



Gryfilen[®]

POLYPROPYLENE



**GRUPA
AZOTY**

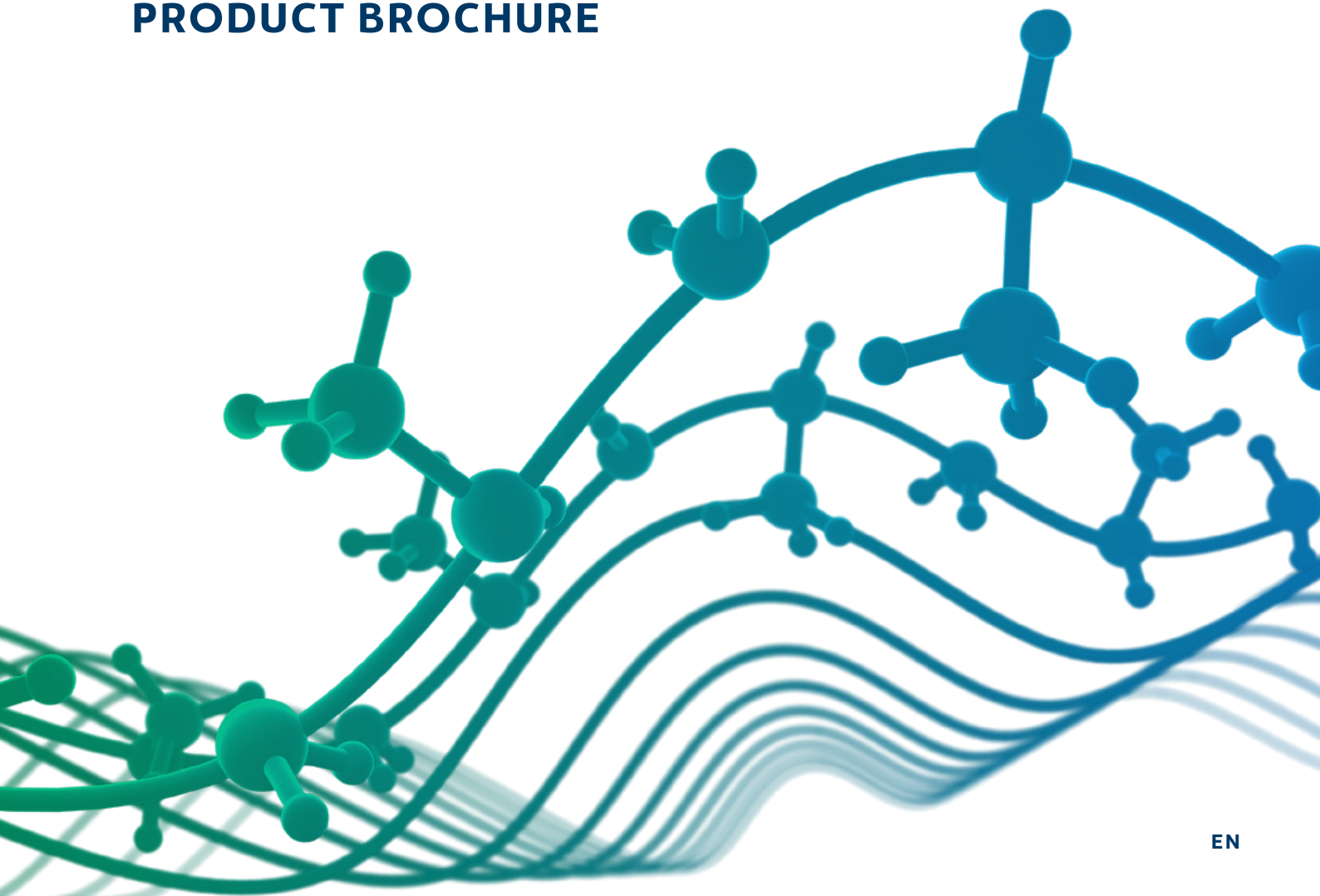
POLYOLEFINS

MADE IN EUROPE

| for European
| leading converters

| for European
| advanced markets

PRODUCT BROCHURE

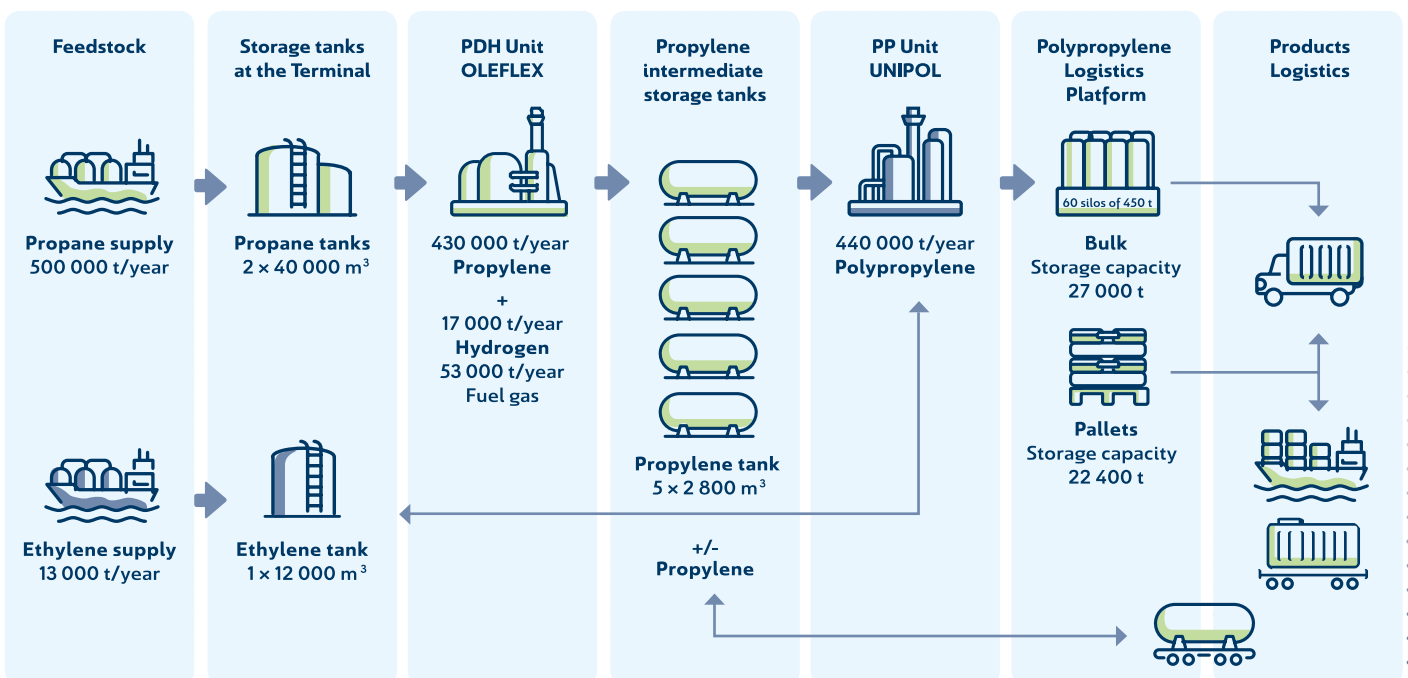


ABOUT POLYOLEFINS COMPLEX PROJECT

Grupa Azoty Polyolefins S.A. executes one of the largest investments in the European petrochemical industry, thanks to which Poland will join the leading producers of polypropylene in Europe. The aim of the project is to build an integrated chemical complex, including a Handling and Storage Terminal, Propane Dehydrogenation Unit (PDH), Polypropylene Production Unit, Polypropylene Logistics Infrastructure, as well as Auxiliary Systems and Interconnections.



POLYOLEFINS COMPLEX PROJECT SCHEME



GRUPA AZOTY STRATEGY FOR 2021-2030

Sustainable development and responsible business practices are of strategic importance to Grupa Azoty. We address the challenges posed to the modern industry by European Green Deal, being proactively involved in projects covering the areas of green energy, emissions reduction or decarbonization. For smooth functioning, we have launched "Green Azoty" project that is based on 3 pillars:

Green Products



Green Technologies



Green Organisation



We understand the gravity of climate change and environmental degradation, which present a major threat to Europe and the whole world. The chemical industry, which is a source of large amounts of greenhouse gas emissions for reasons inherently related to the technologies employed, must take its share of responsibility for slowing down the pace of these changes by striving to achieve carbon neutrality and by investing in green energy and green products. Pro-environmental activities will be carried out within the organization but should increasingly be enforced from our suppliers of feed stocks and intermediate products.

CLIMATE AND ENVIRONMENT

- We mitigate our environmental impact by cutting greenhouse gas emissions and decarbonizing production
- We shift the energy mix towards renewables as alternative green and emission-free sources
- We have developed and are pursuing "Green Azoty" – our strategic corporate project
- We identify and manage climate risks
- We are actively participating in the development of Poland's hydrogen market
- We are developing a Low-Carbon Pathway ("LCP") consistent with Paris Agreement objectives

SUSTAINABLE PRODUCTS

- We guarantee efficient, innovative and environmentally friendly production by prioritising sustainable development
- We strive to identify the carbon footprint of all Grupa Azoty products
- We expand our sustainable product portfolio by promoting efficient use of raw materials and constantly reducing energy consumption in our processes
- We make products designed to support food security

SUSTAINABLE SUPPLY CHAIN

- We strive to identify and estimate our carbon footprint for the purpose of updating our climate ambitions in line with the roadmap set out in the Paris Agreement
- We act and expect our business partners to act in an ethical, socially responsible and environmentally sustainable manner
- We embark on "Operation clean sweep" to protect our environment.

PRODUCT INFORMATION

NOMENCLATURE

Type of polypropylene	
H	Homopolymer
R	Random Ethylene Copolymer
C	Impact Copolymer
T	TPO Resin

Melt flow rate (MFR)	
001 - 009	MFR 0,1 - 0,9
01 - 09	MFR 1 - 9
10 - 99	MFR 10 - 99
≥ 100	MFR ≥ 100

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H 003 - G

Additive package Properties					
G	General Purpose	SAB	Slip and Anti-Block	CL	Clarified
F	General Purpose Film	SAA	Slip, Anti-Block and Anti-Static	N	Nucleated
SL	Slip	AGF	Anti-Gas Fading	PF	Phenol free
AB	Anti-Block	HS	Heat Stabilized	L	Low water carry over
AS	Anti-Static	UV	UV Stabilized	M	Gamma radiation resistant

WIDE RANGE OF PRODUCT PROPERTIES RESPONDING CUSTOMER AND THEIR PROCESSING TECHNOLOGY NEEDS

- Low content of volatiles
- Very good organoleptic properties (low migration of taste and odour)
- Excellent optical properties of random copolymers (high transparency and gloss)
- Excellent stiffness-impact balance of impact copolymers
- Phthalate-free product (production based on the 6th generation catalyst)
- Excellent product consistency guaranteeing stable processing

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POLYPROPYLENE HOMOPOLYMER

Name	Melt Flow Rate	Flexural Modulus	Tensile Strength at Yield	Tensile Elongation at Yield	Charpy Impact Strength	HDT	Process	Main properties / Application
	ISO 1133-1	ISO 178	ISO 527-1, -2	ISO 527-1, -2	ISO 179	ISO 75-1/75-2		
	g/10min	MPa	MPa	%	kJ/m ²	°C		
H003-HS	0,35	1600	37	8	7,0	-	Extrusion Non-pressure pipe	Good heat and chemical resistance with excellent stiffness suitable for non pressure pipes, rods, fittings, profiles, punching boards, filter plates, blow molded parts.
H02-L	2	1600	34	8	4,1	104	Extrusion Raffia	Excellent stiffness, good processability. 'Low water carry over' formulation for monofilaments and tapes.
H03-N	3	1850	31	6	4,0	95	Extrusion Thermoforming	Nucleated, very high stiffness and transparency, high gloss and good dimensional stability.
H03-F	3,4	1450	33	9	3,5	104	Extrusion BOPP Film	Suitable for metallized film, both to monolayer and co-extruded structures. Good optical properties, easy processability and very good thickness distribution.
H04-L	3,5	1600	37	8	3,6	104	Extrusion Raffia	Excellent stiffness, good processability. 'Low water carry over' formulation for monofilaments, ropes and tapes.
H09-F	8,8	1540	36	8	3,2	104	Extrusion CPP Film	Good processability with good optical properties.
H12-G	12	1550	36	7	3,0	104	Injection Molding	Intended for consumer packaging and houseware applications.
H12-AGF	12	1600	37	7	2,7	-	Extrusion Staple Fibre	Excellent stiffness and tensile strength, intended for the production of continuous filaments and fine denier staple fibers. 'Anti-gas fading' formulation.
H12-NAS	12	1700	37	7	2,7	110	Injection Molding	Nucleated, good stiffness-impact balance, intended for consumer packaging and houseware applications. 'Anti-static' formulated for improved demolding.
H25-NAS	25	1650	37	7	2,3	-	Injection Molding	High stiffness, intended for caps and houseware containers. 'Anti-static' formulated for improved demolding.
H25-AGF	25	1350	34	7	2,3	104	Extrusion Spunbond	Very narrow molecular weight distribution, with high tenacity especially designed for spunbond nonwovens. 'Anti-gas fading' formulation.
H35-NAS	35	1800	35	7	2,0	110	Injection Molding	Nucleated, high stiffness, medium flow with good processability, intended for houseware articles, caps, closures, containers and toys. 'Anti-static' formulated for improved demolding.
H50-NAS	50	1800	35	6	2,0	110	Injection Molding	Nucleated, high flow and high stiffness. intended for thin-wall houseware articles and containers. Excellent processability allowing fast cycle times. 'Anti-static' formulated for improved demolding.
H60-NAS	60	1800	36	-	2,0	-	Injection Molding	Nucleated, high flow with good stiffness-impact balance, intended for houseware items and small appliances. 'Anti-static' formulated for improved demolding.



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POLYPROPYLENE IMPACT COPOLYMER

Name	Melt Flow Rate	Flexural Modulus	Tensile Strength at Yield	Tensile Elongation at Yield	Charpy Impact Strength	HDT	Process	Main properties / Application
	ISO 1133-1	ISO 178	ISO 527-1, -2	ISO 527-1, -2	ISO 179	ISO 75-1/75-2		
	g/10min	MPa	MPa	%	kJ/m ²	°C		
T004-NHS	0,4	1500	31	7	70	100	Extrusion Non-pressure Pipe	Nucleated, excellent stiffness-impact balance, intended for solid and structured wall pipes for underground drainage and sewage systems.
T01-N	1,4	1350	28	7	70	102	Extrusion Sheet & Board	Very good stiffness-impact balance, excellent processability, intended for sheet and corrugated board applications.
T03-N	2,5	1100	23	-	65	-	Extrusion Compounding	Nucleated, very high impact resin with exceptional impact-stiffness balance, intended for highly demanding applications such as storm water management systems, sheets, household products, automotive articles and appliances.
C04-G	4	1415	28	6,5	13	96	Injection Molding	High impact, excellent stiffness-impact balance, intended for houseware items, crates and pails.
C07-NSL	7	1510	29	6	9	-	Injection Molding Caps & Closures	Nucleated with very good impact-stiffness balance. Formulated with a low coefficient of friction additive package specifically designed for injection molding closure applications.
C12-N	12	1320	24	6	12	97	Injection Molding	Nucleated, medium flow with good stiffness-impact balance, intended for houseware items and small appliances.
T20-N	20	900	18	5,5	63	70	Extrusion Compounding	Nucleated, medium flow and very high impact, intended for high impact demanding applications as well as building block for automotive and appliance compounding.
C22-NAS	22	1380	25	5,5	10	104	Injection Molding	Nucleated, medium flow with good stiffness-impact balance, intended for toys, furniture and containers. 'Anti-static' formulated for improved demolding.
C45-NAS	45	1250	25	4,5	7,3	103	Injection Molding	Nucleated, medium flow, intended for pails, containers, housewares, toys and closures. 'Anti-static' formulated for improved demolding.
C55-NAS	55	1250	25	4	6,4	103	Injection Molding	Nucleated, high flow, intended for pails, containers, housewares, toys and closures. 'Anti-static' formulated for improved demolding.
C75-NAS	75	1300	25	4	4,1	103	Injection Molding	Nucleated, high flow resin with excellent stiffness-impact balance, intended for high speed injection molding of thin-walled containers, housewares and toys. 'Anti-static' formulated for improved demolding.
C100-NAS	100	1250	26	4	3,2	103	Injection Molding	Nucleated, very high flow, especially intended for high speed injection molding of very thin-walled containers. 'Anti-static' formulated for improved demolding.



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POLYPROPYLENE RANDOM COPOLYMER

Name	Melt Flow Rate	Flexural Modulus	Tensile Strength at Yield	Tensile Elongation at Yield	Charpy Impact Strength	HDT	Process	Main properties / Application
	ISO 1133-1	ISO 178	ISO 527-1, -2	ISO 527-1, -2	ISO 179	ISO 75-1/75-2		
	g/10min	MPa	MPa	%	kJ/m ²	°C		
R08-F	8	760	25	9	7,0	81	Extrusion CPP Film	Barefoot additive package, good processability, high clarity and gloss, softness and good heat sealing.
R20-CLAS	20	1100	27	9	6	83	Injection Molding	Medium flow, clarified with excellent optical properties, intended for consumer packaging and houseware articles requiring very high transparency and excellent organoleptic properties. 'Anti-static' formulated for improved demolding.
R50-CLAS	50	1070	28	9	5,4	-	Injection Molding	High flow, clarified with excellent optical properties, intended for consumer packaging and houseware articles requiring very high transparency and excellent organoleptic properties. 'Anti-static' formulated for improved demolding.
R70-CLAS	70	1100	30	5	4,5	-	Injection Molding	Very high flow for very fast cycle times, clarified with excellent optical properties and excellent organoleptic properties, intended for thin-wall houseware articles and containers with a complex geometry. 'Anti-static' formulated for improved demolding.
R100-CLAS	100	980	28	4	5	-	Injection Molding	Very high flow for very fast cycle times, clarified with excellent optical properties and excellent organoleptic properties, intended for thin-wall houseware articles and containers with a complex geometry. 'Anti-static' formulated for improved demolding.





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