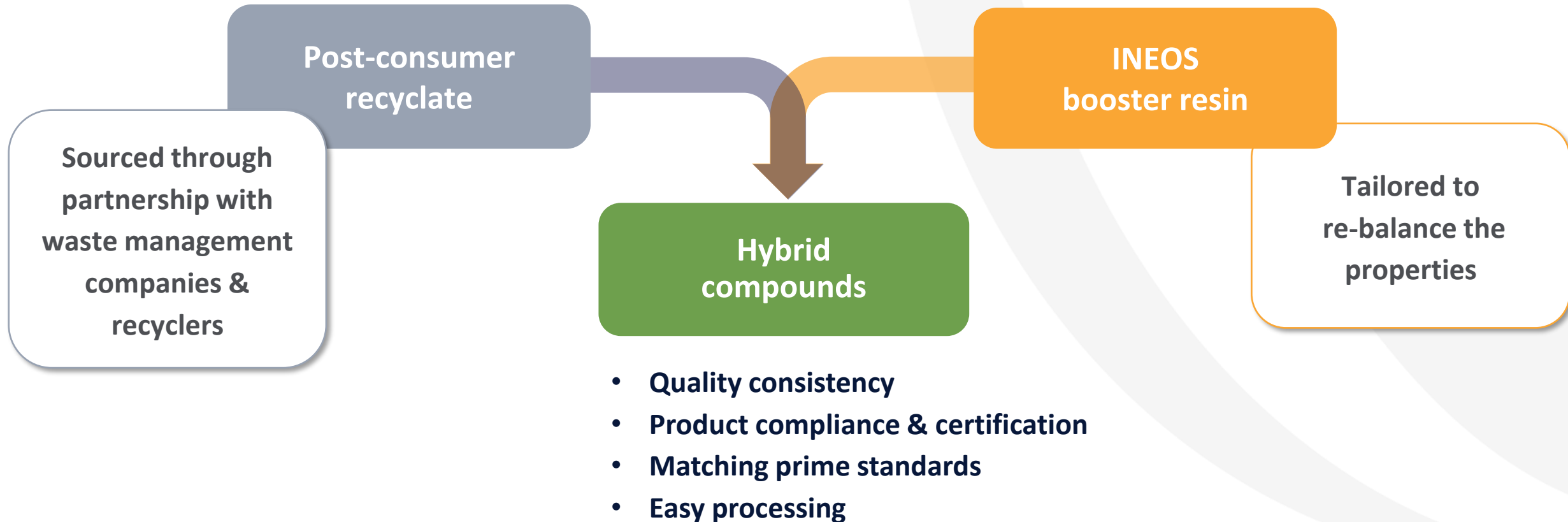


INEOS **Recycl-IN** Solutions – Upgrading PCR



Recycl-IN hybrids – the INEOS approach



Why using Hybrids solutions?

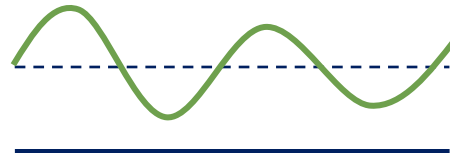
Fit for purpose

- Carefully sourced PCR
- Upgraded with INEOS booster
- In-depth application knowledge



Quality & Consistency

- Virgin-like QC
- Fully homogeneous blends
- Minimizing inherent PCR variations



Certifications

- PCR: ISO 14021
- Certified PCR-content
- No further blending required on your site



EuCertPlast

Recycl-IN

INEOS Hybrids portfolio – covering the full range

rPP

- 9 hybrids for injection & extrusion
- Including virgin-like natural grades

rHDPE

- 4 hybrids for blow-molding
- 4 hybrids for caps & closures

r(L)LDPE

- 5 hybrids for flexible packaging
- Providing solutions for a full structure

rPP grades

Natural Recycl-IN rPP-hybrids for Injection

		HPP		RCP		
Properties	standard	rPP1013	rPP1025	rPP2013	rPP2028	rPP2030
PCR-content (%)	-	70	50	70	70	70
Melt index 230°C/2.16 kg (g/10 min)	ISO 1133-1	13	25	13	26	30
Flexural Modulus (MPa)	ISO178	1300	1800	1100	1100	1150
N. Izod at 23°C (kJ/m²)	ISO 180/A	4	3	4.2	4	3.5
N. Izod at -20°C (kJ/m²)	ISO 180/A	-	-	-	-	-
colour		natural	natural	natural	natural	natural

Natural Recycl-IN HDPE-hybrids for Extrusion & blow-molding

Properties	standard	rPP1002	rPP1003	rPP4002
PCR-content (%)	-	70	60	70
Melt index 230°C/2.16 kg (g/10 min)	ISO 1133-1	2.5	4	2
Flexural Modulus (MPa)	ISO178	1500	1500	1450
N. Izod at 23°C (kJ/m²)	ISO 180/A	4.3	4	8
colour		Natural	Natural	Natural
Applications		Extrusion & Blow- molding non-food	BOPP (double- bubble process) non food	small blow- moulding, Sheet extrusion, corrugated pipes

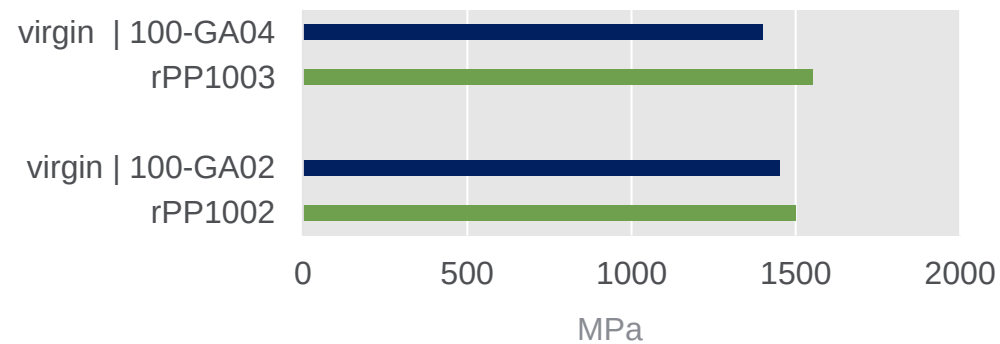
Grey Recycl-IN PP-hybrids for injection

Properties	standard	HPP	ICP
		rPP1015 GY1	rPP4015 GY1
PCR-content (%)	-	65	65
Melt index 230°C/2.16 kg (g/10 min)	ISO 1133-1	15	15
Flexural Modulus (MPa)	ISO178	1550	1400
N. Izod at 23°C (kJ/m²)	ISO 180/A	3.5	6.0
N. Izod at -20°C (kJ/m²)	ISO 180/A	-	-
colour		light grey	dark grey

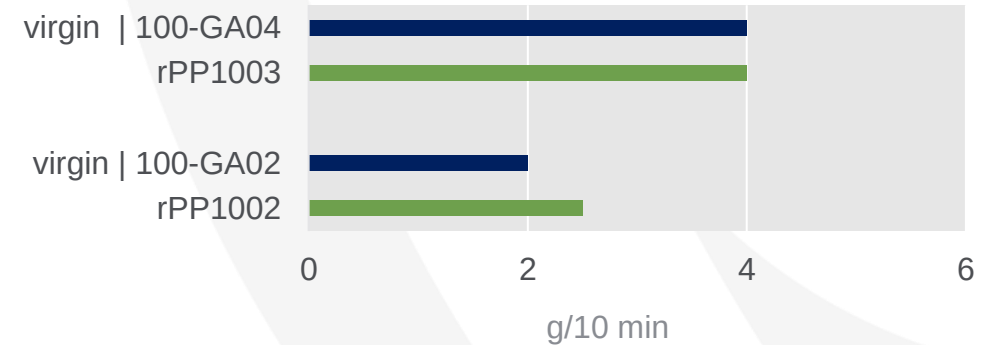
Property profile similar to virgin

- / Similar flow
- / Equal stiffness
- / Matching impact resistance

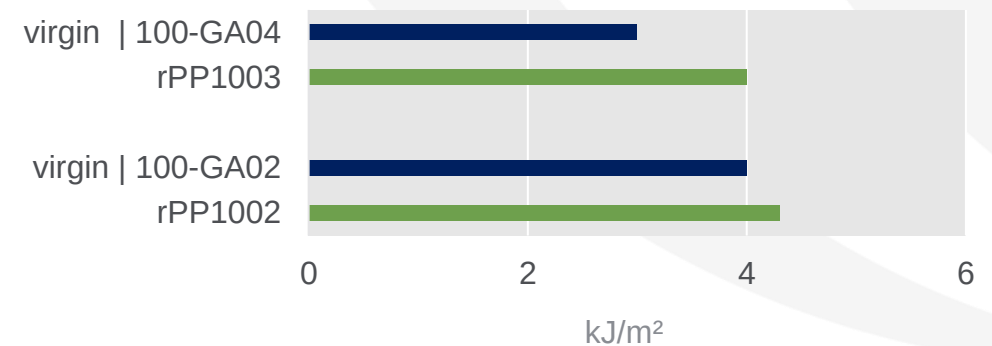
Flexural Modulus



MFR (2.16 kg, 230°C)



Notched Izod impact at 23°C



rHDPE grades

Recycl-IN HDPE-hybrids for caps & injection

Properties	standard	rHD5620GY1	rHD5620BK	rHD5620GN1
PCR content (%)		50	50	50
Melt flow rate, 190°C, 2.16 kg (g/10min)	ISO 1133-1	1.8	1.8	1.8
Density	ISO 1183-1	956	956	956
Enviromental stress cracking resistance (ESCR)	40°C, 6 bar, 10% Igepal Ineos Test method	16	16	16
Charpy impact, 23°C	ISO179	4.3	4.3	4.2
Colour	-	Dark grey RAL5008	Black RAL9005	Dark green
Applications		Non-food caps & closures, injection molding of technical parts, crates		

Recycl-IN HDPE-hybrids for blow-moulding

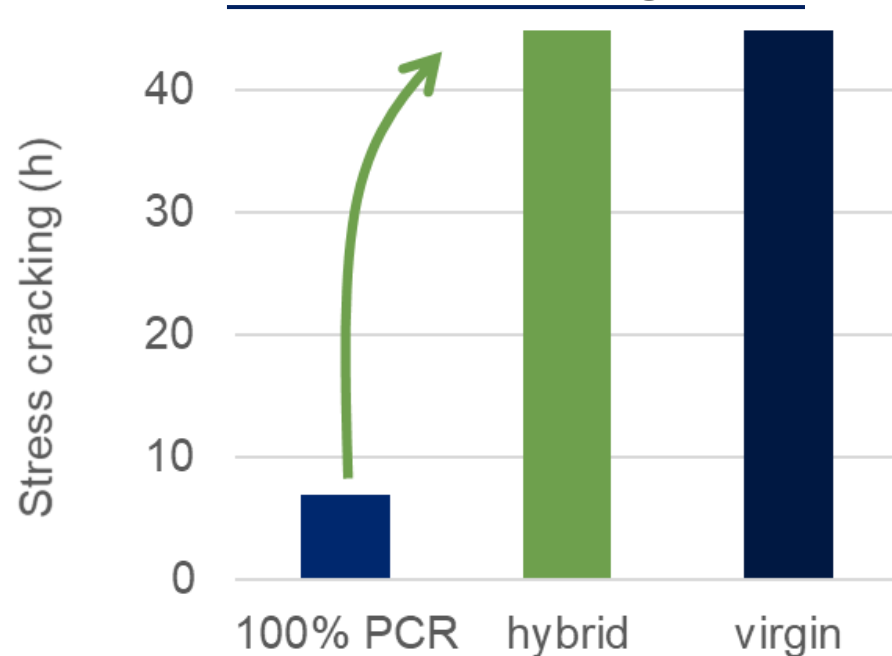
Properties	standard	rHD5402	rHD5603	rHD5402GY1	rHD5402WT
PCR-content (%)	-	50	50	50	50
Melt index 230°C/2.16 kg (g/10 min)	ISO 1133-1	0.2	0.3	0.2	0.2
ESCR	FNCT, 50°C, 5 MPa, 2% Arkopal	>45	25	25	35
N. Izod at 23°C (kJ/m²)	ISO 180/A	12	tbc	7	6.5
Density (kg/m³)	ISO1183	954	tbc	965	970
Colour		Natural	Pearl	Dark grey	White
Applications		Bottles ≤ 10 L stiffness enhancer co-ex film	Bottles ≤ 10 L	Bottles ≤ 10 L	Bottles ≤ 10 L

Blow Moulding

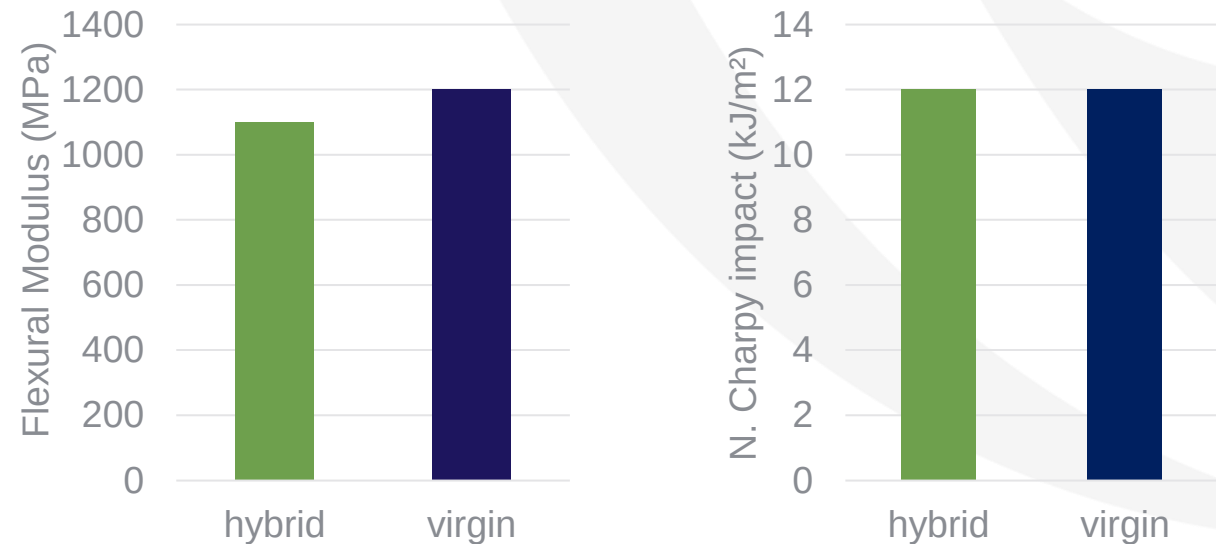
rHDPE with High end ESCR

- > 50% PCR-content
- 34% carbon footprint savings
- Natural coloured
- High stress-crack resistance

Stress cracking



Mechanical properties



r(L)LDPE grades

Flexible Films Hybrids Applications

- **Primary packaging** for non food
 - Refill pouches, powder doypacks
 - FFS heavy duty sacks
- **Secondary packaging**
(typically collation shrink)
- **Tertiary packaging**
(film for palletisation, hoods, liners, bottom sheets)
- **Mail packaging** (flexible mailers)
- **Construction** protective films

Recycl-IN r(L)LDPE-hybrids

A large, commercially available portfolio

Product	Properties	MFR	Density	PCR content (%)	Majority component (> 60%)	Applications
	Conditions	190°C 2,16kg	23°C			
	Methods	ISO1133	ISO1183			
	Units	g/10min	Kg/m3			
rLLDPE	rLL9110	1,6	914	60	LLDPE	Film lamination, heavy duty bags, industrial
rLLDPE	rLL9610	1.2	927	70	LLDPE	Film lamination, rigid layer in coex, heavy duty bags, industrial
rLLDPE	rLL9210	1,3	921	60	LLDPE	Blown stretch
rLLDPE	rLL9125	2,3	918	60	LLDPE	Cast stretch, masterbatches
rLDPE	rLD23E760	0,55	925	60	LDPE	Shrink films, shrink hoods, heavy duty films
rHDPE	rHD5402	0,2	954	50	-	Stiffness enhancer in coex films

Application Example: Tertiary Cast Stretch films (30% PCR)

- Medium Stretch – Stretch Ratio up to 150%
- 3-7 Layers, A/B/C (1/2/1 ratio)
- rLL9125, 60% PCR
- Total PCR content: 30%



rLL9125 Puncture Resistance in line with LLDPE 918 density



Well balanced MD/TD Tear Resistance for rLL9125
Similar to LL 918 & mLL 919



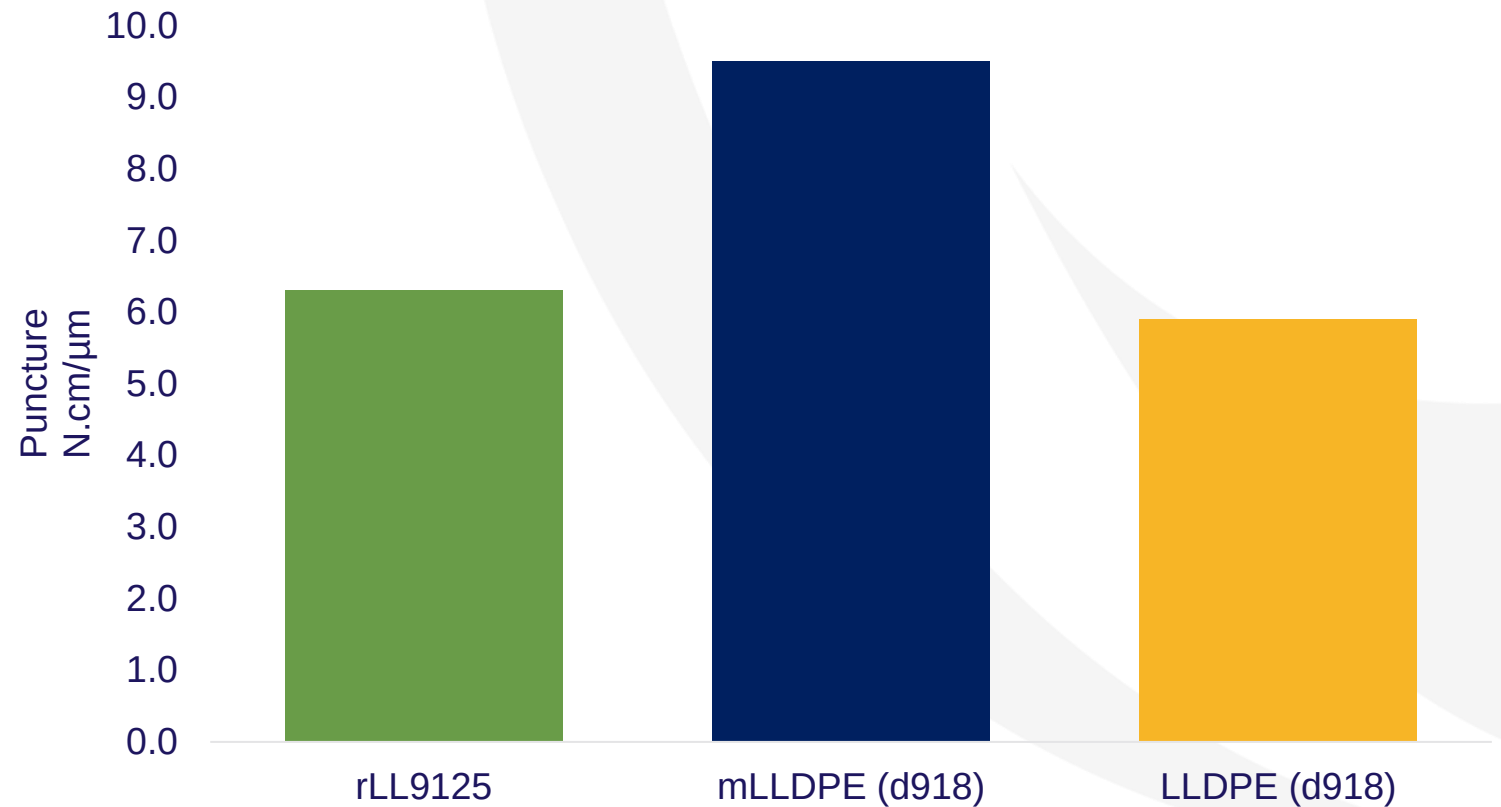
Optical properties in line with Reference LL 918

rLL9125: Drop in solution vs virgin LLDPE 918 in cast stretch

Performance Example: rLL9125 for cast film



Resistance to puncture



Puncture resistance in line with virgin reference

TDS, MSDS and regulatory information

- on-line accessible.
- rPP grades
 - [Homo-polymer](#)
 - [Random Copolymers](#)
 - [Impact copolymers](#)
- rHDPE grades - [link](#)



About us

INEOS is one of the world's largest chemical companies, founded in 1998. INEOS Olefins & Polymers Europe is a leading producer of olefins and polyolefins.

INEOS Olefins & Polymers Europe offers a full range of high value polyolefins solutions for market applications such as food and industrial packaging, pipe and automotive through dedicated sales, and technical service teams.

INEOS is a safe and environmentally responsible company. We are engaged in developing our sustainable agenda to improve our operations and to implement sustainable solutions for our customers. This includes products that offer lightweighting, energy efficiency, durability (extended lifetime) or conservation of resources. We care.

ECC EXCELLENCE
Our sustainable journey

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