Appliance Solutions

Making everyday life easier

Keep Discovering

BOREALIS

بروج
Borouge

Contents

A strong creative partner

By drawing on our over 50 years of experience, our own highly-qualified experts and our proprietary technologies, Borealis and Borouge continue to deliver material solutions for appliances which offer reduced cycle times, improved processability, energy and material savings, and an improved carbon footprint. We work closely with our partners along the entire appliance value chain to better understand current and future needs and to develop value-added solutions addressing these needs. We pledge to advance sustainable development by way of our commitment to Responsible Care® and health, safety and environment (HSE), and are dedicated to expanding our long-term partnerships with converters and OEMs throughout the world.

The appliance market in perspective

Households in both developed and developing societies around the world increasingly rely on the convenience and time saving role played by appliances. The demand for household appliances continues to increase in line with population growth and rising living standards. Urbanisation also contributes to this growing market, as it expands availability and access to appliances though centralisation. Today we see thousands of different, high quality appliances for domestic needs available on the market and the demand for and dependency on these is projected to continue growing.

Trends driving the appliance market

1. Growing population

2. Globalisation and increasing urbanisation

3. Strengthening regional economies with rising living standards

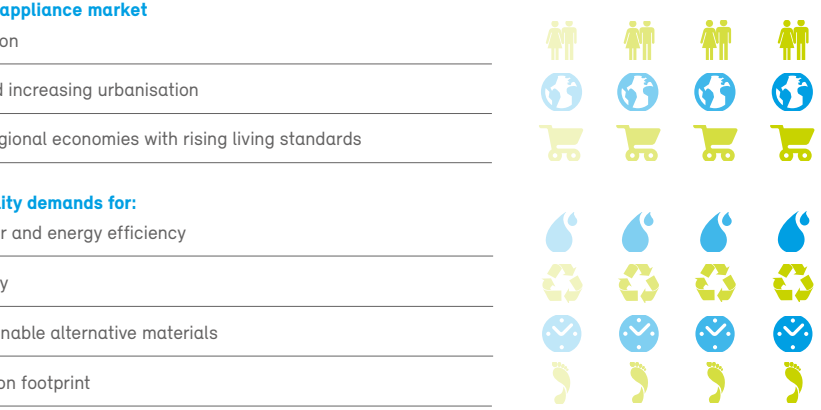
Sustainability demands for:

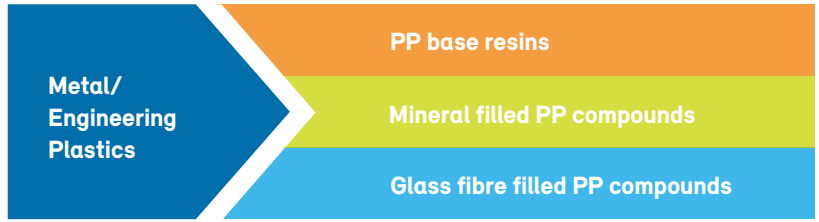
Better water and energy efficiency

Recyclability

More sustainable alternative materials

Lower carbon footprint





Typical appliances

White goods

– Washing machines

– Dishwashers

– Fridges

– Freezers

– Dryers

– Airconditioners

Small appliances

Vacuum cleaners, coffee makers, ventilators, hair dryers, microwave ovens, power tools, water kettles, steam irons, toasters, rice-cookers, tea-makers, water heaters, motor housings, consumer electronics, other household and personal care products.

A competitive materials' environment

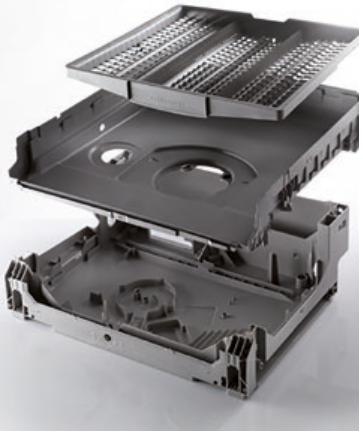
Within the appliances industry PP (Polypropylene), ABS (Acrylonitrile Butadiene Styrene), and PS (Polystyrene) are the three main competing polymers, along with PA (Polyamide) 6 and 66 and PC (Polycarbonate) as part of the polymer mix. Every family of these polymers has a special role and value offering, but both PP resin and PP compounds are gaining market share in the inter-polymer competition. PP comprises a broad range of material grades and, over the past few decades, has grown to become the dominant polymer of choice for a wide variety of domestic appliances.

Major benefits offered by PP when replacing traditional materials

- High performance to cost ratio
- Low density resulting in lightweight products
- Higher productivity and energy savings
- Lower carbon and water footprint
- Excellent stiffness/impact balance
- Detergent resistance up to 95°C
- Good surface aesthetics
- Sound damping behaviour
- Little or no discolouration over time
- Good chemical and mechanical resistance

"As one of the leading home appliance manufacturers in the world, BSH stands for values such as innovation, quality and reliability. Therefore we expect from our strategic suppliers, innovative technology, outstanding design, best quality and sustainable products based on a proper material supply and best in class prices."

Michael Borne, Head of Global Commodity Management Resins & Foam, BSH Hausgeräte GmbH



Focused on your success

Trends in the white goods market – which encompasses items such as washing machines and dryers, dishwashers, AC units, fridges and freezers – include better water and energy efficiency and the use of sustainable alternative materials. Manufacturers seek cost-effective yet aesthetically appealing material solutions that help improve chemical resistance, withstand high water temperatures, reduce noise, and offer easier recyclability. In contrast, the more fragmented small appliances market is driven by innovation and cost competitiveness. Here, the emphasis lies on innovative and smart designs exhibiting a high level of functionality and aesthetic appeal. Our contribution to your success lies in developing materials that enable innovation by increasing design freedom, optimising processes, improving end-use performance and aesthetics. And, do so faster, more efficiently, and with lower energy and resource consumption, than many alternative solutions. The following two examples serve to illustrate this.

Delivering long-term performance with excellent impact resistance

Fibremod™ GB364WG is a 30% chemically coupled short glass fibre reinforced PP compound that offers enhanced performance in tough in-service application components. It enables our customers to reduce material consumption by replacing metal parts with a product with good recyclability.

Typical applications

- High stress parts such as tubs in washing machines
- Functional parts including pumps and basements
- Housings

Key advantages

- Ideal for replacing stainless steel and polyamide (PA) parts with lower density therefore offering significant weight reduction
- Improved flexibility of design, assembly and welding compared to stainless steel, leading to fewer manufacturing steps
- Long-term performance with excellent stiffness, impact resistance, together with absence of corrosion
- Includes specifically designed detergent stabilisation
- Has excellent processability and offers a significant increase in productivity and energy savings
- Reduction of water consumption versus steel and offers easier recycling
- Benefits throughout the value chain, with long-term durability, no discolouration and both UL and food contact approvals
- No moisture absorption (compared to PA)

An allround grade for high requirements

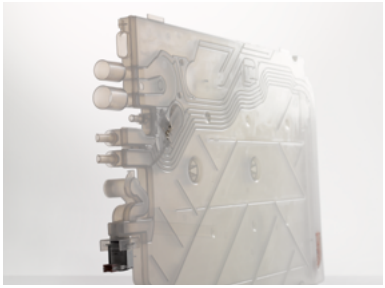
HB601WG is a PP-homopolymer to fulfill high demands in regards to detergant resistance and long term thermal stability. It is suitable for injection molding and is used for visible parts due its very good surface quality.

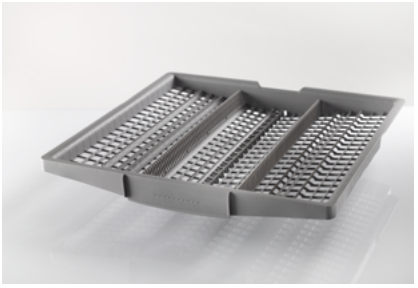
Typical applications

- Dishwasher cutlery tray/basket
- Heat exchanger
- A variety of parts with high demands in regards to detergant resistance and/or heat resistance

Key advantages

- Good processability and colorability
- Good balance between stiffness and impact properties, even at high temperatures
- Excellent detergent and steam resistance for demanding requirements, e.g. dishwashers
- High heat stabilised to guarantee required material performance and dimensional stability during usage
- UL-Listing under E108112





Embrace circularity

Borcycle™ M , Borcycle™ C & The Bornewables™

Meet your sustainability targets with mechanically recycled material or ISCC Plus-certified polyolefins produced from renewable or chemically recycled feedstocks. The Bornewables™ and Borcycle™ C offer the same material performance and regulatory compliance as virgin polyolefin grades.

Borcycle™ M & Borcycle™ C

Borcycle™ is an evolving recycling technology that transforms polyolefin-based waste streams into value-adding solutions for demanding applications. Borcycle™, drives the shift from linear to circular product offerings while safeguarding the environment and combines Borealis innovation heritage in polymer technology with scalable and transformative recycling technology.

The Bornewables™: Renewable Appliance solutions

The Bornewables are produced with renewable feedstock derived entirely from waste and residue streams. These premium polyolefins offer the same material performance as virgin polyolefins, yet with a reduced carbon footprint. Using these innovative and more circular products will help enable Borealis customers to meet their own sustainability targets while maintaining existing quality standards.derived entirely from waste and residue streams.

New circular launches

Borcycle™ MF1981SY-90

Borcycle™ MF1981SY-95 is a PP compound with over 80% post-consumer recyclate and around 10% talc. The grade has high impact performance combined with good aesthetical properties.Available in black colour.

Borcycle™ UF582SA-90

Borcycle™ UF582SA is a 55% post-consumer recycled content PP grade suitable for applications requiring high gloss. The grade is high heat resistant, with excellent aesthetics and good antistatic performance. Available in white and black colour.

Solutions for appliances

Grade	Filler content (%)	MFR (g/10 min) PP: 230°C/2.16 kg	Density (kg/m³)	Tensile modulus (MPa)	Charpy impact, notched 23°C (kJ/m²)	UL 94	HDT B 0.45 MPa (°C)	Typical applications/key properties
Homopolymers								
BE50	n.r.	0.30	905	1,650	7	·	95	IM, BM, EXT for white goods. NU, AS.
BE52	n.r.	0.25	900	1,600	8	·	98	IM, BM, EXT for white goods. NU.
HB600TF	n.r.	2	905	1,400	4	·	86	IM, BM, TF for white goods. AS.
HB601WG	n.r.	2	900	1,600	6	·	85	IM, BM for white goods, as dishwashers. High heat stabilsed, detergent resistant. NU, AS.
HE125MO	n.r.	12	908	1,550	3.5		88	IM, general purpose grade.
HF955MO	n.r.	20	905	2,200	2.5		115	IM, BNT, very high stiffness, good transparency and gloss.
HF700SA	n.r.	21	905	1,500	2	·	80	IM for small appliances. High heat stabilised, excellent antistatic performance, high gloss. AS.
Random copolymer								
RE420MO	n.r.	13	905	1,100	6		75	IM, BM, good transparancy, NU.
RF365MO	n.r.	20	905	1,150	5.5	·	75	Good transparancy and antistatic performance for small appliances, as level indicators. NU, AS.
RF366MO	n.r.	20	905	1,200	5.5		75	Excellent transparancy and antistatic performance for small appliances, as milk pumps. NU, AS.
Heterophasic copolymers								
BC245MO	n.r.	3.5	905	1,350	15		85	IM for small appliances. Good stiffness, impact strength and stress crack resistance. NU, AS.
BC250MO	n.r.	4	905	1,200	25PB		80	IM for small appliances. Good stiffness, impact strength, high melt stability and stress crack resistance. NU, AS.
BC612MO	n.r.	5	900	1,100	9	·	70	IM for white goods, high heat and detergent stabilised.
BF970MO	n.r.	20	905	1,500	8	·	102	IM for small appliances, as vacuum cleaners. BNT nucleation to gain high crystaline PP. AS.
BG055AI	n.r.	22	920	2,000	3.5	·	108	IM for white goods with high aesthetical requirements. Excellent gloss at high stiffness level. NU, AS.
BH381MO	n.r.	35	905	1,700	6.5		105	IM, BNT, very high stiffness and impact.
Mineral filled								
WG140AI	10	20	980	2,600	3.5	·	120	IM for white goods, as washing machine tubs and small appliances. High heat stabilised, high melt strength and detergent resistant. AS.
MB250WG	20	2.5	1,033	2,400	5.5	·	110	IM for white goods, as dishwasher components, detergent resistant. AS.
MD231U	20	6	1,050	2,900	3	·	125	IM for small appliances and other technical parts. High heat stabilised.
ME212U	20	13	1,050	2,900	3	·	120	IM for small appliances and other technical parts, as heater housings. High heat stabilised. AS.
MB352WG	30	2.3	1,150	3,500	4	·	124	IM for white goods, as dishwasher basement. High stiffness and dimensional stability. AS.
MD441U	40	6	1,220	4,200	2.4	·	100	IM for small appliances and other technical parts, as carriers. High heat stabilised. AS.
ME466WG	40	12	1,190	4,100	2.3	·	129	IM for white goods, white colour.
Glass fibre reinforced PP								
Fibremod GB205U	20	2	1,040	4,800	11	·	154	IM for technical parts. High heat stabilised, usable in food and drinking water applications and detergent resistant.
Fibremod GB364WG	30	2	1,120	6,900	12	·	159	IM for white goods, as refrigerators. Replacement of engineering plastics, like Polyamide. High heat stabilised, usable in food and drinking water applications and detergent resistant.
Fibremod GB366WG	30	2	1,120	6,900	12	·	159	IM for white goods, as washing machine tubs. Replacement of engineering plastics, like Polyamide. High heat stabilised and detergent resistant incl. UL 2157.

Polypropylene MFR
(230°C/2.16 kg) g/10 min = ISO 1133

BNT = Borstar® Nucleation Technology, giving highly nucleated polypropylenes with excellent dimension consistency, regardless of colour pigments, and a high potential for cycle time reduction and lightweighting.

CR = Controlled Rheology (CR) grades have a narrower molecular weight distribution resulting in reduced internal stresses and excellent dimensional stability.

SA = slip agent
AS = antistatic agent
NU = nucleating agent
UV = UV-stabilised
PB = partial break
IM = injection moulding
BM = blow moulding
EXT = extrusion
TF = thermoforming

For more information visit:
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More info:

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About Borealis Borealis is one of the world's leading providers of advanced and circular polyolefin solutions and a European market leader in base chemicals, fertilizers and the mechanical recycling of plastics. We leverage our polymers expertise and decades of experience to offer value adding, innovative and circular material solutions for key industries. In re-inventing for more sustainable living, we build on our commitment to safety, our people and excellence as we accelerate the transformation to a circular economy and expand our geographical footprint.

With head offices in Vienna, Austria, Borealis employs 6,900 employees and operates in over 120 countries. In 2021, Borealis generated total sales and other income of EUR 10,153 million and a net profit of EUR 1,396 million. OMV, the Austria-based international oil and gas company, owns 75% of Borealis, while the remaining 25% is owned by a holding company of the Abu-Dhabi based Mubadala. We supply services and products to customers around the globe through Borealis and two important joint ventures: Borouge (with the Abu Dhabi National Oil Company, or ADNOC, based in UAE); and Baystar™ (with TotalEnergies, based in the US).

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