


199 Ways Automotive Plastics Save OEM Costs

Lightweighting Energy Efficient Plastics Can Save OEM Costs

by The American Chemistry Council -- Plastics Division and the Society of Plastics Engineers Automotive Division








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The average light vehicle now contains 377 pounds of plastics and composites, 9.2% of the total weight. This is up from 286 pounds in 2000 and 194 pounds in 1990. In 1960, less than 20 pounds were used. Over 15 major resins find significant use in light vehicles. Currently manufacturers in 45 states use over 5.7 billion pounds (Source: Townsend Solutions) of plastics annually to create innovative vehicle parts and components, and the use of plastics in vehicles continues to climb.

Typical plastics and composite applications include exterior body panels, trim, and bumper fascia, as well as interior trim panels, instrument panel substrates, knee bolsters, window encapsulation and side lights, headlamp housings and lenses, manifolds and valve covers, oil pans and fuel tanks, underbody shields, trunk wells, wheel-well liners, electronic/electric parts and components, LED lighting and light pipes, knobs and buttons, wiring harnesses, steering wheels and steering column covers, insulation, dampening and sound deadeners, upholstery fabrics and cushioning materials, mechanical parts and components, airbag fabrics, safety glass, tires, and myriad other uses.

Today's plastics typically make up 50% of the volume of a new light vehicle but less than 10% of its weight, which helps make cars lighter and more fuel efficient, resulting in lower greenhouse gas emissions. Tough, modern plastics also help improve passenger safety and automotive designers rely on the versatility of plastics when designing today's vehicles. In addition, many polymer materials are recyclable.

Composites are any combination of polymer matrix and fibrous reinforcement. Glass, carbon, aramid, and other fibers provide strength and stiffness while the polymer matrix (or resin) of polyester, polyurethane, epoxy, polypropylene, nylon, or other resin and transfers loads between fibers. This creates a material with attributes superior to polymer or fiber alone.

This booklet gratefully acknowledges the contributions of the Automotive Division of the Society of Plastics Engineers, Detroit, Michigan and the group's invaluable contributions to the plastics industry through the annual SPE Automotive Innovation Awards Competition & Gala (speautomotive.com/inno.htm), without which, this book would not have been possible.

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For more information, contact **rob_krebs@americanchemistry.com** or **news@speautomotive.com**.
Please visit our mutual blog/database plasticscar.blogspot.com where the winners of the annual awards can be found, researched, sorted by model year, part, resin, manufacturer and OEM. Please reference for future plastics automotive design inspiration.

Contents

Cost Saving
Automotive Plastic Innovations

Model Year (MY)	Starting Page
2013	4
2012	18
2011	41
2010	74
2009	111
2008	134
2007	151
2006	189
2005	206
2004	209
Hall of Fame	211
Index	214

Cost Saving Automotive Plastic Innovations **2013 MY**

All-Olefin, Soft Skin, Stitched Full IP System

These midsize crossover vehicles demonstrate the use of contour stitching on an all-olefin, multi-grained full instrument panel (IP) surface with complex geometry. Advanced robotic sewing technology provides an "up-level" appearance while saving 15-25% costs vs. non-cut / sew applications and up to 50% vs. cut / sew leather plus 15% weight.

OEM/Vehicle

General Motors Co.
2013MY Buick Enclave,
Chevrolet Traverse,
GMC Acadia

System Supplier

Inteva Products, LLC

Material Processor

Inteva Products, LLC

Material Supplier

Adell Plastics, Stahl, Ticona Engineering Polymers

Resin

TPO-631 SSXT Soft TPO

Tooling/Equipment Supplier

KTX Co. Ltd.

Energy-Absorbing Screw-Cap Cover

Integration of energy-absorbing features into a visual screw-cap cover on a headliner-mounted assist handle provides the possibility of eliminating headliner countermeasures inboard of the grab handles, saving $2-4 USD in cost avoidance. The grab-handle systems it replaced exposed the functional features, creating a less aesthetically desirable appearance.

OEM/Vehicle

Ford Motor Co.
2013MY Ford Fusion/MKZ

System Supplier

Grupo Antolin Ingenerria

Material Processor

NIFCO Products ESPANA

Material Supplier

DuPont Performance Polymers

Resin

PA

Tooling/Equipment Supplier

NIFCO Products ESPANA

Front Bolster Assembly

This 1-piece PA 6/6 fascia bolster is tunable, thanks to stress initiators designed into the part to control energy absorption and breakage, enabling vehicle safety targets to be achieved without any body structure changes. It led to exterior body craftsmanship improvements for fascia-to hood flushness (61%), gap (38%), parallelism (33%), and deflection (43%) while reducing OEM labor 50%, and saving 1.8 lb / 0.8 kg and $2.50 USD variable cost per vehicle.

OEM/Vehicle

Ford Motor Co.
2013MY Ford Mustang

System Supplier

JCIM LLC

Material Processor

JCIM LLC

Material Supplier

BASF Corp.

Resin

Ultramid A3WG7 35% Glass Filled PA6 GF PA

Tooling/Equipment Supplier

Toolplas Systems Inc.

Illuminated Engine Cover

A unique combination of injection-molded PMMA, PC, and high-temperature (to 300F/149C) PA are used to provide thermal and chemical resistance for this engine cover, which has a chromed appearance during daylight but is illuminated in low-light conditions. The TECHNO (translucent, electro-chromatic, high-intensity novelty optics) process applies an electro-chromatic layer and sealed low-voltage wiring/LED assembly that replaces the hazardous, time consuming, and costly chrome plating process while creating a unique effect that will not flake, peel or delaminate over time. The assembly is available on new vehicles or can be retrofit back 4 years.

OEM/Vehicle

Ford Motor Co.
2013MY Ford Mustang

System Supplier

Colonial Plastics, Inc.

Material Processor

Colonial Plastics, Inc.

Material Supplier

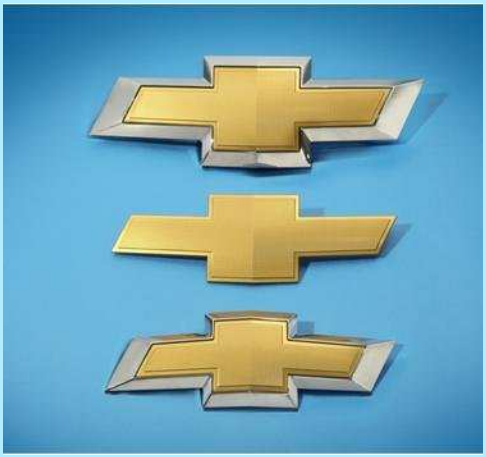
EMS-Grivory America

Resin

Grilamid TR 55 LX Nylon Blend

Tooling/Equipment Supplier

Colonial Mold, Inc.



Bowtie Emblem

By combining a robust, first-surface textured PVDF paint film plus creative tooling with unique microstructures, a "jewel-colored" exterior emblem was created that offers superior color with weathering and chemical resistance. This not only led to improved aesthetics and a 6% component-level scrap savings, but reduced warranty issues and eliminated the cost and environmental impact of vacuum metallization.

OEM/Vehicle

General Motors Co.
2013MY Chevrolet Traverse

System Supplier

Eimo Technologies, Inc.

Material Processor

Eimo Technologies, Inc.

Material Supplier

Soliant LLC

Resin

PVDF

Tooling/Equipment Supplier

Eimo Technologies, Inc.

Two-Shot Window Lift Carrier Plate

With a goal of reducing mass, processing and assembly time, and providing greater assembly flexibility, the team replaced the previous metal-intensive assembly comprised of 21 component produced in 16+ processing / assembly steps with a plastics-intensive, 10-component unit produced in 10 assembly steps. Two-shot overmolding of high-molecular-weight POM with a Shore D 25 polyester-based TPE enables integrated down-stop and glass anti-rattle bumpers to be molded in while adding a glass-guidance feature. The result delivers design flexibility, weight and cost savings, simplified assembly and a reduction of process steps.

OEM/Vehicle

Ford Motor Co.
2013MY Ford Escape

System Supplier

Hi-Lex America Inc.

Material Processor

Hi-Lex America Inc.

Material Supplier

Ticona Engineering Polymers

Resin

Celcon M25 & Riteflex 425 POM & TPE-C

Tooling/Equipment Supplier

MPP Corp.

Bio-Recycled Structural Guard

The material used on this structural guard is produced from recycled TPE from tires and reinforced with coconut-shell powder – a waste stream from coconut processing that is a functional filler. The result is a part that is lower in cost (2%), lower in weight (3%), and has greater performance properties. Additionally, coconut-shell powder is less abrasive than mineral fillers on molding equipment, it reuses a product otherwise destined for a landfill, and creates jobs and opportunities in other parts of the world.

OEM/Vehicle

Ford Motor Co.
2013MY F250 Super Duty

System Supplier

GDC

Material Processor

GDC

Material Supplier

Natural Composites, Inc.

Resin

Enduraprene 2395C BioTPE

Tooling/Equipment Supplier

GDC

Integrated Camera-Retention Hardware

This innovative, integrated rear camera retention / attachment device injection molded from PA 6/6 replaces 4 separate parts for substantial cost and labor savings while precisely positioning the camera to prevent rotation and movement that can lead to distorted views. The new system offers easier installation and guaranteed location each and every time on a rear appliqué. It saved 15% weight, 45% piece cost, and a projected $2.3-million USD global savings.

OEM/Vehicle

Ford Motor Co.
2013MY Ford Edge Sport

System Supplier

ITW Global Automotive

Material Processor

ITW Global Automotive

Material Supplier

BASF Corp.

Resin

TYC 852X PA66

Tooling/Equipment Supplier

Tolerance Tool, Inc.

Soft Thermoformable TPO Foam Bilaminate with Clear Coat

Patented, reaction-compounded soft TPO material with soft resin foam provides deep vacuum forming, sewability, laser scorability, and wrapability while bonding to the LFT PP retainer, yielding an all-olefin IP for improved recyclability. Special water-based clearcoat system improves surface haptics, while resisting scuffing/abrasion and UV yellowing, and offering a low-gloss / matte finish. Unique robotic decorative stitching with contrasting polyester thread is applied around 70% of the perimeter of the complex, 3D preformed bilaminate cladding, achieving a 15-25% cost reduction vs. non-cut / sew systems and up to 50% cost savings vs. leather wrapped systems.

OEM/Vehicle

General Motors Co.
2013MY Chevrolet Traverse and GMC Acadia

System Supplier

Inteva Products, LLC

Material Processor

Inteva Products, LLC

Material Supplier

Adell Plastics, Stahl, Ticona Engineering Polymers

Resin

TPO-631 SSXT Soft TPO, Celstran LFT-PP

Tooling/Equipment Supplier

KTX Co. Ltd.

Structural Rocker Molding

This is the first structural-foam molded, painted TPO rocker molding, which uses a unique endothermic foaming agent, counterpressure, and a proprietary primer to facilitate foam dispersion. The combination was selected to be compatible with Ford's paint systems, ensure good paint adhesion, and the foaming agent is tuned not to release even under high molding pressures until the tool is completely filled. The resulting 1-piece, Class A part uses less material, reduced part count by 2 pieces, is now 100% recyclable, and meets step-load requirements without additional metal reinforcements while yielding a 5 lb/vehicle weight and 65% direct-cost savings vs. previous technology.

OEM/Vehicle

Ford Motor Co.
2013MY Ford Edge Sport

System Supplier

ABC Group

Material Processor

ABC Group

Material Supplier

LyondellBasell Industries

Resin

Sequel TYC 852X TPO

Tooling/Equipment Supplier

Delta Tool

Uniform Lighting Lens

The uniform lighting lens (ULL) is a patented thermoformed PC film used for an inner lamp lens and containing 2 different microstructure patterns produced via micro-replication. The system is designed to balance optical properties for uniformity and luminous intensity while reducing the number of LEDs needed. Using this technology led to weight and cost reductions as well as lower lead times on lens tooling and greater design freedom.

OEM/Vehicle

General Motors Co.2013MY Buick Enclave

System Supplier

Magna International

Material Processor

Display Pack

Material Supplier

Bayer MaterialScience

Resin

Makralon AL2447 PC

Tooling/Equipment Supplier

3M Co.

Bi LED Achromatic Plastic Lens

This is the first time a plastic lens has been used as a headlamp projector. The achromatic plastic lens with microstructure features allows 2 different beam patterns (high- and low-beam) to be created with a single-piece PC lens produced in a single molding operation. The lens is laser welded to the lens bracket for precision location. Versus glass, the plastic lens can be lit with an LED instead of halogen lamp (saving energy), provides a 45% weight reduction and a cost save of $14.30 USD / vehicle, and offers far greater styling versatility.

OEM/Vehicle

Ford Motor Co.
2013MY Lincoln MKZ

System Supplier

Valeo Sylvania

Material Processor

Eschenbach Optik GmbH

Material Supplier

Bayer MaterialScience

Resin

Makrolon LED2245 PC

Tooling/Equipment Supplier

Eschenbach Optik GmbH

Second-Row Vanity Mirror & Dome Lamp with Dual LED

This second-row vanity and dome lamp combo shares a single LED circuit board to serve both vanity and courtesy/reading light functions. Additional features include a light ramp-up intensity feature to provide a luxury feel for Lincoln customers. Molded-in-hooks & snaps on the back of the vanity bezel helped eliminate 4 J-clips, 4 high-retention clips, 4 screws & screw caps, plus labor during vehicle assembly. The resulting system saves 2.02 lb / vehicle vs. previous systems and saved $4 USD/unit direct and $8 USD/vehicle indirect costs vs. separately packaged units.

OEM/Vehicle

Ford Motor Co.
2013 Lincoln Town Car livery

System Supplier

Daimay NA Automotive, Inc.

Material Processor

Daimay NA Automotive, Inc.

Resin

PC/ABS

Cost Saving Automotive Plastic Innovations **2012 MY**

B-Pillar Gas Assist Grab Handle

Gas-assist injection-molded PP was used to replace steel overmolded with PVC for a structural grab handle that assists occupant ingress/egress in second-row seats of this crew-cab pickup. The part provides the structural performance and comparable haptics of the steel-reinforced handle it replaced without degradation due to allowable load forces. It meets FMVSS 201 and Ford internal safety standards by integrating HIC countermeasures directly in the part. This led to weight reduction of 1 lb/0.5 kg, a cost reduction of $1.30 USD, and a cycle-time reduction of 10% per handle while improving color and harmony and facilitating easy recycling.

OEM/Vehicle

Ford Motor Co.
2012MY Ford F150

System Supplier
Johnson Controls

Material Processor

Johnson Controls

Material Supplier

LyondellBasell Industries

Resin

PP

Multi-Function Bracket with Vitreous Appearance

This vitreous-appearance, fully integrated, multifunction below-belt bracket – which includes a tinted-quarter-glass sail, TPE seal, PP boss, bright cap, and PA 6/6 and 6 clips, plus closed-cell foam – represents a 50% weight reduction vs. conventional metallic channel designs and can be used with either tempered or laminated glass. It also eliminated the need to make a $2.5MM USD investment to the conventional door build to add the vitreous quarter-glass theme.

OEM/Vehicle

Ford Motor Co.
2012MY Ford Fusion

System Supplier

Hutchinson Sealing Systems

Material Processor

Precision Plastics

Material Supplier

EMS Gritech
ExxonMobil Chemical

Resin

Grilon M369 PA 6, Santoprene

Tooling/Equipment Supplier

Plastik Jay-Enn

Bright Film Outer Belts

The change from stainless steel to PMMA with a bright foil cap for the outer belt wrap lowered cost 47% /vehicle (by eliminating end caps and stretch bending); reduced mass 18% /vehicle; improved customer fit & finish by using a material with low CLTE for tighter margins; eliminated corrosion and sharp corners; improved serviceability; and increased design flexibility by creating a smooth transition between fixed glass and belts.

OEM/Vehicle

Ford Motor Co.
2012MY B-Max

System Supplier

Cooper Standard

Material Processor

Cooper Standard

Material Supplier

3M Co.

Resin

3M Alum Foil 3340 Blended tri-layer PMMA

Tooling/Equipment Supplier

Kunstoff GmbH

Inside Door Handle

The application integrates the inside door handle, decorative bezel / spear, speaker grill, and appliqué into a single consolidated assembly. Two variants are available: an upscale high-series, 2-piece set with separate appliqué and a 1-piece low-series set with integral appliqué. Benefits are a wraparound theme that seamlessly connects door spears to IP with improved fit & finish, superior dimensional control, hidden attachments and pivot, no visible parting lines, improved ergonomics and feel, lower cost (25%), and improved quality through reduced assembly errors.

OEM/Vehicle

Ford Motor Co.
2012MY Ford Fusion

System Supplier

Key Plastics

Material Processor

Tomkin Plastics

Material Supplier

BASF Corp.

Resin

PA 6 40% Mineral filled

Tooling/Equipment Supplier

Stone Plastics and Manufacturing, Inc.

Wide-Open Panoramic Roof

This wide-open panoramic roof (WOPR) module features industry's first multi-shot, multi-function, injection-molded bracket without additional retention clips or U-channel welding / hemming. The substrate PC panels meets world-class levels of flushness to the moveable and fixed portions of the WOPR assembly. The very-complex design allows direct load to the vehicle sheet metal for optimum security, provides robust impact resistance, protecting the WOPR from direct scratching to the frame, improves NVH, optimizes airflow over the glass, and closes out all joints on the WOPR assembly. It also eases installation, reduces weight 60% vs. sheet metal and reinforcements, and brought a direct cost save of $925,000 USD and an indirect cost save of $425,000 USD annually.

OEM/Vehicle

Ford Motor Co.
2012MY Lincoln MKZ

System Supplier

Webasto Roof Systems, Inc.

Material Processor

Webasto Roof Systems, Inc.

Material Supplier

SABIC

Resin

Lexan 525 PC

Tooling/Equipment Supplier

Plastik Group

Composite Rear Seat Cushion Frame

Replacing a spot-welded steel structure with a 1-shot, injection-molded high-strength (long-glass/high-crystalline) PP composite allowed for development of a lightweight, low-cost rear seat cushion frame for a rear-wheel-drive sedan. The application reduced weight 25% and costs 10% while improving the manufacturing process and has generated 1 Korean patent and 2 additional patents overseas.

OEM/Vehicle

Hyundai Kia Automotive Group
2012MY Kia K9

System Supplier

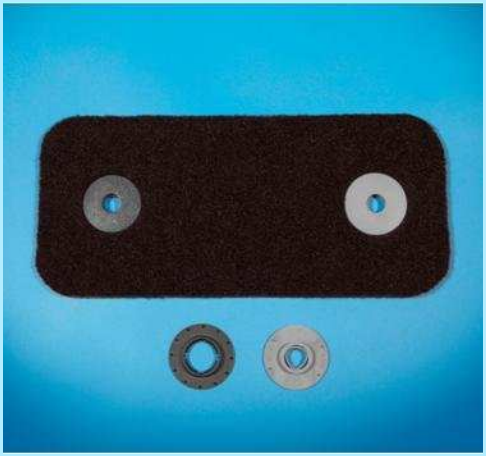
Dymos, Inc.

Material Supplier

Honam Petrochemical Corp.

Resin

PP



Floor-Mat Attachment Clip

A redesigned global floor-mat clip provided the opportunity to revise attachment of the mat to the carpet post from the lower and upper clip halves. The new design features a more robust J-hook to join clip halves and a tri-lobular attachment design on the upper clip half to grip the carpet post in the vehicle. To reduce arm breakage and scrap a new UV-stable, impact-modified, MIC POM copolymer grade was developed that met both functional and aesthetic requirements simultaneously. The new design saves between $0.30 and $1.00 USD / affected unit, drove the scrap rate to almost zero, and reduced breakage during installation.

OEM/Vehicle

Ford Motor Co.
2012MY Ford S-Max and Mondeo

System Supplier

ITW Global Automotive

Material Processor

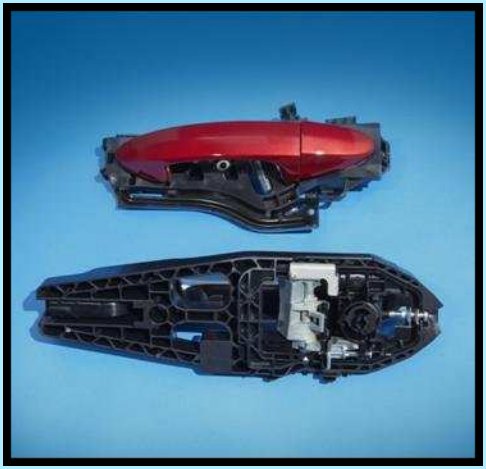
ITW Global Automotive

Material Supplier

Ticona Engineering Polymers

Resin

Hostaform CKX-5643 POM Copolymer



Outside Door Handle

This next-generation injection-molded PA 6 outside door handle features a unique, multifunction slide-lock chassis design in POM (previously done in diecast zinc) that improves handle assembly to the chassis at the OEM plant and improves bezel and lock retention to the chassis. Additionally, a 30% increase in strength was measured in the abusive pull test vs. the current design while also reducing weight 3%, reducing rework at the plant, and reducing piece costs by 40%.

OEM/Vehicle

Ford Motor Co.
2012MY Ford Fusion

System Supplier

ADAC Automotive Inc.

Material Processor

Tomkin Plastics

Material Supplier

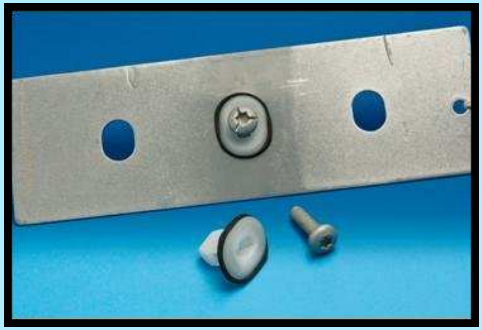
BASF Corp.

Resin

PA6+GF 15%+MF 25% & POM

Tooling/Equipment Supplier

Stone Plastics and Manufacturing, Inc.



Plastic Ratcheting-Stud Insert

This all-plastic, self-centering ratcheting insert replaces metal nuts and allows for a much quicker load / hold (vs. traditional nut / bolt). The POM insert also acts as an isolator to protect the assembly from corrosion, paint chipping, and noise while achieving over 100 lb in pull-force retention. Weight is also reduced 50% and assembly time and warranty costs are reduced.

OEM/Vehicle

General Motors Co.
2012 Chevrolet Camaro sports car

System Supplier

ITW Super Products

Material Processor

ITW Shanghai

Material Supplier

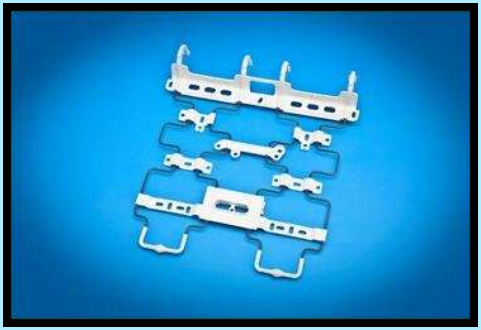
Mitsubishi Engineering Plastics

Resin

Lupital F20-03 POM

Tooling/Equipment Supplier

Donglei Shanghai



Overmold-Cushion Suspension

The injection-molded PP design reduces part count from 5 to 1 / seat, piece cost $0.56 USD per seat, tooling costs $288,000 USD, and per-vehicle mass by 1.93 kg vs. previous design. The single-piece design provides wire harness routing and retention, seat-cushion and back-trim retention, and climate-control system retention – functionality that previously required 6 parts to achieve. Now there are 5 fewer parts to manage, control, and install and fewer opportunities for potential failure modes.

OEM/Vehicle

Ford Motor Co.
2012 Ford Escape SUV / Kuga CUV

System Supplier

Flex-O-Lators Div. of Leggett & Platt Inc.

Material Processor

Flex-O-Lators Div. of Leggett & Platt Inc.

Material Supplier

Washington Penn

Resin

PPC5UF0 PP

Tooling/Equipment Supplier

Advanced Mold Engineering Inc.

Seat-Controls Plastic-Module Bracket

This plastic module bracket for seat controls replaced a steel stamping manufactured in progressive dies with an injection-molded 30% glass-reinforced PA 6/6 material. The approach saves 805 g of weight per vehicle vs. the previous. Further, it reduces parts from 2 to 1 and increases design frequency from 30 Hz to 61 Hz, eliminating potential NVH issues via a tripod mounting approach with honeycomb construction. It also eliminated $260,000 USD in tooling costs and piece-costs were reduced $0.15/set.

OEM/Vehicle

Ford Motor Co.
2012 Ford Escape SUV / Kuga CUV

System Supplier

Magna Seating LVSS

Material Processor

Genesis

Material Supplier

BASF Corp.

Resin

Ultramid A3WG6 PA 6/6 30% GF

Tooling/Equipment Supplier

ETCS Inc.

Ram Box Assembly with Lid

Twin-sheet thermoforming replaces blow molding to create the structure and ribbing of this tough storage box with lid. The result is a more uniform, more dimensionally accurate part whose length was increased from 5 ft 7 in. to 6 ft 4 in., requiring greater emphasis on the "heavy-duty" nature of the structure's design and materials of construction. A special new grade of GR-PP eliminated the need to upgrade to heavier and more costly PA 6/6, avoiding a 9% weight and 20% cost increase.

OEM/Vehicle

Chrysler Group LLC
2012 Dodge Ram pickup

System Supplier

Penda Corporation

Material Processors

Penda Corporation, Evco Plastics, River Bend Industries

Material Supplier

Asahi Kasei Plastics North America Inc.

Resins

Thermylene P8-40FG-4611, P6-15FG-0741, P6-15FG-0754 PP

Tooling/Equipment Suppliers

Cavalier Tool & Mfg Ltd.,
Tooling Technology LLC

Structural Aero Spoiler

A patented chemical foaming agent combined w/ASA in a non-traditional injection molding process was used to mold this aero spoiler, which reduces weight 1.5 lb / vehicle (for better fuel economy) and better meets customer requirements. The design allowed for parts integration while maintaining a Class A surface appearance and saving $5.6MM USD direct costs and an estimated $200,000 USD indirect costs due to reduced complexity vs. the previous process.

OEM/Vehicle

Ford Motor Co.
2012 Ford Edge / Lincoln MKT CUV

System Supplier

ABC Group

Material Processor

Delta Tool

Material Supplier

SABIC Innovative Plastics

Resin

Geloy XP4034 ASA+PC

Tooling/Equipment Supplier

Delta Tool

data, and more for injection-molded thermoplastics, enabling engineers to design closer to the theoretical limits of materials and saving 10-20% weight for interior plastic components. This leads to a 5-15% reduction in material costs and a $500,000 USD reduction in testing costs per program.

OEM/Vehicle

Ford Motor Co.
2012 Ford Explorer SUV

Advanced Material Characterization for Interior Parts

Use of advanced material characterization of plastics enables improved analytical modeling and therefore proveout of parts molded from these materials. Advanced analysis tools are used to predict crack propagation, high strain-rate behavior, anisotropic properties of glass-filled plastics, creep

1-Piece Structural TPO Aero Rocker Molding

A patented, non-traditional injection molding process, where a chemical foaming agent is combined with TPO, was used to produce this rigid 1-piece structural component that met customer requirements while maintaining a Class A surface and lowering weight and part count vs. previous processes. The innovation saved 2 parts and 3.86 lb / vehicle, resulting in a $7.6-MM USD direct cost savings and an additional $1.0-MM USD estimated indirect cost savings due to reduced part complexity and assembly-plant labor.

OEM/Vehicle

Ford Motor Co.
2012 Ford Edge SUV

System Supplier

ABC Group

Material Processor

ABC Group

Material Supplier

LyondellBasell Advanced Polyolefins USA, Inc.

Resin

Sequel TYC 852P TPO

Tooling/Equipment Supplier

Delta Tool

Molded-in-Color Air-Register Bezel

The unpainted, low-gloss, PC/ABS Class A surface on these air-register bezels was achieved using injection molding / steam-mold technology and a new material with low gloss and UV resistance. The design also featured a unique method to interface with the chrome-plated ring. The innovation represents an indirect cost save of $1.80 per affected vehicle.

OEM/Vehicle

Ford Motor Co.
2012 Ford Escape SUV / Kuga CUV

System Supplier

TRW Engineered Fasteners & Components

Material Processor

Fisher Tech

Material Supplier

Samsung Chemical

Resin

WP-1098 PC/ABS

Tooling/Equipment Supplier

Fisher Tech

saving 50% of the weight and 50-60% of the direct cost of previous systems. An additional 60% indirect savings due to cost avoidance was also achieved.

OEM/Vehicle

General Motors Co.
2012 Chevrolet E10 pickup

System Supplier

ATF Inc.

Material Supplier

Nylok Corp.

Sealing Stud for Rear Lamp & Appliqué Attachments

This application uses a pre-applied sealant on a cold-formed collar stud for rear lamp and appliqué attachments. This is the first application of the sealant to studs for lamps and exterior applications,

Fender Vent Mold-in-Color Layers

This injection-molded ASA and chromed ABS design offered black lettering inside a chrome bezel while avoiding costly paint-over-chrome and subsequent delamination during the life of the vehicle. It is the first MIC exterior side fender-vent application with interchangeable / multi-model lettering. It reduced weight 10% and direct costs 20% while also lowering assembly time.

OEM/Vehicle

Ford Motor Co.
2012 Ford F250, F350, F450, F550 pickups

System Supplier

Lupini Targhe S.p.A.

Material Processor

Gamma Mold

Material Supplier

BASF Corp.

Resin

ASA, ABS

Tooling/Equipment Supplier

Gamma Mold

Mold-in-Color Ford Oval

The unique MIC design provides the appearance of a paint-over-aluminum badge without use of paint for significant cost savings and quality improvements The snap-together design significantly reduces cost and eliminates paint-adhesion issues with aluminum and has improved performance for stonepecking and denting during assembly, shipping, and customer use. Although weight savings is negligible, there is significant quality and environmental improvement (through elimination of paint), resulting in a direct cost savings of 35%.

OEM/Vehicle

Ford Motor Co.
2012 Ford F250 Superduty pickup

System Supplier

Tribar Manufacturing LLC

Material Processor

Tribar Manufacturing LLC

Material Suppliers

Evonik Industries
SABIC Innovative Plastics

Resin

PMMA, ABS

Tooling/Equipment Supplier

Granby Tool Co.

MuCell Instrument Panel

This instrument panel is the largest automotive component and first IP molded with the patented MuCell injection-molding process. That innovation was combined with 10% reactor-grade talc-filled PP, to create a microcellular foam part that reduced weight over 1 lb, lowered cycle times by 15% and clamp tonnage by 45%, and saved an estimated $3 USD / vehicle vs. solid injection molding.

OEM/Vehicle

Ford Motor Co.
2012 Ford Escape SUV & Kuga CUV

System Supplier

Faurecia

Material Processor

Faurecia

Material Suppliers

SABIC Innovative Plastics & Flint Hills Resources

Resins

Stamax EXRP-49 30YK270LFT-PP & 10% reactor-grade talc-filled PP

Tooling/Equipment Supplier

Lamko

Integrated Liftgate Trim Grab Handle

Through design and tooling innovations, the injection-molded polypropylene liftgate grab handle was molded in a single piece vs. previous 2-piece assemblies thanks to 3 large cavity-side slides in the tool. The innovation saved 0.1 lb and $0.60 USD / vehicle.

OEM/Vehicle

Ford Motor Co.
2012 Ford Focus compact hatchback

System Supplier

NYX Inc.

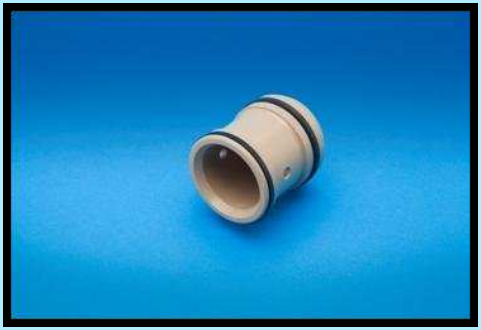
Material Processor
NYX Inc.

Resin

PP

Tooling/Equipment Supplier

Aalbers Tool



Plastic Transmission Accumulator Piston

This molded plastic transmission accumulator piston was designed around the current application so that the bore, seal rings, and return springs did not have to be changed and it was a drop-in replacement. Maximum effort went into material choice (PPS) and model shape to achieve appropriate toughness to handle time, temperature, pressure, and combined cycling to create a 200,000-mile capable piston. The resulting part is 29 g vs. typical 47 g for aluminum pistons. A direct thermoplastic injection technology was developed to produce the parts, resulting in zero material waste through the use of a single-cavity design. The process allowed for a 33% improvement in cycle times and reduce the total floor space required by 20% over previous multi-cavity processes. The innovative approach used here has allowed for a modular business cell that is adaptable to large market-volume fluctuations.

OEM/Vehicle

Chrysler Group LLC. 2012 All Chrysler Vehicles with Automatic Transmissions

System Supplier

Chrysler Group LLC

Material Processor

Freudenberg-NOK Sealing Technologies

Material Supplier

Chevron-Phillips

Resin

Ryton R-Y-120 PPS

Tooling/Equipment Supplier

Freudenberg-NOK Sealing Technologies

Cost Saving Automotive Plastic Innovations **2011 MY**

Hybrid Rear Bumper Beam

This is the first hybrid (plastic / steel) rear bumper beam that can travel through the OEM E-coat process. An unfilled, crushable MPPE/PA honeycomb that is hot-plate welded to a base plate is used to pass all relevant test specifications. The part also provides support and fixation for the rear bumper fascia, while reducing mass 1.5 kg / 3.3 lb and cost 10%.

OEM/Vehicle

Fiat SpA2011MY Fiat Panda

System Supplier

Ben Vautier

Material Processor

RT Technologies

Material Supplier

SABIC

Resin
Noryl GTX 910 MPPE / PA

Tooling/Equipment Supplier

Redstamp

Sunroof Wind Deflector

This multi-material sunroof wind deflector is co-molded using rigid LFT-PP overmolded with a flexible styrenic-block copolymer TPE (TPE-s) using a 2-shot rotary press. Careful materials selection assured high rigidity, low moisture absorption, toughness, good aesthetics, and light weight for the LFT-PP grade, as well as good UV stability and a strong cohesive bond for the TPE grade. By co-molding the part on 1 press, costs are reduced, there is less flash, secondary operations are eliminated, scrap is lowered, appearance is improved, warranty costs are reduced, and a more robust adhesion between materials is achieved.

OEM/Vehicle

Ford Motor Co.2011MY Focus C346

System Supplier

Webasto Roof Systems, Inc.

Material Processor

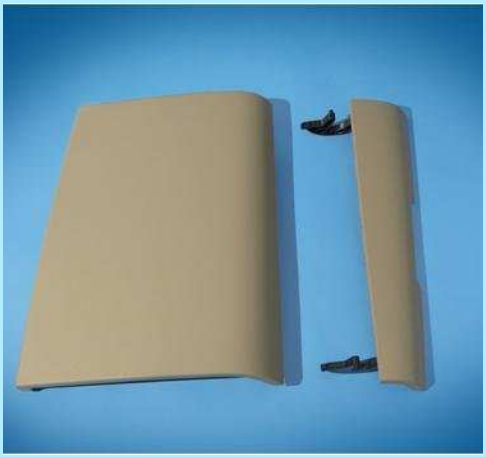
Windsor Mold Group

Material Supplier

Ticona Engineering Polymers

Resin

Celstran PP-GF40-03 LFT-PP-GF40



Dolphin Interior Trim Components

The new multi-phase Dolphin process allows a rigid substrate with integral foam core and MIC grained skin to be produced in one step on one machine. Equipped with an opposing, 2-barrel rotary platen with expansion / decompression option and utilizing the microcellular foam molding process, the system molds a rigid PC/ABS carrier, then forms a solid, MIC grained Class A outer skin (thickness adjustable by manipulating mold cooling time) as well as a low-density foam core layer (thickness / density are adjustable by altering the mold opening stops) from the same shot of TPE. The 3 layers maintain a strong bond without need for corona treatment. The parts reduced cost 25% vs. the previous PVC slush-molded option, reduced process steps from 8 to 2, eliminated waste (since scrap from the all-thermoplastic system is fully recyclable and can be ground and reused).

OEM/Vehicle

Daimler AG
2011MY Mercedez-Benz Actros

System Supplier

Sole SpA

Material Processor

Trexel Inc.
ENGEL Austria GmbH

Material Supplier

SO.F.TER. SpA

Resin

Pibiflex polyester based TPE

Tooling/Equipment Supplier

Georg Kaufmann AG

TPE "Coating" for Finish Panel

Thanks to a sequential injection molding operation on a shuttle press, this center console is coated with a soft-touch TPE, eliminating the need to paint or spray on a coating. This results in a 20% cost reduction and a cycle-time reduction from 2 hr to 2 min.

OEM/Vehicle

Hyundai-Kia Automotive Group
2011 MY Hyundai Veloster CU

System Supplier

Dongkook Corp.

Material/Processor

Hankook Mold Corp.

Material Supplier

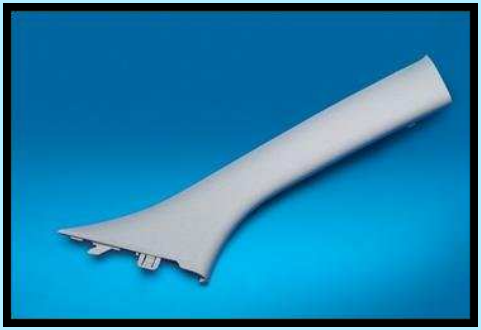
Kriburg GmbH & Co. KG

Resin

TPE HTP8830 / 98

Tooling/Equipment Supplier

Hankook Mold Corp.



Volcanic-Filler

This lightweight, injection-molded PP pillar trim provides the texture and appearance of more costly fabric wrapped trim through use of a unique filler combination consisting of volcanic rock, fiber pile, and glass spheres replacing talc-filled PP and fabric-wrapped PP No special tooling was required but process control was important so as not to crush the glass spheres and to distribute the fiber pile evenly during compounding and molding. A 10% weight and a 50% direct cost savings was achieved. Other benefits gained from using the volcanic mineral are that it emits negative ions (to reduce pollutants) and far-infrared energy.

OEM/Vehicle

Hyundai-Kia Automotive Group
2011 Kia Pride subcompact & Optima mid-size sedan & Hyundai Elantra compact car

System Supplier

Plakor Co., Ltd.

Material Processor

Plakor Co., Ltd.

Material Supplier

Hyundai EP Co., Ltd.

Resin

Supol HL345CL PP

Power Window Motor Output Gear & Shaft

This power-window motor changed from a steel output pinion to a new injection-molded polyester one for a quieter/lighter motor to meet customer targets while still complying with window velocities. It is industry's first plastic output pinion that ensures functionality. Additionally, the design allows for regulator plug-'n-play capability into the power drum for better motion control. Packaging of the involute onto the spline gear to the accommodating drum spline was critical to the customer. The application saved $450,000 USD direct and $250,000 USD indirect cost savings annually.

OEM/Vehicle

Ford Motor Co.
2011 Ford Focus compact car

System Supplier

Brose Fahrzeugteile GmbH & Co. KG

Material Processor

Mitsuba Corp.

Material Supplier

DuPont Automotive

Resin

Hytrel TPC-ET Polyester

Tooling/Equipment Supplier

Camoplast Inc.

Outer Belt Weatherstrip Hidden Fastener Retention

The outer belt weatherstrip eliminates a threaded steel fastener and utilizes a plastic clip retainer. This is industry's first injection-molded plastic output pinion, which ensures functionality for 6-way locating with just 1 clip. Tough PA 6/6 provides robustness for impact resistance and holding force even after heat aging and high-pressure car washing. The application led to a 70% weight reduction, direct cost savings of $850,000 USD annually and an indirect savings of $450,000 USD each year.

OEM/Vehicle

Ford Motor Co.
2011 Ford Focus compact car

System Supplier

Henniges Automotive

Material Processor

Manufacturas Maher II, S.L.

Material Supplier

BASF Corp.

Resin

Ultramid PA 6/6

Tooling/Equipment Supplier

Camoplast Inc.

Spoiler with Integrated Antenna & Amplifier

This is the first-ever integrated amplifier and antenna in a blow-molded spoiler. An innovative method was used to incorporate the antenna into and locate the amplifier in the spoiler. Not only were rear-vehicle aesthetics improved, but a 10% weight savings and 66% indirect cost savings were achieved.

OEM/Vehicle

General Motors Co.
2011 Chevrolet Camaro convertible sports car

System Supplier

ABC Group Exterior Systems

Material Processor

ABC Group Exterior Systems

Material Supplier

Styron LLC

Resin

Pulse 2000EZ PC/ABS

Tooling/Equipment Supplier

ABC Supreme Tooling

Anti-Stain Finish for Cloth Seats

Materials that typically soil and stain cloth are easily cleaned off even after significant wear takes place. Moisture-barrier, antistatic, and odor-resistant properties are also retained after wear. The improved fluoroalkyl resin coating uses the same pad/spray application method as previous technology while reducing costs 15%.

OEM/Vehicle

Hyundai-Kia Automotive Group
2011 Hyundai Soul CUV & Kia Optima mid-size sedan

System Supplier

Kolon Glotech Inc.

Material Processor

Kolon Glotech Inc.

Material Supplier

Kolon Glotech Inc.

Resin

Cleantex Innoclean Polyester

Tooling/Equipment Supplier

Kolon Glotech Inc.

Low-Cost Automated Preform Fabrics

This new approach of using hook and loop fasteners on both sides of fiber plies leads to low-cost, 3D composites with increased strength and enable automation for layup of prepreg / preform fabrics. The new materials are able to make next-generation composites with a stronger interlaminate strength, impact resistance, compression strength, fatigue strength, bolt-hole strength, and bonding/connection strength for resin-transfer molding. The result is much faster ply layup due to easy handling of the plies. Use of advanced composites can reduce weight 40%, direct costs 50%, and indirect costs 30% vs. previous technology.

OEM/Vehicle

Jiangsu Xinri E-Vehicle Co., Ltd.
2011 XR-EV05 electric delivery vehicle

System Supplier

Advanced Fiber Materials Technologies Co.

Material Processor

Advanced Fiber Materials Technologies Co.

Material Supplier

Owens Corning

Resin

Araldite low-viscosity LY 564 Epoxy

Tooling/Equipment Supplier

Advanced Fiber Materials Technologies Co.

B-Pillar Appliqué

This is a dual-shot (ABS over PMMA), injection-molded decorative pillar appliqué provides excellent aesthetics and electrical functionality for the vehicle's keyless entry system. It also provides glass guidance, replacing a steel u-channel. Filling analysis was critical to the success of this design to prevent cracking and over-stressed parts in joints and corners. The result is a 46% weight savings, a $1.4MM USD direct cost savings, and an additional $800,000 USD indirect cost savings.

OEM/Vehicle

Ford Motor Co.
2011 Ford Focus compact car

System Supplier

Windsor Mold Group

Material Processor

Windsor Mold Group

Material Supplier

Evonik Industries

Resins

Acrylite ABS, PMMA

Tooling/Equipment Supplier

Windsor Mold Group

Below Belt Glass Bracket

This multi-shot execution of a below-belt weatherstrip eliminates seal-unzipping failure mode. It is an industry-first use of a multi-shot/multi-function bracket that is overmolded to accommodate the glass-run sealing section without need for additional retention clips or u-channel welding/hemming. As such, the PP/EPDM provides robust impact resistance and holding force even after heat aging and china dust exposure, reducing costs 60% vs. the previous method and providing the automaker a $900,000 USD direct and $400,000 USD indirect savings annually.

OEM/Vehicle

Ford Motor Co.
2011 Ford Focus compact car

System Supplier

Brose Fahrzeugteile GmbH & Co. KG

Material Processor

Erwin Quarter, Inc.

Material Supplier

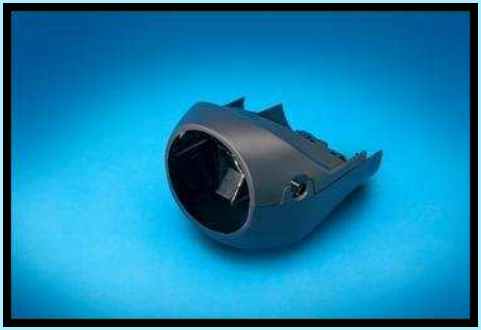
RheTech, Inc.

Resin

PP T20T100 PP/EPDM

Tooling/Equipment Supplier

Camoplast Inc.



Low-Gloss, Molded- in-Color Steering- Column Cover

Use of a new lower gloss, molded-in-color ABS/PC blend eliminates the need for painted ABS/PC blends and provides improved thermal performance vs. straight ABS and PP. The part also provides improved dimensional stability vs. PP. The application saves $1-3 USD / part depending on part size due to elimination of paint and associated scrap.

OEM/Vehicle

BMW AG
2011 BMW 5 Series mid-size luxury sedan

System Supplier

Leopold Kostal GmbH & Co. KG

Material Processor

Leopold Kostal GmbH & Co. KG

Material Supplier

SABIC Innovative Plastics

Resin

Cycolac DL100LG ABS/PC

Pedestrian-Safety Upper Load Path

This 1-piece injection-molded fascia reinforcement eliminates the need for support brackets and offers tuned stiffness to control lower-leg kinematics during pedestrian impact with this cross-over utility vehicle (CUV). The fascia reinforcement, also tuned for pedestrian protection, eliminates the need for an additional energy absorber in front of the bumper beam. The upcycled PC/PBT material used in this application is reclaimed from post-consumer plastic waste, reducing landfill burden and hydrocarbon fuel needs. The application reduced weight 20% by eliminating the metal bracket. Cost and assembly time were also reduced.

OEM/Vehicle

Land Rover
2011 Range Rover Evoque CUV

System Supplier

Magna International Inc.

Material Processor

Magna International Inc.

Material Supplier

SABIC Innovative Plastics

Resin

Xenoy iQ1103R PC/PBT

Undertray with Pedestrian-Safety Functionality

The undertray structure was uniquely designed with "spring-back action" to help the vehicle achieve a Euro-NCAP 5 Star rating while eliminating the need for a separate lower spoiler, saving 1.5-2.0 kg of weight and $10-15 USD in extra cost. The lightweight corrugated structure incorporates other functional requirements, including air guides for air intake to cool the tower assembly and to meet stone chipping requirements. The PC/PBT resin used to injection mold this part is upcycled from post-consumer plastic waste, reducing landfill burden and hydrocarbon-fuel consumption while providing excellent impact resistance.

OEM/Vehicle

Ford Motor Co.
2011 Ford C-Max world car

System Supplier

Faurecia

Material Processor

Faurecia

Material Supplier

SABIC Innovative Plastics

Resin

Xenoy iQ1103R PC/PBT

Dual-Lens Cupholder Light

In this next-generation interior-lighting application, a 1-piece design integrates primary illumination surface and show-surface lens for improved craftsmanship, 10% weight savings, and $0.35 USD cost savings vs. previous 2-piece lens designs. The design also reduced assembly costs and lowered warranty issues.

OEM/Vehicle

Ford Motor Co.
2011 Ford Explorer

System Supplier

Chicago Miniature Lighting, LLC

Material Processor

Chicago Miniature Lighting, LLC

Material Supplier

Ashland

Resin

Cyro Acrylite 8N-123-000 PMMA

Tooling/Equipment Supplier

Global Management & Sales Group

Cam Cover with Integrated Variable-Valve Timing

This is the first time that a plastic surface has been used for a cam variable-valve timing cover. Holding a positional tolerance of 0.5 mm and required to pass 100% inspection, the application required development of a special workstation with laser and optical measurement tools to verify dimensional compliance. High-flow 35%-glass-reinforced PA 6/6 was injection molded for this application and replaced machined die-cast aluminum while saving 2,200 g and 25% direct material costs.

OEM/Vehicle

Chrysler Group LLC
2011 Jeep Cherokee

System Supplier

Bruss NA

Material Processor

Bruss NA

Material Supplier

BASF Corp.

Resin

Ultramid A3WG7 HP BK20560 PA66 35% GF

Tooling/Equipment Supplier

Active Burgess

Diesel Exhaust Fluid (DEF) System

This is the first high-volume pickup truck application to use an all-plastic system to fill, store, and deliver diesel-exhaust fluid (DEF) to the exhaust system to meet stringent diesel-emissions requirements. Multiple materials and molding processes are featured on this system, 90% of whose components are polymeric, including the plastic filler-pipe assembly (which requires no clamps), plastic supply module with integrated pump, reverting valve, pressure sensor, heater, and filtration unit. Additional plastic components in the system include heated intake reservoir (with integral heater), level sensor, filter, and temperature sensor. The only other material that could have withstood the DEF fluid is stainless steel, which would have been 7x heavier and cost 40% more.

OEM/Vehicle

Ford Motor Co.
2011 Ford Superduty Diesel

System Supplier

Robert Bosch LLC

Material Processor

Kautex Textron GmbH & Co.

Low-Gloss Soft Feel Resin

A new low-gloss, soft-touch TPO resin was developed for these applications, offering improved aesthetics, better haptics, and greater durability. Previously, to achieve this combination of properties, more costly wrapping or painting the substrate was required. The new applications, the first in North America, led to cost reductions of $4 USD/part vs. painted substrates and $5 USD/part for wrapped substrates.

OEM/Vehicle

Ford Motor Co.
2011 Ford Edge & Lincoln MKX

System Supplier

Johnson Controls, Inc.

Material Processor

Johnson Controls, Inc.

Material Supplier

LyondellBasell

Resin

Softell TKG259N PP

Tooling/Equipment Supplier

Toolplas Systems Inc.

Mold-in-Color ABS/PA for Defroster Grill

This molded-in-color ABS/PA material for a defroster grille uses special high-flow resin to eliminate knitlines, eliminating the need to paint this Class A surface as had previously been required when the part was molded in PC/ABS. Owing to the resin's flow properties, clamp tonnage and injection pressures were also reduced, helping save energy. The low-gloss injection-molded part offers excellent heat resistance and durability and was dropped into previous PC/ABS tooling without modifications. The result was approximately a $1.00 USD/vehicle direct cost savings.

OEM/Vehicle

Ford Motor Co.
2011 Ford Mustang

System Supplier

Automotive Components Holdings, LLC

Material Processor

ACH - Saline Plastics Plant

Material Supplier

BASF Corp.

Resin

Terblend NG02 ABS/PA

Tooling/Equipment Supplier

Roush Industries

Reactor Grade Talc Filled Polypropylene

In an industry first, reactor-grade, talc-filled PP was used to increase stiffness in a quarter trim panel while allowing a decrease in wallstock and improvements in craftsmanship. By eliminating the burden of secondary compounding, a lower carbon footprint was achieved and the supplier gained greater lot-to-lot consistency, higher stiffness that allowed for thinner parts to be molded (reducing mass 7%), and saving an estimated $500,000 annually over precompounded PP grades.

OEM/Vehicle

Ford Motor Co.
2011 Ford Explorer

System Supplier

NYX, Inc.

Material Processor

NYX, Inc.

Material Supplier

Flint Hills Resources

Resin

AP3320-HT PP

Tooling/Equipment Supplier

Toolplas Systems Inc.

Engine Cradle Mount

In this application, an injection-molded TEEE thermoplastic elastomer replaced thermoset rubber thanks to the unique properties of the elastomer and a post-mold forming step that used controlled insertion to achieve proper compression. The design also takes advantage of the elastomer's ability to take a new material property set in order to meet hysteresis requirements. Cost saving of 15% were achieved, and cycle time was reduced 90% versus thermoset rubber.

OEM/Vehicle

Ford Motor Co.
2011 Ford Focus & C-Max

System Supplier

Hutchinson Paulstra

Material Processor

ThyssenKrupp Tallent Ltd.

Material Supplier

DuPont Automotive

Resin

Hytrel 7248 TEEE

Tooling/Equipment Supplier

SPLAST Sp z 0.0

High-Gloss Finish without Paint

These are the first molded-in-color, high-gloss, jet-black ABS instrument panel, console, and door-finish panel applications produced by a modified injection process that eliminates paint while avoiding molding defects such as flow marks and knitlines. By increasing the cavity-side tool temperature to between 110 and 160C, before and during injection, then quickly cooling down before the part is injected, a highly aesthetic surface is achieved A new grade of ABS resin was developed to deliver deep, jet-black color while also meeting head-impact criteria. The application increased aesthetics, eliminated paint, improve environmental compatibility, and lowered direct costs by 20-65%.

OEM/Vehicle

Ford Motor Co.
2011 Ford Escape

System Supplier

Summit Polymers, Inc.

Material Processor

Summit Polymers, Inc.

Material Supplier

SAMSUNG Cheil Industries, Inc.

Resin

IV-1075 PC & SR-0300 ABS

Tooling/Equipment Supplier

Namdo Tool Co.

saved 91 g per headliner and $5 USD direct cost by eliminating glue.

OEM/Vehicle

Ford Motor Co.
2011 Lincoln MKS

System Supplier

Dakkota Integrated Systems

Material Processor

Dakkota Integrated Systems

Glueless Sonic Edge Wrapping Process

To achieve a quality edge-wrapped finish around injection-molded moon-roof reinforcement rings on this thermoformed headliner without the cost and mess of adhesive, the textile material was sonically welded to the reinforcing ring polymer. Special tooling was created for this application combining a traditional edge-wrap that allowed sonic welding. The new process

Interior Trim with 3-D Appearance

A new decorative option and an industry first allowed a technical pattern to be injection molded into an interior-trim component, preventing distortion in the pattern in deep-draw areas via graining of the substrate rather than incorporating patterned paint film. This provides greater decorative flexibility for the substrate to be molded-in-color, painted, or filmed – all from the same tool. This led to a 10-20% variable cost savings due to use of non-patterned films, and 100% avoidance of multiple substrate tools for different decorative finishes, allowing easy and cost-effective model differentiation.

OEM/Vehicle

Ford Motor Co.
2011 Ford Explorer

System Supplier

Johnson Controls Inc.

Material Processor

Johnson Controls Inc.

Material Supplier

Dow Automotive

Resin

Magnum MT3325 ABS

Tooling/Equipment Supplier

ToolPlas Systems Inc.

Bio-Based TPU over Recycled PC/ABS Tambour Door

This is the auto industry's first use of a bio-based TPU, which was injection overmolded on top of a PC/ABS derived from 100% post-industrial scrap. Both materials were a drop-in replacement for existing materials on the tambour door. While weight was the same, a direct cost savings of $0.41/part was achieved while making the application both more environmental friendly and ensuring 100% recyclability at end of part life.

OEM/Vehicle

Ford Motor Co.
2011 Lincoln MKZ

System Supplier

International Automotive Components

Material Processor

Leon Plastics Inc.

Material Supplier

Merquinsa & ACI Auto Group

Resin

Pearlthane ECO 12T90 TPU
Recycled ABS 3000

Advanced Passenger Airbag Chute

A unique cavity / core tool design at the hinges allowed a special “hook and window” feature to be created on this advanced passenger-airbag chute that intersects the chute’s inner wall rather than the top flange. The result is reduced squeak and rattle, vertical support, and better PAB-to-chute alignment, as well as a savings of 612 g and $4.36 USD / vehicle.

OEM/Vehicle

Ford Motor Co.2011 Lincoln MKX

System Supplier

Automotive Components Holdings LLC

Material Processor

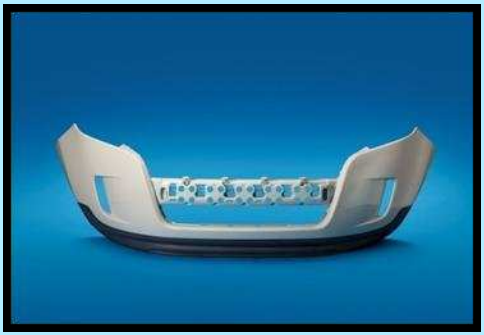
Automotive Components Holdings LLC

Material Supplier

Mitsubishi Chemical USA, Inc.

Resin

Thermorun TT860B TPO



Integrated Bumper Energy Management Device

This injection-molded flexible TPO bumper incorporates the energy-management device into a one piece design, providing world-class appearance, structural integrity, and impact energy management while reducing weight 50%, direct costs 20%, and indirect costs $1/vehicle.

OEM/Vehicle

Ford Motor Co.
2011 Ford Edge

System Supplier

Flex-N-Gate Corp.

Material Processor

Flex-N-Gate Corp.

Material Supplier

LyondellBasell

Resin

Hifax Tyc773 TPO

Tooling/Equipment Supplier

Concours Mold

Roof Ditch Molding

Two-shot rotational molding was used for the first time to produce this roof-ditch molding, eliminating 100% of the assembly labor while providing significantly improved craftsmanship. Use of 40% LFT-PP in this application yielded a stiffer part than the aluminum it replaced, leading to more consistent fit with the exterior sheet metal. An overmolded TPV seal was customized to improve bonding to the PP substrate. Weight was reduced 15% and cost is 55% lower, saving the OEM $1.2 million USD annually.

OEM/Vehicle

Ford Motor Co.
2011 Ford F150

System Supplier

SRG Global, Inc.

Material Processor

SRG Global, Inc.

Material Supplier

Multibase & A. Schulman

Resin

TPV / PP

Tooling/Equipment Supplier

Proper Mold & Engineering Inc.

Pillar Appliqué

This complex one-piece pillar appliqué uses vertical 2-shot rotational stack molding to efficiently produce acrylic / ABS appliqués with integrated glass-run channels and PUR seals in a single part. The design eliminates tape, and assures precise fit and minimal appliqué-to-glass offset for world-class craftsmanship. Overmolding produces a significantly stronger part, eliminating breakage and the need for impact modifiers. Special scratch-resistant additives improve long-term finish. Additional benefits include 15-25% lower weight and approximately $12 USD direct cost savings.

OEM/Vehicle

Ford Motor Co.
2011 Ford C-Max

System Supplier

Dura Automotive & Windsor Mold

Material Processor

Dura Automotive & Windsor Mold

Material Supplier

Evonik / SABIC Innovative Plastics / BASF Corp.

Resin

Acrylic / ASA & Urethane

Recycled Polyol for Seat Foam

This is the first industrial production application of flexible urethane seat foams produced with polyols manufactured from post-industrial scrap foam. A two-stage, closed-loop recycling process converts the scrap foam back into a polyol product, reducing waste going to the landfill and allowing up to 10% recycled content in new parts. A unique process to reformulate the reclaimed polyol to meet OEM specs was also developed for this application. Neither weight nor direct cost were negatively impacted and an estimated $348,000 USD indirect cost savings was achieved, along with reduced CO2 and landfilling.

OEM/Vehicle

Chrysler Group LLC
2011 Jeep Grand Cherokee

System Supplier

Magna Seating of America

Material Processor

MS Chemical Technologies (Magna)

Material Supplier

InfiChem Polymers LLC

Resin

InfiGreen 320 PU

Dual Material Sealing with PIT Technology

Projectile-injection technology (PIT) allowed an EPDM bulb seal to be co-molded with a PP cowl grille in a single process step, producing a single part. By fixing the precise position of the seal, quality improvements were gained during assembly, lower and more easily tunable compression force was achieved, and greater freedom in designing the seal's path was accomplished, saving 30% weight (vs. a separate, extruded seal) and 10% direct costs.

OEM/Vehicle

Ford Motor Co.
2011 Ford C-Max

System Supplier

Röchling Automotive AG

Material Processor

Röchling Automotive Italia srl

Material Supplier

Softer SpA

Resin

PP+EPDM

Tooling/Equipment Supplier

Röchling Automotive Italia srl

Cost Saving Automotive Plastic Innovations **2010 MY**

Mirror-Shell Bracket

By replacing glass-reinforced PBT and PET with this high strength and stiffness PP material, a 15% weight savings and $0.76 USD cost savings is achieved. Excellent vibration-dampening characteristics were also important in the application. The material has since been expanded into folding mirrors where it also meets the durability requirements.

OEM/Vehicle

General Motors Co.
2010 Chevrolet Equinox CUV

System Supplier

Magna International Inc.

Material Processor

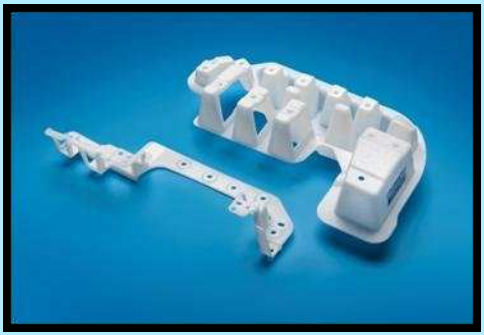
Magna International Inc.

Material Supplier

Asahi Kasei Plastics North America Inc.

Resin

Thermylene P7-60FG-0790 BK711 PP



Energy Absorbing Module

The injection-molded Safe-TEC module's design flexibility provides a unique safety-integration point, since stiffness can be tuned multi-axially to optimize energy-absorption requirements for occupants ranging from 5th to 50th percentile – all in a single component. The module's design can be integrated with existing injection-molded components to reduce weight, investment, and complexity and to significantly reduce part count. Mass was reduced 0.91 kg/vehicle and significant cost-savings were achieved. The pelvic version saves $3.20 USD for pickups and $2.77 USD for SUVs, while the armrest version saves $3.30-$3.50 USD / vehicle.

OEM/Vehicle

General Motors Co.
2010 Chevy Silverado, Suburban, Tahoe & Avalanche, GMC Sierra & Yukon, & Cadillac Escalade

System Supplier

International Automotive Components

Material Processor

International Automotive Components

Material Supplier

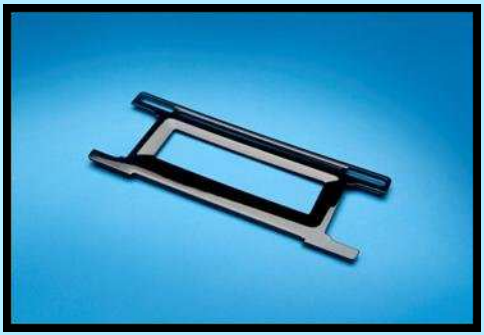
LyondellBasell & Formosa Plastics

Resin

Pro-fax SG802N PP
Formelene 6535N PP

Tooling/Equipment Supplier

International Automotive Components



Radio Bezel with MIC Piano Black

A new grade of polycarbonate with improved scratch resistance, and rapid heating and cooling of the tool were key to achieving molded-in-color “piano black” for this injection-molded switch bezel, which was produced without need for a base coat or clear coat. Since paint was eliminated, not only was $2.00 USD / vehicle saved, but VOCs and related waste were reduced during production, making the application “greener.”

OEM/Vehicle

Volkswagen AG
2010 Volkswagen Jetta

System Supplier

Visteon Corp.

Material Processor

Huizhou Huayi Plastic Products Co., Ltd.

Material Supplier

SABIC Innovative Plastics

Resin

Lexan DMX1435 PC

Turbocharged Engine Cover

This injection-molded turbocharged engine cover features a PA copolymer with new “Shield” technology for high heat stability and double the heat-aging property retention of conventional nylons and some higher cost specialty resins. The material handles the application’s routine 180C service temperature and periodic 200C temperature excursions while offering easy processing, good surface finish, faster cycle times, and extended performance at up to 30% lower cost than specialty resins in this demanding underhood application.

OEM/Vehicle

General Motors Co.
2010 Ecotec 2L Turbo for Cadillac CTS

System Supplier

Camoplast Inc.

Material Processor

Camoplast Inc.

Material Supplier

DuPont Automotive

Resin

Zytel PLUS PLS 95G35DH PA

Tooling/Equipment Supplier

Camoplast Inc.

Spoiler Pan in Liftgate

This is the first online-painted liftgate / spoiler module in plastics, which resulted in high levels of functional integration, as well as cost and weight reduction. The injection-molded part replaced a 6-piece aluminum assembly. Maintaining the same process flow at the OEM, the high-heat, conductive part is assembled to the body-in-white where it passes through eCoat and paint. An estimated 1.5 kg of weight and 20% direct costs were saved, along with indirect costs by lowering tooling investment and eliminating bonding / sealing as was done with the aluminum part.

OEM/Vehicle

Porsche AG
2010 Panamera

System Supplier

VW Braunschweig

Material Processor

VW Braunschweig

Material Supplier

SABIC Innovative Plastics

Resin

Noryl GTX975 PPO / PA

Tooling/Equipment Supplier

Schweiger Formenbau

OEM/Vehicle

Ford Motor Co.2010 Ford Taurus

System Supplier

Automotive Components Holdings, LLC

Material Processor

Summit Polymers, Inc.

Material Supplier

Enviroplas

Resin

PC/ABS

Recycled PC/ABS Finish Panel

This A-surface finish panel is comprised of 100% recycled PC/ABS, which delivers properties comparable to virgin resin yet saves $0.50 USD/lb. The part is injection molded and can be painted, filmed, or use molded-in-color.

Mold-in Metallic Handle Cover

This molded-in-color application uses a metallic finish to replace painting on this handle cover, saving 49% direct costs.

OEM/Vehicle

Ford Motor Co.
2010 Ford Fiesta

System Supplier

Faurecia

Material Processor

Faurecia

Material Supplier

Ticona Engineering Polymers

Resin

Celcon UV90Z Acetal

Tooling/Equipment Supplier

Omega Tool, Inc.

Thermoplastic Oil-Pan Module

A next-generation all-plastic oil-pan module is specifically designed for this trail-rated vehicle to be able to channel oil uphill on a 60% grade. New levels of parts integration have incorporated the pan's windage tray with cam scraper function, oil pickup tube, seal, fasteners, and oil plug in an injection molded assembly that is joined via vibration and infra-stake welding. The 35%-glass-reinforced PA 6 base material was optimized for stone impact and retention of mechanicals when exposed to hot oil, cold temperatures, and road salts. Replacing stamped steel, quiet steel, and cast aluminum, the all-plastic oil pan reduces weight 41%, saved 50% on tooling costs and eliminates 4 assembly operations.

OEM/Vehicle

Chrysler Group LLC
2010 5.7L V8 Hemi

System Supplier

MAHLE North America

Material Processor

MAHLE North America

Material Supplier

BASF Corp.

Resin

Ultramid B3ZG7 OSI PA6

Tooling/Equipment Supplier

Integrity Tool & Mould Inc.

On-Engine Oil Filter Module

This material is a hydrolysis-resistant PA 6/6 modified during polymerization to increase hot glycol resistance at temperatures from 120-130C and extend hot-air heat-aging performance. It also offers reduced swelling and improved weld strength in this application that is subject to oil and coolant contact. Because the material's higher heat and chemical resistance, it allowed this oil-filter module to be mounted directly in the engine valley, eliminating 148 parts, reducing weight 43%, and saving over 60% direct costs, plus indirect costs owing to greater reliability.

OEM/Vehicle

Chrysler Group LLC
2010 Pentastar Engine

System Supplier

Hengst of North America, Inc.

Material Processor

Hengst of North America, Inc.

Material Supplier

BASF Corp.

Resin

Ultramid A3WG7 HRX BK PA66, 35% GF

Tooling/Equipment Supplier

VHM

Turbo Charge

A new injection-molded PA 4/6 resin offering good weldability and excellent long-term heat aging and mechanical-property retention to 220C proved ideal for meeting relevant requirements in this turbo charge air-duct resonator. Replacing metal, the application reduced mass by 50% and cost by 20%.

OEM/Vehicle

Daimler AG
2010 Daimler Sprinter

System Supplier

Woco Group

Material Processor

Woco Group

Material Supplier

DSM Engineering Plastics

Resin

Stanyl Diablo OCD2100 PA 46

LED Headlamp Reflectors

High-temperature, lightweight PEI resin has replaced lacquered glass-reinforced BMC and PPS, or die-cast aluminum in this LED headlamp reflector. High-polish SPI-1 finish on hardened steel tooling was required to get the reflector's highly polished surface and the resin was formulated with a high-purity pigment package and low oligomers base resin. The part saves approximately 50% weight and 30% direct cost vs. BMC, and an additional 10% indirect cost savings due to scrap reduction and recyclability.

OEM/Vehicle

Hyundai Motor Co.
2010 Equus

System Supplier

SL Lighting Inc.

Material Processor

SL Lighting Inc.

Material Supplier

SABIC Innovative Plastics

Resin

Ultem AUT200 PEI

OEM/Vehicle

Ford Motor Co.
2010 Ford Focus

System Supplier

Brose North America

Material Processor

Brose North America

Power Window Motor

Industry's first injection-molded press-fit plastic-output pinion on this power-window motor helps give the regulator plug & play capabilities into the power drum while reducing noise and weight vs. steel. No functionality has been compromised: packaging of the involute on the spline gear to the acCo.ing drum spline was a critical feature for the customer and it has been met successfully. Direct cost savings of $250,000 USD and indirect cost savings of $150,000 USD were also achieved.

OEM/Vehicle

Ford Motor Co.
2010 Ford Fiesta

System Supplier

Cooper-Standard Automotive Inc.

Material Processor

Cooper-Standard Automotive Inc.

Resin

ABS & EPDM

Bright Belt Weather Strips with High Luster

Stainless steel was replaced by an injection-molded plated ABS cap that snaps into place on the EPDM outer-belt weatherstrip, providing a bright, body-in-white finish, while still ensuring functionality. In addition, the change saved an estimated $350,000 USD direct and $350,000 USD indirect cost annually while reducing weight 428 g per door.

Customizable Ignition Key System

Offering new levels of control for parents, this ignition key system features an embedded transponder that IDs the vehicle and allows parents to manage functions like maximum driving speed when the vehicle is being operated by young drivers. All programming is managed from the master key via radio signals sent to other keys in the system. Radio waves travel between RF-transparent injection-molded, ultrasonic-welded acetal resin housing on all keys in the system. New levels of safety are achieved while saving an estimated $200,000 USD in direct and $100,000 USD annual in indirect costs.

OEM/Vehicle

Ford Motor Co.
2010 Ford Focus

System Supplier

Huf North America Automotive Parts Manufacturing Corp.

Material Processor

Huf North America Automotive Parts Manufacturing Corp.

OEM/Vehicle

Ford Motor Co.
2010 Ford Explorer

System Supplier

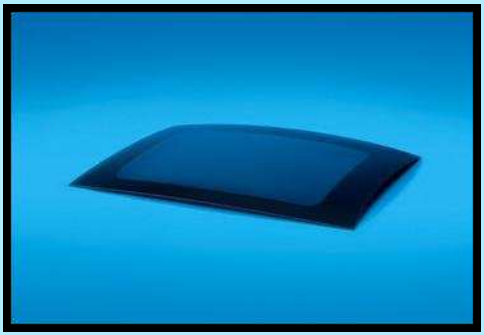
Johnson Controls Inc.

Material Processor

Johnson Controls Inc.

Inside Handle / Tweeter / Bezel Wrap Around

This is industry's first all-plastic, inside handle/tweeter speaker/bezel release module. The injection molded, plated system provides outstanding fit and finish as well as function. It simplifies the assembly sequence for the tier 1 while saving an estimated 43% in weight and 30% in cost vs. the previous system.



OEM/Vehicle

Ford Motor Co.
2010 Ford Mustang

System Supplier
Pittsburgh Glass Works LLC

Material Processor

Sekisui Chemical Co., Ltd.

Resin

PVB

Fixed Glass Roof Airy Feel

This large (1.2-m2) fixed-glass roof is the largest in the industry and features an acoustic PVB inner layer (ply) that provides a light, airy feeling in the vehicle interior while increasing consumer comfort by reducing noise and glare and eliminating the cost of tempered glass.

Structural Composite Radiator Support

This structural composite radiator support is a single part capable of passing a 5,340 N hood-latch pull test, while saving cost and weight. Compression molded of direct-(inline-compounded) LFT-PP / glass and a glass-mat overlay (for extra strength), the part reduced weight 33%, direct costs 20%, and also lowered part count, materials handling, and assembly time, while replacing coated-steel and cast-magnesium parts.

OEM/Vehicle

Ford Motor Co.
2010 Ford Taurus

System Supplier

Magna International Inc.

Material Processor

Magna International Inc.

Material Supplier

Dow Automotive & Composite One

Resin

PP

Tooling/Equipment Supplier

Century Tool

Nameplate Badge

This molded-in-color ASA and ABS design provides the appearance of a paint-over-chrome badge without use of paint, leading to a significant cost savings and quality improvement. The injection-molded part's snap-together design reduces cost, has less scrap and rework, eliminates paint adhesion issues, and allows simple series-differentiation via material / finish changes on insertion. The OEM also saw a $1-million USD direct cost savings on its F150 pickups, and there were significant environmental benefits by eliminating paint.

OEM/Vehicle

Ford Motor Co.
2010 Ford F150

System Supplier

Tribar Manufacturing

Material Processor

Tribar Manufacturing

Material Supplier

SABIC Innovative Plastics & Ashland Distribution

Resin

Geloy MG37 ASA / Cycolac ABS

Tooling/Equipment Supplier

Granby Tool

Impact Blocker for Fuel System Protection

This compression-molded, SMC part provides impact protection for a diesel-engine fuel pump. A new application for thermoset composites, it replaces die-cast metal and nylon for a 50% weight savings (vs. metal) and a 50% cost reduction. Compression-molded SMC brought short tooling lead times, excellent dimensional tolerances, and impact strength that exceeded both metal and nylon.

OEM/Vehicle

Chrysler Group LLC
2010 Jeep Wrangler

System Supplier

VM Motori S.p.A.

Material Processor

Premix Inc.

Material Supplier

Premix Inc.

Resin

Premi-Glas 1286 Hybrid Vinylester / Unsaturated Polyester SMC

Tooling/Equipment Supplier

Witco Tool & Die

Highly Integrated Spare-Wheel Well

This highly integrated, gas-assist, injection-molded spare-wheel well replaced steel and SMC with 60%-glass-reinforced PA 6 and an insert-molded aluminum inlay and screw inserts. Despite the high glass loading levels, the resin offers excellent flow and yields a part with very-good surface quality, while injection molding brought significant parts-integration opportunities. The final part is bonded into the body-in-white and therefore contributes to chassis stiffness, reducing weight 30% (vs. steel) and capital equipment investment by 70%. It is particularly well-suited for small-to-midsize production runs owing to this tooling savings.

OEM/Vehicle

Audi AG
2010 Audi A8

System Supplier

Voestalpine Polynorm Group

Material Processor

Voestalpine Polynorm Group

Material Supplier

Lanxess

Resin

Durethan BKV 60 PA6 GF 60%

Tooling/Equipment Supplier

Grupo Simoldes

Heated Steering Wheel System

This heated steering-wheel system makes use of reaction-injection molded PUR and a unique sprayed-on, silver-impregnated coating-based heating element, which was developed especially for this application. Heating is achieved by the silver-based specialty coating rather than traditionally wrapped / sewn-in heating wire. Not only does the new system reduce weight by 50% (100 g) and reduce tooling and assembly steps, but it also leads to a 5% direct cost savings. In addition, it reduces risks of fire (since the unit operates below 80C), produces more soothing, deep-penetrating far-infrared heat, and also provides antibacterial properties.

OEM/Vehicle

Hyundai-Kia Motor Co.
2010 Kia Optima

System Supplier

LG Hausys

Material Processor

LG Hausys

Material Supplier

LG Hausys

Resin

RNF9008 Urethane

Tooling/Equipment Supplier

LG Hausys

Multi-Functional Exchange Blow Molding Airduct

This multi-functional-exchange blow-molded air duct integrates the resonator, brackets, and pipe in a single step using a combination of hard PP / soft TPV resins via a new process. The part replaced a combination of rubber hose, metal and resin ducts, the resonator, and clamps with a single part produced in a single process step where material change, wall thicknesses, and inner pressure are all controlled very precisely. The application saved an estimated 30-40% in weight and 25-35% in both direct and indirect costs.

OEM/Vehicle

Subaru 2010 Legacy & Outback

System Supplier

Excell USA Inc.

Material Processor

Excell USA Inc.

Material Supplier

Channel Prime Alliance & ExxonMobil Chemical

Resin

Marlex AMN-010 PP
Santoprene 101-73 TPV

Tooling/Equipment Supplier

Excell Corp.

Integrated Sunroof Module

This 12-meter part is the first-integrated sunroof module assembly using 45%-glass-reinforced PP and replacing long-glass PP and short-glass ASA/PBT while meeting OEM requirements. Its novel design consolidates 4 parts into 1 (front and rear beam and 2 guides) to reduce assembly time and weight (12%) thanks to the injection molding via the Mucell process. Other benefits include 24% component cost, and 47% capital investment cost savings.

OEM/Vehicle

General Motors Co. 2010 Cadillac CTS

System Supplier

Inalfa Roof Systems Group B.V.

Material Processor

NS Technologies Group

Material Supplier

AsahiKasei Plastics

Resin

Thermylene P7-45FG-0790 BK711 PP 45% GF

Tooling/Equipment Supplier

Datrin Industry Co. Ltd

Molded-in-Color Metallic Interior-Finish Panels

Injection-molded, molded-in-color, metallic-finish PC/ASA replaced painted PC/ABS in this application, eliminating paint for greater sustainability while meeting tough weathering, scratch/mar, and low-gloss requirements. Good gating strategies and a modified pigment package were essential to minimize flow disruptions that can lead to dark streaks in molded metallic parts where flow-fronts converge. The result is industry's first metallic-finish interior-trim panel, which is greener, increases customer satisfaction (by eliminating paint-related defects), and provides a $2.30 USD/vehicle cost savings.

OEM/Vehicle

2010MY Ford Motor Co.: Ford® Mustang® Sports Car

System Supplier

Summit Polymers

Material Processor

Summit Polymers

Material Supplier

SABIC Innovative Plastics

Resin

Geloy® FXW751SK PC/ASA

Tooling/Equipment Supplier

Great Wall Moulding

Below-Belt Door-Glass Retaining Bracket

These below-belt door brackets are an industry first, replacing steel channels with injection-molded nylon. The plastic channels will not ding the door outer panel during installation and they provide quiet window system operation, while also reducing weight 50% and cost 20%.

OEM/Vehicle

2010MY Ford Motor Co.: Ford® Taurus® Sedan

System Supplier

Henniges Automotive

Material Processor

Tribar

Material Supplier

A. Schulman

Resin

30%-GR PA

Door-Glass Bond-On Bracket

The door-glass bond-on brackets with integral leaf springs are an industry first replacing steel with plastics and accommodating the compound curvature of the side-door glass. Plastic brackets provide adequate deflection for glass movement in 6º of freedom, yet are sufficiently stiff to prevent slippage of glass inside the track during operation. This application provided a 50% weight reduction and 30% cost reduction vs. steel and provides quieter operation of glass.

OEM/Vehicle

2010MY Ford Motor Co.:
Ford® Taurus® Sedan

System Supplier

Vitro Engineering

Material Processor

Vitro Engineering

Material Supplier

SABIC Innovative Plastics

Resin

Valox® PBT

Electric Power-Steering Flexible Coupling

This flexible plastic coupling for the vehicle's electric power steering replaced a similar stainless-steel coupling with broached splinesand grease. The part features ribs that connect and transfer torque from one rotating shaft to another, which in turn strokes axially and stretches and compresses the coupling. The fully compliant, constant-velocity joint eliminates torsional lash, the need for grease, and all sliding interfaces at a cost savings, while reducing audible cabin noise and improving steering "feel." The system replaces traditional hydraulic systems, reducing weight 17%, cost 50%, increasing fuel economy by 4%, and improving system performance and customer satisfaction.

OEM/Vehicle

2010MY Fiat S.p.A.: Fiat® 500 Compact Car

System Supplier

Nexteer Automotive

Material Processor

Forteq

Material Supplier

DSM Engineering Plastics

Resin

Stanyl® TW241F10 50%-GR PA 4/6

Long-Glass PP for Console Side Panels

This is the largest molded-in-color, 20% long-glass PP part with a Class A surface out of the tool for a premium vehicle to date. The precoloredand textured part is 100% color-matched, has no glass read-through, and offers higher stiffness than talc-filled PP and is lower cost than ABS. It also eliminated the need for squeak & rattle countermeasures, saving $6.00 USD/vehicle.

OEM/Vehicle

2010MY Ford Motor Co.: Lincoln® MKT CUV

System Supplier

Automotive Components Holdings

Material Processor

Automotive Components Holdings

Material Supplier

Ticona Engineering Polymers

Resin

Celstran® PP-GF20-02 LFT-PP

Expansion Slots in Passenger-Airbag Cover

Design changes to the surface of the passenger-airbag (PAB) door eliminated the cross-car crown on the door and necessitated design changes in the door substrate. To prevent warpage during elevated temperatures, CAE was used to evaluate a number of potential design changes to the aluminum-wrapped PC/ABS door. Expansion slots in the PC/ABS substrate proved to be the right solution to accommodate CTE differentials between the substrate, appliqué, and TPE/TPO IP base. This design eliminated the warpage issue ensuring proper airbag deployments, enabling the plastic door to be kept (rather than necessitating change to a full aluminum one) while minimizing mass and saving significant cost.

OEM/Vehicle

2010MY Ford Motor Co.: Ford® Mustang® Sports Car

System Supplier

Takata

Material Processor

Northern Engraving

Material Supplier

Dow Automotive

Resin

Pulse® 2000EZ PC/ABS

Soft-Foam-Feel IP

This is the first ultrasoft-foam instrument panel (IP) in North America that uses injection mold/closed-pour soft foaming and spray urethane skin technology to improve customer-perceived craftsmanship. The program began with competitive benchmarking and a customer tactility clinic to learn which variables affected consumer perceptions of softness and quality. This led to an ability to quantify softness targets and development of a new Ford softness spec. The commercial launch has helped reduce manufacturing foam scrap rates and lowered part weight 100 g, while improving customer craftsmanship expectations.

OEM/Vehicle

2010MY Ford Motor Co.: Ford® Taurus® Sedan

System Supplier

Automotive Components Holdings

Material Processor

Automotive Components Holdings

Material Supplier

Renosol Systems

Resin

PUR

Tooling/Equipment Supplier

Frimo

Molded-in Faux Stitching

The realistic appearance of a hand-wrapped leather insert with French and Coach seams was achieved on this door panel using a 1-piece molded spray urethane part without need for separate operations. The realistic appearance of leather stretching, bunching, and stitching is achieved via a silicone mold cast from leather originals. Each of the vehicle's four-door panels retains its own unique bunching and stretching pattern, yet each panel is absolutely repeatable vehicle-to-vehicle. The result is a $50 USD/vehicle cost savings, better quality, perfect repeatability, and greater durability.

OEM/Vehicle

2010MY Ford Motor Co.: Ford® Taurus® Sedan

System Supplier

Ford Motor Co.

Material Processor

Automotive Components Holdings

Material Supplier

BASF & Red Spot Paint

Resin

Elastoskin® 50555 PU

Tooling/Equipment Supplier

Frimo

Hybrid-Composite Bolster with Glass-Mat Reinforcement

By converting from a pelletized 40%-long-glass thermoplastic (LFT)-PP with metal reinforcement to a 40%-glass direct-LFT PP grade reinforced with 3 layers of 70% unidirectional glass mat (in 0°/90° orientations), this compression-molded front-end module (bolster) offers better airflow, improved serviceability, a 25-30% piece-price reduction, and approximately $500,000 USD in tooling savings due to component reduction. The final part can withstand severe hood-latch loads of 5,340 N without the need for metal reinforcement.

OEM/Vehicle

2010MY Ford Motor Co.: Ford® Taurus® Sedan

System Supplier

Magna Exteriors & Interiors

Material Processor

Magna Composites - Lenoir

Material Supplier

Dow Automotive, Owens Corning & Composite One

Resin

DLFT-PP with Uni-Glass Mat

Tooling/Equipment Supplier

Century Tool & Gage Company

Oil Pan Optimized for Stone Impact

This is the first plastic oil pan designed for full exposure to the road environment. It was optimized to withstand road chemicals and stone impacts thanks to a new material / ribbing configuration. An impact-modified nylon 6 provides excellent impact strength even at -40C and is not affected by CaCl thanks to a proprietary modification package. A special waffle-rib design can handle multiple impacts (unlike earlier designs with sacrificial ribs). Another unique aspect of this oil pan is that it features the first plastic drain plug, which sports a cam-lock design that makes it impossible to over-torque and break the plug's screw threads. The oil pan is 2.1-lb lighter than the steel pan it replaced and 30% less costly. It has an NVH value similar to that of cast aluminum and quiet steel, yet will not rust or corrode, and provides better protection against stone impact than metal designs.

OEM/Vehicle

2010MY Ford Motor Co.: 6.7L Power-Stroke Turbo Diesel

System Supplier

Dana

Material Processor

Dana

Material Supplier

BASF

Resin

Ultramid® B3ZG7 OSI 35%-FR PA 6

Tooling/Equipment Supplier

Decatur Mold Tool & Eng. Co.

Plastic Intensive Fluid Filter Module

This fluid module filters engine oil and cools it via cooling liquid. The cooling unit is fully integrated into a new plastic housing that provides 38% weight and 16% cost reductions and reduces pressure losses for higher engine efficiency. The 35%-glass-reinforced nylon 6/6 shell covering the cooling unit serves to stiffen the filter housing against oscillation. A plastic hose replaces rubber for further cost savings.

OEM/Vehicle

2010MY Daimler AG-Mercedes Car Group: Mercedes® C-Class Compact Executive Sedan

System Supplier

Mahle Filtersysteme GmbH

Material Processor

Mahle Filtersysteme GmbH

Material Supplier

Lanxess

Resin

Durethan® AKV 35%-GR PA 6/6

Tooling/Equipment Supplier

Mahle Filtersysteme GmbH

Illuminated Door-Sill Insert

Combining several different plastic technologies to create highly efficient optics that require only 1 LED light source, this illuminated door-sill insert can easily be customizable (via laser etching) to produce unique high-impact illuminated graphics. The system's unique construction allows the design to be adapted to new vehicles in weeks, not months, significantly reducing development costs. In addition, the application is the auto industry's first to provide multi-color illumination from a single LED light engine.

OEM/Vehicle

2010MY Ford Motor Co.: Ford® Mustang® Sports Car, Lincoln® MKZ & Ford® MKT Sedans

System Supplier

Innotec Group

Material Processor

Innotec Group

Material Supplier

Altuglas, SABIC Innovative Plastics, Serigraph

Resin

ABS, PC, & Acrylic

Timing-Chain Tensioner Arms

This application features the first thermoplastic timing tensionerarms, which replaced cast aluminum. The parts were designed to meet high-performance engine dynamics and sustain chain tensions up to 3,000 N. A heat-stabilized, 50% glass-reinforced grade of nylon 4/6 provides high strength and stiffness at 140C. It also offers extremely high fatigue resistance at elevated temperatures, extreme wear resistance at pivot and tensioner piston interfaces, long-term property retention in oil, impact strength, dimensional stability, and low CLTE, plus high knitline strength at the pivot. A separate unfilled nylon 4/6 wear surface is also used. The system provides 30% cost and 20% mass savings vs. previous metal designs, eliminates the need for a hardened-metal wear pin, eliminates 5 machining operations/part, provides tooling savings of $200,000 USD/year, and is quieter.

OEM/Vehicle

General Motors Co.: HFV6 Engine

System Supplier

Cloyes

Material Processor

Mayfair Plastics

Material Supplier

DSM Engineering Plastics

Resin

Stanyl® TW241F10 Black PA 4/6

Tooling/Equipment Supplier

Mayfair Plastics

Cost Saving Automotive Plastic Innovations **2009 MY**

Chrome Film Thermoformed Bumpers

This is the largest and thinnest chrome-film thermoformed TPO fascia to date. It offers excellent impact resistance and gravelometer performance, is fully recyclable, and offers a lustrous chromed surface while eliminating hexavalent chromium chemicals. The result is a lighter, less costly bumper cover that is more environmentally benign. Low tooling costs make this technology very attractive for quick-change transition parts at any production volume.

OEM/Vehicle

Retro USA
2009 Limited Edition "Bullit" Mustang

System Supplier

Retro USA

Material Processor

Orion Plastics &
Brentwood Industries Inc.

Material Supplier

Mytex PolymersInc.
& Soliant LLC

Resin

MetaForm 7200 TPO

Tooling/Equipment Supplier

Castek

Powder-Coated Plastic Roof-Rack Cover

Conductive, powder-coatable MPPE/PA resin was used for this plastic roof-rack cover to ensure perfect color-match (metal-to-plastic) at lower cost vs. liquid paint. Not only were VOCs (from conventional paint) eliminated, but a 30% direct cost savings was also achieved.

OEM/Vehicle

Skoda 2009 Yeti

System Supplier

ACL

Material Processor

MSSL

Material Supplier

SABIC Innovative Plastics

Resin

Noryl GTX 674PC PPO/PA

Tooling/Equipment Supplier

MSSL

High Duty Light Weight Engine Mounts

For the first time, a highly loaded transmission cross-beam with integrated hydraulic mounts was achieved in a lightweight plastic design thanks to use of injection-molded, 50%-glass-reinforced PA 6/6. Replacing rubber/steel and rubber aluminum, the nylon design was designed to meet the rigorous requirements of this application with regard to acoustics, crash, fatigue, and high-temperature stability. The result was a 50% weight savings, as well as in-house production integration at the systems supplier, leading to further reductions in logistics and transportation costs.

OEM/Vehicle

BMW AG
2009 BMW 550i & 750i

System Supplier

ContiTech Vibration Control GmbH

Material Processor

ContiTech Vibration Control GmbH

Material Supplier

BASF SE

Resin

Ultramid A3WG10CR PA 66 GF 50

100%-Recycled Material for Door-Trim Substrates

The ABS door-trim substrates for this vehicle use 100% postindustrial scrap. No virgin resin is used for this application, which diverts 100,000 lb of scrap from landfills, saves $4 USD/vehicle, and required a specification change (since previous parts only allowed 20% regrind).

OEM/Vehicle

2009MY Ford Motor Co.: Lincoln® Town Car® Luxury Sedan

System Supplier

Automotive Components Holdings

Material Processor

Automotive Components Holdings

Material Supplier

Dow Automotive

Resin

Magnum® 3325 ABS

Fast-Cycle Material for Fascias & Exterior Trim

This TPO (with advanced nucleating agents, elastomers, and additives) delivers fast-cycle molding, a fascia thickness reduction from 3.0 to 2.6 mm, while maintaining the part's firm-feel requirements. The material's additives package helps provide a significantly stiffer material with higher melt flow, adequate impact strength, and higher dimensional and thermal stability vs. traditional thin-wall materials, driving improved craftsmanship, lowering weight, 15%, and achieving a $2.00 USD cost savings/vehicle.

OEM/Vehicle

2009MY Ford Motor Co.: Ford® Taurus® Sedan

System Supplier

Flex-N-Gate

Material Processor

Peterborough

Material Supplier

LyondellBasell

Resin

Hifax® TYC 852X TPO

Pedestrian-Protection-Compliant Front Fender

This is the first SUV with thermoplastic fenders that meets tough European pedestrian-protection requirements for head impact in a single part, eliminating the need for secondary bracketry under the fender as in steel designs. The MPPE/PA material is online paintable, dent and corrosion resistant, a unique styling enabler, and reduces both weight and cost by 50% vs. steel. The vehicle was also able to qualify for a better insurance rating thanks to this innovation.

OEM/Vehicle

2009MY Ford Motor Co.: Ford® Kuga® Compact CUV

System Supplier

Montaplast

Material Processor

Montaplast

Material Supplier

SABIC Innovative Plastics

Resin

Noryl GTX® 979 MPPE/PA

Tooling/Equipment Supplier

Schneiderform

Radio Case with Insert-Molded EMC Shielding

This application features an innovative, patented method of embedding EMC shielding into an environmentally friendly plastic case, enabling significant reduction in weight and assembly time. A metallic-mesh Faraday cage is insert molded into the reprocessed, 16%-glass-reinforced PC/ABS material. The case is greener and enables the use of slide lock & snap lock design features that speed assembly while eliminating the previous sheet-metal case and 29 screws. The resulting unit provides significant weight reduction, assembly cost & time savings, with improved physical and EMC shielding.

OEM/Vehicle

2009.5MY General Motors Co.:
Chevrolet® Tahoe® / GMT900 Family

System Supplier

Delphi E&S

Material Processor

Delphi E&S

Material Supplier

MRC

Resin

Naxaloy® 770GF16 PC/ABS

Tooling/Equipment Supplier

Amity Molding

Simultaneous-Shot Invisible PAB Door

This soft, seamless passenger airbag (PAB) door is integrally molded into a hard instrument panel using a simultaneous-shot molding process and two grades of olefins: talc-filled PP for the IP and a TPO grade for the door itself. This system provides a simple, uncluttered appearance and color harmony while eliminating fit & finish issues and providing improved cold-temperature impact strength. Both design and materials optimization were required for success, and the final system – covered by 7 patents – provides better performance at a $5.00 USD cost and 500 g weight reduction, while significantly reducing molding and assembly operations.

OEM/Vehicle

2009MY Hyundai Motor Co.: Hyundai®i20 Supermini Car

System Supplier

Hyundai-Mobis

Material Processor

Hyundai Motor Co.

Material Supplier

Multibase Co.

Resin

Multiflex® TPO 3202 ST2 TPO

Tooling/Equipment Supplier

Samwha Elec. Co.

Air-Extractor Grille

This is the largest air-extractor grille in the industry (31 in. / 780 mm long) and was a significant molding challenge due to the complexity of the grille's geometry and size. The injection-molded grille also had stringent appearance and performance requirements for this luxury-vehicle application. Special resin development allowed the successful molding of this Class A trim component, saving approximately $2 USD / vehicle and $40,000 USD in tooling.

OEM/Vehicle

2009MY Ford Motor Co.Lincoln® MKS Sedan

System Supplier

Intier Automotive Inc.

Material Processor

SPI

Material Supplier

Ticona

Resin

Hostaform® LG450UV-D Acetal

Infraweld® Headliner Assembly

Eliminating the mess, weight, and cost of hot-melt glue to attach various components (e.g. energy absorbers, wire harnesses, moon roof trim rings, console retainers, NVH pads, pig tails) to the backside of headliners, this process uses a halogen infrared light source and pressure to attach components quickly (4 sec). The weld that is formed is strong and of higher temperature than hot-melt glue, making the headliner more heat tolerant at a 10-15% weight and average $3 USD / vehicle cost reduction, while also improving recyclability.

OEM/Vehicle

2009MY Ford Motor Co.
Ford® F-Series® Pickups

System Supplier

Trim Quest

Material Processor

Oakwood Safety Plastic

Material Supplier

LyondellBasell & Amoco

Resin

Pro-Fax® SV152 PP

Tooling/Equipment Supplier

Extol Inc.

Twin-Sheet Blow-Molded Fuel System

Twin-sheet blow molding offers the advantages of an extrusion blow-molded fuel system with the design flexibility of a half-shell process. Sheets extrude between a central core and the mold. Core actions attach the components during initial sheet forming. The empty core is withdrawn and the mold is closed to join the formed sheets. Fuel tanks formed via this process meet the strictest PZEV emissions requirements, while also providing higher tank capacity, lower emissions, weight and cost reductions, and elimination of post-mold operations.

OEM/Vehicle

2009MY BMW AG
BMW® Series 7 Sedan

System Supplier

Inergy Automotive Systems

Material Processor

Inergy Automotive Systems

Material Supplier

LyondellBasell, Kurrary & Mitsui

Resin

Lupolen® 4261 HDPE

Tooling/Equipment Supplier

Inergy Automotive Systems

Post-Consumer Recycled Plastic Underbody System

A new Ford strategy mandates use of post-consumer recycled (PCR) materials – where supply is available – on new programs for a variety of components, e. g. multiple underhood, underbody and exterior black, UV-stable trim parts. Approximately 20 lb/9.1 kg of PCR plastics are used to produce the front and rear splash shields, rear tire spoiler, radiator air deflectors, and front-bumper cover chin spoiler. Material is compounded to offer improved UV stability and impact strength. Since material is not tied to crude prices, costs of finished parts are approximately 20% lower than previous products, saving an average of $4 USD/vehicle.

OEM/Vehicle

2009MY Ford Motor Co.
Ford® Flex™ CUV

System Supplier

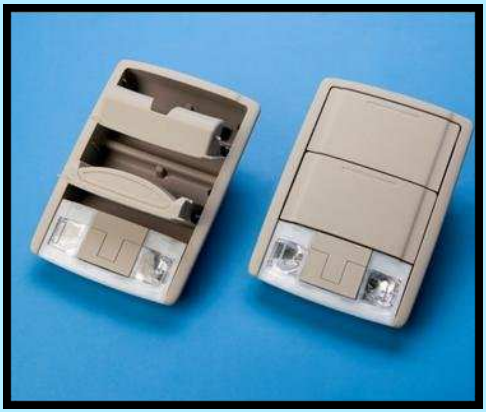
Flex-n-Gate

Material Processor

Flex-n-Gate

Resin

PP / TPO



Long-Glass PP for A-Surface Overhead Console

This is a unique use of injection-molded long-glass fiber-PP materials in an above-the-beltline, Class A interior part with light texturing and in light colors. It replaced a talc-filled TPO material that had insufficient thermal stability. A special UV-protection package helps stabilize the colorant; components are sonically welded to the bin door. The A-surface side of the mold is heated hotter than the B-surface side to ensure a resin-rich surface and avoid glass read-through for excellent aesthetics. Improved craftsmanship and appearance come at a slight cost reduction as well.

OEM/Vehicle

2009MY Ford Motor Co.
Ford® Flex™ CUV

System Supplier

Grupo Antolin

Material Processor

Grupo Antolin

Material Supplier

Ticona

Resin

Long-Glass PP

Low-Plateout, Direct-Metallizable Bezel/Reflector Resin

Special pigment and resin system yields a direct-metallizable thermoplastic polyester reflector resin with very-low plate-out and excellent surface replication. Productivity is enhanced 50% by reducing tool cleaning, and a cost avoidance of 15-20% is achieved due to reduced scrap from appearance-related issues.

OEM/Vehicle

2009MY Ford Motor Co.
Ford® F-150® Pickup

System Supplier

Ford ACH Lighting – Sandusky

Material Processor

Ford ACH Lighting – Sandusky

Material Supplier

SABIC Innovative Plastics

Resin

Valox® V2000DM PBT

Tooling/Equipment Supplier

Redo Mold Ltd.

Rear Footwell Ambient Lighting

An entirely new feature, footwell ambient lighting provides interior-vehicle illumination of rear footwells along with front and rear cupholder and rear HVAC-controls. Injection-molded, light-diffusing acrylic materials provide ambient lighting with uniformity of blended colors (from RGB LED light sources) and cross-car distribution of light without “hot spots.” The design approach also reduces costs and reduces vehicle power consumption while increasing usable life of interior lighting.

OEM/Vehicle

2009MY Ford Motor Co.
Ford® Flex™ CUV

System Supplier

CML Innovative Technologies

Material Processor

CML Innovative Technologies

Material Supplier

Evonik Cyro LLC

Resin

Acrylite® Acrylic

Liftgate Structural Inner Panel

This is the first time injection-molded long-glass polypropylene with molded-in-color was used to form a structural inner panel for a liftgate , which also has partial first-surface exposure. The component allows a steep swept design to be achieved while also reducing mass 40% vs. steel and saving 10-20% based on component integration and assembly-cost savings.

OEM/Vehicle

2009MY Ford Motor Co.
Ford® Kuga® Compact CUV

System Supplier

Plastal

Material Processor

Plastal

Material Supplier

SABIC Innovative Plastics - Europe

Resin

STAMAX® 30YM240MB
Long-Glass PP

Integrated Roof Shade/Aux. AC Duct/Headliner Reinforcement

This integrated headliner system arrives at the assembly plant already carrying an auxiliary air-conditioning (AC) duct, headliner stiffener, headliner attachment base, moon-roof opening stiffening rings, and dual sun-shade carrier, reducing online assembly operations and costs, lowering part count from 22 to 15, lightening the headliner by 1 lb/0.45 kg, and allowing for a larger daylight opening and better airflow management and distribution. By integrating the duct and shade system using high-heat ABS and a high-strength hot-melt adhesive with nitrogen-assist spray, the installation process can be better controlled to meet required tolerances, saving $10-15 USD piece cost / vehicle and $2.45MM in tooling avoidance.

OEM/Vehicle

2009MY Ford Motor Co.
Ford® Flex™ CUV

System Supplier

Dakkota Integrated Systems LLC

Material Processor

H.S. Die

Resin

High-Heat ABS & Lofted GMT Composite

Tooling/Equipment Supplier

H.S. Die

Crushable Armrest with Decorative Grab Handle

This injection-molded, crushable armrest substrate with snap-on stainless-steel decorative rings, provides a durable, crafted, bright-accent appearance in place of traditional multi-piece assemblies. This design avoids multi-piece buildups of the armrest and meets safety crush loads and durability requirements, saving over $6 / handle and $150,000 USD in manufacturing & assembly costs.

OEM/Vehicle

2009MY Ford Motor Co.Ford® Flex™ CUV

System Supplier

Johnson Controls

Material Processor

Leon Plastics

Material Supplier

All-Rite Industries

Resin

High-Heat ABS

Tooling/Equipment Supplier

Leon Plastics

Instrument Panel with Seamless Airbag

This hand-stitched & hand-wrapped topper panel with passenger airbag (PAB) door significantly reduces cost ($110 USD) and mass (10 lb / 4.5 kg) vs. previous technologies, while improving vehicle craftsmanship. A polyurethane skin is laminated to a polyester spacer fabric, then attached to a polypropylene substrate; both skin & substrate are simultaneously laser scored to produce the PAB door using an “H” pattern that eliminates out-of-position concerns. Additionally, a molded-in-color TPO defroster grill is sonically welded to the substrate and the airbag chute and door are attached via vibration welding with neither exhibiting read-through.

OEM/Vehicle

2009MY Ford Motor Co.
Lincoln® MKS Sedan

System Supplier

Automotive Components Holdings

Material Processor

Automotive Components Holdings – Saline

Material Supplier

Advanced Composites

Resin

PUR, PP, & Polyester

All-Plastic Integrated Floor Shifter / Front Console

This modular floor console an/d shifter assembly uses an all-plastic (recycled, injection-molded SMA) structure to support a floor-based shifter and eliminate use of metal bracketry previously used to secure the shifter to the vehicle floor pan. The integrated system simplifies online assembly and improves package space, thus improving stowage and craftsmanship. It also reduces cost ($7 USD plus assembly labor) and weight (5 lb / 2.3 kg) vs. earlier designs.

OEM/Vehicle

2009MY Ford Motor Co.
Ford® Flex™ CUV

System Supplier

Automotive Components Holdings

Material Supplier

Nova Chemical

Resin

Recycled Dylark ® SMA & Long-Glass PP

Tooling/Equipment Supplier

Hitech

Integrated Refrigerator / Rear Floor Console

An industry first, this unit combines a rear-floor console with a compressor-driven refrigerator, whose cooling-time performance exceeds most home units. The molded-in-color refrigerator compartment assists with moisture management as well as cleanability, and a unique integral vent design supports thermal-management requirements while drawing only 4.5 amps of power and with low noise output. Recycled, injection-molded glass-filled polypropylene is used to reduce cost, mass, and assembly.

OEM/Vehicle

2009MY Ford Motor Co.
Ford® Flex™ CUV

System Supplier

Automotive Components Holdings

Material Processor

Automotive Components Holdings & NYX

Material Supplier

Washington Penn

Resin

30%-GF PP

Tooling/Equipment Supplier

Hitech

TPV Primary Seal & Notched Plastic Carrier

This is the first 100%-recyclable, all-plastic carrier seal for a tough-duty cargo box, replacing co-extruded metal or wire mesh and EPDM rubber. Production of the TPV seal uses 70% less energy than EPDM, eliminates production scrap sent to landfills, has no VOC emissions, and is 20% lighter than a metal carrier system, while also lowering costs 5-15%.

OEM/Vehicle

Adrian Steel Cargo Box for Work Trucks

System Supplier

JYCO

Material Processor

JYCO

Material Supplier

Elastogreen

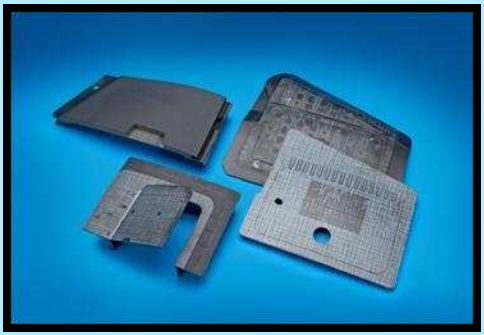
Resin

Elastogreen® 1045D 45D TPE / TPO

Tooling/Equipment Supplier

JYCO

Cost Saving Automotive Plastic Innovations **2008 MY**



Self Reinforced Airbag Door System

This is the auto industry's first airbag door system that integrates an all-PP construction, (PP-fiber-reinforced PP). As such, it is fully recyclable and does not require typical post-mold scoring / weakening of the door flap. The injection-molded door system is the lightest, least-expensive system solution, since additional components and post-mold operations (to enable the door flap to open / hinge) are eliminated. Multi-zone temperature control of the mold was required, as was use of a vacuum-holding system for the fabric insert. The program also required development of a specialized fiber-reinforced material to facilitate overmolding and subsequent adhesion. The resulting system reduced weight between 30% & 300% weight vs. competitive systems and saved approximately $5 USD/part vs. welded systems. Additional indirect savings of approximately 5% were also accrued, and production scrap is 100% recyclable.

OEM/Vehicle

PSA Citroën
2008 Citroën C5

System Supplier

Visteon Corp.

Material Processor

Visteon Corp.

Material Supplier

LyondellBasell & Propex Fabrics

Resin

PP

Door Panel in Natural-Fiber Prepreg Composite

This lower door-panel inner was compression molded from a new, high-performance, lightweight, cost-effective, and green composite. The resin matrix is a unique acrylic polymer that is thermoplastic in its "B-stage," allowing for production of prepreg/semi-finished rollstock or blanks, yet cross-linking at temperatures above 120C to produce a very durable thermoset. The resin's high wetout of natural fibers and ability to form chemical as well as mechanical bonds to the reinforcement allows for very-high fiber loadings – 70% in this case – yielding lightweight parts with high stiffness in thin walls. This saves weight and cost, and reduces VOCs. And the rapidly renewable natural fiber mat reduces the vehicle's carbon footprint without sacrificing performance.

OEM/Vehicle

2008MY BMW: BMW® 7 Series Luxury Sedan

System Supplier

Dräxlmaier Group

Material Processor

Dräxlmaier Group

Material Supplier

BASF AG & J. Dittrich & Söhne GmbH

Resin

Acrodur® Acrylic Copolymer

Injection/Blow Molded Intercooler Air Duct

This is the first time glass-reinforced PPS has successfully been blow molded. The complex part was formed by a unique patented hybrid injection/blow-molding process, which allows functional elements to be injected against the parison during expansion, forming a chemical bond and yielding a robust part with a clean joint vs. welding the element to the part in a secondary step. Two different grades of glass-reinforced PPS were used. The process eliminates two previous production steps and provides extremely high repeat accuracy. High-performance PPS resin provides dimensional stability and outstanding mechanicals in high-temperature, chemically aggressive environments at cost and weight reductions.

OEM/Vehicle

2008MY Volkswagen AG: Volkswagen® PQ35 Platform

System Supplier

Röchling Automotive Leifers GmbH

Material Supplier

Ticona Engineering Polymers

Resin

Fortron® 1115L0 PPS

EPP Head Restraint Core for FMVSS-202a

This patent-pending safety application is the first time an expanded-polypropylene (EPP) foam head-restraint insert has been used to meet FMVSS-202a static requirements in a headrest. Local depressions in the core are used to reduce permanent set during FMVSS-202 “backset” and “height” retention testing. A unique snap-fit design is formed without the need for slides or lifters in the low-cost steam-chest tooling, providing a secure fit to the head-restraint rod and ease of assembly. The core’s unique geometry allows for a large number of cavities (32) to be used in the mold, helping increase productivity and reduce piece costs. The application provides significant piece-price and tooling avoidance savings vs. injection- or blow-molded plastic cores.

OEM/Vehicle

2008 & 2009MY Ford Motor Co.
Various Vehicles

System Supplier

Windsor Machine Group

Material Processor

Tegrant Corp.

Material Supplier

JSP

Resin

Arpro® EPP

Tooling/Equipment Supplier

Tegrant Corp.

Thermoformed EA Countermeasures in Recycled Resin

This 100% reuse of edge trim and offal from the energy-absorption (EA) countermeasures produced in the thermoforming process minimizes waste and reduces product costs without degradation of performance in this important head- and side-impact safety application. No waste is sent to the landfill now, which saves $85,000 USD/annually.

OEM/Vehicle

2008 & 2009MYVarious Vehicles

System Supplier

Trim Quest

Material Processor

Oakwood Safety Plastic

Material Supplier

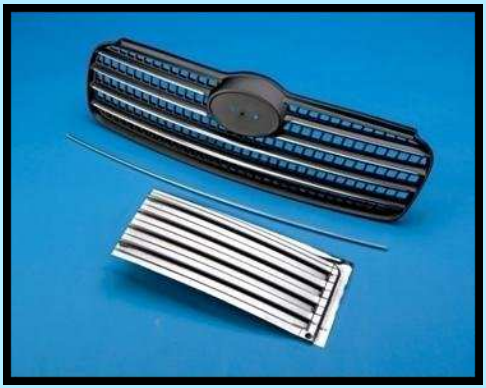
LyondellBasell & Amoco

Resin

SV152, 6015, & 3045

Tooling/Equipment Supplier

Oakwood Safety Plastic



Front Grille with Insert-Molded Bright Paintfilm

This chrome-look front grille is achieved in a single shot thanks to 6 pre-forms of bright paintfilm, eliminating post-mold chrome plating or painting and providing a more durable part with fewer warranty issues and better resale value. Cost and weight are reduced, there are no environmental compliance issues (as with plating or painting), less energy is used, and this product is 100% recyclable.

OEM/Vehicle

2008MY Hyundai Motor Co.
Hyundai® Avante® Compact Car

System Supplier

ECOplastics

Material Processor

Hanguk Mold

Material Supplier

LG Chemical

Resin

ASA

Tooling/Equipment Supplier

MOTOST

Recycled TPO Air Inlet Panel / Leaf Screen

A proprietary paint-removal process produces recycled material with minimal contamination, a common challenge with recycled TPOs. Physical properties are equivalent to those of virgin resin for this aesthetic, non-painted part in a highly visible location subject to outdoor weathering. Cost savings of 2.2% were achieved vs. virgin resin and 445,000 lb/201,848 kg of landfill-bound material was salvaged.

OEM/Vehicle

2008MY General Motors Corp. GMC® Envoy® & Chevrolet® Trailblazer® SUVs

System Supplier

Nyloncraft Inc.

Material Supplier

MRC Polymers Inc.

Resin

Maxtel® 600T25-BK TPO

Oil Pan Module

This is the first modular plastic oil pan module adopted for passenger cars. It integrates an uppers hell of diecast aluminum and a multifunctional lower shell injection molded from glass-reinforced nylon 6/6. An integrated windage tray (oil deflector) reduces oil vapor around the crankshaft (improving horsepower 5%), lowers air entrapment in the oil, and decreases friction for longer bearing life. The component is 2.4 lb/1.1 kg lighter and 20-25% less costly than an all-aluminum design and use of integrated oil baffles improves flow and reduces sloshing of oil.

OEM/Vehicle

2008MY Daimler AG Mercedes®
C-Class 4-Cylinder Diesel Sedan

System Supplier

G. Bruss GmbH

Material Processor

G. Bruss GmbH

Material Supplier

DuPont Automotive

Resin

Zytel® 70G35 PA 6/6

TPO for Hard Seamless PAB Applications

This seamless passenger airbag (PAB) system for hard instrument panels (IPs) delivers superior low-temperature performance and improved aesthetics in a C-car package environment. A steel door is overmolded with TPE, then vibration welded to the B-surface of the IP. A TPO reaction ring incorporates demister duct geometry. The system is 5 lb / 2.3 kg lighter and $20-25 USD less costly than a comparable system for a soft IP.

OEM/Vehicle

2008MY Ford Motor Co.
Ford® Focus® Compact Car

System Supplier

Automotive Components Holdings

Material Processor

Automotive Components Holdings– Saline

Material Supplier

Advanced Composites

Resin

ADX-5028 TPO & TPE

Integrated Rocker Molding / Running Board System

For the first time, rocker moldings, end features, and running board/step area are combined in a single blow-molded component that is foam-sealed to the body side for improved craftsmanship, fit, and finish. The component also reduces weight (8.6 lb / 3.9 kg), lowers piece-price and assembly costs ($5 USD / vehicle), provides improved stone-chip resistance, and reduces assembly time.

OEM/Vehicle

2008MY Ford Motor Co.
Ford® Escape® SUV

System Supplier

ABC Group

Material Processor

ABC Group

Material Supplier

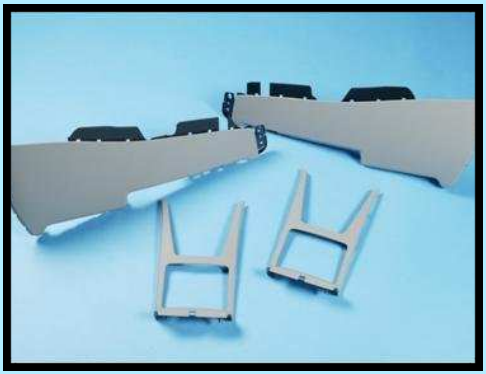
Salflex Polymers Ltd.

Resin

Salflex® 30%-GF PP

Tooling/Equipment Supplier

ABC Group



Automated Wrap Floor Console

This process is an automated edge-wrapping technology for interior trim applications. The unique bonding process involves heat and pressure used in conjunction with automated edge wrap tooling and yields improved fit and finish at reduced cost.

OEM/Vehicle

2008 Cadillac ® STS sedan by General Motors

System Supplier

Dakkota Systems

Material Processor

Continental Plastics Co.

Material Supplier

Dow Automotive

Resin

Magnum ® 975P High Heat ABS

Tooling/Equipment Supplier

ASI

Cut and Sew IP Top Pad

Cut & Sew PUR was laminated to an injection-molded LFT-PP retainer, then coupled with an innovative scoring technology to provide for seamless passenger airbag deployment while improving styling flexibility and enhancing appearance on this instrument panel. Cut & Sew PUR is a cost-effective solution for vehicle builds under 100,000 units, offering weight and cost savings, improved NVH, and the option for stitching and 2-tone colors to enhance perceptions of craftsmanship.

OEM/Vehicle

2008 Cadillac CTS ® sedan by Chrysler LLC

System Supplier

Dräexlmaier Automotive

Material Processor

Dräexlmaier Automotive

Material Supplier

Benecke & Ticona Engineering Polymers

Resin

Benova ® PU
Celstran ® 30% LGF PP

Tooling/Equipment Supplier

HS Die

Under Seat Storage System

This injection-molded Crate ‘n Go storage system securely snaps into the vehicle to hold gear securely, then can be removed to carry contents out of vehicle for greater customer convenience. When not in use, it collapses and can be stored under the seat. Components snap together tightly to reduce BSR potential. An alternative, less innovative design, would have cost $32/vehicle more and been less convenient for the customer.

OEM/Vehicle

2008 Dodge ® Dakota ® pickup by Chrysler LLC

System Supplier

Vikeda

Material Processor

Depo

Resin

PP 20%talc

Themoplastic Composite Headliner

A new grade of thermoformable, low-density GMT composite uses a special additive to provide greater loft and molded part thickness, yielding better stiffness (per area weight) and a 10% cost savings (through elimination of acoustic materials) as well as a 5% weight savings in this headliner. Acoustical performance is also improved.

OEM/Vehicle

2008 Honda ® Accord ® sedan by Honda Motor

System Supplier

TS Tech

Material Processor

TS Tech

Material Supplier

AZDEL, Inc.

Resin

SuperLite ® XLT PP/GF

Structural Console Side Panel

Replacement of conventional injection molded PP with sequential-valve-gated injection molded glass-reinforced PC/ABS allowed thinner, stiffer console side panels to be produced, eliminating the need for several structural components and increased belt-clearance space and bin storage size. These side panels meet styling and structural requirements at lower mass , cost, and assembly time while improving airflow.

OEM/Vehicle

2008 Cadillac ® CTS sedan by General Motors

System Supplier

Dräexlmaier Automotive

Material Processor

Plastic Tec

Material Supplier

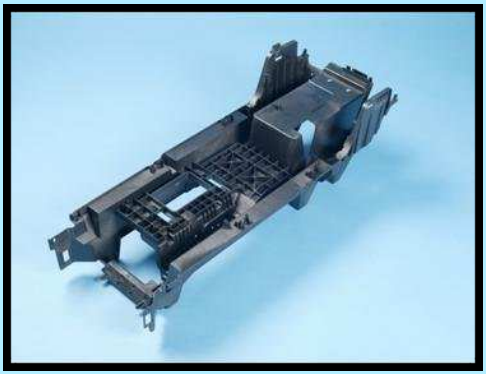
Bayer MaterialScience

Resin

Bayblend ® T-88 2N GF PC/ABS

Tooling/Equipment Supplier

Delta Mold



Console Reinforcement Bracket

Glass-filled SMA with a molded-in Class A surface replaced GFPP for this console reinforcement bracket, allowing an additional steel bracket to be eliminated without any decrease in performance. Dimensional stability was improved for better fit and finish, plus an 0.80 lb mass and $2 / part cost savings were achieved.

OEM/Vehicle

2008 Nissan ® Titan ® pickup by Nissan Motor Co.

System Supplier

Visteon Corporation

Material Processor

Atlantic Automotive Components

Material Supplier

Nova Chemicals

Resin

Dylark ® 480P16 GF SMA

Tooling/Equipment Supplier

Michael Tool & Mold LTD

Cost Saving Automotive Plastic Innovations **2007 MY**

Drive -Axle Inspection-Cover Assembly

This rear-differential inspection cover for commercial trucks has been converted from a 7-piece aluminum and steel assembly to a 2-piece aromatic PA system that reduced weight >40% and cost 20%. The resin was selected for its high strength, chemical compatibility, and creep resistance. Developed in <20 weeks, the system has passed rigorous gravel bombardment, thermal cycling (spike and shock), dimensional integrity, and chemical resistance tests and also provides savings on warranty, freight, and serviceability, plus provides a quieter transmission without need for secondary parts or sound dampeners.

OEM/Vehicle

AB Volvo
2007MY Mack 150

System Supplier

American Axle

Material Processor

Sturgis Molded Products

Material Supplier

Mitsubishi Engineering Plastics Corp.

Resin

Reny N252 MXDX6

Tooling/Equipment Supplier

Sturgis Molded Products

Protective Layer for Airbag Assembly

Cross-laminated HDPE film was diecut and sandwiched between the airbag module and IP substrate as a protective layer to maintain flexibility of airbag deployment while eliminating foam adhesion and fragmentation issues that can occur with seamless airbag designs. The HDPE film flap reduces cost and packaging space, improves quality of bag deployment, and saved development time.

OEM/Vehicle

2007MY Ford Motor Co.: Lincoln® MKX CUV

System Supplier

JCI - Intertech

Material Processor

JCI - Intertech

Material Supplier

Avery Dennison

Resin

HDPE

Electronic Throttle Control Module

This is the first plastic ETC housing, which replaces machined cast aluminum at mass savings of 28% and costs savings of 18%, while also reducing warranty costs and potential for ice freeze-up and potential throttle blade stick. A special zero-shrink BMC grade was used and the units tight concentricity better controls air flow at idle.

OEM/Vehicle

2007 Chrysler ® Pacifica ® cross-over vehicle by Chrysler LLC

System Supplier

Bosch

Material Processor

Christophery

Material Supplier

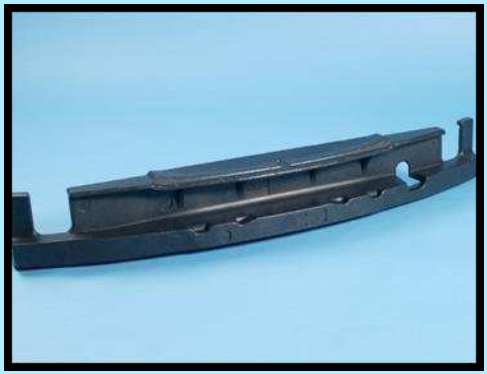
BMC Inc.

Resin

TetraDUR BMC TD 455 BMC thermoset polyester

Tooling/Equipment Supplier

Christophery



Bumper Core with EPS/PE

This fully recyclable, EPP/PS interpolymer foam bead material is processed via expandable resin shape molding in conventional steam chests to provide superior tensile strength, thermal insulation, shock absorption, and chemical resistance at a 20% weight and cost savings over conventional EPP foam bead. The process allows insert molding of metal components, and can produce dual-density moldings with ribs to improve energy absorption.

OEM/Vehicle

2007 Lexus ® LS460 sedan by Toyota Motors

System Supplier

Nittoku

Material Processor

Homec

Material Supplier

Sekisui Plastics USA Inc.

Resin

Piocelan ® OP PS/PE

Brush Grille Guard

This is the first composite brush grille guard with a chrome tube overmolded by glass-reinforced thermoplastic; it is also the first use of the direct-LFT/compression molding process to produce this type of part. A custom resin formulation limits color change due to UV exposure for longer part life, and part weight and cost savings of 50% were seen vs. previous methods and materials.

OEM/Vehicle

2007 Chevrolet® Suburban® & Tahoe® SUV / Avalanche® crossover vehicle by General Motors

System Supplier

Algonquin Automotive

Material Processor

Composite Products, Inc.

Material Supplier

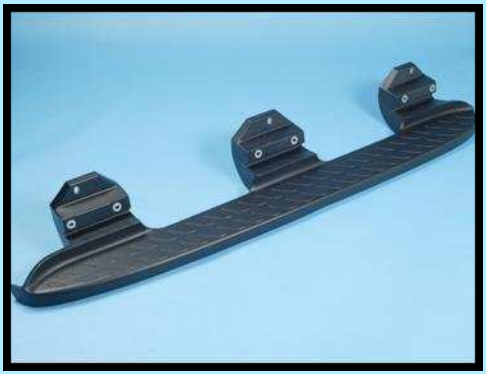
Composite Products, Inc.

Resin

Ineos H38G-02 PP

Tooling/Equipment Supplier

Delta Mold, Inc.



Composite Assist Step

Innovation in rib design and use of weatherable material enabled this 1-piece running board to withstands higher loads with lower deflections than the 5-piece steel and plastic assembly it replaced. It is produced in a 2-stage injection molding process and provides a 50% mass reduction and a direct cost savings in excess of $19 USD / vehicle.

OEM/Vehicle

2007 General Motors Trailblazer ® / Envoy ® SUVs

System Supplier

Magna Decoma – Mytox Division

Material Processor

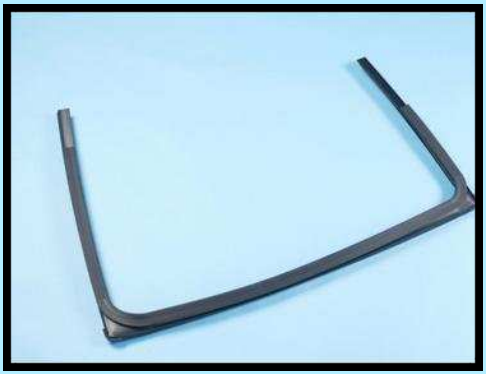
Magna Decoma – Mytox Division

Material Supplier

Magna Decoma – Mytox Division

Resin

Myplas 40 PP Long Glass Fiber



Glass Run Channel

This is the first sliding door glass run channel for a minivan with an all-plastic sealing and retention structure, and the first time TPV has been used for this type of door without metal reinforcement. This fully recyclable TPV extrusion is produced with inline cutting and injection molding processes, reducing mass by 30% and cost 20-30% vs. the previous technology.

OEM/Vehicle

2007 Chrysler ® Town & Country /
Dodge ® Caravan minivans by Chrysler LLC

System Supplier

JYCO

Material Processor

JYCO

Material Supplier

DSM

Resin

Saralink ® highly cross-linked TPV

Tooling/Equipment Supplier

JYCO

Tubular Composite Running Board

This is the first tubular-style, Class A, blow-molded composite running board, replacing injection-molded/electromagnetic assembly bonded and steel running boards at lower cost and better styling. A special resin was developed to meet the aesthetic and mechanical requirements and to provide modified melt-strength for this 1,880-mm long part.

OEM/Vehicle

2007 Jeep ® Wrangler SUV by Chrysler LLC

System Supplier

Magna Decoma – Mytox Division

Material Processor

Magna Decoma – Mytox Division

Material Supplier

A.Schulman, Inc.

Resin

Polyfort ® FPP 3551E 20% GLASS PP

Tooling/Equipment Supplier

Mach Mold

Fascia Applique

This highly stylized thermoformed fascia appliqué uses precisely trimmed and thermoformed paint film with excellent stone-chip resistance to eliminate the two-tone paint process while providing a more durable finish and eliminating VOCs. A cost savings of ~10% is achieved by eliminating paint, and scrap is also reduced ~10%.

OEM/Vehicle

2007 SAAB ® 9-7X SUV by General Motors

System Supplier

Plastech Industries

Material Processor

Durakon Industries

Material Supplier

Solvay Engineered Polymers, Inc.

Resin

Sequel ® E3000 TPO

Tooling/Equipment Supplier

Portage Casting & Mold

Composite Door Module & Trim System

This multifunctional hardware carrier and structural trim assembly features integrated structural, mechanical, and Class A trim surfaces and a vibration welded map pocket while saving 2.5 kg of mass per door, $2 cost per part, $200,000 in tooling savings, and $5 of labor savings, plus additional savings due to 100% automated end-of-line testing. A single family of low-cost polypropylene compounds improves appearance and tactile feel.

OEM/Vehicle

2007 Freightliner ® P3 Cascadia trucks by Freightliner Trucks

System Supplier

Delphi Interiors and Closures

Material Processor

Florida Production Engineering

Material Supplier

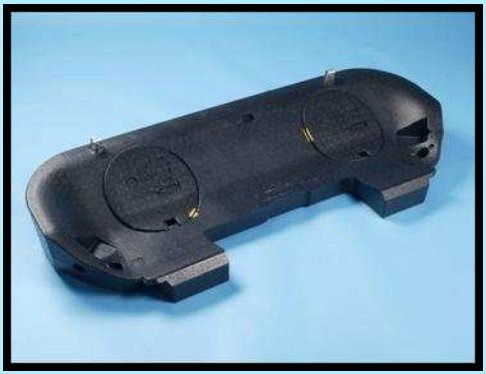
Adell Plastics

Resin

40% Glass Fiber PP

Tooling/Equipment Supplier

UTC



Rear Seat Cushion Riser

This application combines stamped steel and expanded PP bead foam to provide a lightweight, structural replacement for conventional stamped steel floor pans, while allowing common architectures and assembly steps to be used between 5- and 7-passenger vehicles. Insert molding of the steel / EPP foam component eliminated the need for secondary assembly, and saved 3.9 kg of mass and $2.8-million in tooling investment.

OEM/Vehicle

2007 BMW ® X5 ® cross-over SUV by BMW AG

System Supplier

JSP International

Material Processor

JSP International

Material Supplier

JSP International

Resin

Arpro ® Polypropylene

Tooling/Equipment Supplier

JSP Mold

Extruded Seal for HIM Door Modules

This is the first time a TPE has been extruded directly onto a door-module carrier, providing a 3600 seal that acts as a water barrier between wet/dry sides, an acoustic barrier, and sealing out dirt and dust. The seal is fully recyclable, simplifies assembly, is more robust than previous technology, and reduces material costs 53%, capital expenses 15%, seal mass 48%, and tack/cure time 90%.

OEM/Vehicle

2007 Dodge ® Nitro ® / Jeep ® LibertySUVs by Chrysler LLC

System Supplier

Faurecia Interior Systems

Material Processor

Faurecia Interior Systems

Material Supplier

ExxonMobil

Resin

Santoprene ® TPE

Tooling/Equipment Supplier

Reiss Robotics / Gepoc

OEM Carbon Caniste

This is industry's first carbon canister with an extruded housing that can be cut to length to accommodate different carbon load rates without re-tooling the part. The unique linear canister design has higher carbon efficiency (fewer dead zones) and a spring plate assembly that maintains carbon pack, plus evaporative emissions are reduced by using a lower permeation rate material, reducing carbon waste, component mass (1.5 lb / vehicle), plus material, warranty, and tooling-avoidance costs.

OEM/Vehicle

2007 Dodge® Charger ® & Magnum / Chrysler ® 300 by Chrysler LLC

System Supplier

Stant Manufacturing, Inc.

Material Processor

Stant Manufacturing, Inc.

Material Supplier

BASF

Resin

Ultraform ® H4320 Blk120 Q 600 POM

Tooling/Equipment Supplier

Stant Manufacturing, Inc.

Front End Bolster

The is the first predominantly plastic front-end module, produced at lower weight and lower costs than metal or plastic/metal hybrid systems. The injection molded fully recyclable LFT component also decreases total vehicle part complexity, and allowed Ford to implement open-architecture vehicle builds, improving assembly line access.

OEM/Vehicle

2007 Ford ® Edge ® cross-over SUV by Ford Motor Co.

System Supplier

Android

Material Processor

Meridian Automotive Systems

Material Supplier

Ticona Engineering Polymers

Resin

Celstran ® PP-GF40

Tooling/Equipment Supplier

Omega

Backlighting using Color Converting Plastic

This innovative, patented system for producing custom-colored interior backlighting via LEDs (fed through light distribution pipes) relies on patented fluorescing dyes and proprietary light-scattering additives in translucent resins used to mold buttons, knobs, and backlit plates rather than far more costly custom-colored LED bulbs. Moving color control from the LED to the plastic button not only results in more uniform, controllable emitted color, but also makes backlighting more economically feasible.

OEM/Vehicle

2007 Chevrolet ® Tahoe ® SUV by General Motors

System Supplier

Delphi Electronics and Safety

Material Processor

Delphi Electronics and Safety

Material Supplier

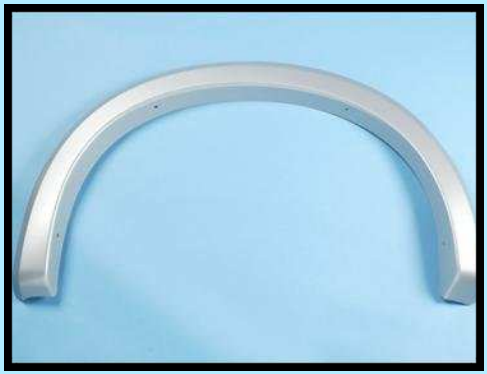
RTP

Resin

Makrolon 2405 PC

Tooling/Equipment Supplier

Kno-Mar Tool



High-gloss, Mold-in-color Metallic Resin

This weatherable, integrally colored, high-gloss, metallic-look material eliminates the need for primer and paint (and its associated cost and environmental issues) while providing a scratch-and-mar-resistant surface that reduces apparent damage to the wheel flare caused by stone and gravel impact. A proprietary, patent-pending tooling configuration was also key. A cost savings of $10 / vehicle was achieved and finished parts can be easily recycled.

OEM/Vehicle

2007 Ford ® F250 ® pickup by Ford Motor Co.

System Supplier

Decoma International

Material Processor

Plastcoat

Material Supplier

Solvay Engineered Polymers, Inc.

Resin

Indure ® X76 TPO

Tooling/Equipment Supplier

Accurate Mold

Removable Hard Top with "Freedom Panels"

"Freedom Top" SMC panels provide 8 unique design and styling configurations for this composite roof module. All main panels achieve a Class-A finish on the interior via molded-in-color, as well as Class-A finish on the exterior via spatter coating. Structure is derived from bonded inner "picture frames" that also house all necessary latching hardware and seals. The molded roof panels achieved a significant cost and mass savings vs. traditional metal roof structures while offering more configurations for use.

OEM/Vehicle

2007 MY DaimlerChrysler Jeep® Wrangler

System Supplier

Meridian Automotive Systems

Material Processor

Meridian Automotive Systems

Material Supplier

Meridian Automotive Systems

Resin

SMC

Tooling/Equipment Supplier

Century Tool

Truck Bumper End Cap

Through the use of a paint-film lamination, Hendrickson's AERO BRIGHT® (HAB®) end cap provides a chrome appearance without the expense and environmental issues of electroplating. Mass and cost reductions were achieved by using the mirror-finish paint film, which is laminated to the TPO sheet prior to being thermoformed into the final part geometry. The bright, all-plastic end cap can be replaced without changing the entire bumper assembly if damage occurs.

OEM/Vehicle

2007 MY Freightliner LLC Columbia®

System Supplier

Hendrickson Bumper & Trim

Material Processor

Profile Plastics Corporation

Material Supplier

Solvay Engineered Polymers, Inc.
Soliant LLC

Resin

SEQUEL® E3000 TPO
Fluorex® bright film

Tooling/Equipment Supplier

Portage Casting & Mold, Inc

Integrated Park & Turn Lamp Assembly

Integration of the park and turn lamp assembly into the TPO front fascia module not only provided a unique styling effect, but also enabled a significant mass savings (1 kg) and cost reduction ($3.50 USD / vehicle). This is the first integrated park and turn lamp assembly mounted into a TPO front fascia module that utilizes a self locating T-rib design.

OEM/Vehicle

2007 MY DaimlerChrysler Jeep® Compass

System Supplier

Collins & Aikman

Material Processor

Collins & Aikman

Material Supplier

ExxonMobil

Resin

Exxon® 8224-E2 TPO

Tooling/Equipment Supplier

Collins & Akman

A Pillar Column Cover

The use of an on-line paintable thermoplastic for exterior pillar cover applications enabled a 40% weight savings and 30% cost savings. The development of on-line painting achieved Class-A surfaces for the first time in the heavy-truck segment.

OEM/Vehicle

2007 MY MAN® TGA - Heavy Duty Cab

System Supplier

Kienbacher

Material Processor

Kienbacher

Material Supplier

Du Pont de Nemours

Resin

Crastin® LW9330 PBT

Tooling/Equipment Supplier

Stadler

Blow-Molded Front and Rear Bumper System

This blow-molded, all-plastic bumper replaced a traditional steel application and offered a 12% piece cost and assembly-cost reduction as well as a 9% weight reduction. Furthermore, the design meets domestic impact performance and European safety requirement while complying with OEM styling objectives.

OEM/Vehicle

2007 MY DaimlerChrysler Jeep® Wrangler

System Supplier

ABC Group Inc

Material Processor

ABC Group Inc

Material Supplier

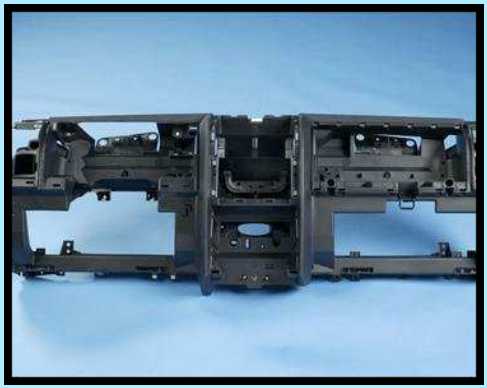
Salflex Polymers (ABC Group)

Resin

Sallfex® 610 MW - RXF TPO

Tooling/Equipment Supplier

Supreme Tooling (ABC Group)



Inline Compounded Structural Duct Assembly

This is the first application of in-line compounding / injection molding for a 2-piece, vibration-welded instrument panel structural-duct assembly. The TPO IP retainer (base panel) is subsequently welded to the structural duct, which has a Class-A finish. Overall assembly cost savings due to materials used (PP vs. PC/ABS) is approximately 15%.

OEM/Vehicle

2007 MY DaimlerChrysler Dodge® Nitro

System Supplier

Intertec Systems

Material Processor

Intertec Systems

Material Supplier

Basell Polyolefins

Resin

Pro-fax® SG853 PP

Tooling/Equipment Supplier

Phillips Tool & Mould Limited

Rear Seat Bolster

This seat bolster replaces a soft polyurethane foam and wire construction part, and incorporates the mounting fasteners for installing the part. Additionally, mounting channels for installation of the fabric cover are molded in. This part provides full-surface coverage for passenger comfort, and support for ingress and egress of the vehicle. Additionally, it yielded both weight and cost savings.

OEM/Vehicle

2007 MY Ford Motor Company Ford® Five Hundred

System Supplier

Lear Corporation

Material Processor

JSP International LLC

Material Supplier

JSP International LLC

Resin

ARPRO® EPP 5000 series PP

Tooling/Equipment Supplier

JSP Mold LLC

Instrument Panel with RIM skin

This instrument panel (IP) skin uses a 2-component, aliphatic polyurethane (PUR) elastomer modified for the RIM molding process in a closed cavity process. This results in reduced cycle time and lower tooling investment. Skin-thickness control, low-temperature ductility, and tear properties of the polyurethane RIM skin are key enablers for integration of the seamless passenger airbag. The estimated savings vs. alternative technologies is $15 USD / vehicle.

OEM/Vehicle

2007 MY Ford Motor Company Lincoln® MKX

System Supplier

Intertec Systems

Material Processor

Intertec Systems

Material Supplier

Intertec Systems
Basell Polyolefins

Resin

Aliphatic Polyurethane
Hostacom® TRC727N TPO

Tooling/Equipment Supplier

EPW

Rail-less Window Regulator

This is the first integrated, cable-driven, rail-less window regulator system for door modules. The innovative carrier integrates the drum housing and utilizes an industry-first, robotically extruded thermoplastic seal to form the seperation between wet and dry sides. The application achieved a weight savings of 25% and a direct cost savings of $7 USD / vehicle.

OEM/Vehicle

2007 MY DaimlerChrysler Dodge® Nitro

System Supplier

Faurecia Interior Systems

Material Processor

Faurecia Interior Systems

Material Supplier

St. Gobain / Exxon

Resin

Twintex® GF PP

Tooling/Equipment Supplier

Omega

Thermoplastic Door Module and Carrier

This single-piece door hardware module and structural reinforcement uses long-fiber technology to reduce weight and provide structural, acoustical, and safety door functions. Part reduction is achieved through integration of the window regulator, latch, audio, interior panel, electrical, and electronics systems components. Mass savings of over 0.9 kg (2 lb) / vehicle were realized, along with 50% reduction in assembly costs, and 10% reductions in materials costs.

OEM/Vehicle

2007 MY DaimlerChrysler Chrysler® Sebring

System Supplier

Magna Closures

Material Processor

Intier Automotive Interiors

Material Supplier

Intier Automotive Interiors

Resin

GF PP

Tooling/Equipment Supplier

Micro Mold

All plastic Structural Window Frame

The first-ever structural window frame that is visible from the exterior and the interior of the vehicle is achieved by ultrasonically welding fabric to the window frame & insert molding metal support arms. "Lightweighting" the door enables easy consumer removal for a full vehicle open-air experience. Over 4% weight savings and 8% cost savings were realized.

OEM/Vehicle

2007 MY DaimlerChrysler Jeep® Wrangler

System Supplier

Decoma / Bestop

Material Processor

Nyloncraft

Material Supplier

Ticona Engineering Polymers

Resin

Celstran® PP-GF40-10 GF PP

Tooling/Equipment Supplier

Briadco Tool and Mold

Body on Frame Front End Carrier

This application represents the first use of reinforced plastic as a structural load member for a body-on-frame assembly. Use of low-energy adhesive, long-glass-fiber-reinforced polypropylene, and steel tubes allowed joint stiffness to be maintained while improving durability performance. The final design provided a 15% systems weight saving and a 25% cost saving replacing vs. the all-steel welded system it replaced.

OEM/Vehicle

2007 MY DaimlerChrysler Jeep® Wrangler

System Supplier

Decoma TEAM Systems

Material Processor

Decoma TEAM Systems

Material Supplier

Ticona Engineering Polymers

Resin

Celstran® PP-GF40-03 GF PP

Tooling/Equipment Supplier

TMD (Toledo Mold)

Long-Fiber Reinforced Thermoplastic in Instrument Panels

Instrument panel substrates are typically produced in SMA, PC / ABS, or steel. Environmental benefits stem from low volatile-organic compound (VOC) material and reduced specific gravity (for fuel economy benefits). The use of LFRT PPGF30 in this application offers cost and weight savings compared to traditional materials. Other benefits include improved acoustical properties, improved stiffness, excellent low-temperature impact, low warpage, and parts consolidation.

OEM/Vehicle

2007 MY General Motors Cadillac® SRX

System Supplier

DAA Draexlmaier

Material Processor

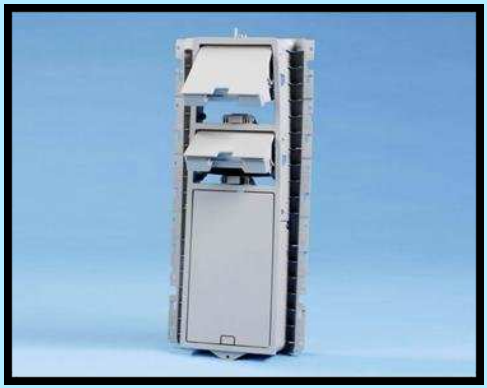
DAA Draexlmaier

Material Supplier

Ticona Engineering Polymers

Resin

Celstran® PPGF30-05 Long Glass Fiber Reinforced PP



Interior Overhead Console

Low gloss and a scratch-resistant matte finish are achieved without the use of paint on this 1.8-meter (5.9-ft) long, 8-compartment overhead console molded using a unique acrylonitrile butadiene styrene (ABS) / polyamide (PA, nylon) blend. Acoustical properties of the material allow for increased damping behavior vs. PC / ABS, ABS, or PP resins, significantly improving noise-vibration-harshness (NVH). Cost savings of 40% were achieved through elimination of metal structures.

OEM/Vehicle

2007 MY General Motors Opel® Zafira, Geo® Tracker

System Supplier

REUM Group

Material Processor

REUM Group

Material Supplier

BASF

Resin

TERBLEND® N NG-02 (8% GF), and NG-04 (20% GF) ABS+PA6

Thermoplastic Vulcanizate Primary Seal

This application is the first TPV body-mounted primary seal used in a complete dynamic-sealing application. The new JyFlex material is an EPDM-sponge-equivalent material that enables the transition from rubber to thermoplastic. Estimated cost savings of 20% ($5 / vehicle) were achieved.

OEM/Vehicle

2007 MY DaimlerChrysler Dodge® Ram

System Supplier

JYCO

Material Processor

JYCO

Material Supplier

JYCO

Resin

JyFlex™ TPE

Tooling/Equipment Supplier

JYCO

Thermoformed Custom Seating

This thermoformed custom seating for two with integral cup holders provides convenient seating on the tailgate of pickup trucks. The seat surface is textured and the base model features molded-in black color. Other custom colors and finishes, such as Camouflage and Real Tree, are also available. The product provides weight savings of 20% and cost savings of 50% vs. other systems.

OEM/Vehicle

2007 MY All Pickup Trucks

System Supplier

Talegator Distributors LLC

Material Processor

Advanced Engineering Company

Material Supplier

Primex Plastics

Resin

Lustran® 752 ABS

Tooling/Equipment Supplier

Millennium Mold and Tool

Gas-Assist Injection Molded Coolant Tube

This is the first plastic coolant tube of complex geometry produced for '07 MY Ford F250 pickup engine to withstand long life coolant and high engine temperatures. It was only made possible by gas-assist injection molding of PPS resin. The resulting part was only half the mass and 20% lower in cost than the conventional metal tubes it replaced.

OEM/Vehicle

2007 MY Ford Motor Company F250

System Supplier

International

Material Processor

Illinois Valley Plastics

Material Supplier

Chevron Phillips

Resin

Ryton® R-4-220 BL PPS

Tooling/Equipment Supplier

Gain Technology

Direct Metalized High Heat Headlamp Bezel

This is the first headlamp bezel launched in North America with a PBT crystalline plastic that can be directly metalized without use of a base coat. The team developed the resin, tooling and processing expertise necessary to create an as-molded, high-gloss, Class-A surface for these decorative parts. Additionally, their 30% thinner wall section leads to as much as a 40% material cost savings.

OEM/Vehicle

2007 MY Ford Motor Company Lincoln® Navigator

System Supplier

ACH Holdings Limited

Material Processor

ACH Holdings Limited

Material Supplier

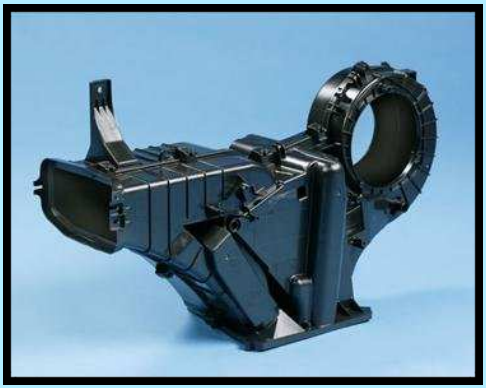
DuPont Automotive

Resin

Crastin® CE2548 GY740 PBT

Tooling/Equipment Supplier

BTM



Integrated Snap Attachment and Split Tongue and Groove Seal

The combination of snap design and split-tongue & groove case-to-case seal creates a simple, snap-together HVAC module. The unit's assembly was automated using an innovative workstation that performs the assembly with verification of engagement of each of the snap features. A 5% module cost reduction was achieved via the elimination of screws and the associated labor.

OEM/Vehicle

2007 MY General Motors Cadillac®, Chevrolet®, & GMC® vehicles

System Supplier

Delphi Automotive

Material Processor

Delphi Thermal

Material Supplier

Spartech-Polycom

Resin

TF PP

Tooling/Equipment Supplier

Asis Co., LTD

OEM/Vehicle

2007 MY Audi AG Audi® TT

System Supplier

Lear Corporation

Material Processor

Moellertech GmbH

Material Supplier

Dow Automotive

Resin

PULSE™ 2200 BG PC/ABS

Fully Structural Blow-Molded Seatbacks

These all-plastic, blow-molded PC/ABS seatbacks meet strict European safety legislation, including ECE 17 luggage retention, as well as other globally mandated requirements. Because the PC/ABS blow-molded seatbacks replaced metal, a significant weight savings of almost 2.3 kg (5 lb) / vehicle was realized as well as a cost savings of $4 USD / vehicle.

Chrome Sidewind Deflectors

The chrome sidewind deflectors uses thermoformable bright metallized film laminated to an ABS substrate in a single production step. This process eliminated the expense of traditional chrome plating on plastic or metal – something that was tried on this part but failed. The application was subsequently extended to several other models and vehicles.

OEM/Vehicle

General Motors Full Size Pickups Various Models

System Supplier

Stampede Products

Material Processor

Stampede Products

Material Supplier

Southtech Plastics and Soliant LLC

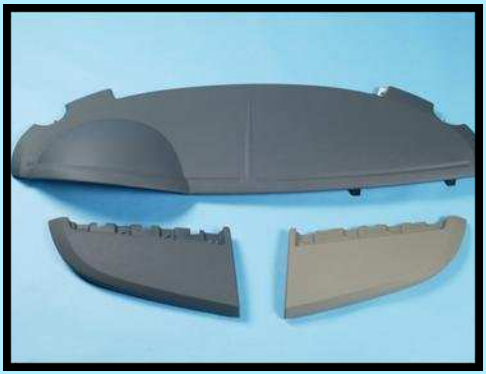
Resin

Magnum® 555 ABS
Fluorex® bright film lamination

Tooling/Equipment Supplier

Stampede Products

Cost Saving Automotive Plastic Innovations **2006 MY**



Pressure Formed IP Top Pad

This top pad is the largest known component to use the in-mold graining pressure forming process. Replacing a 3-step spray-adhesive / injection molding / PUR back foaming process, the product is produced in a 2-shot process that yields crisp radii and uniform grain with no stretch or loss of graining as seen in traditional vacuum forming. As produced, the part is 45 g lighter, 35% less costly, and capital investment was reduced 40% vs. traditional in-mold graining / foam-in-place operations.

OEM/Vehicle

2006 Chrysler ® Sebring ® mid-size car by Chrysler LLC

System Supplier

Faurecia Interior Systems

Material Processor

Pearl

Material Supplier

O'Sullivan

Resin

PP 20% talc

Tooling/Equipment Supplier

KTX America / Kyowa

Transmission Thermal Valve Assembly

This is the first transmission by-pass valve with plastic poppet utilizing a patented, overmolded metal-to-plastic joint, which eliminates costly fittings and components, metal crimping, and welding processes. The application produced a 50% weight and 30% cost savings, while improving performance and reducing leaks.

OEM/Vehicle

2006 Nissan® Sentra® compact car by Nissan Motor Co.

System Supplier

Cooper-Standard Automotive

Material Processor
Calico

Material Supplier

DuPont Automotive

Resin

Zytel ® HTN 51G35 HSLR PPA

Tooling/Equipment Supplier

Lutman Precision Mold

Pickup Bed Extender

This is the first blow-molded pickup bed extender, replacing roll-formed steel or aluminum profiles, while reducing part count, weight, cost, assembly, and quality costs. The high-strength fully-recyclable composite solution features in-mold-color and grained texture to meet OEM Class A specs, retaining excellent grain quality in such a large blow-molded part. The system's unique design provides 3 methods of use: cargo, storage, and stowaway to increase usable bed space on pickups.

OEM/Vehicle

2006 Ford ® F250 ® pickup by Ford Motor Co.

System Supplier

ABC Group

Material Processor

ABC Group

Material Supplier

Salflex Polymers (ABC Group)

Resin

Salflex ® S 815 PP GF

Tooling/Equipment Supplier

Supreme Tooling (ABC Group)

Door Trim & Hardware Module

This unique assembly combines all door hardware components plus trim panel in a single module produced via injection molding and the 2-shot bolster process. It is directly sequenced into the plant, arriving fully tested to reduce door dress-up at the vehicle assembly plant, and offers 10% weight and $10-$17 USD OEM cost savings per vehicle.

OEM/Vehicle

2006 Chrysler ® Caliber / Compass /Patriot SUVs by Chrysler LLC

System Supplier

Grupo Antolin

Material Processor

International Automotive Components

Material Supplier

Dow Automotive

Resin

702-20 PP

Tooling/Equipment Supplier

HiTech

Nanocomposite Interior Console

This highly stylized thermoformed fascia appliqué uses precisely trimmed and thermoformed paint film with excellent stone-chip resistance to eliminate the two-tone paint process while providing a more durable finish and eliminating VOCs. A cost savings of ~10% is achieved by eliminating paint, and scrap is also reduced ~10%.

OEM/Vehicle

2006 Chevrolet ® HHR compact wagon by General Motors

System Supplier

Johnson Controls Inc

Material Processor

PEMSA

Material Supplier

Noble Polymers

Resin

Forte ® 18CPP091 PP

Tooling/Equipment Supplier

RCO Engineering

Electric Brushless Pump

This is the first brushless pump with MMT motor-control technology and overmolded integrated brackets. The lightweight, compact packaging increased the life expectancy for pump thanks to special hydrolysis- and ethylene glycol-resistant resin. The pump delivers 8% higher performance in flow at 53% of the size, 33% of the mass (vs. metal brush pumps), and at lower cost ($2.3 million saved over 3 years), while increasing cabin comfort and improving vehicle fuel efficiency.

OEM/Vehicle

2006 Nissan ® Quest ® minivans by Nissan Motor Co.

System Supplier

Cooper-Standard Automotive

Material Processor

Calico

Material Supplier

DuPont Automotive

Resin

Zytel ® HTN 51G35 HSLR PPA

Tooling/Equipment Supplier

Lutman Precision Mold

Front Grille

This new design and molding significantly reduces the complexity of grille-opening reinforcement (GOR) systems via use of a unique slide-fastening design, which eliminates traditional snap attachments and post-molding operations. The resulting parts consolidation and weight reduction provided a significant cost reduction per vehicle. Improved serviceability and ease of assembly were also achieved.

OEM/Vehicle

2006 MY DaimlerChrysler Jeep® Grand Cherokee / Commander

System Supplier

Guardian Automotive

Material Processor

Guardian Automotive

Material Supplier

BASF Corporation

Resin

Luran® S 777K ASA

Tooling/Equipment Supplier

Braidco

Passenger Airbag Door / Chute System

This application is an all-thermoplastic passenger airbag door, replacing a steel bracket previously used to support the door during airbag deployment. The TPV chute is vibration welded to the backside of the decorative door, which is decorated using a film applied in-mold. This design resulted in over a 20% weight savings, and assembly cost reduction.

OEM/Vehicle

2006 MY DaimlerChrysler PT Cruiser

System Supplier

Cadence Innovation

Material Processor

Cadence Innovation

Material Supplier

Solvay Engineered Polymers

Resin

Sequel® 2326 TPO with Paint Film
NexPrene® 1087A TPV
Dexpro® 515 TPO

Tooling/Equipment Supplier

Cadence Innovation

Long-Glass Fiber Instrument Panel

This is the first application of long-glass fiber polypropylene (PP) in a large injection-molded instrument panel retainer. This part has thin wallstock (1.8 mm), and the process utilized sequential valve gating and a special injection-mold screw design to aid processing. A weight reduction of 20% was achieved, and savings of $200,000 USD were realized.

OEM/Vehicle

2006 MY DaimlerChrysler Mercedes® M-Class/R-Class/GL-Class

System Supplier

Delphi Corporation

Material Processor

Delphi Corporation

Material Supplier

StaMax

Resin

StaMax® GF PP

Dually Bed Rails

This application utilizes a new molded-in color TPO material in a highly visible truck-bed rails application. The material has excellent scuff and mar resistance, and a low coefficient of linear-thermal expansion (CLTE) value. Innovations allowed the material to replace an engineered thermoplastic ionomer in the existing tools, resulting in a 30% direct materials and process savings.

OEM/Vehicle

2006 MY General Motors Silverado Dually

System Supplier

Creative Engineered Polymer Products, LLC

Material Processor

Creative Engineered Polymer Products, LLC

Material Supplier

Basell Polyolefin

Resin

Hifax® Hifax TRL783P TPO

Coolant Adapter Manifold / Housing

This coolant adapter manifold – using a hermetically spin-welded seal that is more than 3 in. (7.6 cm) in diameter – is manufactured for a high-volume 2006 MY DaimlerChrysler world engine. The spin-seal design reduced mass by 7%. By converting the manifold from aluminum to PPA, all machining for the gasket surfaces, the press-in-place grooves, and the pressed-in hose ports were eliminated, reducing overall costs by 20% and weight 50% vs. the original metal housing.

OEM/Vehicle

2006 MY DaimlerChysler World Engine - Dodge® Caliber / Chrysler® Sebring

System Supplier

Miniature Precision Components

Material Processor

Miniature Precision Components

Material Supplier

Solvay Advanced Polymers

Resin

Amodel® AS-1933 HS BK324 PPA

Tooling/Equipment Supplier

Industrial Molds Group

Composite Valve Cover Assembly with Oil Trap

This first metallic top-coated SMC valve-cover assembly with deep draw and die-locked features meets all requirements for Volvo Powertrain – North America. Use of SMC allowed for significantly reduced investment, with 30% mass saving and 50% piece-cost savings vs. a cast-aluminum design.

OEM/Vehicle

2006 MY Volvo Powertrain Mack® Vision, Granite, and MR

System Supplier

Meridian Automotive Systems

Material Processor

Meridian Automotive Systems

Material Supplier

Meridian Automotive Systems

Resin

SMC

Tooling/Equipment Supplier

Concours Mold

Spoiler Assembly with Intergrated Green-House Trim

This is the first application utilizing TPO / TPE 2-shot injection molding with vertical cubic rotation to produce a spoiler assembly integrated with upper green-house trim. The structural base of the spoiler is friction welded. An estimated 10% weight savings and approximately 40% piece-cost savings was achieved.

OEM/Vehicle

2006 MY DaimlerChrysler Dodge® Caliber

System Supplier

Scherer Trier USA

Material Processor

Scherer Trier USA

Material Supplier

Basell Polyolifins

Resin

HiFax® BR 1149 PC 'RFX' Black TPO

Tooling/Equipment Supplier

Hoffman Tool

Two Shot Door Bolster

This process combines a structural substrate and a soft-feel outer surface in a single high-pressure molding operation. Creative surface designs that can intermix different colors, haptics, thicknesses, and textures are used to produce a single, more-cost-effective part while also providing the perception of a more expensive component. Cost savings of 10 - 20%, and weight savings of 15%, were realized.

OEM/Vehicle

2006 MY DaimlerChrysler Dodge® Caliber

System Supplier

Lear Corporation

Material Processor

Lear Corporation - Greencastle

Material Supplier

Kraiburg

Resin

Thermolast® K PP + TPE-S

Tooling/Equipment Supplier

Hi-Tech Mold
Husky Injection Molding Systems

In-Mold Coating Slush Process

This is the first in-mold-coating (IMC) - Slush process to produce instrument-panel skins. The process allows surface properties of a slush-molded skin to be decoupled from the substrate properties. By optimizing the surface and the substrate independently, conflicting customer requirements can be met. Cost savings of 30% were realized through the use of a lower cost aromatic TPU grade.

OEM/Vehicle

2006 MY BMW E63 M-Version

System Supplier

Intier Automotive Eybl Interiors GmbH

Material Processor

Intier Automotive Eybl Interiors GmbH

Material Supplier

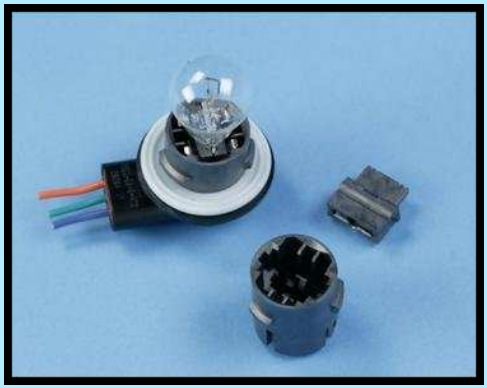
Bayer Material Science

Resin

Desmopan® 3790 AP TPU

Tooling/Equipment Supplier

Galvanoform



S-8 High Temperature Series Lighting Assembly

This lighting system uses a unique combination of materials that withstand higher temperatures while reducing levels of material outgassing. LCP resin, used for the lighting body and wedge base, enables front and daytime running lamps to continuously operate up to 230C (446F) without negatively impacting the photometric output, as can occur when other materials (e.g. nylons and PPA's) are used in its place. Furthermore, the LCP solution saves costs due to reduced cycle times.

OEM/Vehicle

2006 MY General Motors Various Platforms

System Supplier

OSRAM SYLVANIA

Material Processor

OSRAM SYLVANIA

Material Supplier

Ticona Engineering Polymers

Resin

Vectra® E Series Resin LCP

Tooling/Equipment Supplier

Various Suppliers

Cost Saving Automotive Plastic Innovations **2005 MY**

Power Liftgate Drive Motor

To reliably open/close large and heavy automotive power liftgates with the push of a button, a highly engineered and optimized gear train was produced using unfilled POM and a highly filled PA 6/6 to replace powder-metal parts. Innovations were required in gear body and rib design, optimization of the gear geometry, and mounting and application of precision bearings on the plastics shafts. Not only was a 500% cost reduction achieved, but the gear train meets extreme thermal constraints and is highly tuned to NVH performance required by the customer.

OEM/Vehicle

Ford Motor Co.
2005MY Ford Expedition

System Supplier

Hi-Lex America Inc.

Material Processor

Enplas (U.S.A), Inc.

Material Supplier

Ticona Engineering Polymers

Resin

Celcon, Celstran M90, GC25T, PA66-GF50 POM, PA66

Tooling/Equipment Supplier

Enplas (U.S.A), Inc.

Electric Water Valve Assembly

This is the first single-package, multi-function, under hood, water-valve assembly that uses over molded joints to delivery better heat and AC performance. System provided 58% less pressure drop, 42% less internal leakage, 33% higher flow, and 17% less external leakage, all at 40% lower weight and 15% lower costs.

OEM/Vehicle

2005 Nissan® Titan ® pickup /Armada® SUV / Quest ® minivan by Nissan Motor Co.

System Supplier

Cooper-Standard Automotive

Material Processor

Klum

Material Supplier

DuPont Automotive

Resin

Zytel ® HTN 51G35 HSLR PPA

Tooling/Equipment Supplier

Klum

Cost Saving Automotive Plastic Innovations **2004 MY**

Carbon Fiber Decklid

This structural, Class A sandwich panel assembly is 60% lighter than the 3-piece stamped steel assembly it replaced, which helps offset the mass of the vehicle's fuel-cell system for better vehicle range and lower operating costs. It was produced via vacuum bag / autoclave cure using one-sided carbon fiber tooling, which is 75% less costly than the aluminum benchmark.

OEM/Vehicle

2004 Ford ® Focus ® FCV fuel-cell vehicle by Ford Motor Co.

System Supplier

Multimatic Technical Centre

Material Processor

Multimatic Technical Centre

Material Supplier

Advanced Composites Group

Resin

MTM49-3 Epoxy

Tooling/Equipment Supplier

Multimatic Technical Centre

Hall of Fame

Cost Saving Automotive Innovations

First Use of Urethane Foam Seat Cushioning

Believed to be the earliest use of polyurethane foam in automotive seating, this application was featured on the rear seat of the 1957MY Desoto and Chrysler 300 2-door hardtops by then Chrysler Corp. The urethane seat topper replaced cotton batting and latex-rubber sponge products, providing a 50-60% weight and 10-20% piece-cost savings plus lower manufacturing and assembly costs. It also increased seat comfort, durability, flexibility, and breathability for consumers. Flame-retardant materials were used for safety.

OEM/Vehicle

1957MY Chrysler Corp. DeSoto
& Chrysler 300 2-Door Hardtop

System Supplier

Reynolds Chemical Products

Material Supplier

Union Carbide
(Now Bayer MaterialScience)

Resin

PUR

First Plastic Radiator End Tank

As one of the first major underhood applications for engineering plastics, the radiator end cap broke ground for many future engine-compartment applications. Objective for converting the application from aluminum to nylon were parts integration and cost reduction, weight reduction, and equal or better performance.

OEM/Vehicle

1982 Ford® Escort® / Mercury® Lynx ® compact cars by Ford Motor Co.

System Supplier

Ford Plastics Product Division

Material Processor

Hoover Universal

Material Supplier

DuPont Automotive

Resin

Zytel® glass-reinforced nylon 6/6

INDEX

OEM/Vehicle
Adrian Steel - 133
All Pickup Trucks - 183
Audi - 94, 187
BMW - 54, 114, 122, 136, 162, 204
Chrysler - 30, 40, 58, 72, 82, 83, 93, 146, 147, 154, 158, 159, 163, 164, 190, 193, 212
Citroen - 135
Diamler - 44, 84, 108, 142
Diamler Chrysler - 168, 170, 172, 173, 176-179, 182, 196-198, 200, 202, 203
Fiat - 42, 101
Ford - 6-8, 10-12, 14, 16, 17, 19-23, 25, 26, 28, 29, 31-34, 36-39, 43, 47, 48, 52, 53, 56, 57, 59-71, 73, 80, 81, 86-92, 98-100, 102-107, 109, 115-117, 120, 121, 123-131, 138, 143, 144, 153, 165, 167, 174, 175, 184, 185, 192, 207, 210, 213
Freightliner - 161, 169
General Motors - 5, 9, 13, 15, 27, 35, 49, 75, 76, 78, 97, 110, 118, 141, 145, 149, 156, 157, 160, 166, 180, 181, 186, 188, 194, 199, 205
Honda - 148
Hyundai - 24, 45, 46, 50, 85, 95, 119, 140
Jiangsu Xinri - 51
Land Rover - 55
MAN - 171
Nissan - 150, 191, 195, 208
Porsche - 79
Retro USA - 112
Skoda - 113
Subaru - 96
Toyota - 155
Various - 139
Volkswagen - 77, 137
Volvo - 152, 201

Category
Body Exterior - 14-16, 23, 26, 30, 31, 35-38, 49, 69-71, 73, 87, 92, 113, 144, 157-160, 168-172, 196, 210
Body Interior - 5, 17, 24, 25, 28, 29, 34, 44, 45, 54, 66, 81, 89, 95, 128-132, 135, 143, 149, 150, 161, 162, 173-175, 193, 194, 197, 198
Chassis/Hardware - 12, 20-22, 27, 47, 48, 52, 53, 63, 86, 91, 94, 99-101, 114, 127, 142, 163-165, 176-179, 195, 207
Environmental - 67, 72, 80, 115, 123, 133, 141, 180
Materials Category - 11, 13, 46, 50, 51, 60-62, 75, 77, 78, 83-85, 98, 102, 116, 124-126, 136, 148, 155, 166, 167, 181, 182, 199
Performance/Customization - 8, 57, 88, 90, 109, 112, 147, 156, 183, 188, 192
Powertrain - 40, 59, 82, 93, 107, 108, 110, 127, 137, 142, 152, 154, 184, 191, 200, 201, 208
Process/Assembly/Enabling Technologies - 9, 10 , 19, 32, 33, 39, 42, 43, 58, 64, 65, 79, 96, 97, 104-106, 118-122, 140, 145, 146, 185, 186, 190, 202-204
Safety - 6, 7, 55, 56, 58, 76, 103, 117, 138, 139, 153, 187, 203,

Savings
Saves Assembly Time - 10, 15, 19, 27, 28, 33, 36, 40, 43-45, 55, 95, 97, 118, 132, 165, 172, 196, 199
Saves Weight - 5, 7, 10-12, 14-17, 19-21, 23, 24, 26-33, 35, 36, 38, 39, 42, 45, 46, 48, 49, 51, 52, 55-59, 65, 68-71, 73, 75, 79, 82, 83, 85, 87, 89, 91, 93-96, 99-101, 104, 107, 108, 112, 114, 116-119, 121, 122, 128, 130, 131, 133, 135-137, 140, 142-144, 146, 148-150, 152, 154-156, 161, 162, 164, 165, 168-172, 174, 176-180, 183, 184, 187, 190-194, 196, 198, 200-203, 208, 210, 212, 213

INDEX

Model Year*
2013 MY - 5-17
2012 MY - 19-40
2011 MY - 42-73
2010 MY - 75-110
2009 MY - 112-133
2008 MY - 135-150
2007 MY - 152-188
2006 MY - 190-205
2005 MY - 207, 208
2004 MY - 210

***Note:** Entries are arranged by specified Model Year (MY). In three instances (Pages 110, 133, 188) the MY introduced is assumed to be the MY on display at the time of the SPE Innovation Awards Gala. Of course, many innovations are used during multiple model years.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