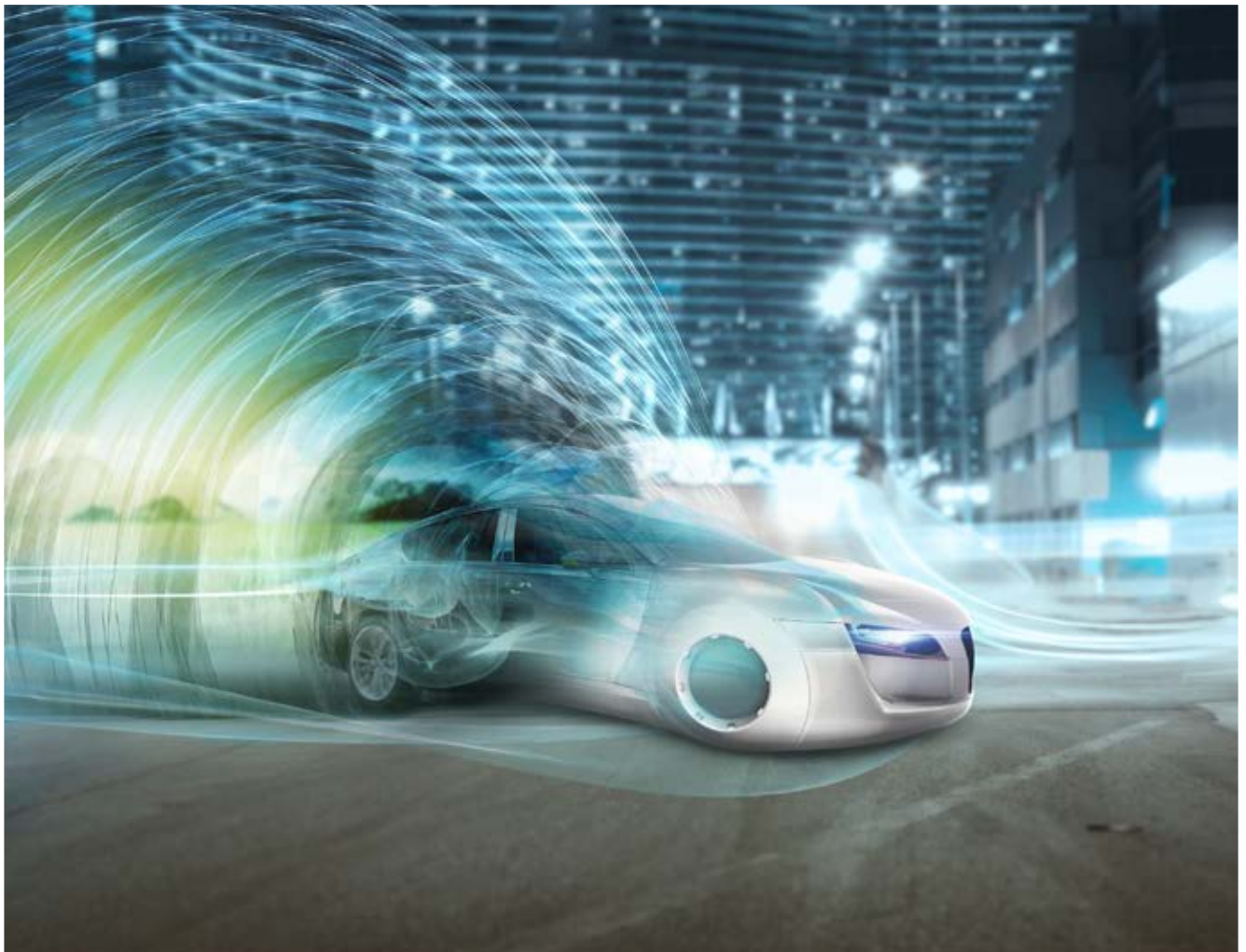




**DRIVING  
TOMORROW**



## **Environment sustainability, design integrity and disruptive innovations are key games changers for Driving Tomorrow**

Design thinking, disruptive innovation and improved sustainability are shaping tomorrow's automotive needs.

Borealis' and Borouge's leading edge polypropylene (PP) compounded materials are used in a wide range of exterior, interior, and under-the-bonnet applications. These include bumpers, body panels, trims, dashboards, door claddings and air intake manifolds amongst others.

Our comprehensive range of PP compounds are rooted in unique, proprietary Borstar® technology, which facilitates the tailoring and balancing of the compounded properties to customise the desired performance for interior and exterior applications. Today, PP compounds serve as an alternative replacement solution for conventional materials like metal, rubber and engineering polymers which are more environmentally friendly.

Borouge and Borealis remain committed to helping the automotive industry enable faster development-to-production cycles while raising the bar of providing reliable and high performance solutions.

# UNDER-THE-BONNET

High performance polypropylene compounds like Fibremod™ and Daplen™ replace engineering plastic and play an important role in enhancing weight saving and cost efficiency.

## Reservoir system

- High performance PE for multi automotive reservoir

## Engine cover

- Hybrid GF and Talc PP compound
- Good appearance
- Low warpage

## Fan & shroud

- PP-SGF replace PA-SGF
- Weight saving
- Cost saving

## Front end carrier

- PP-SGF replace PA-SGF
- High stiffness
- Cost saving

## Air intake manifold

- PP-SGF replace PA-SGF
  - Weight saving
  - Lower noise
  - Cost saving

## Lamp housing

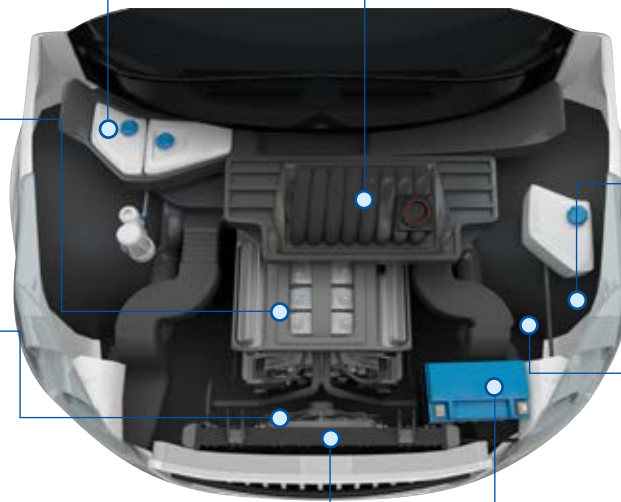
- High performance
- Low fogging

## Under body shield

- High performance
- Light weight

## Battery case

- Chemical resistance



# EXTERIOR SYSTEM

Innovative and lightweight solutions designed to fit desired automotive specifications for better driving performance.

## Bumper grille

- ASA replacement
- UV stabilised

## Cowl vent grille

- Low density material
- UV stabilised

## Mirror housing

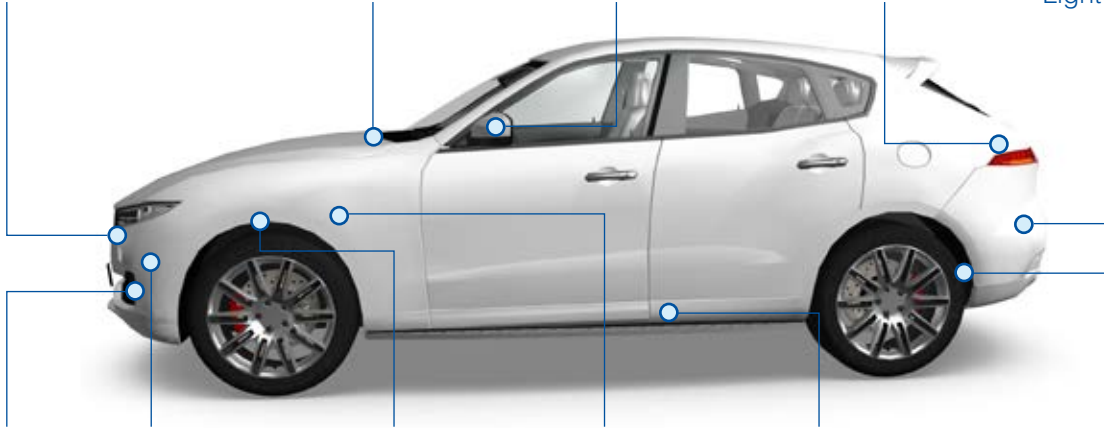
- PP-SGF to replace PA-SGF

## Tailgate

- Low CLTE high stiffness

## Bumper fascia

- Primerless painting
- Lightweight



## Lower protector

- Paintless metallic material

## Bumper fascia

- Low density material
- Thin wall material
- High flow material

## Wheel arc

- Low density high performance

## Fender

- Offline painting PP fender up to 50% weight saving

## Rocker panel

- Low CLTE for dimensional stability

## Outer door panel

- Pre-colored
- One layer clear coat
- Up to 50% weight saving



# AUTOMOTIVE EXTERIOR AND UNDER-THE-BONNET SOLUTIONS

Product Name	Filler Content [wt%]	Density [kg/m <sup>3</sup> ]	MFR 230°C/2.16kg [g/10min]	Flexural Modulus [MPa]	Tensile Stress at Yield [MPa]	Charpy Impact Notched [kJ/m <sup>2</sup> ] 23°C	Charpy Impact Notched [kJ/m <sup>2</sup> ] -30°C	Typical Applications
EE050AEC	0%	900	12	810	16.5	50	7	Wheel housing, deflectors
EF005AEC	10%	950	20	1070	16	47	3.5	Bumper, spoiler and exterior trims
EF119AEC	13%	980	24	1550	17	50	6	Low density bumper and other lightweight application
EH104AEC	12%	980	35	1200	16	32	4	Bumper, spoiler and paint free metallic lower protector
EH126AEC	13%	980	32	1650	20	32	4	Cost efficient low density bumper and other lightweight application
EG107HPC	15%	995	22	1750	20	40	6	High performance low density bumper and exterior trim
EG134AEC	15%	1010	31	1620	18	40	4.5	Low density bumper and exterior trim
EF150HPC	15%	1020	23	2100	20	30	8	Body panel, bumper and other exterior trims
EG119AEC	15%	1000	25	1350	16	45	4	Low density bumper and exterior trim
EE109AEC	20%	1040	15	1450	15	60	5.5	Bumper and exterior trims
EH200AEC	20%	1040	36	2000	19	41	5	Thin wall bumper and other lightweight application
EF209AEC	20%	1040	22	1600	17	60	5	Bumper and exterior trims
ED223AEC	20%	1010	10	1450	16	65	7	Bumper and exterior trims
EH227AEC	20%	1050	35	1450	15.5	43	4.5	Bumper and exterior trims
EF296AEC	20%	1040	21	1400	15	35	5.5	Bumper and rocker panel
EE340AEC	30%	1130	12	1900	18	35	3	Rocker panel and other exterior trim which need low thermal expansion (CLTE)
EF341AEC	30%	1150	15	3300	25	7.5	2.4	Body panel and other exterior trims
EE342AEC	30%	1160	16	2400	19	22	2.5	Front grille and bumper brackets
EE336AEC	30%	1120	12	2300	19	15	1.2	Front grille, rocker panels and exterior trims
ED345AEC	30%	1180	12	2700	20	30	2.5	Tailgate skin, body panel and other exterior trims
GD301FEC	30% SGF	1140	5	6500	100	12	9	Front end carrier and door module carriers
GB205UC	20% SGF	1040	3	4400	75	11	6	Under-the-bonnet bracket and bumper stiffeners
MSC64T20C	20%	1040	14	2400	25	4	-	Cowl vent grilles and under-the-bonnet components
GB306SAFC	35% SGF	1180	2	8000	118	11	10	Air intake manifold, fans and shrouds
MD232UBC	20%	1070	10	3000	34	2.5	-	Air filter housing
MD441UC	40%	1220	7	4700	32	3	-	HVAC parts
GB477HPC	40% SGF	1230	2.5	9000	127	12	11	Front end carrier and door module carriers



# AUTOMOTIVE INTERIOR SOLUTIONS

Product Name	Filler Content [wt%]	Density [kg/m <sup>3</sup> ]	MFR 230°C/2.16kg [g/10min]	Flexural Modulus [MPa]	Tensile Stress at Yield [MPa]	Charpy Impact Notched [kJ/m <sup>2</sup> ] 23°C	Charpy Impact Notched [kJ/m <sup>2</sup> ] -30°C	Typical Applications
BF970AI	0%	905	20	1450	27	8.5	2.5	Interior trims and pillars
MF170AIC	10%	990	19	1700	20	7	2	Interior trims and pillars
WN100AIC	10%	950	19	1650	20	35	5	Door panel, trims
EE188AIC	15%	1040	15	1600	20	25	2.5	Dashboard, door panel, glove box
EE189HPC	15%	1000	16	1700	19	25	2.5	Door panel, glove box
EE250AIC	20%	1040	20	1800	19	30	3	Door panel, glove box
EF261AIC	20%	1040	20	1800	18	36	4	Door panel, glove box
EF267AIC	20%	1040	21	2350	26	5.5	2	Central console, interior trims
EF292AIC	20%	1050	18	1800	20	19	2.5	Dashboard, door panel, glove box
EG299HPC	20%	1040	18	1600	16	40	6	Seamless airbag dashboard, door panel
ME266UC	20%	1040	12	2400	26	4.5	-	Interior trims
ME268AIC	20%	1050	14	2400	25	8	2.5	Dashboard, centre console
GE277AIC	20% SGF	1040	12	4800	80	10	8	Instrument carrier, structure part
GD310UC	30% SGF	1130	8	6200	100	10	8	Instrument carrier, structure part
MD441AIC	40%	1220	8	4900	30	2.2	-	Glove box, interior parts
EF011AIC	5%	940	20	1450	21	25	-	Door cladding, interior trims



# INTERIOR SYSTEM

Innovative polypropylene solutions allow customers to develop interior trims with excellent safety, low VOC emission/odour, weight saving and balanced mechanical properties.

## Instrument panel carrier

- Fibremod™
- Foaming technology

## Instrument panel

- Daplen™
- Airbag shot test (-35°C)
- Surface quality

## Air ducts

- Daplen™
- Fibremod™
- Foaming technology

## Pedal carrier

- Fibremod™
- Metal replacement

## Centre console carrier

- Fibremod™

## Centre console

- Daplen™
- Impact and stiffness balance
- Anti-scratch

## Seat cover

- Daplen™
- Surface quality

## Trunk cladding

- Daplen™
- Surface quality

## Airbag housing

- Fibremod™
- Dimensional stable
- Welding process

## Pillar

- Daplen™
- Airbag shot test
- Surface quality
- Impact and stiffness balance

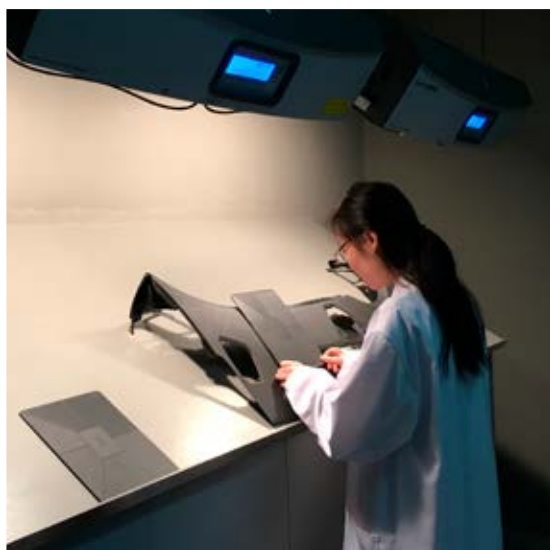
## Door panel

- Daplen™
- Weight saving and low filled
- Surface quality
- Anti-scratch

## Door module carrier

- Fibremod™
- Stiffness





## BOROUGE APPLICATION CENTRE

The expanded Borouge Application Centre is located at Zhang Jiang High Tech Park in Shanghai.

The Application Centre further enhances our service level and response time to our growing customers base in China and across the region.

The new facility is equipped with the latest equipment and instrumentation for technical service demonstrations, polymer characterisation and polymer testing as we strengthen our ability to deliver innovative solutions in development of tailor-made compounds for automotive and non-automotive applications, polyolefin application development and laboratory services.

## About Borouge and Borealis 2018

Borealis is a leading provider of innovative solutions in the fields of polyolefins, base chemicals and fertilizers. With its head office in Vienna, Austria, the company currently has around 6,600 employees and operates in over 120 countries. Borealis generated EUR 7.5 billion in sales revenue and a net profit of EUR 1,095 million in 2017. Mubadala, through its holding company, owns 64% of the company, with the remaining 36% belonging to Austria-based OMV, an integrated, international oil and gas company. Borealis provides services and products to customers around the world in collaboration with Borouge, a joint venture with the Abu Dhabi National Oil Company (ADNOC).

Borealis and Borouge aim to proactively benefit society by taking on real societal challenges and offering real solutions. Both companies are committed to the principles of Responsible Care<sup>®</sup>, an initiative to improve safety performance within the chemical industry, and work to solve the world's water and sanitation challenges through product innovation and their Water for the World programme.

For more information, visit [borouge.com](http://borouge.com)

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