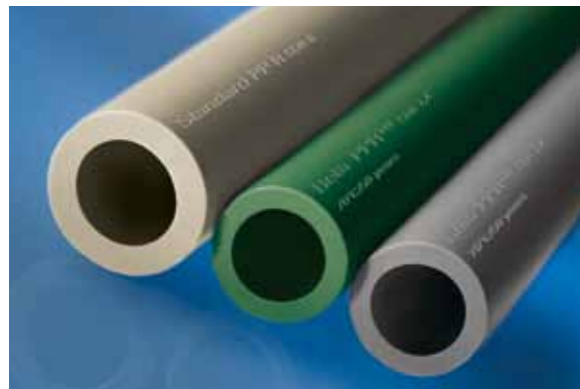


Polypropylene pipe solutions



BorECO™

Economical solutions with foresight for non-pressure pipe systems



Beta-PPR™

Unique high performance of next generation polypropylene for pressure pipe systems



Borcoat™ PP

Complete coating system solution under extreme conditions with proven track records

Polyethylene pipe solutions



BorSafe™

Tailor made PE pressure pipe products from our proprietary bimodal process



BorPEX™

One stop shop for experience and innovation in cross-linked polyethylene



Borcoat™ PE

Compatible, tested and proven systems for multi-layer pipe coating

Solutions for Pipe and fitting applications



Solutions for pipe and fitting applications

Borealis – a leading, innovative plastics provider

About Borealis

Borealis is a leading provider of chemical and innovative plastics solutions that create value for society. With sales of EUR 6.6 billion in 2008, customers in over 120 countries, and 5,400 employees worldwide, Borealis is owned 64% by the International Petroleum Investment Company (IPIC) of Abu Dhabi and 36% by OMV, the leading energy group in the European growth belt. Borealis is headquartered in Vienna, Austria, and has production locations, innovation centers and customer service centers across Europe and the Americas. Through Borouge, a joint venture between Borealis and the Abu Dhabi National Oil Company (ADNOC), one of the world's major oil companies, the company's footprint reaches out to the Middle East, Asia Pacific, the Indian sub-continent and Africa. Established in 1998, Borouge employs approximately 1,400 people, has customers in more than 50 countries and its headquarters are in Abu Dhabi in the UAE and Singapore.

Borealis Pipe Systems

Borealis is a leading global supplier of advanced polyolefin plastics solutions for the pipe industry. Through more than 30 years of close dialogue with customers and other stakeholders, we have developed a broad and innovative product and service portfolio. The applications cover water and gas distribution, waste and sewage disposal, chemical and industrial projects, in-house plumbing and heating and oil & gas exploration

and transportation. Borealis believes that customer-driven innovation is the only way to achieve and sustain progress. In the pipe industry, Borealis has pioneered the development of stiff PP grades for sewage and storm water pipes (BorECO™) and "low sag" PE grades for large diameter PE pipes (BorSafe™). In hot and cold water systems the widest range of PEX and PPR materials (including BorPEX™ and the new Beta-PPR™) provide plastics solutions in virtually all European plumbing and heating markets. Steel pipe coating solutions are also addressed with the widest range of PE and PP materials and adhesives (Borcoat™), which have been used in many of the world's largest oil and gas pipeline projects. Through foresight and focus on customer needs, Borealis continues to provide innovative solutions for the pipe and fittings industry that add real value throughout the value chain. We also know the high value that our customers in the pipe and fittings industry place on product consistency and processability. We pride ourselves on the performance of our products, and through ongoing investment in upgrades and new plant programmes, we continue to set new records for output efficiency and product reliability. Borealis believes that responsiveness is the foundation of fruitful customer partnerships. We ensure this through highly skilled and experienced technical, marketing and product development people, located in Borealis hubs across Europe: Central Europe, Scandinavia and Finland. In addition we have a strong sales force around Europe and close cooperation with our joint venture Borouge in the Middle East and Asia.

Disclaimer The information contained herein is to our knowledge accurate and reliable as of the date of publication. Borealis extends no warranties and makes no representations as to the accuracy or completeness of the information contained herein, and assumes no responsibility regarding the consequences of its use or for any printing errors. It is the customer's responsibility to inspect and test our products in order to satisfy himself as to the suitability of the products for the customer's particular purpose. The customer is also responsible for the appropriate, safe and legal use, processing and handling of our products. Nothing herein shall constitute any warranty (express or implied, of merchantability, fitness for a particular purpose,

compliance with performance indicators, conformity to samples or models, non-infringement or otherwise), nor is protection from any law or patent to be inferred. Insofar as products supplied by Borealis or its subsidiary companies are used in conjunction with third party materials, it is the responsibility of the customer to obtain all necessary information relating to the third party materials and ensure that Borealis' products when used together with these materials are suitable for the customer's particular purpose. No liability can be accepted in respect of the use of Borealis' products in conjunction with other materials. The information contained herein relates exclusively to our products when not used in conjunction with any third party materials.

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BorECO, BorSafe, Beta-PPR, BorPEX, Borcoat, Shaping the Future with Plastics, Borecene, Beta(s)-PP and Daploy are trademarks of Borealis A/S.



Solutions for pipe and fitting applications

Grade	Designation	Type	Colour	MFR (190°C/5.0 kg) g/10 min	Density kg/m ³	Tensile stress at yield MPa	Tensile modulus MPa	Corresponding stripe grade	Typical applications
Polyethylene Pressure Pipes									
BorSafe™ HE3490-LS	PE100	HDPE	Black	0.25	959	25	1,100	BorSafe™ HE3498-LS (orange) BorSafe™ HE3496-LS (yellow) BorSafe™ HE3495-LS (blue) BorSafe™ HE3497-LS (brown)	Drinking water, gas, sewage, industrial
BorSafe™ HE3492-LS	PE100	HDPE	Orange	0.30	951	25	1,100		Gas
BorSafe™ HE3494-LS	PE100	HDPE	Dark-blue	0.30	951	25	1,100		Drinking water
BorSafe™ HE3490-IM	PE100	HDPE	Black	0.55	959	25	1,100		Injection moulded PE100 pressure fittings
BorSafe™ HE3490-LS-H	PE100-RC	HDPE	Black	0.25	959	25	1,100		PE100 for demanding installation conditions
BorSafe™ HE3494-LS-H	PE100-RC	HDPE	Dark-blue	0.30	951	25	1,100		PE100 for demanding installation conditions, drinking water
BorSafe™ HE3470-LS	PE80	HDPE	Black	0.30	956	22	1,000	BorSafe™ HE3476-LS (yellow) BorSafe™ HE3474-LS (blue) BorSafe™ HE3477-LS (brown)	Drinking water, gas, sewage, industrial
BorSafe™ ME3420	PE80	MDPE	Black	0.40	948	19	700	BorSafe™ ME3426 (yellow) BorSafe™ ME3425 (blue)	Drinking water, gas, geothermal probes
BorSafe™ ME3440	PE80	MDPE	Black	0.85	951	19	800	BorSafe™ ME3446 (yellow) BorSafe™ ME3445 (blue)	Drinking water, gas, sewage, industrial & PE80 pressure fittings
BorSafe™ ME3441	PE80	MDPE	Yellow	0.80	944	19	800		Gas
BorSafe™ ME3444	PE80	MDPE	Blue	0.80	947	19	800		Drinking water

Grade	Colour	MFR (190°C/21.6 kg) g/10 min	Density kg/m ³	PEX pipe standards	Resin form	Typical applications
Crosslinkable Polyethylene PEX for Pressure Pipes Peroxide (PEX-a)						
BorPEX™ HE1878	Natural	3	955	EN ISO15875, DIN16892, ASTM F 876	Powder	Plumbing & heating, gas, drinking water, industrial
BorPEX™ HE1878-E	Natural	10	951	EN ISO15875, DIN16892, ASTM F 876	Powder	Plumbing & heating, gas, drinking water, industrial
BorPEX™ HE1878E-C2	Natural	10	951	EN ISO 15875, DIN 16892, ASTM F876	Mini pellets	Plumbing & heating, gas, drinking water, industrial
BorPEX™ HE2550	Natural	6	956	EN ISO15875, DIN16892, ASTM F 876	Powder	Plumbing & heating, gas, drinking water, industrial
BorPEX™ HE2591	Natural	10	944	EN ISO15875, DIN16892, ASTM F 876	Powder	Plumbing & heating, gas, drinking water, industrial
Irradiation (PEX-c)						
BorPEX™ HE2590	Natural	8.5	944	EN ISO15875, DIN16892, ASTM F 876	Pellets	Plumbing & heating, gas, drinking water, industrial
BorPEX™ HE2595	Black	7.5	955	EN ISO15875, DIN16892, ASTM F 876	Pellets	Plumbing & heating, gas, drinking water, industrial
BorPEX™ ME2592	Natural	10	936	DIN16894	Pellets	Plumbing & heating, industrial

Grade	Colour	MFR (190°C/2.16 kg) g/10 min	Density kg/m ³	Resin form	Typical applications
Polyethylene Steel Pipe Coating					
Borcoat™ HE3450	Black	2*	952	Pellets	Bimodal HDPE top coat, up to 85°C
Borcoat™ HE3453	Natural	2*	942	Pellets	UV and thermal stabilised bimodal top coat for use with colourable pipe coating systems other than black
Borcoat™ ME0420	Natural	1.3	934	Pellets	Grafted adhesive for HDPE systems
Borcoat™ ME0433	Natural	5	934	Powder	Grafted adhesive for HDPE systems
Borecene™ RM7405	Black	6	940	Powder	Rough coating and repairs

Grade	Colour	Designation	MFR (230°C/2.16 kg) g/10 min	Tensile stress at yield MPa	Tensile modulus MPa	Charpy impact notched (+23°C) kJ/m ²	Charpy impact notched (-20°C) kJ/m ²	Typical applications
Polypropylene Homopolymer								
Beta(β)-PP™ BE60-7032	Grey	PP-H	0.3	30	1,300	50	5	Industrial, pressure & non-pressure pipe systems, sheets, profiles
BE50	Natural	PP-H	0.3	36	1,650	7	2	Industrial, non-pressure pipe systems, sheets, profiles
BE50-7032	Grey	PP-H	0.3	36	1,650	7	2	Industrial, non-pressure pipe systems, sheets, profiles
HA104E	Natural	PP-H	0.8	35	1,490	4.5		Soil & waste pipe systems
Block Copolymer								
BorECO™ BA2000	Natural	PP-HM**	0.3	38	2,000	29	2	Underground drainage & sewage, soil & waste, solid wall systems
BorECO™ BA212E	Natural	PP-HM**	0.3	31	1,700	50	5	Underground drainage & sewage, soil & waste, solid & structured wall systems
BorECO™ BA415E	Natural	PP-B	0.5	29	1,500	60	6	Underground drainage & sewage, soil & waste, Corrugates pipe systems
BA204E	Natural	PP-B	0.8	27	1,100	20	4	Underground drainage & sewage, soil & waste systems
BEC5012	Natural	PP-B	0.3	28	1,300	70	5	Underground drainage & sewage, soil & waste systems
BB412E	Natural	PP-B	1.3	28	1,300	25	5	Cable conduit pipes
BA160E-8229	Black	PP-B	0.3	30	1,300	50	5	Injection moulding of compression fittings for pressure pipes, irrigation
Random Copolymer								
RA130E-8427***	Grey	PP-R	0.3	25	900	20	2	Plumbing & heating, industrial
RA130E-1498***	White	PP-R	0.3	25	900	20	2	Plumbing & heating
Beta-PPR™ RA7050	Steel-grey	PP-RCT	0.3	25	900	40	2	Plumbing & heating
Beta-PPR™ RA7050-GN	Green	PP-RCT	0.3	25	900	40	2	Plumbing & heating
Filled Compound								
BEC50T30	Natural Modified	PP	0.6	28	3,100	10	2.5	Profiles
Pipe Coating								
Borcoat™ BB108E-1199	White	PP-B	0.9	25	1,200	25	3	UV stabilised white top coat
Borcoat™ BB108E	Natural	PP-B	0.9	25	1,200	25	3	Natural intermediate layer, UV stabilised
Borcoat™ BB700E-7032	Grey Modified	PP	1.6	25	1,400			Thermal insulation material
Borcoat™ EA165E	Natural Modified	PP	0.3	18	800	(±0°C) 75	65	Polymer for subsea field joints
Borcoat™ BB127E	Natural Grafted	PP	8.0	22	1,100	15	8	Grafted adhesive for PP coating systems up to 155°C
BA202E	Natural	PP-B	0.3	28	1,300	50	4.5	Foam manufacture for thermal insulation
Borcoat™ BA213E	Natural	PP-B	0.3	31	1,600	50	5	Thermal insulation material
Borcoat™ MA115E	Natural Modified	PP	1.6	16				Heavy weight coating for subsea and special applications
Daploy™ WB130HMS	Natural Modified	PP	2.1	40	2,000	3	1	Foam manufacture for thermal insulation

* Typical value: 190°C/5.0 kg
 ** PP-HM = new class of high modulus PP-B acc. to EN 1852-1
 *** Other coloured compounds are available

Test Methods
Designation for PE
Designation for PEX
MFR (230°C/2.16 kg)
MFR (190°C/5.0 kg)
MFR (190°C/21.6 kg)
Density
Tensile stress at yield
Tensile modulus
Peel strength
Charpy impact, notched (+23°C)
Charpy impact, notched (-20°C)

Grade	Peel strength adhesion @ 23°C	Peel strength adhesion @ 110°C
Borcoat™ ME0420	200	40
Borcoat™ ME0433	150	40
Borcoat™ BB127E	>200	40

Borealis has a broad product portfolio for various pressure and non-pressure pipe applications. For detailed information, please contact our local sales representatives or visit us at www.borealisgroup.com/pipe.