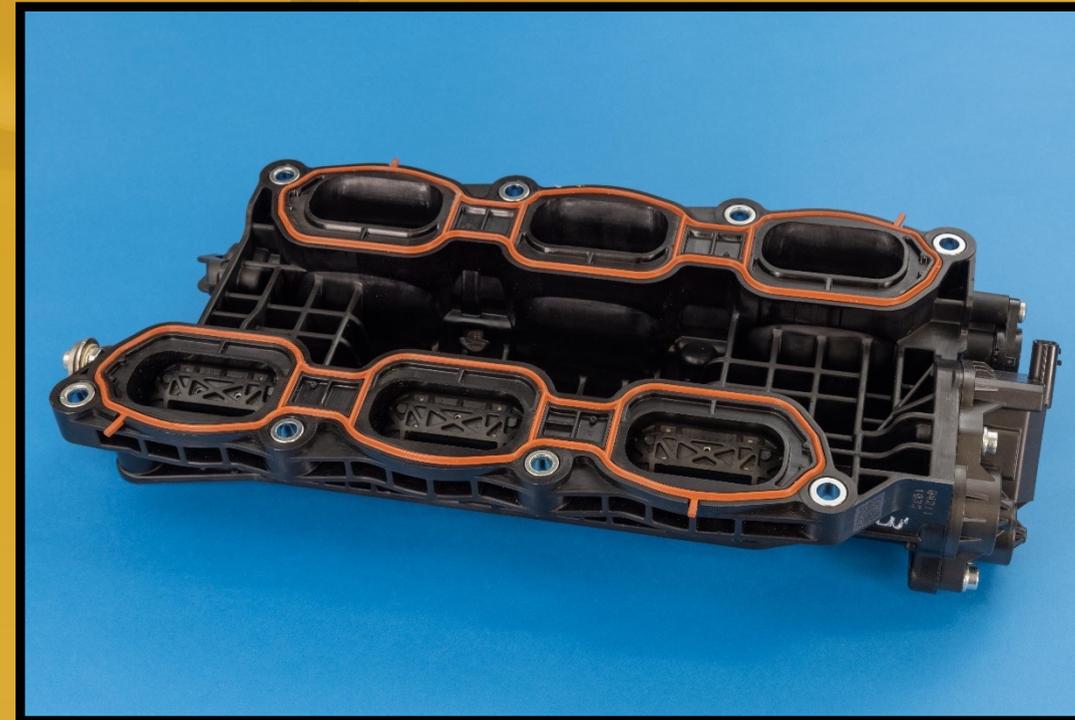
BASF Corp.

Resin

Ultramid B3WG6 PA6 GF30%

Tooling/Equipment Supplier

KTM Industries, Inc.



Replacing multicomponent metal/plastic interfaces that made precision tuning and balancing of the door train for active air-intake modules more difficult, this single-piece injection molded tuning plate not only held demanding tolerances (± 0.025 mm) and offered 0.040 mm adjustments, but also reduced mass 12% and cost 10% while improving performance. Key innovations were the use of a low-wear 30% GR-PA6 resin that molds very flat, use of 10 tuning pillars each per left and right plates for precision balancing, cavity pressure sensors for exacting process control and data-driven micro-processing adjustments.



50 YEARS OF
PLASTICS INNOVATION



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

Process/Assembly/Enabling Technologies

OEM/Vehicle

General Motors
2022 Chevrolet Silverado

System Supplier

Flex-N-Gate Corp.

Material Processor

Flex-N-Gate Corp.

Material Suppliers

DSM, Finkl Steel

Advanced Composites, Inc.

Resin

ADX2342 TPO

Tooling/Equipment Supplier

Omega Tool Corp.

MD Xtra Project



A new study compared conventional P20 steel vs. a new grade of P20 that holds the promise of allowing moldmakers to eliminate the stress relieving step after rough cutting injection, compression, and blow molding tools, potentially reducing tool build times by up to 1 week. Not only does the new steel exhibit minimal residual stresses and movement during machining, but it also causes less wear to cutters and requires less energy to machine, and took polish and grain equally well. Also, parts molded in an injection tool produced in the new steel could be ejected 2-3 sec faster



50 YEARS OF
PLASTICS INNOVATION



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

Process/Assembly/Enabling Technologies

OEM/Vehicle

General Motors Co.
2021 Cadillac Escalade

System Supplier

Valeo Lighting Systems

Material Processor

Valeo Lighting Systems

Material Supplier

Covestro LLC

Resin

Makrolon LED PC

Tooling/Equipment Supplier

Windsor Mold Group

Thick Lightbar Development



This challenging 780 mm long and 18 mm thick transparent-red light blade for rear taillamps functions offers a unique appearance and homogeneous lit appearance. Keys to making the patented application work were advanced simulation tools for design and functional optimization and warpage control; complex runner, parting line, shutoff valves, and multi-shot injection process control; plus a custom-formulated optical-grade of PC that helped manage quality, cost, and molding capacity and met all legal rear-lighting requirements. Despite technical challenges, program timing was reduced by 3 months and \$250,000 in prototype tooling was avoided through virtual prototyping.



50 YEARS OF
PLASTICS INNOVATION



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

Process/Assembly/Enabling Technologies

OEM/Vehicle

Ford Motor Co.

2021 Mach-E

System Supplier

Plastics Omnium

Material Processor

Plastics Omnium

Material Supplier

SABIC

Resin

STAMAX 40YM240 PP-LGF-40%

Tooling/Equipment Supplier

Omega Tool Corp.

Liftgate Inner



This MIC LFT-PP injection molded liftgate features a clamshell design with integral interior trim integration and reinforcements plus styling flexibility that allows for design studio changes. Versus steel designs, the composite offered 35% cost and 15% mass savings and a lower carbon footprint. A high-flow copolymer filled the design featuring wall thicknesses that varied from 2.0 to 4.5 mm. A 6-axis robot inserted metal reinforcements for overmolding and removed parts. The highly controlled process used sequenced hot runners with PSP sensors and a part-presence sensor for overmold stamping.



50 YEARS OF
PLASTICS INNOVATION



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

Process/Assembly/Enabling Technologies

Fabric Wrapped Speaker Grille

OEM/Vehicle

Ford Motor Co.

2021 Ford Mustang Mach-E

System Supplier

Grupo Antolin

Material Processor

Williamston Products, Inc.

Material Supplier

Trinseo

Resin

Magnum 3325 MT ABS

Tooling/Equipment Supplier

Toolplas Systems Inc.



To achieve the desired look for a series of fabric-wrapped speaker grilles on IP and doors, a number of technical challenges needed to be overcome, including finding the right size speaker holes as well as fabric and adhesives that did not interfere with sound performance yet met customer abuse, cleaning, and FR requirements and other auto industry performance standards. In the end, appearance, audio performance, and assembly requirements were met for this industry-first fabric wrapped speaker grille application.



50 YEARS OF
PLASTICS INNOVATION



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

Process/Assembly/Enabling Technologies

OEM/Vehicles

General Motors Co.

**2021 Chevrolet Tahoe & Suburban, Cadillac
Yukon & Escalade**

System Supplier

IAC Group

Material Processor

IAC Group

Material Suppliers

**Carver Non-Woven Technologies LLC
Celanese**

Resins

NF PP Mat / Celstran NF PP

Tooling/Equipment Supplier

Persico SpA

Hybrid Fleece Technology



Panels of compression moldable natural fiber/PP hybrid fleece with up to 25% recycled PP plus an injection moldable LFT-PP substrate are being used for a variety of interior panels (e.g. door carriers, uppers, bolsters, and armrests; IP substrates, top pads, and mid-panels; and hard trim). Versus injection molded plastic panels, mass was reduced 50%, numerous secondary operations including welding, adhesive application, and insert molding were eliminated, and renewable materials were used in a single efficient process producing 320,000+ car sets/year. The first use of non-contact IR heating in North America supports fast cycle time.



**50 YEARS OF
PLASTICS INNOVATION**