

Icorene Powders for rotomolding

Product Range 2019/2020



Rotomolding Powders

Welcome to our range of rotomolding materials manufactured and distributed in Europe by LyondellBasell.

LyondellBasell is one of the largest plastics, chemicals and refining companies in the world. Driven by its employees around the globe, LyondellBasell produces materials and products that are key to advancing solutions to modern challenges like enhancing food safety through lightweight and flexible packaging, protecting the purity of water supplies through stronger and more versatile pipes, improving the safety, comfort and fuel efficiency of many of the cars and trucks on the road, and ensuring the safe and effective functionality in electronics and appliances. LyondellBasell sells products into more than 100 countries and is the world’s largest producer of polymer compounds and the largest licensor of polyolefin technologies.

Contents	Page
General Purpose Rotomolding Powders	3
Hexene High Performance Powders	3
Icorene Materials Used in Automotive Applications	4
Metallocene Hexene (mPE) Powders	5
Flexible Rotomolding Grades	5
Specialty Rotomolding Powders	6
Rigid Rotomolding Powder Grades	7
Rotomolding Powders for Tanks	7
Applications per Grade	8-11
Flame Retardant Powder Grades	12
Additives for Rotomolding	13
Polypropylene Powder Grades	13
Special Effect Powders	14
Drinking Water Approvals	15
“Designer” Rotomolding Powders	15

General Purpose Rotomolding Powders

All fully UV and heat stabilized for use in rotomolding:

- Icorene General Purpose resins are prime quality ground powders supplied in bags, bulk or big bags
- Icorene is available as natural powder or in compounded black, standard or customer colors



Color	Icorene	Density	MFI	Characteristics	Typical Applications
Natural, Black & Colors	3545	0.935	4.2	Medium stiffness, easy to mold	General purpose
	3560	0.935	5	Medium stiffness, easy to mold	General purpose
	3575	0.935	7.5	High flow & easy to mold	General purpose, intricate items
	3855	0.938	5.0	Higher stiffness & easy to mold	Tanks and other large moldings

Hexene High Performance Powders

- These excellent high performance rotomolding materials all contain a premium high performance UV and AO stabilization package
- They also contain a special internal release agent, enabling moulders to require the use of minimal externally applied release agent



Color	Icorene	Density	MFI	Characteristics	Typical Applications
Natural, Black & Colors	1210	0.926	3.3	Flexible, tough with very high impact strength & ESCR	IBCs, floats and bins
	1613	0.938	4.5	Good stiffness, high processing speed, impact strength & ESCR	General Molding, medium sized tanks & fuel tanks
	1314	0.939	3	Very high ESCR & impact with good stiffness and easy release	Large tanks for water. Heating oil EN 13341, Chemical, Septic & Agricultural tanks
	1339	0.943	3	Very high stiffness, high impact strength and ESCR	Big tanks and other large moldings
	1380	0.939	4	Very high ESCR & impact with good stiffness	Large tanks, heating oil, chemical, septic and agricultural tanks
	1440	0.940	4	Very high ESCR & impact with good stiffness	Big tanks and other large mouldings
	1460	0.936	7.5	High cure speed & wide impact window	Fuel tanks, custom parts

ICORENE materials used in automotive applications

- Rotomolding is used to manufacture all kinds of products used in trucks, buses, tractors and off road vehicles. These include for example: interior and exterior cab components and mudguards for tractors and trucks; diesel fuel tanks that vary from small sized tanks in quad bikes to very large tanks for harvesters (e.g. 800 liters)
- For diesel fuel tanks, Icorene 1440, 1460, 1505, 1613 and 1761 have been successfully tested in customer fuel tanks to pass the automotive regulation ECE R34 Annex 5. These grades are recognized by test houses such as TUV and appear on certain specific "approved material" lists



Color	Icorene	Density	MFI	Characteristics	Typical Applications
Natural & Black PE	1440	0.940	4	High density material with good impact	Tanks and other large items
Natural & Black PE	1460	0.936	7.5	High cure speed & wide impact window	Fuel tanks, custom parts
Natural PE	1613	0.938	4.5	Ad-blue resistance	Ad-blue garage bulk storage and on-truck tanks
Natural mPE	1741	0.941	4	Diesel resistance, High toughness and rigidity	Bulk storage, diesel tanks and on-truck tanks
Natural mPE	1761	0.935	6	Ad-blue resistance	Ad-blue garage bulk storage and on-truck tanks, TUV positive list ECE R34
Natural XPE	1505	0.945	na	Higher temperature resistance vs PE	Hot hydraulic and coolant solution tanks
Natural & Black PP	4014	0.900	15	Higher temperature resistance vs PE	Hot hydraulic and coolant solution tanks
Black PE	1613 BK85	0.938	4.5	Diesel resistance, High toughness	Diesel fuel tanks, TUV positive list ECE R34
Black mPE	1741 Black 9001	0.941	4	Diesel resistance, High toughness and rigidity.	Bulk storage, diesel tanks and on-truck tanks.
Black mPE	1761 Black 9001	0.935	6	Diesel resistance, High toughness	Diesel fuel tanks, TUV positive list ECE R34
Black XPE	1505 Black 9001	0.945	na	Diesel resistance, High toughness & Lower Creep	Diesel fuel tanks

Metallocene Hexene (mPE) Powders

High Performance Powder Grade Range

- These high performing mPE rotomolding materials all contain an excellent UV and AO stabilization package
- They are designed to have super toughness, improved gloss and a wider than standard processing window. LyondellBasell is a preferred supplier of these materials in natural, black and custom colored powder form



Color	Icorene	Density	MFI	Characteristics	Typical Applications
Natural, Black & Colors	1741	0.941	4	High density metallocene material with very good impact	Tanks, stiff custom parts
	1761	0.934	6	Medium stiffness mPE, with high cure speed & wide impact window	Fuel tanks, custom parts

Flexible Rotomolding Grades

- All listed PE materials are fully UV and heat stabilized for use in rotomolding
- Moulders use these materials to make products that are designed to flex rather than crack under bending or impact stress
- With lower shrinkage rates than typical PE roto materials, they are often used to keep tolerance too



Color	Icorene	Density	MFI	Flex Mod (Mpa)	Characteristics	Typical Applications
Natural, Black & Colors	1210	0.926	3.3	400	Flexible and tough with very high impact strength & ESCR	IBCs, floats and bins
	2550	0.924	3.6	380	Flexible, good ESCR, low shrinkage and very tough	Floats, buoys & items for material handling
	1901	0.900	10	100	Rubber-like Plastomer, high flexibility & easy molding	Floats, buoys & fenders
	9402	0.890	30	100	Optimum hot and cold Elastomer, soft touch, easy to process and extremely tough	Furniture, marine buffers and automotive ducting
	9468	1.110	8.5	45	Flexible and tough with very high scratch resistance	Interior parts automotive

Specialty Rotomolding Powders

- I LyondellBasell designs and manufactures many specialized powder materials for rotomolding
- I These include electrically conductive materials, X linkable PE, Polyamide, Polycarbonate, TPE, Elastomer, PVDF and rotolining
- I These and other specialty grades are made for applications requiring properties that PE/PP resins don't have

Please contact us to discuss your special material's requirements.



Color	Icorene	Density	MFI	Characteristics	Typical Applications
Natural, Black & Colors	1062 ESF	0.934	8	Next generation Enhanced Surface Finish and excellent mechanical properties.	Design furniture, hygienic & medical applications
Natural & Black	1505	0.945	na	Cross link HDPE superior ESCR, chemical resistance and flow.	Hydraulic oil & fuel tanks, chemical tanks and abrasion applications
Black	3590 SC Black 9002	0.935	9	Semi Conductive black PE. Exhibits good flow and impact properties.	Bins & parts requiring electrical conductivity
Natural	1869	0.927	3.5	Adhesive grade, good bond to metal, good processability & physical properties.	Adhesive tie layer for PE, corrosion protection rotolining of pipes or tanks
Black	1870	0.939	20	Adhesive grade, good bond to metal, especially aluminum, excellent processability & physical properties.	Excellent lining for aluminum tanks. E.g.: Ad-blue, fire extinguishers
Natural, Black & Colors	9402	0.890	30	Optimum hot and cold Elastomer, soft touch, easy to process and extremely tough.	Furniture, marine buffers and automotive ducting
Natural, Black & Colors	9468	1.110	8.5	Flexible and tough, very high scratch resistance	Interior parts automotive
Natural & some tints	9909	1.20	20	Polycarbonate, glass-clear, roto-powder. High stiffness & built-in flame retardancy	Lighting globes, point of sales items, safety products, small cabinets
Natural	9993	1.800	na	PVDF. Easy to mold exhibiting EXTREMELY high temperature and chemical resistance	Typically chemical tanks and ducts, continuous service temperature to 120°C

Rigid Rotomolding Powder Grades

- All listed rigid materials are fully UV and heat stabilized for use in rotomolding
- LyondellBasell makes toughened HDPE for applications where high stiffness, hardness, temperature resistance is needed
- Superlinear™ (SL) is trademark of LyondellBasell Inc.



Color	Icorene	Density	MFI	Flex Mod (Mpa)	Characteristics	Typical Applications
Natural, Black & Colors	1339	0.943	3	900	Stiff and tough	Kayaks and boats
	5045 SL	0.950	5.9	1130	Extremely rigid, hard and tough	Kayaks and boats

Rotomolding Powders for Tanks

- These excellent rotomolding materials all contain a good quality UV and AO stabilization package
- Rotomolded tanks will vary in size and wall thickness, typically 4-8mm, but sometimes up to 25mm
- The smallest tank considered is 500 liters and the biggest known so far is 40000 liters
- In general the larger sized tanks will use lower MFI to cope with the need for very thick walls and the long heating times
- Higher MFI resins will be more likely to suffer “dripping” and may also have insufficient resistance to long term stress
- For the best longevity the material should be compound colored. Standard or matched colors are available



Color	Icorene	Density	MFI	Characteristics	Typical Applications
Natural, Black & Colors	1613	0.938	4.5	Good stiffness, high processing speed, impact strength & ESCR	Small and medium tanks. Large moldings
	3855	0.938	5	Higher stiffness & easy to mold	Spray tanks
	3940	0.939	4	Higher stiffness & easy to mold	Tanks and other large moldings
	1440	0.940	4	High density material with good impact	Tanks and other large moldings
	1460	0.936	7,5	Material with high cure speed & wide impact window	Fuel tanks, custom parts
	1741	0.941	4	High density metallocene material with very good impact	Tanks and other large moldings
	1314	0.939	3	Very high UV, ESCR & impact with good stiffness and easy release	Big tanks for water. Heating oil EN 13341, chemical, septic, agricultural and other moldings
	1339	0.943	3	Very high stiffness, high impact strength and ESCR	Large tanks for water . Heating oil EN 13341, chemical, septic & agricultural tanks
	1505	0.945	na	Very stiff. Cross link HDPE superior ESCR, chemical resistance and flow. UV.	Small to VERY big tanks, hydraulic oil & fuel tanks, chemical tanks

APPLICATIONS PER GRADE		Icorene grades									
		1062	1210	1314	1339	1440	1460	1505	1613	1741	
Automotive (related) tanks	Diesel tanks tractor / trucks			S	S	S	S	S	S	S	
	Diesel tanks other			S	S	S	S	S	S	S	
	Bio diesel tanks			S	S	S	S	S	S	S	
	Urea tanks			S	S	S	S	S	S	S	
	Gasoline tanks							L			
	Hydraulic oil							L	L		
	Petrol tanks							L			
	Caravan			S	S	S	S	S	S	S	
Automotive parts	Cabs, body panels etc	S	S								
	Trailers and load liners				S			S			
	Fenders		S								
	Ducting			S	S	S	S	S	S	S	
Road furniture	Road Barriers/separators		S								
	Bollards		S								
	Road Cones		S								
	Litter bins	S	S								
	Traffic signs										
	Salt or grit bins		S	S	S	S	S		S	S	
	Recycle bins		S	S	S	S			S		
Infrastructure & tanks	Heating Oil			S	S		S	S	L	S	
	Fuel stations			S	S	S		S	L		
	Water<3000					S			S		
	Water>3000			S	S		S	S	S	S	
	Water>20000				S			S			
	Water drinking			S	S	S			S		
	Chemical static & IBC		S	S	S		S	S		S	
	Chemical drum			S	S			S			
	Grease trap			S	S	S	S	S	S	S	
	Other tanks			S	S	S	S	S	S	S	
	Rubble/mortar tubs		S	S					S		
	Infrastructure underground	Septic			S	S		S	S	S	S
		Wastewater treatment			S	S		S	S	S	S
Rainwater harvest				S	S	S	S		S	S	
Grey water				S	S	S	S		S	S	
Manholes & Inspection Chamber				S	S		S		S	S	
Recycling deep containers			S	S	S	S	S	S	S	S	
Telecon fittings											

S = suitable
L = limited

Icorene grades																	
1761	1869	1870	1901	2550	3150	3545	3560	3575	3590	3855	4014	5045SL	9106V0	9402	9468	9909	9993
S										S	L						S
S										S	L						S
S										S	L						S
		S								S	S						S
											L						S
																	S
S						S	S	S	S	S	S						S
				S		S	S	S		S		S					S
			S	S										S			
S										S	S			S			S
				S		S	S	S		S							
			S	S										S	S		
			S	S													
				S		S	S	S	S	S							
					S	S	S	S	S	S							
S				S		S	S	S		S							
S				S		S	S	S	S	S							
																	S
L																	S
S						S	S	S		S		S					
S						S	S	S		S							
				S						S							S
																	S
S										S				S			
S						S	S	S	S	S	S						
				S		S	S	S		S							
						S	S	S		S							
						S	S	S		S							
S						S	S	S		S							
S						S	S	S		S							
											S						S
S				S		S	S	S		S							
						S	S	S									

APPLICATIONS PER GRADE		Icorene grades								
		1062	1210	1314	1339	1440	1460	1505	1613	1741
Leisure & Consumer	Flower pots	S								
	Statues etc	S								
	Furniture	S	S			S			S	
	Composters		S							
	Water butt			S	S	S	S		S	S
	Foam boats								S	
	Canoe/boat			S	S	S	S		S	S
	Kayak			S	S	S	S		S	S
	Speakers & Instrument case	S	S	S		S			S	
	Display/Exhibition	S	S			S			S	
	Point of Sale/Shop	S				S			S	
	Pet products		S							
	Spa			S	S		S		S	S
	Mannequins					S				
	Toys/Playground	S	S	S	S	S	S		S	S
Agriculture	Farm containers		S	S	S	S	S		S	S
	Troughs		S	S	S	S	S		S	S
	Shelters		S	S	S	S	S		S	S
	Hoppers etc		S	S	S	S	S	S	S	S
	Chemical spray-tank			S	S	S		S	S	S
Marine	Buoys		S	S			S		S	S
	Pontoon		S	S	S	S	S	S	S	S
	Fish box		S	S					S	
	Fish farm		S	S	S				S	
Industrial	Lamps	S								
	Insulated transit boxes		S	S		S			S	
	Rotolined vessels									
	Food carts	S	S			S			S	
	Pallets			S	S		S	S		S
	Hoppers	S		S	S	S	S	S	S	S
	Refuse bins			S	S	S			S	
	Bin lids					S				
	Food/general bins	S	S			S			S	
	Cleaning machines			S	S	S	S		S	S
	Hospital Medical products	S		S		S			S	
Portable toilets	S		S	S		S		S	S	

S = suitable
L = limited

Icorene grades																	
1761	1869	1870	1901	2550	3150	3545	3560	3575	3590	3855	4014	5045SL	9106V0	9402	9468	9909	9993
					S	S	S	S	S								
					S	S	S	S	S								
S			S	S	S	S	S	S	S	S	S			S	S	S	
				S		S	S	S		S							
S						S	S	S	S	S							
										S		S					
S												S					
S						S	S	S		S		S					
S				S	S	S	S	S	S	S			S				
S				S	S	S	S	S	S	S	S						S
S			S		S	S	S	S	S	S	S					S	S
				S		S	S	S	S								
										S							
S					S	S	S	S	S	S							
S				S		S	S	S	S	S				S	S		
S				S		S	S	S	S	S		S					
S				S		S	S	S	S	S							
S				S		S	S	S	S	S							
																	S
			S	S		S	S	S						S	S		
S			S	S		S	S	S		S				S	S		
				S													
				S													
					S				S		S		S			S	S
S				S		S	S	S	S								
	S	S															
S				S		S	S	S	S								
												S					
S						S	S	S		S		S					
S						S	S	S		S							
S				S		S	S	S	S	S							
S						S	S	S		S							
S					S	S	S	S	S		S						
						S	S	S		S							

Flame Retardant Powder Grades

I LyondellBasell supplies PE based flame retardants (“FR”) powders to a range of specialized applications. These materials are tested to conform to FR standards such as those specified by Underwriters Laboratories (“UL”) in the USA

I For details about test methods/UL certificates, please contact your local LyondellBasell salesperson

Note: Tests for flame retardancy are affected by COLOR.

E.g.: black products perform differently to white products in flame tests.

Wall thickness also has an effect on FR performance.



Color	Icorene	Density	MFI	Characteristics	Typical Applications
Off White color	1761 V2 White 1801	>1	5	UL94 V2 rated flame retardant polyethylene is a creamy white as a standard uncolored material. UV stabilized	Tanks, covers, bins & industrial items required to have flame retardancy
White	1761 V2 White 1802	>1	5	UL94 V2 rated white flame retardant polyethylene UV stabilized	Tanks, covers, bins & industrial items required to have flame retardancy
Black	1761 V2 Black 9004	>1	5	UL94 V2 rated black flame retardant polyethylene UV stabilized	Tanks, covers, bins & industrial items required to have flame retardancy
Off White color	1762 V2 White 1801	>1	5	Non-halogenated UL94 V2 rated flame retardant polyethylene is a creamy white as a standard uncolored material. UV stabilized	Tanks, covers, bins & industrial items required to have flame retardancy
White	1762 V2 White 1802	>1	5	Non-halogenated UL94 V2 rated white flame retardant polyethylene UV stabilized	Tanks, covers, bins & industrial items required to have flame retardancy
Black	1762 V2 Black 9004	>1	5	Non-halogenated UL94 V2 rated black flame retardant polyethylene UV stabilized	Tanks, covers, bins & industrial items required to have flame retardancy
Natural color	9103 GW1	0.943	3.2	Glow wire EN60695/2/12 approved at 750C 3mm	Lighting fixtures
Natural color	9104 GW1	0.935	6	Glow wire EN60695/2/12 approved at 750C 3mm	Lighting fixtures
White	9106 V0 White 1803	>1	na	Non-halogenated UL94 V0 Certified for 5mm flame retardant PE, UV stabilized	Engine housing, machine covers, electrical covers and boxes
White	9134 M3	>1	na	M3 Certified for 5mm flame retardant PE, UV stabilized	Engine housing, machine covers, electrical covers and boxes

Additives for Rotomolding

- LyondellBasell engineers can develop additive systems to help make your products perform better
- Incorporation of the additives can usually be done at the same time as colors are added



Additive	Characteristics	Typical Applications
Anti Algae (AAL)	Reduce marine growth, weed and crustaceans	Sub sea buoys, Navigation buoys
Anti-oxidant (AO)	For extra protection in high temperature processing or long term use	Thick walled parts, hot temperatures
Micro-pellets	For use when dry flow-ability or bulk density of the powder needs to be increased	Intricate tools
Anti-microbial (AMB)	Reduces microbial (bacterial) growth on the product surface. AMB product line passes JIS 2801.2000	Medical or hygiene uses
Anti-static (AS)	Helps to keep dust from sticking to the finished parts. Ask for AS product line	POS or consumer items

Polypropylene Powder Grades

- Polypropylene powders are relatively easy to use for the rotomolding process
- Final parts made in Polypropylene are in general more rigid than LLDPE or HDPE produced parts but typically do not exhibit the same excellent low temperature toughness
- All listed materials are fully UV and heat stabilized for use in rotomolding



Color	Icorene	Density	MFI	Characteristics	Typical Applications
Natural, Black & Colors	4014	0.900	15	Improved stiffness combined with high temperature and scratch resistance	Engine components, small tanks and industrial

Special Effect Powders

- All of the LyondellBasell special effect colors are fully UV and heat stabilized for use in rotomolding
- The most common base is *Icorene 3560*, *Icorene 3590* and *Icorene 3545*



Color	Description	Typical Example	Typical Applications
Millstone granite	Dark colored marble effect		Garden, POS products, spas, small tanks
White marble	Light colored marble effect		Garden, POS products, spas, small tanks
Green marble	Dark colored marble effect		Garden, POS products, spas, small tanks
Pink granite	Light colored marble effect		Garden, POS products, spas, small tanks
Sandstone	Dark colored marble effect		Garden, POS products, spas, small tanks
Terracotta	Swirl effect		Garden planters, pet houses
Sparkle	Sparkle in various background colors including black		Various

Please note, colors may vary from the printed brochure. Please request sample from your Account Manager

Drinking Water Approvals

- Rotomolded items in direct contact with drinking water require additional material and part testing
- These test standards for these approvals vary from region to region. They also require testing individually by color
- All of the listed LyondellBasell materials are fully UV & heat stabilized for use in rotomolding



Color	Icorene	Standard	Country	Density	MFI
Natural	Icorene 1314 NATURAL 0000	WRAS	UK	0.939	3
Natural	Icorene 1613 NATURAL 0000	DGS/VS4	France	0.938	4.5
Natural	HD3930 GRANULES	WRAS	UK	0.939	3
Black	Icorene 1314 BLACK 9001	WRAS	UK	0.939	3
Black	Icorene 1613 BK85	WRAS	UK	0.938	4.5
Blue	Icorene 1613 BLUE 5747	WRAS	UK	0.938	4.5
Black	Icorene 3560 BLACK 9001	WRAS	UK	0.935	5
Black	Icorene 3575 BLACK 9001	WRAS	UK	0.935	7.5

“Designer” Rotomolding Powders

- All of the listed materials are fully UV and heat stabilized for use in rotomolding
- This is a segment of the rotomolding industry which demands very good looks and surface quality
- LyondellBasell supplies a number of specific PE powders that meet these requirements, below are a number of examples: Our powders are used in exciting lighting fixtures where clarity or whiteness is a key attribute
- Customers parts for outdoor furniture and lighting which needs to be free of surface pinholes and pass international flammability standards



Color	Icorene	Density	MFI	Characteristics	Typical Applications
Natural	1062 ESF	0.934	8	Next generation Enhanced Surface Finish and excellent mechanical properties.	Design furniture, hygienic & medical applications
Natural	1761	0.934	6	Medium stiffness mPE, with excellent whiteness and great gloss	Furniture
Natural	3150	0.935	13.0	Extremely high flow LLDPE low pinholes on the surface	Furniture, lighting, intricate moldings
Natural	3590	0.935	9.0	Medium stiffness, high melt flow and low pinholes on the surface	Lighting, intricate moldings
Natural	9104 GW1	0.935	6	Glow wire EN60695/2/12 approved at 750C 3mm	Lighting
Natural	9909	1.2	20	Polycarbonate, glass-clear, UV stabilized. Very high stiffness with built-in flame retardancy	Lighting, point of sale

ABOUT US

LyondellBasell (NYSE: LYB) is one of the largest plastics, chemicals and refining companies in the world. Driven by its employees around the globe, LyondellBasell produces materials and products that are key to advancing solutions to modern challenges like enhancing food safety through lightweight and flexible packaging, protecting the purity of water supplies through stronger and more versatile pipes, improving the safety, comfort and fuel efficiency of many of the cars and trucks on the road, and ensuring the safe and effective functionality in electronics and appliances. LyondellBasell sells products into more than 100 countries and is the world's largest producer of polymer compounds and the largest licensor of polyolefin technologies. More information about LyondellBasell can be found at www.LyondellBasell.com.

For more information, visit lyb.com

Before using a LyondellBasell product, customers and other users should make their own independent determination that the product is suitable for the intended use. They should also ensure that they can use the LyondellBasell product safely and legally. This document does not constitute a warranty, express or implied, including a warranty of merchantability or fitness for a particular purpose. In addition, no immunity under LyondellBasell's or third parties' intellectual property rights shall be implied from this document. No one is authorized to make any warranties, issue any immunities or assume any liabilities on behalf of LyondellBasell except in a writing signed by an authorized LyondellBasell employee. Unless otherwise agreed in writing, the exclusive remedy for all claims is replacement of the product or refund of the purchase price at LyondellBasell's option, and in no event shall LyondellBasell be liable for special, consequential, incidental, punitive or exemplary damages.

Icorene is a trademark owned or used by the LyondellBasell group companies and is registered in the U.S. Patent and Trademark Office.

lyondellbasell
Advancing Possible