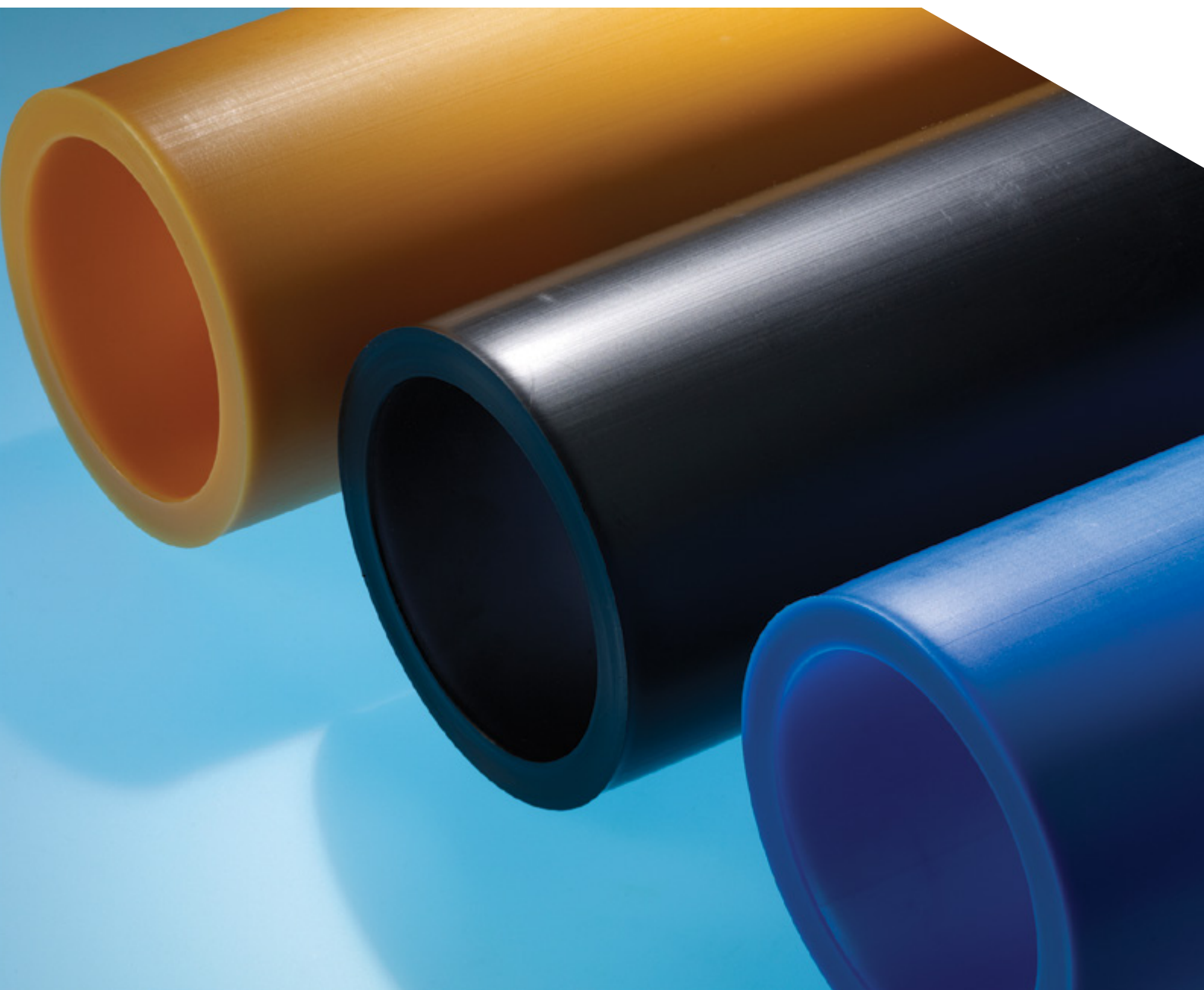


Value-based polyolefin solutions used in pipe applications



About LyondellBasell

We are LyondellBasell (LYB) – a leader in the global chemical industry creating solutions for everyday sustainable living. Through advanced technology and focused investments, we are enabling a circular and low carbon economy. Across all we do, we aim to unlock value for our customers, investors and society. As one of the world’s largest producers of polymers and a leader in polyolefin technologies, we develop, manufacture and market high-quality and innovative products for applications ranging from sustainable transportation and food safety to clean water and quality healthcare. For more information, please visit www.lyb.com or follow [@LyondellBasell](https://www.linkedin.com/company/lyondellbasell) on LinkedIn.

Adding value for customers

Customers in the pipe industry, including steel pipe coating companies, are served by a dedicated team of LyondellBasell experts which offers benefits that deliver a competitive advantage:

- Strong market reputation
- 50 years of experience
- Quality products, services and people
- Leadership in technology and innovation
- Global Pipe & Infrastructure business unit, with sales and technical service teams in Europe, North America and Asia-Pacific



Sustainable water management

Water scarcity concerns are on the rise across the world. With our broad portfolio of polyolefins used in piping systems, LyondellBasell can contribute to making nature’s water cycle more efficient. Piping systems made from polyolefins can provide sustainable and reliable water management solutions for generations to come.

Water shortages arise when there is a mismatch between where water is available and where populations dwell. For example, India and China combined comprise 36% of the world’s population, but only 9% of the earth’s water supply. During the past 50 years to 2020, growing populations, urbanization and changing lifestyles increased domestic water consumption by 600%, according to the World Resources Institute.

Whilst 60% of the world’s population live in regions that are facing high or extremely high levels of water stress.

Benefits of LyondellBasell resins

The water circle in Fig. 1 illustrates how water moves from natural sources to water treatment, distribution, consumption, disposal, wastewater treatment, and then back to nature.

Within the water distribution, consumption and disposal sections,

piping systems produced using polyolefins contribute to making the water circle more efficient

Water transmission systems use high-pressure pipes made from steel, which are protected from corrosion with top-coat materials such as the LyondellBasell *Lupolen* 4552 D black. Medium-pressure HDPE pipes produced using the company’s *Hostalen CRP 100* product family can be fully welded, providing water tight systems that are designed to prevent infiltration and exfiltration. Leakage rates are considerably lower than pipes produced with traditional materials such as steel or ductile iron. Pipes made from HDPE can help transport water to households more efficiently than those produced with other materials.

Sanitary piping systems made from PE-X, PE-RT, PP-R, PP-RCT and PB-1 ensure safe hot and cold water

distribution inside homes and commercial buildings. Plastic pipes also provide better sound dampening performance than those produced using copper and steel, offering improved comfort.

In the disposal of waste water, *Hostalen* PP resins are the materials of choice for today’s sanitation systems. Push-fit jointing systems enable fast and economical installation. Pipes made from PP materials are light, and can be handled safely and easily during installation. Polypropylene-based pipes transport water back to wastewater treatment plants, preventing infiltration and exfiltration.

All of the polyolefin solutions described above exhibit extensive durability, reliability and sustainability.



Fig. 1 – Water circle – courtesy of Hewing (PE-X), REHAU (PP-B)

Polyolefin systems used in steel pipe coating

LyondellBasell offers a wide range of PE and PP products used in anti-corrosion coating, mechanical protection and thermal insulation coating applications for oil, gas and water transportation pipelines.

In three-layer steel pipe coating, customers apply our *Lupolen 4552 D* Black PE top-coat using our *Lucalen G3710E* PE adhesive to achieve outstanding protection from impact, ageing and corrosion, even at high operating temperatures of up to 85°C.

Lupolen 4552D Black is a multimodal PE product used by customers due to its outstanding environmental stress crack resistance (ESCR), superior impact resistance and excellent processability, even at high coating speeds.

Lucalen G3710E is a grafted PE adhesive resin, available in pellet form, that customers use due to its superior adhesion, processability and wide application window.

Lucalen A2910M is a low density PE adhesive with high thermal stability. Due to its acrylic acid/acrylate copolymer content this grade offers excellent adhesion to polar materials (e.g. epoxy resin, steel and aluminium).

It is designed to be used in 2-layer anticorrosion coating and wire and cable applications. Available in pellet form.

Our PP-based coating products are widely used in pipelines that transport hot liquids, with elevated operating temperatures from 85°C up to 140°C. *Moplen Coat EP/60 BIANCO* is a well-established white top-coat resin with excellent thermal ageing resistance and UV-protection. It is applied by customers with the grafted adhesive resins *Hifax EPR/60 BIANCO* or *Hifax EP2 015/60* on pipelines with very high service temperatures.

LyondellBasell also offers *Hifax* products for use in the coating of field joints, using flame spray and injection moulding techniques, together with thermal insulation coatings for off-shore, deepwater pipeline projects.



Fig. 2 - Steel pipes with HDPE top-coat - courtesy of Socotherm España



Fig. 3 - Steel pipe with PP top-coat

HDPE used in pressure pipe applications

The LyondellBasell experience and reputation for technology and innovation in the development and production of grades used in the pipe sector spans more than 60 years. Since the production of the first *Hostalen* HDPE pipe grades in 1955, the range of products has been expanded and upgraded to encompass a complete portfolio of polyolefin grades used by customers in pipe systems.

Hostalen HDPE used in pressure pipes for drinking water, gas, storm-water wastewater and industrial applications.

Hostalen HDPE grades are produced using a low-pressure slurry process plant, based on the latest-generation the LyondellBasell *Hostalen* Advanced Cascade Process (ACP) technology.

The LyondellBasell HDPE resins used by customers in pipe systems combine high pressure resistance, toughness and a good balance of flexibility and stiffness at a wide range of operating temperatures, enabling their use in both pressure and non-pressure applications.

Our *Hostalen CRP 100* black, blue and orange grades are PE100 industry benchmarks that have an extensive track record in a wide range of applications across the world.

Compared to standard grades, *Hostalen CRP 100 RESIST CR* black, blue and orange demonstrate high resistance to stress cracking (slow crack growth) under demanding installation conditions and are certified as PE100-RC materials.

Hostalen CRP 100 XL black has been developed to allow the extrusion of large diameter pipes with high wall thickness.

Hostalen CRP 100 RT Black is a specialist grade for both pressure and non-pressure applications where pipes and conduits are exposed to higher long term operational temperatures. These include industrial applications and high voltage cable conduits

Hostalen CRP 100 RCD Black has been developed for applications where water networks are exposed to higher than usual levels of chlorine disinfectants, which can attack the inner pipe surface, particularly at higher operational temperatures

Hostalen GM 5010 T3 black is a PE 80 grade that exhibits a very good balance of properties.

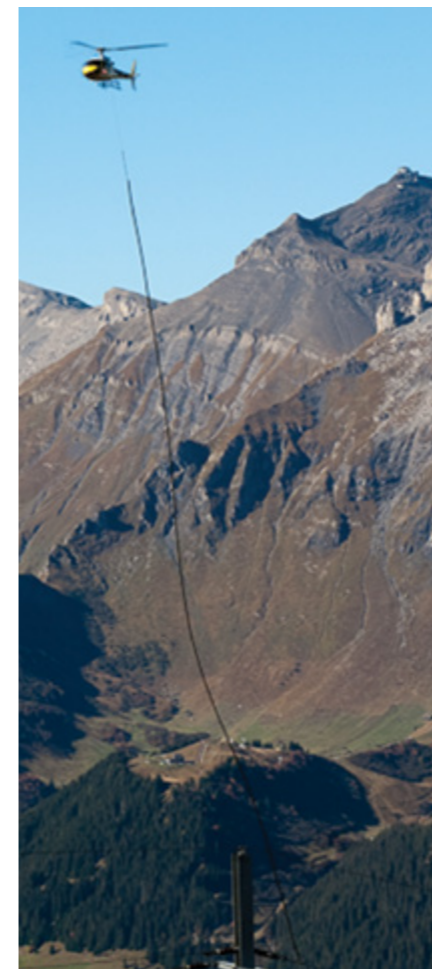


Fig. 4 - Pipe transport by helicopter



Fig. 5 - Seaoutfall line - courtesy of PLOMYPLAS



Fig. 6 - Extrusion of an 800 mm pipe

Heating and plumbing applications

Over the past four decades, polyolefin products have been steadily replacing traditional materials such as copper in hot water pipe applications. This change began more than 35 years ago, with the development of high molecular weight HDPE for cross-linked pipes. Today, LyondellBasell offers a wide range of PE-X, PE-RT, PP-R, PP-RCT and PB-1 products used in heating and plumbing applications.

LyondellBasell offers a range of Lupolen grades used in all PE-Xa and PE-Xc cross-linking techniques

- Lupolen 5261 Z Q 456 for PE-Xa
- Lupolen 5261 Z Q 456 B for PE-Xa
- Lupolen 5461 B Q 471 for PE-Xa
- Lupolen 5461 B Q 471 B for PE-Xa
- Lupolen 4261 A Q 416 for PE-Xc

Cross-linking takes place during or after production, leading to extremely high stress crack resistance and extending operational temperatures up to 95°C.

PE-X pipes are used in plumbing applications; industrial and domestic surface heating and cooling; radiator connections; district heating and anti-freeze systems.

PE-X is also used for the transport of chemicals and industrial slurries at elevated temperatures and where high abrasion resistance is needed. Pipes of up to 630 mm can be extruded.

PE-RT Type II material

4731 B is a PE-RT resin that meets the Type II classification given in ISO 24003 and is used as part of *Hostalen* aluminum metal composite pipes and for underfloor heating systems. The grade has outstanding resistance to chlorine disinfectants at high temperatures. Pipes produced using the grade and tested in accordance with ASTM 2023 comfortably met the Class 5 requirements of ASTM F2796.

Where a more flexible material with a glossy finish is required, LyondellBasell can offer *Hostalen* 4131 B, which thanks to the latest catalyst technology, is also a PE-RT Type II grade.



Fig. 7 – Underfloor heating, PE-Xa – courtesy of Schütz



Fig. 8 – Underfloor heating made from *Hostalen* 4731 B – courtesy of Kingbull

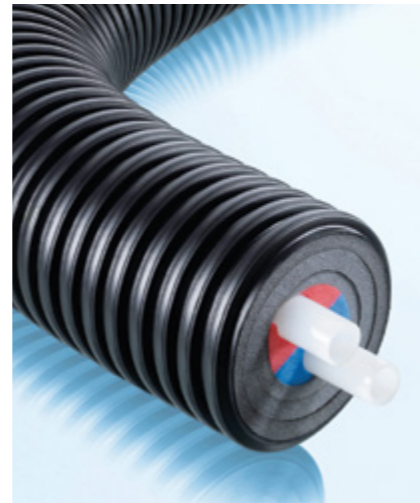


Fig. 9 – District heating pipe, PE-Xa – courtesy of Uponor

Heating and plumbing applications



Fig. 10 – Heating distribution system made from PP-R – courtesy of Aquatherm



Fig. 11 – Socket welded PP-R piping system – courtesy of Aquatherm



Fig. 12 – Fittings made from PB-1



Fig. 13 – Underfloor heating made from PB-1 – courtesy of Viega/ Gabo

Plexar tie-layer resins used in multi-layer pipe applications

Multi-layer pipe applications based on PE-X or PE-RT that contain aluminum or ethylene vinyl alcohol copolymer (EVOH) barrier layers also require high performance adhesive layers. Our *Plexar* resins are LLDPE-based, tie-layer adhesives grafted with maleic anhydride.

- *Plexar* PX3216 used in the adhesive layer between the inner layer and the aluminum layer of a metal composite pipe
- *Plexar* PX5335 used in EVOH, multi-layer pipe applications

Polypropylene random copolymers (PP-R and PP-RCT)

Hostalen PP H5416 random copolymer (PP-R) grade is well-established in the field of piping systems for heating and plumbing.

Our advanced PP-R resins, *Hostalen* XN112-I and *Hostalen* XN125-P are classified as PP-RCT, pushing the bar of excellence higher in terms of strength and pressure resistance, through an advanced polymerization process and use of a Hexene comonomer.

Akoalit and Akoafloor, polybutene-1 (PB-1) used in heating, cooling and plumbing applications

PB-1 features the excellent properties of polyolefins – light weight, weldability, chemical resistance and low-noise transmission – with a unique combination of outstanding creep resistance and flexibility over a wide temperature range.

Akoalit PB-1 resins are used by the LyondellBasell customers for the production of flexible pressure piping systems for domestic hot and cold drinking water supply, surface heating and cooling, district heating, radiator connections and fittings.

Akoafloor is a PB-1 based copolymer featuring improved flexibility, which makes it the ideal choice for fast installation in surface heating and cooling applications.

Wastewater management

Rapid urbanization and accelerating industrialization are causing increased water pollution and corresponding environmental threats. Modern wastewater systems made from polyolefins can provide solutions for sewage, stormwater run-off and rainwater infiltration systems.

PP-B used in storm water and sewage pipe networks, including manholes and chambers, together with infiltration systems.

Customers in this specialist application select the LyondellBasell *Hostalen* PP copolymer grades, that demonstrate high levels of stiffness and resistance to deformation compared to traditional PP grades.

Other benefits include light weight, which facilitates easy and fast installation on construction sites, a very smooth inner surface which helps prevent build up of deposits and a very high level of resistance to corrosion and chemical attack.

Taken together these properties make *Hostalen* PP copolymer grades the ideal material for durable low maintenance gravity flow networks.

- *Hostalen* PP H2464
- *Hostalen* PP H2483 (PP-HM)
- *Hostalen* PP H2493 (PP-HM)

Hostalen PP H2483 and *Hostalen* PP H2493 are classified as PP-High Modulus (PP-HM) grades according to the European Standards EN 1852 and EN 13476.

Soil sealing causes a loss of soil resources due to the covering of land for housing, roads or other construction work.

HDPE used in gravity pipes for sewage and drainage applications

Our *Hostalen* CRP 100 grades are ideal for the manufacture of structured wall large diameter pipes, manholes and chambers that are formed using spiral winding techniques.



Fig. 14 - Corrugated pipes made from *Hostalen* PP H2464 - courtesy of PLOMYPLAS



Fig. 15 - 375mm and 400mm orange sewage pipes waiting to be installed



Fig. 16 - Push connection, inline socketing courtesy of PLOMYPLAS



Fig. 17 - Smooth sewage pipe with push fitting courtesy of REHAU

Industrial applications

High molecular weight HDPE and PP are used in construction applications such as storage tanks for chemicals. LyondellBasell materials are used by customers in the extrusion of sheets and rods, and in compression-molded applications. Ultra high molecular weight (UHMW) PE material exhibit excellent abrasion resistance and toughness, which makes it the ideal choice for durable parts.

PP used in industrial applications, heating, cooling systems and plumbing

The *Hostalen* PP range includes a variety of PP families:

- PP-H (Homopolymer)
- PP-B (Block - Copolymer)
- PP-R (Random - Copolymer)

Hostalen PP H2150 *Hostalen* PP H1022 and *Hostalen* PP H5416 are the preferred resins used by customers for industrial pipes, sheets and fittings.

They offer a combination of high stiffness and good impact resistance at sub-zero temperatures and are selected by customers for industrial applications and pipe systems.

UHMW-PE used in industrial applications

Lupolen UHM 5000 is a UHMW PE1000 material produced using the LyondellBasell latest-generation catalyst. The polymer is supplied in a coarse particle-size powder form that is ideal for the production of natural compression-molded sheets. During the filling and closing of the press molds, the dust formation is considerably lower than the more common, fine UHMW-PE granules.

Manufacturers predominantly produce semi-finished products in the form of sheets, bars, rods and a variety of ram-extruded profiles which are then machined to produce the final products.

For applications where outstanding abrasion resistance is not required, *Lupolen* 5261Z Q 456, which is classified as a high molecular weight PE500 material can be used.



Fig. 18 - Storage tank for pickling of aluminum sheets (UHMW-PE and PP-H100) courtesy of Steuler



Fig. 19 - Parts made from UHMW-PE



Fig. 20 - Semi-finished products made from PP courtesy of SIMONA



Fig. 21 - Semi-finished products made from HDPE courtesy of SIMONA

Pipe applications

Properties	Physical				Mechanical		Slow Crack Growth Resistance		Conformance			Specific characteristics	Typical customer applications
	MFR 190 °C/ 2.16 kg	MFR 190 °C/ 5 kg	MFR 190 °C/ 21.6 kg	Density (23 °C)	Flexural Modulus, 2% Secant	Tensile Stress at Yield	Bent Strip ESCR, Condition B, f50 (100% Igepal®)	PENT on Black [Natural + MB] (2.4Mpa, 80)	Hydrostatic Design Basis(HDB)		Cell Classification		
	73 °F		140 °F										
ASTM test method	D1238			D1505	D790	D638	D1693	F1473	D2837		D3350		
Units	g/10 min			g/cm ³	MPa	MPa	hr	hr	psi				
Conduit Resins													
<i>Alathon L4930TC</i>	0.3	1.1	26	0.949	136000 psi	3600 psi	>1000				PE 435540A	Balance of stiffness, toughness, and ease of processing, meets ASTM F2160, natural color, pellets	Conduit for fiber optic cable, electrical cable and telecommunications cable applications
<i>Alathon L5040TC</i>	0.29			0.949	145000 psi 1000 MPa	3700 psi 26 MPa	>1000				PE 435580A		
<i>Petrothene LT493501</i>	0.34			0.948	131600 psi 900 MPa	3500 psi 24.1 MPa	>1000				PE 435530A		
Corrugated Resins													
<i>Alathon 8005M-5</i>			7	0.949	144000 psi	3700 psi	>1000				PE 445540A	Broad, bimodal molecular weight distribution	Non-pressure rated pipes for corrugated pipe, conduit and profile wall extrusion applications
<i>Alathon L5332CP</i>	0.32			0.953	160000 psi	4000 psi	450				PE 435500A	Meets the stress crack resistance requirement of AASHTO M294. Excellent processing stability and high crush resistance. NCLS >35 hrs per ASTM F2136	
Pressure Pipe													
<i>Alathon L5008HP</i>	0.07		16	0.949	972	24.5		3200	1600	1000	PE 445574C CC1, PE 445574E CCO	Excellent processing characteristics, natural color; PE80, 8 MPa MRS @ 20 per ISO 12187	Pressure pipes for industrial piping, mining, municipal water service lines and sewers
<i>Alathon L4904</i>	0.04	0.18	7	0.949	1006	24.1		5000	1600	1000	PE445574C CC3, PE445574E CCO, PE445576C CC3, PE445576E CCO	High resistance to pipe failure by rapid crack propagation and slow crack growth ; natural color; PE100, 10Mpa MRS @ 20°C per ISO 12187	Pressure pipes, industrial piping, mining, municipal water service lines and sewers
<i>Alathon L4904LS</i>		0.15	7	0.949	993	24.1		5000	1600	1000	PE445574C CC2, PE445576C CC2	Bimodal, high molecular weight, low sagging, excellent processing characteristics; natural color; PE100, 10Mpa MRS @ 20°C per ISO 12187	Large diameter and thick wall applications; Pressure pipes; drinking water pipes; fittings; industrial pipes
<i>Alathon L4904LSC</i>		0.15	7	0.949	945	24		5000	1600	1000	PE445574C CC3	Bimodal, high molecular weight, low sagging, excellent processing characteristics; chlorine disinfectant resistance; natural color; PE100, 10Mpa MRS @ 20°C per ISO 12187	Large diameter and thick wall applications; Pressure pipes; drinking water pipes requires chlorine disinfectant resistance; fittings; industrial pipes
<i>Hyperzone HY4008</i>		0.25	7.5	0.949	1000	25.6		>10000	1600	1000	PE445574C CC3, PE445576C CC3	Excellent processing characteristics, natural color; PE100, 10Mpa MRS @ 20 per ISO 12187	Pressure pipes; drinking water pipes; fittings; industrial pipes

Values shown are not to be considered as product specifications

Pipe & industrial sheet: *Hostalen* HDPE

Properties	Physical			Mechanical					Thermal	Other		Specific characteristics	Typical customer applications	
	MFR 190 °C/ 5 kg	MFR 190 °C/ 21.6 kg	Density	Tensile modulus (sec., v=1mm/ min)	Tensile Stress at Yield (v=50mm/min)	Hardness shore D (3 sec.)	Charpy notched impact strength		Vicat softening point (49 N)	OIT (210 °C)	FNCT (4 MPa, 2% Arcopal, 80 °C)			
	ISO 1133-1		ISO 1183 A	D790	D638	F1473	at 23 °C	at -30 °C						ISO 179/1eA
Test method	g/10 min		g/cm ³	MPa	MPa	hr	kJ/m ²		°C	min	h			
Product Grades – Hostalen														
23050 B	0.23	6.4	0.950	900	24			20			>25	1000	High impact, stiffness; HDPE; natural color; pellets	Non-pressure pipes; Conduit; Drainage pipes; Sewer pipes; industrial pipes
CRP 100 N B	0.23	6.4	0.950	900	24			20			>25	1000	High impact, stiffness; HDPE; PE100 natural color; pellets	Pressure pipes (sewage); drinking water pipes; fittings; industrial pipes
CRP 100 Black	0.23	6.4	0.959	1100	23	63		26	13	74	30	>1000	High impact, stiffness; HDPE; PE100 black color (RAL 9004); pellets	Pressure pipes (sewage); gas pipes; drinking water pipes; relinings; fittings; industrial pipes
CRP 100 Resist CR Black	0.23	6.4	0.958	1100	23	63		26	13	74	30	>8760	Superior ESCR; PE100-RC, black color (RAL9004); fulfills PAS1075; pellets	Pressure pipes for sandless bedding; no dig installation; relining
CRP 100 Black (XL)	0.23	6.4	0.959	1100	23	63		26	13	74	30	>1000	High impact, stiffness; high melt viscosity; low sagging; PE 100 black color (RAL9004)	Extra large bore and thick-walled pressure pipes
CRP 100 RD Black	0.23	6.4	0.959	1100	23	63		26	13	74	30	>1000	Improved resistance against disinfectants; PE 100 black color (RAL9004); pellets	Drinking water pipes; industrial pipes; fittings
CRP 100 RCD Black	0.23	6.4	0.958	1100	23	63		26	13	74	40	≥8760	Improved resistance against disinfectants; PE100-RC, black color (RAL9004); pellets	Drinking water pipes; industrial pipes; fittings
CRP 100 RT Black	0.45	9.5	0.957	1050	22	59		24	8	70	40	350	Excellent heat ageing and extremely high extraction stability, PE-RT, PE100, black color (RAL9004)	Industrial applications at higher temperatures >40°C, where long term heat ageing stability is required
CRP 100 Blue	0.23	6.4	0.950	850	23	62		29	15	74	30	>1000	Improved processability; High impact, stiffness; PE 100 dark blue color (similar RAL5005); pellets	Drinking water pipes; relining
CRP 100 W Blue	0.27	7.3	0.950	1050	23	62		26	13	74	30	≥1000	Improved processability; High impact, stiffness; PE 100 dark blue color (similar RAL5005); pellets	Drinking water pipes; relining
CRP 100 RESIST CR W Blue	0.27	7.3	0.950	1050	23	63		26	13	74	30	>8760	Superior ESCR; PE100-RC, dark blue color (similar RAL 5005); fulfills PAS1075; pellets	Drinking water pipes for sandless bedding, no dig installation and relining
CRP 100 Orange	0.23	6.4	0.951	1050	23	62		29	15	74	30	>1000	PE100, good ESCR, orange color (similar RAL 1033)	Gas pipes acc. EN1555 / ISO 4437
CRP 100 RESIST CR Orange	0.27	7.3	0.950	1050	23	62		29	15	74	30	>8760	Superior ESCR; PE100-RC, orange color (similar RAL 1033); fulfills PAS1075; pellets	Gas pipes for sandless bedding, no dig installation and relining
CRP 100 Orange	0.23	6.4	0.951	1050	23	62		29	15	74	30	>1000	PE100, good ESCR, orange color (similar RAL 1033)	Gas pipes acc. EN1555 / ISO 4437

Values shown are not to be considered as product specifications

Pipe & industrial sheet: Crosslinkable HDPE and PE-RT

Properties	Physical				Mechanical				Thermal		Specific characteristics	Typical customer applications
	MFR 190 °C/ 2.16 kg	MFR 190 °C/ 5 kg	MFR 190 °C/ 21.6 kg	Density	Tensile modulus (sec., v=1mm/min)	Tensile Stress at Yield (v=50mm/min)	Hardness shore D (3 sec.)	Ball indentation hardness H132/30	Vicat softening point (9.8 N)	Vicat softening point (49 N)		
Test method	ISO 1133-1			ISO 1183 A	ISO 527	ISO 527	ISO 868	ISO 2039-1	ISO 306/A	ISO 306/B		
Units	g/10 min			g/cm ³	MPa	MPa		MPa	°C	°C		
Product Grades – Cross-Linked Pipes												
Lupolen 4261A Q416		0.5	8.5	0.946	850	24	62	40	125	75	x-linkable (Radiation); PE-Xc; HDPE; color natural; pellets	Heating; plumbing; multilayer pipes
Lupolen 5261Z Q456*			2.0	0.954	1100	27	65	52	132	80	x-linkable (Peroxide); PE-Xa; HDPE; color natural; powder	Heating; plumbing; large bore pipes for gas/water; compression-molded sheets
Lupolen 5261Z Q456 B*			3.0	0.954	1200	27	65	52	132	80	x-linkable (Peroxide); PE-Xa; HDPE; color natural; powder	Heating; plumbing; multilayer pipes
Lupolen 5461B Q471		0.5	10.0	0.953	1100	28	64	49	130	79	x-linkable (Peroxide); PE-Xa; HDPE; color natural; powder	Heating; plumbing; multilayer pipes
Lupolen 5461B Q471 B		0.7	15.0	0.953	1100	28	64	49	130	79	x-linkable (Peroxide); PE-Xa; HDPE; color natural; powder; lower viscosity than 5461B Q471	Heating; plumbing; multilayer pipes
Lupolen 5461 B Q471 NA*		0.27	10	0.954	154000 psi (Flexural modulus)	4020 psi					HDPE with high melt viscosity for extrusion of peroxide cross-linked pipes (PEX-a). Nominal 25 mesh powder	Drinking water pipe, plumbing, heating and cooling, and underfloor heating
Alathon M537OPX*	6.8			0.953	151000 psi (Flexural modulus)	4110 psi					High impact strength and stress crack resistance, excellent color, low odor and good processability	Used by customers as a base resin for PEX-b crosslink compounds
Product Grades – Hostalen												
4731B		0.45	9.5	0.947	850	22	59		128	70	PE-RT Type II; PE 100; color natural; pellets; good processability, extremely high resistance to ageing	Heating; plumbing; multilayer pipes
4131B		2.2	18	0.941	650	23	58		125	70	PE-RT Type II with higher flexibility; color natural; pellets; good processability, extremely high resistance to ageing	Underfloor heating; plumbing; multilayer pipes

Values shown are not to be considered as product specifications

* Grade currently produced and available both in Europe and US

Pipe & industrial sheet - 1: Hostalen PP

Properties	Physical		Mechanical						Thermal	Specific characteristics	Type	Color	Typical customer applications
	MFR 230 °C/ 2.16 kg	MFR 190 °C/ 5 kg	Tensile modulus (sec., v=1mm/ min)	Tensile Stress at Yield (v=50mm/min)	Tensile Strain at Yield (v=50mm/min)	Notched Charpy Impact			Vicat softening point A				
						at 23 °C	at 0 °C	at -30 °C					
Test method	ISO 1133-1		ISO 527-2	ISO 527-2	ISO 527-2	ISO 179/1eA			ISO 306/A				
Units	g/10 min		MPa	MPa	%	kJ/m ²			°C				
Product Grades – Hostalen PP													
H2150	0.3	1.5	1500	36	11	30	4.3	–	158	High heat and extraction stability	PP-H	natural	Pipes; sheets; rods; fittings; profiles; punching boards; filterplates; blow molded parts
H2150 304850	0.3	1.3	1500	36	10	38	5	–	156	High heat and extraction stability	PP-H	grey (RAL 7032)	Pipes; sheets; rods; fittings; profiles; punching boards; filterplates; blow molded parts
H2150-RC	0.3	1.3	1400	36	10	61	6	–	–	High heat and extraction stability	PP-H	natural	Pipes; sheets; rods; fittings; profiles; punching boards; filterplates; blow molded parts; classified by ISO9080 as PP100
H647D	0.5	–	1650(FM)	35	10	8	–	–	110 (HDT)	High heat resistance, high stiffness	PP-H	natural	Sheets, profiles, non-pressure pipes, thermoforming
HP500D	0.5	–	1560(FM, ASTM)	35	12	104 J/m	–	–	103(HDT)	Low sag, low yellowness, good stiffness, good heat resistance, excellent chemical resistance	PP-H	natural	Sheets; profiles; non-pressure pipes, food trays, food containers, electronic trays
H2450	0.3	1.3	1450	36	11	20	5	–	157	High heat and extraction stability; non-nucleated	PP-H	natural	Pipes; sheets; rods; fittings; profiles; punching boards; filterplates; blow molded parts
H2250 36	0.3	1.3	1500	36	12	26	6	–	157	High heat and extremely high extraction stability	PP-H	grey (RAL 7032)	Press. pipes; sheets; rods; housings; filterplates; fittings
H7350FLS 303064	0.4	2.0	1500	35	11	18	5	–	158	Flame retardant; not food approved	PP-H	grey (RAL 7037)	House drain-pipes; semifinished products
EPD60R	0.4	1.6	1100	26	15	54	18	3.5	151	Exc. impact strength; long-term heat & detergent resistance	PP-B	natural	Sheets; corrugated hoses; industrial pipes; conduits; profiles
H2464	0.3	1.3	1350	28	13	55	34	5	155	Excellent balance rigidity/impact; dimensional stability	PP-B	natural	Sewage/drainage pipes (EN1852/EN13476) profiles; blown and injection molded parts
H2483	0.3	1.3	1800	32	8	67	20	4.3	159	High stiffness, high impact; dimensional stability;	PP-B	natural	Sewage/drainage pipes (EN1852/EN13476) profiles; blown and injection molded parts
H2992	0.25	1.3	2000	38	8	50	4	2.5	–	Very high stiffness; impact; dimensional stability	PP-B	natural	Sewage/drainage pipes (EN1852/EN13476) profiles; blown and injection molded parts
H1022	0.3	1.3	1300	30	13	50	15	3	159	Basic stabilization; good heat aging resistance	PP-B	natural	Pipes; fittings; sheets; profiles; blow molded parts
H1022 12	0.25	1.3	1400	31	12	117	21	4	158	Basic stabilization; good heat aging resistance	PP-B	black	Pipes; fittings; sheets; profiles; blow molded parts
H2222 36	0.3	1.3	1350	30	12	50	13	5.8	158	High heat stability; extreme extraction stability	PP-B	grey (RAL 7032)	Press. pipes; sheets; profiles; filterplates; fittings
H2142 12	0.3	1.4	1500	34	12	54	5	2	150	High heat stability; weather resistance; low creep	PP-B	black	Mechanical-joint compression fittings (ISO14236); classified by ISO9080 as PP100
H4122 103220	0.3	1.3	1400	30	13	110	20	5.8	159	High heat, weather and extreme extraction stability	PP-B	black	Pipes; solar heat absorbers; corrugated pipes; fittings

Values shown are not to be considered as product specifications

Pipe & industrial sheet - 2: Hostalen PP

Properties	Physical		Mechanical					Thermal	Specific characteristics	Type	Color	Typical customer applications	
	MFR 230 °C/ 2.16 kg	MFR 190 °C/ 5 kg	Tensile modulus (sec., v=1mm/min)	Tensile Stress at Yield (v=50mm/min)	Tensile Strain at Yield (v=50mm/min)	Notched Charpy Impact							Vicat softening point A
						at 23 °C	at 0 °C	at -30 °C					
Test method	ISO 1133-1		ISO 527-2	ISO 527-2	ISO 527-2	ISO 179/1eA			ISO 306/A				
Units	g/10 min		MPa	MPa	%	kJ/m ²			°C				
Product Grades – Hostalen PP													
XN125-P *	0.2	1.1	850	26	12	–	8.0	–	–	High heat stability; extreme extraction stability	PP-RCT	natural	Press. pipes (EN ISO15874); hot/cold water pipes; sheets and parts in chemical apparatus; classified by ISO9080 as PP125/ PP-RCT
XN112-I *	0.2	1.1	800	24	32	–	9.5	–	–	High heat stability; extreme extraction stability	PP-RCT	natural	Press. pipes (EN ISO15874); hot/cold water pipes; sheets and parts in chemical apparatus; classified by ISO9080 as PP112/ PP-RCT
H5416K	0.3		850(FM, ASTM)	27	10	23(Izod)	–	–	83(HDT)	High heat stability; extreme extraction stability; good impact	PP-R	natural	Press. pipes (EN ISO15874); hot/cold water pipes; sheets and parts in chem. apparatus; classified by ISO9080 as PP112
H5416T	0.3	1.3	850(FM, ASTM)	26	16	58(Izod)	–	–	84(HDT)	High heat stability; extreme extraction stability; good impact	PP-R	natural	Press. pipes (EN ISO15874); hot/cold water pipes; sheets and parts in chem. apparatus; classified by ISO9080 as PP100
H5416	0.3	1.3	850	24	13	89	12.0	–	132	High heat stability; extreme extraction stability; good impact	PP-R	natural	Press. pipes (EN ISO15874); hot/cold water pipes; sheets and parts in chem. apparatus; classified by ISO9080 as PP100

Values shown are not to be considered as product specifications

* XN125-P & XN112-I production will be available in Thailand plant from 2025.

Pipe & industrial sheet: Polybutene-1

Properties	Physical		Mechanical				Thermal	Color	Specific characteristics	Typical customer applications
	MFR 190 °C/2.16kg	Density	Flexural Modulus	Tensile Stress at Yield	Tensile Stress at Break	Tensile Strain at Break	Melting Temperature			
Test method	ISO 1133-1	g/cm ³	MPa	ISO 527	ISO 527	ISO 527	DSC			
Units	g/10 min	g/10 min	MPa	MPa	MPa	%	°C			
Product Grades										
Akoafloor PB R 509 Brown	0.7	0.93	370	15	35	300	124–126	Brown	Random copolymer	Underfloor heating
Akoafloor PB R509	0.7	0.92	370	15	35	300	124–125	Natural	Random copolymer	Pressure pipe, not for potable water
Akoafloor PB 4235-1 Ivory	0.6	0.93	450	17	30	225	127–129	Ivory	Homopolymer	Non-potable heating water
Akoalit PB 4267 Grey	0.6	0.925	450	17	30	225	127–129	Grey	Homopolymer	High-performance extrusion into pipe for potable hot and cold water distribution applications where improved organoleptic properties are required
Akoalit PB 4268 White	0.6	0.925	450	17	30	225	127–129	White	Homopolymer	High-performance extrusion into pipe for potable hot and cold water distribution applications where improved organoleptic properties are required
Akoalit PB DKG 300	2.0	1.325	6000	75	72	4.5	127–129	Natural	Homopolymer	Glass fibre reinforced high flow polybutene-1, typically used for fitting applications such as fitting bodies, support rings, etc. in combination with hot and cold potable water pipe installations

Values shown are not to be considered as product specifications

*PB-1 is not sold for pipe applications in North America

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We are LyondellBasell (LYB) – a leader in the global chemical industry creating solutions for everyday sustainable living. Through advanced technology and focused investments, we are enabling a circular and low carbon economy. Across all we do, we aim to unlock value for our customers, investors and society. As one of the world's largest producers of polymers and a leader in polyolefin technologies, we develop, manufacture and market high-quality and innovative products for applications ranging from sustainable transportation and food safety to clean water and quality healthcare. For more information, please visit www.lyb.com or follow [@LyondellBasell](https://www.linkedin.com/company/lyondellbasell) on LinkedIn.

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