Sustainable Plastics

www.TERplastics.com

TER | plastics

Sustainable Plastics

Close the loop.
Together.

About TER Plastics Polymer Group

For more than 45 years TER Plastics offered its partners and customers across Europe reliable and future-oriented solutions in the field of advanced engineering plastics and commodity plastics.

Recent years have shown that the world is moving ahead with much greater focus on sustainability, circular economy and environment awareness – especially with regards to industries using plastics.

In order to meet the growing market's needs and expectations, TER Plastics is constantly expanding its portfolio to include products that will further support the customers' needs in designing the most sustainable solutions by providing high quality recyclates or mass-balanced polymer products that are built on using plant-based and recycled oils.

ISCC PLUS CERTIFIED SUSTAINABILITY

■ ISCC PLUS

The end result of a mass-balanced production process is a polymer indistinguishable from prime grades in terms of chemical composition, properties and analytics. However, this means that the origin from sustainable raw materials cannot be verified by material testing and therefore the sustainability, traceability, and mass balance requirements must be monitored by an external body. The ISCC (International Sustainability & Carbon Certification), which is voluntary, enables all companies throughout the supply chain to transparently trace back the material flow through the entire complex value chain.

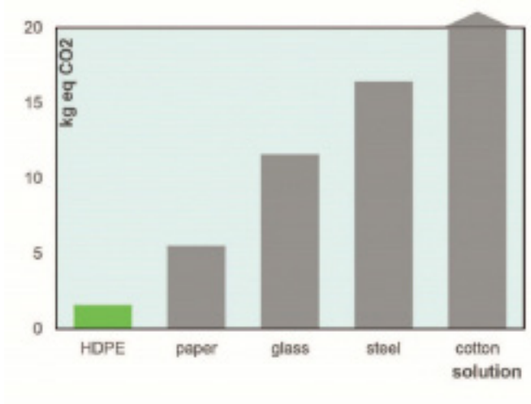
TER Plastics, following a successful audit by DQS GmbH specialists, has received the ISCC plus certification for the marketing and distribution of certified polymers made from renewable or recycled raw materials.

ISCC
International Sustainability & Carbon Certification

Reducing the environmental footprint with TER Plastics

■ **Carbon-footprint of Plastics**

In contrast to common opinion, plastic solutions for packaging and components almost always carry less environmental impact in regard to greenhouse gasses emissions, as compared to alternative materials.

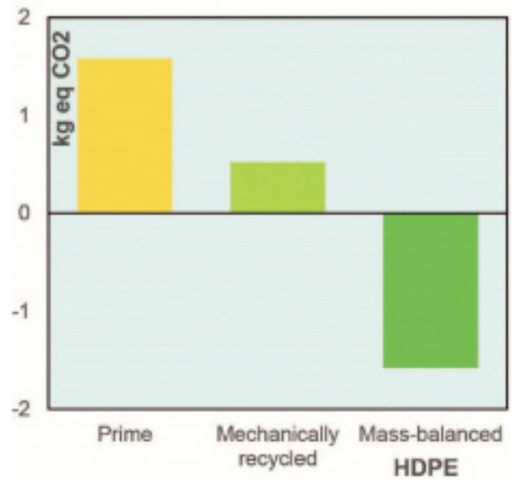


The carbon footprint of plastics can be further reduced by 70%, if mechanically recycled plastics are used instead of prime grades. Changing to mass-balanced plastics evens results in reversing the greenhouse gas emissions, as the complete production process ends up with negative value of CO2 emissions .

■ **Necessity of Plastics Recycling**

As already described, the obstacle to sustainability of plastics is not their carbon-footprint. Instead, the major challenge is the time of remanence of plastic wastes in the environment once they have been dumped onto land or into the sea. To tackle this shortcoming, plastics industry has to set up a circular economy for plastics.

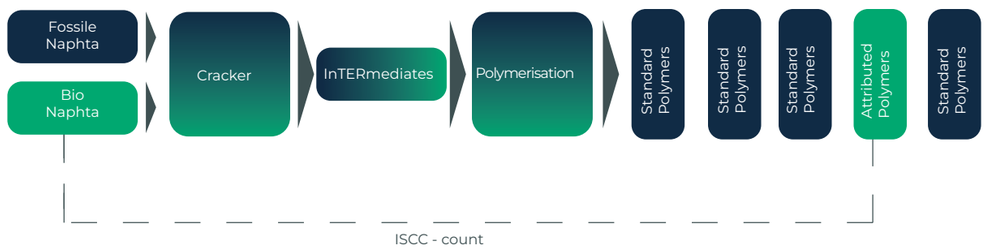
The way forward is to give plastic waste a value, so that it is too precious to be discarded into the ambiance and gets collected instead. Once collected, it can get sorted, cleaned and recycled into new grades of plastics and newly be sold into the plastics market.



Mass Balanced Plastics at TER Plastics

Mass Attribution

Mass-balanced plastics are created in a process that utilizes sustainable plant- and recycled-oil-based materials mixed with standard fossil raw materials. The amount of co-fed monomers from renewable sources is afterwards attributed to specific lots of polymers.



Biobased Grades at TER Plastics

TER Plastics' customers can now purchase sustainable ISCC plus-certified polymers from its distribution partners Versalis, TotalEnergies and Envalior, among others.
This includes the grades in TER Plastics' current portfolio of:

- PP, PE, PS,
- EcoPaXX®, For Tii®, Stanyl®, Akulon®
- Arnitel®
- Chemiton® Life

Recycling Plastics at TER Plastics

Recycling Methods

Recycling methods can be grouped by how much the molecular structure of the original material is changed during the recycling process. From strong to low interference, the groups are:

- Molecular Recycling, where the plastics' molecules are reused for other substances,
- Monomeric recycling, which contains the many approaches for chemical recycling,
- Polymeric recycling, where the solcent-based recycling methods can be grouped, and
- Material recycling, which mainly covers the mechanical recycling of plastics.

Inside the mechanical recycling, two ways of collection are currently distinguished:

- PIR is the collection of plastic wastes as they emerge next to the manufacturing or processing line. If handled properly, similar-to-prime, very clean and grade-specific qualities can be achieved.
- PCR is the collection of any plastics part that has already been used, no matter in what business relationship, at what location and by which collecting scheme. Food-packaging-approved qualities only can be achieved under very specific collecting conditions. A typical PCR-grade is not grade- or colour-specific and only applicable for general use parts.

Mechanically Recycled Grades at TER Plastics

TER Plastics represents more than 45 years of experience in mechanical recycling of the TEREZ ECO product range. Based on this expertise, TER Plastics has lately expanded its range of commodity plastics to include a full portfolio of PIR and PCR regranulates with 100% recycling content. These grades are bundled under the own brand:

terXene® eco

This portfolio is complemented by partial recyclates of PE from Versalis, Total, LG, and others, so that the total range currently encompasses:

- TEREZ® Eco
- G-Blend™
- Longlite®
- Polylan®
- TERXene® eco
- Versalis Revive, Total rHDPE and LG rLLDPE

EcoPaXX®, For Tii® Stanyl®, Akulon®
Biobased | Biomass Balanced

■ **EcoPaXX®**

EcoPaXX® is a high-performance, aliphatic, bio-based polyamide that combines the advantages of typical short- and long-chain polyamides. These include low moisture absorption and high mechanical properties. EcoPaXX® has a very wide range of applications. It can even be processed in existing PA 66 molds.

- 30% lower moisture absorption than PA66 with higher mechanical performance
- Excellent surface finish
- Approx. 70% bio-based

■ **Automotive**

■ **Engine compartment cover**

EcoPaXX® PA410 offers ideal conditions for engine compartment covers due to its high temperature resistance (higher than PA6), excellent surface finish and low warpage. EcoPaXX® PA410 stands for more sustainable solutions compared to PA 66 and PA 6. It stands out for its carbon footprint (70% bio-based).

■ **Drinking water applications**

■ **Mixing valve**

EcoPaXX® PA410 features high toughness, as well as improved adhesion, high hydrolytic stability (NSF61 hot water certified) and its excellent dimensional stability. The up to 70% bio-based content results in sustainable product solutions.

- **Building area**
- **Window profiles**

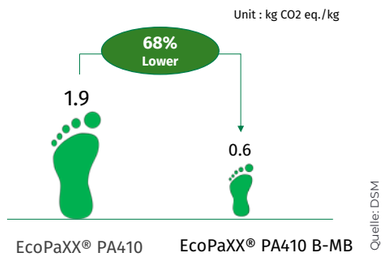
EcoPaXX® PA410 enables new lightweight construction potentials compared to conventional aluminum window profiles. Due to its high melting point of 250 °C, EcoPaXX® PA410 is ideally suited for the powder coating process.

- **Food applications**
- **Kitchen gadgets**

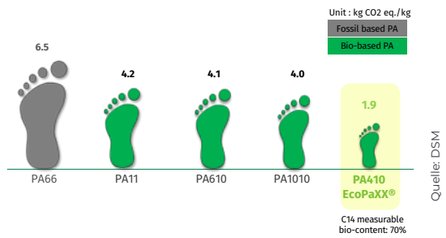
EcoPaXX® PA410 is suitable for use at high application temperatures. The molding surfaces are easy to clean and thus contribute to high hygiene standards. EcoPaXX® PA410 complies with the regulations for contact with foodstuffs. In direct comparison with PA 66, it features a low oligomer content.

- **Carbon footprint**

Mass balancing can increase bio content to 100% and further lower carbon footprint.

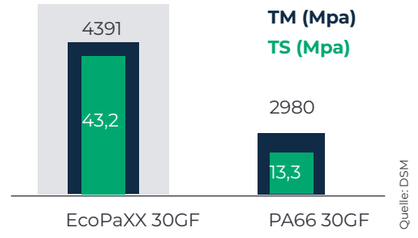


EcoPaXX® has the lowest carbon footprint amongst polyamides.

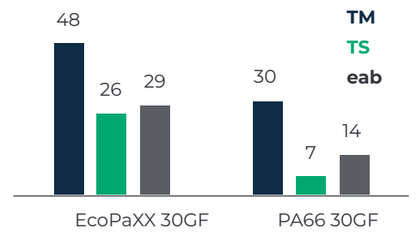


- **Water-Glycol Ageing**

Tensile properties after 1000 hrs water/glycol (50/50) ageing at 135 °C



% retention afTER 1000 hrs water/glycol (50/50) ageing at 135 °C



- **B-MB + ECO**

Stanyl® takes the sustainability route with two material solutions:

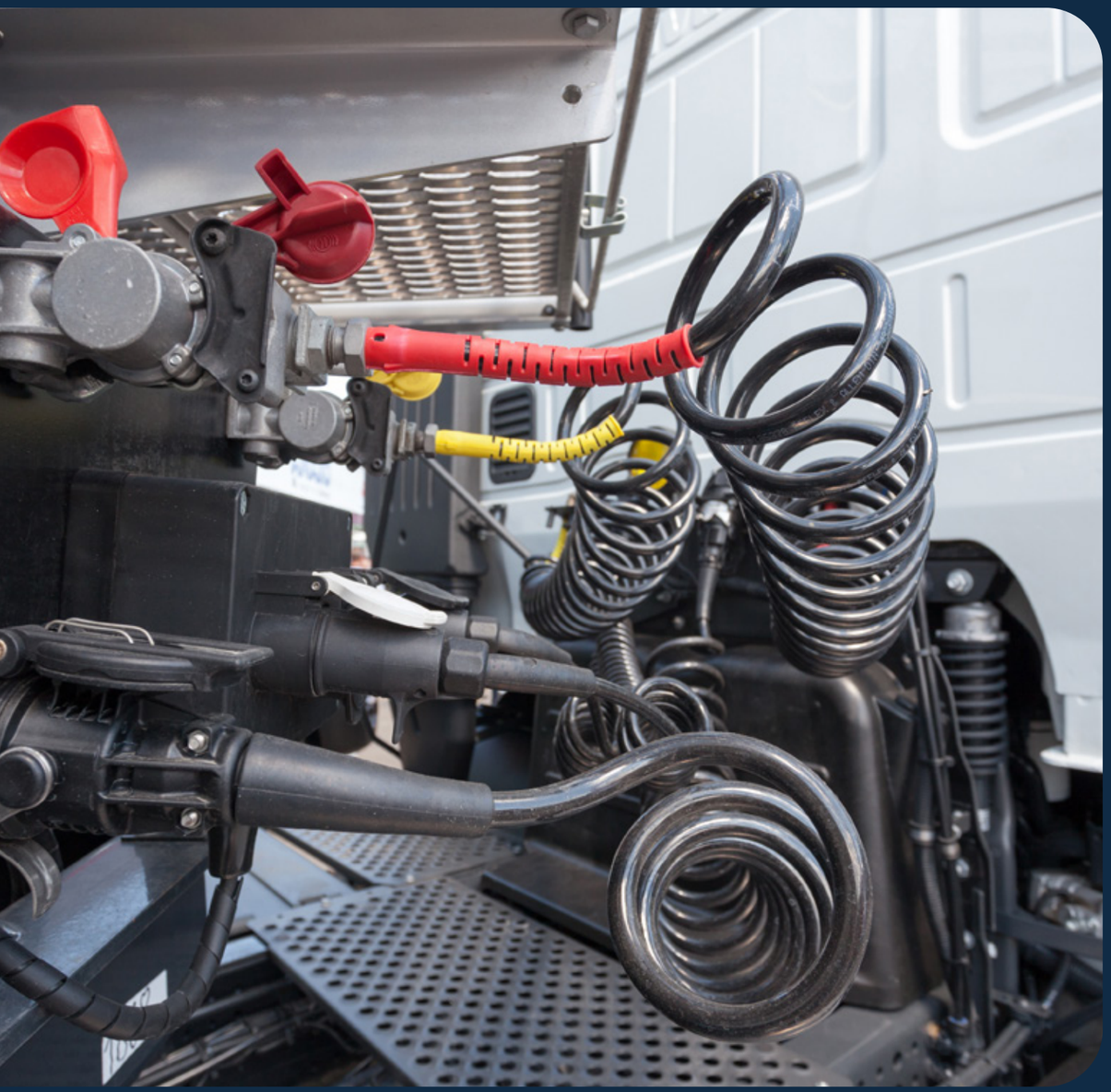
- Stanyl® ECO with biodegradable raw materials.
- Stanyl® B-MB via bio-based mass balancing.

Stanyl® ECO is a new series of Stanyl® with raw materials partly derived from castor oil. Stanyl® ECO retains the classic advantages of Stanyl in terms of high flowability, toughness at high temperatures, wear and friction resistance. Additional properties include a high-gloss surface appearance, high dimensional stability and sustainability.
Stanyl® ECO and Stanyl® B-MB (Biomass Balanced). Both bio-based solutions enable the transition from fossil raw materials to the use of renewable energy sources while reducing the carbon footprint of our materials. In this way, we help our customers to reduce their own CO_2 footprint.

- **ForTii® Eco E11**

has an excellent balance in flow, toughness and stiffness with superior processing performance for injection molding. It has improved toughness and is suitable for SMT processes. Eco E11 has a high electrical RTI rating of 150°C at 0.75 mm and has CTI 600V. Eco E11 is Eco-friendly due to its partly bio-based content

Arnitel® Biobased

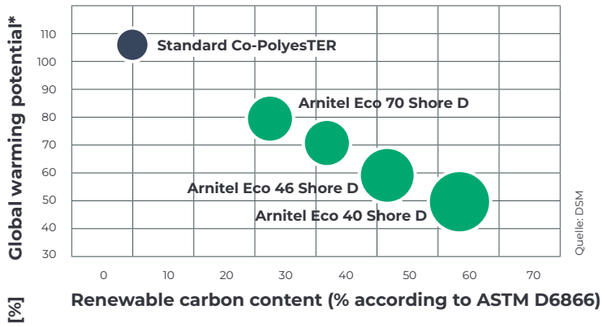


■ **Arnitel® ECO**

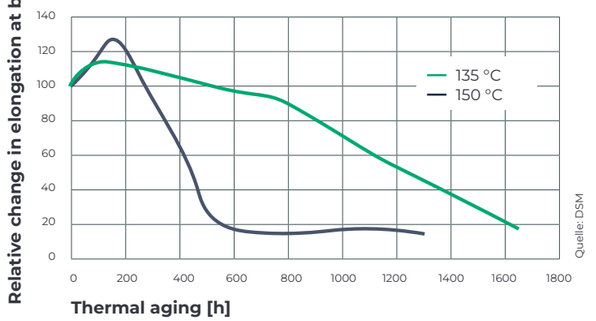
Arnitel® ECO is a bio-based thermoplastic co-polyester (TPC). The material consists of up to 50% from renewable raw materials, based on rapeseed oil instead of mineral oil. Arnitel® ECO (available in four shore hardnesses) is ideal for demanding applications ranging from heat-resistant films and consumer electronics to sports equipment and furniture.

- Carbon footprint reduced by up to 40 % compared to conventional co-polyesters.
- Temperature resistance up to 200 °C
- First-class properties after heat ageing
- Reliable solutions in cable applications, machine and motor controls

Arnitel® Eco proven sustainable technology



Thermo-oxidative aging in air Arnitel® Eco 55 ShoreD



Chemiton® Life
Biobased

Franplast

FRANPLAST takes the next step towards sustainable thermoplastic elastomers with Chemiton® Life.
Chemiton® Life grades are the first bio-based TPEs from FRANPLAST.
The trend towards environmentally friendly or sustainable thermoplastic elastomers has gained tremendous momentum in some industries in the consumer and also automotive sectors, for which sustainable solutions are now available.
Chemiton® Life elastomers are made from renewable raw materials (cane sugar) which are a good alternative to fossil raw materials.

Main features
- Bio-based content from 20% to >60%
- Available hardness from ShoreA 30 to ShoreD 50
- Light whitish natural color
- Very odorless
- Density 0.88 gr / cm^3

Biobased TPE
Process:
- Injection molding and extrusion

Main markets:
- Household appliances (also food contact)
- Consumer goods

Conformity:
- Compliant with 10/2011 / CE (except for fatty food), 1907/2006 / CE REACH Annex XIV and XVII, ROHS, RAEE, WEEE, ELV

Serie	biobased%	Density (g/cm3)	Hardness range (Shore A/D)	Fluidity	Aspect	Normatives	Additional info
LFB	40%	0,89	30A-95A	low	translucent, unfilled	Reach, Rohs, EN71, FDA, EU10/2011	for injection moulding and extrusion
L6B	60%	0,89	25A-80A	low	translucent, unfilled	Reach, Rohs	for injection moulding and extrusion
LPA	40-55%	0,94-1,04	50A-80A	low	matte, unfilled	Reach, Rohs	for injection moulding and extrusion, 2K onto ABS, PC, ASA, PMMA
LSA	60%	0,98-1,05	65A-85A	medium	glossy, unfilled	Reach, Rohs	for injection moulding, 2K onto ABS, PC, ASA, PMMA

Duracon® Bg-Pom
Biomass-based

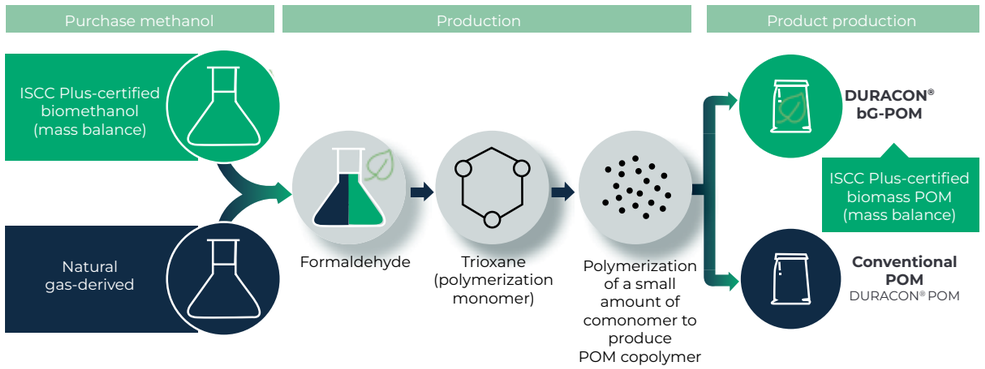
Polyplastics

Biomass-Generation Plastics

Polyplastics follows the global efforts to reduce atmospheric CO2 emissions. The aim is to achieve CO2 neutrality. Conventional POM is mainly produced from methanol, which is obtained from natural gas. DURACON bG-POM is produced from methanol made from biomass-based raw materials.
During the entire manufacturing process of DURACON bG-POM, the bio-based raw material results in a CO2 reduction of up to 60% compared to conventional POM. The quality of both types of methanol used fulfils inTERnational requirements, which means that the quality of both DURACON POM types is equivalent.

ISCC Plus
DURACON bG-POM is certified by the ISCC as a 'bio-based POM'. Certification by this widely recognised biomass certification system stands for sustainability along the entire value chain - from the raw material to the dispatch of the finished polymer.

DURACON® bG-POM production process



From resource extraction to product creation, CO_2 emissions reduced by up to 60%

- **Key Facts**
- Bio based feedstock using mass balance production method
- ISCC certified
- M90-57 WK2001BG und M270-57 WK2001 BG FDA and EU 10/2011 compliant
- Up to 60% reduction in CO2 emissions vs conventional POM

Commodities
Biobased

Bio-Based Polyolefine

Bio Based
Plastics

Producer	Brand/Material	Product
TotalEnergies	Polyethylen Polypropylen Lumicene® Finalloy® Aceso® Polystyrol	HDPE PPH, PPC, PPR mPP, mPE PP Automotive Compounds PP for medical technology PS-GP, PS-HI, PS-FR
versalis	Clearflex® BA / BCA Edistir® BA / BCA Eraclene® BA / BCA Flexirene® BA / BCA Greenflex® BA / BCA Pharmalene® BA / BCA Riblene® BA / BCA	VLDPE PS-GP, PS-HI, PS-FR HDPE LLDPE EVA EVA LDPE LLDPE HDPE LDPE

Numerous types are also available as powders. All regulatory documents of the basic variants apply to the mass-balanced types. Equality confirmations are available.

Röhm PLEXIGLAS®
proTerra

Lower carbon footprint with proven high performance: PLEXIGLAS® proTerra molding compounds
Röhm offers the customers two different ways to lower their product carbon footprint: PLEXIGLAS® proTerra M5 contains mechanically recycled PMMA, while in PLEXIGLAS® proTerra 8N, fossil resources have been replaced with raw materials certified under ISCC PLUS*.
All Röhm products with a significantly reduced CO2 footprint, that were made from sustainable raw materials, that make a significant contribution to promote the circular economy and that save resources, such as raw materials, energy or water, qualify for the proTerra brand family.

PLEXIGLAS® proTerra M5
- 30% Plastic recycling content (post-industrial)
- Reduced CO2 footprint**

PLEXIGLAS® proTerra 8N
- 25% Sustainable share (ISCC-PLUS)*
- Reduced CO2 footprint**

Key properties of our PLEXIGLAS® proTerra products

Property	PLEXIGLAS® proTerra M5	PLEXIGLAS® proTerra 8N
Vicat	106°C	108°C
MVR	2.3 cm^3/ 10 min	3.0 cm^3/ 10 min
Tensile modulus	3300 MPa	3300 MPa
Transmittance	91%	92%

*ISCC = International Sustainable Carbon Certification; only available for products produced at our Worms production site in Germany www.iscc-system.org
**calculated according ISO14044 with product category rules TfS initiative and LCA Software by Sphera, compared to basic PMMA grade 3.75 kg CO2 eq., status May 2023

Producer	Brand	Product
TER GROUP TEREZ PERFORMANCE POLYMERS	TEREZ® B CLA	PA6 Closed Loop Automotive Content
	TEREZ® B 400	PA6 Post Industrial Content
	TEREZ® B 500	PA6 Post Consumer Content
	TEREZ® B 600	PA6 Post Industrial/ Post Consumer Content
	TEREZ® A 400	PA66 Post Industrial Content
	TEREZ® A 500	PA66 Post Consumer Content
	TEREZ® A 600	PA66 Post Industrial/ Post Consumer Content
	TEREZ® P CLA	PP Closed Loop Automotive Content
	TEREZ® P 400	PP Post Industrial Content
	TEREZ® P 500	PP Post Consumer Content
	TEREZ® P 600	PP Post Industrial/ Post Consumer Content
	TEREZ® GT3 400	PA66 PA6I/PA6T Post Industrial Content
	TEREZ® GT4 400	PA66 PA6I/PA6T Post Industrial Content
	TEREZ® PC/ABS	PC/ABS Post Industrial Content
	TEREZ® PC/ABS	PC/ABS Post Consumer Content
	TEREZ® PC/ABS	PC/ABS Post Industrial/ Post Consumer Content
	TEREZ® PC 400	PC Post Industrial Content
	TEREZ® PC 500	PC Post Consumer Content

Better than Prime!
The new TEREZ polyamide 6 GF ECO compound series

Recycling-based polymer compounds have long been developed and used to reduce the material costs for plastics converters. TER Plastics and its compounding subsidiary TEREZ Performance Polymers were among the pioneers of polymer recycling almost 50 years ago.

Growing demand for recylcing grades

However, in recent years, recycling-based compounds have been the focus of material science engineers for other reasons: Most importantly, they significantly lower the carbon footprint, and advance sustainability in the plastics industry. Also, the smart return of plastic waste to the material cycle avoids its disposal in landfills or incineration plants.

Finally, stricter legal requirements, for example in the automotive industry, and a more widespread environmental awareness of customers, have been key drivers for the increased demand for sustainable material alternatives.

While polymer recyclates have entered almost every industry branch, the challenges for their usage are especially demanding for applications in the automotive and electrical industries, where high mechanical requirements are placed on the materials.

For automotive parts, often polyamide compounds are the material of choice due to their excellent price-performance ratio.

Therefore, the demand for compounds based on recycled polyamide is growing well beyond the sluggish market growth.

Plastics to be used in new vehicles according to the proposal of an ELV regulation

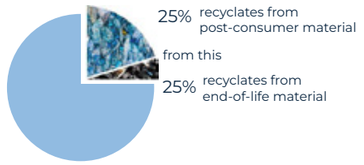


Fig. 2: ELV regulation by 2030

Traditional recycling technology is well developed

In the past, it has been generally accepted by the polymer industry that the technical performance of recycling-based compounds is somewhat below that of prime compounds.

The traditional recycling technology has been based on established compound formulations with a straight replacement of prime raw materials by eco-friendly recycling raw materials. Good examples for this category are the two TEREZ grades TEREZ B 405 H G30 Black 9992 (50% post-industrial recycled polymer) and TEREZ B 503 H G30 Black 9992 (30% post-consumer recycled polymer).

The two grades show a good performance which is adequate for many industrial applications. This is the reason why these two grades are widely used across industry.

The property challenge

However, when two VW-requirements for interior and exterior (VW50125 PA6 H GF30 PA6-7 Interior and VW50134 PA6 H GF30 PA6-7-A Exterior are considered as the benchmark, the two traditional recycling grades above do not satisfy all requirements safely. The mechanical properties are just at or even slightly below the VW-requirements. In particular, the tensile stress at break in the conditioned state does not meet the minimum requirement of > 90 MPa.

Mechanical performance

To fully meet the requirements of the automotive industry while using recycled raw materials, TER Plastics has developed a new product line "Better than Prime“, which meets these VW requirements at 100%: TEREZ B 405 H30 G30 Black 9992 is based on 50% post-industrial recycled polymer (PIR) and TEREZ B 503 H30 G30 Black 9992 is based on 30% post-consumer recycled polymer (PCR).

With this novel formulation improvement, the VW-requirements for the notched impact strength of > 10 kJ/m2 and for the tensile stress at break (cond.) of > 90 MPa can safely be met. Even more, the overall performance of the two new grades is better than prime!

Weathering performance

The new development not only excels in the mechanical values. As shown for TEREZ B405 H30 G30 Black 9992 below, the results of the weathering tests are well according to interior and exterior standards. As presented in figures 6 and 7 the new „Better than Prime“ grades pass the Grey scale test and the requirements regarding color deviation ΔL, Δa, Δb of Volkswagen.

Property	VW-Minimum-Requirements*	Unit	Norm
Impact Strength Charpy notched, 23°C, dry	10	kJ/m²	ISO 179
Tensile stress at break, 23°C, dry	140	MPa	ISO 527
Tensile elongation at break, 23°C, dry	2,5	%	ISO 527
Impact Strength Charpy notched, 23°C, cond	17	kJ/m²	ISO 179
Tensile stress at break, 23°C, cond	90	MPa	ISO 527
Tensile elongation at break, 23°C, cond	5,0	%	ISO 527

* *VW50125 PA6 H GF30 PA6-7 Interior*
* *VW50134 PA6 H GF30 PA6-7-A Exterior*

Fig. 4: VW requirements interior and exterior

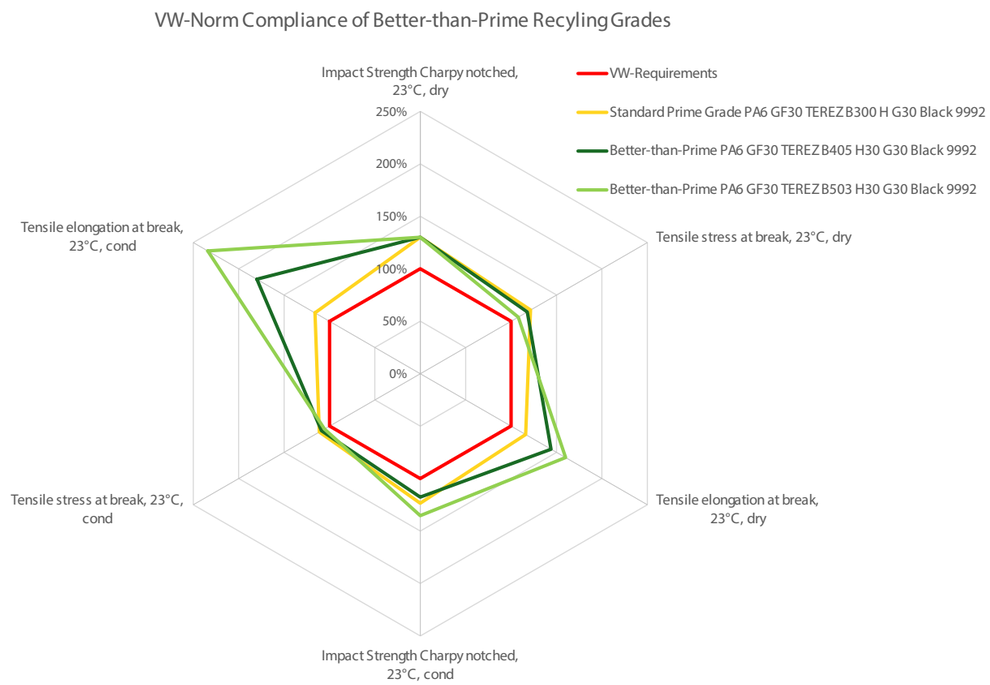


Fig. 5: The new TEREZ ECO grades “Better-than-Prime”

Long-Term Performance

Another part of the VW 50134 requirements is the long-term heat requirement at 150 °C/1000 h. As shown in fig. 8 below, the new TEREZ grades show no significant performance differences between prime, PIR and even PCR based compounds.

Highest Standards: Better-than-Prime

In conclusion, it can be said that the new "Better than Prime" TEREZ series of TER Plastics meets the highest standards. These examples demonstrate that TER Plastics offers products equivalent to prime grades by using post-industrial (PIR) or post-consumer (PCR) raw materials. The new “Better-than-Prime” TEREZ series is available in various grades for different requirements, such as

- Natural and various colors
- Glass fiber content from 15 to 50%
- For laser welding applications: Laser transparency and laser absorption
- Tracking resistance settings CTI 600 V
- Highly impact-modified „Better than Prime“ compounds

Improved long-term heat stabilizations for higher temperature requirements.

This shows that the most demanding applications in automotive can be well solved by using TEREZ compounds – either recycled or prime.

G-Blend™ PC/ABS
Mechanical Recycling

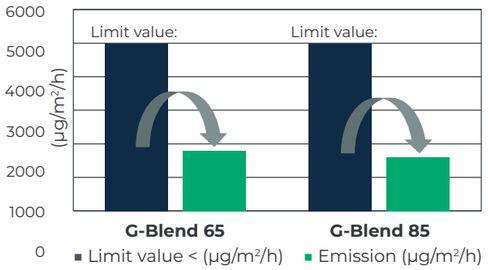
TEREZ Performance
Polymers

High-quality PC/ABS blend for inTERior applications

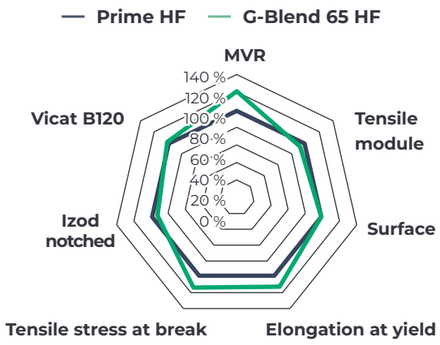
G-Blend™ stands for over 17 years of experience in the development and production of PC/ABS blends based on recycled polycarbonate. First class access to the waste streams ensures consistent quality and supply.

- Property profile on par with virgin material
- Low carbon footprint
- Meets requirements (fogging, odor, emission) for inTERior applications
- Very good surface quality and paintability
- Excellent batch consistency
- Recycling rate 50-70 % depending on typ

VOC Emission according to Alliance RNES-B-20116



Low emission for use within the vehicle inTERior



Comparison of property profile Prime/G-Blend

Chemiton® Life
Mechanical Recycling

Franplast

Franplast is pushing further with his eco-friendly and biobased TPE compounds, increasing its portfolio. Under the brand name Chemiton® Life we can find TPE compounds developed with the aim to reduce the impact on the environment.

From TER we can offer bio-based compounds from several renewable sources and with a range content from 20% to 80%; even with Food Approval certification. Mechanical features are equal or even superior to the original materials and they can be used both for extrusion or injection moulding , with a wide range of hardness from 30 Shore A to 40 Shore D.

Furthermore, the recycled-based TPE improve the effectiveness of the recycle chain. They are available in a wide range of hardness values (from 30 Shore A to 60 Shore D) and density values from 0,88 g/cm³ to 1,24 g/cm³. They can be processed by extrusion and injection moulding. The applications for this grades can be in fields like: Home&Design, industrial and electrical.

Serie	% recycled	Density (g/cm3)	Hardness range (Shore A/D)	Fluidity	Aspect	Normatives	Additional info
RGB_N	80% post industrial/post-consumer	0,89	25A-95A	High	Translucent, unfilled	Reach, Rohs	For injection moulding
RGE_N	70% post industrial/post-consumer	1,02	25A-95A	High	Matte, half-filled	Reach, Rohs	For injection moulding
RGG_N	70% post industrial/post-consumer	1,1	30A-95A	High	Matte, filled	Reach, Rohs	For injection moulding
RGJ_N	80% post industrial/post-consumer	1,22	35A-95A	High	Matte, heavy-filled	Reach, Rohs	For injection moulding
RFG_M/B	30% post industrial	1,1	30A-95A	Medium-low	Matte, filled	Reach, Rohs, EN71, FDA, EU10/2011	For injection moulding
RFJ_M/B	40% post industrial	1,22	35A-95A	Medium-low	Matte, heavy-filled	Reach, Rohs, EN71, FDA, EU10/2011	For injection moulding

Longlite®
Mechanical Recycling
Chemical Recycling

Chang Chun
Plastics

Chang Chun Group reduces plastic waste from the oceans

CCP leverages the value of already used materials for its high-tech products and relies on two sources to generate raw materials from PET waste again for its Longlite polyesTER products:

- **Post Consumer Recycling**
  This is waste generated from consumer collection systems. The raw materials are then recycled afTER use to produce high quality polyesTER polymers.

- **Ocean Bound Plastics**
  Ocean Bound describes plastics collected from the sea or from tributaries where it can be assumed that the waste will end up in the sea. Ocean Bound is very well defined and some major consumer companies have already embraced this idea.

In the proportion of recycled PET, carbon emissions are reduced by up to 63%. The carbon footprint has been proven and certified.
While the food and electronics sectors want to present environmentally friendly products to consumers, the automotive industry has very specific carbo targets that must be met. For these reasons, switching to lower-carbon plastics is inevitable in the future.
The portfolio also includes other unreinforced, reinforced and flame-retardant PBT grades as well as reinforced PET grades and is being continuously expanded.

CCP Sustainable Portfolio

- Post Consumer (PCR) - rPET/PBT
- Post Consumer (PCR) - rPBT (Chemical)
- Post Consumer (PCR) - rPBT (Mechanical)

Post-Consumer Recycled (PCR) - rPET/PBT

The mechanical recycling process converts the PCR/OBP PET bottle into reusable PBT pellets for further applications. The portfolio is currently being expanded to include the 6000RE and 7000RE series with the introduction of rPC or rABS

Grade	Description	PCR Content (wt%)
1100RE	Unfilled, General Purpose	30
3000RE	PBT-HB GF10/15/20/30	30
4000RE	PBT-FR GF30	25
5000RE	PBT-FR GF30	25
9000RE	PET (GF+MD) 40 / PET-FR-GF30	30/50
6000/7000RE	Underdevelopment	-

Post-Consumer Recycled (PCR) - rPBT (Chemical)

The chemical recycling process uses depolymerisation to convert recycled post-consumer PET (PCR) into feedstock for PBT production. The PCR feedstock is then polymerised with a portion of fossil monomers to produce PCR-PBT

Grade	Description	PCR Content (wt%)
CR1100	Unfilled, General Purpose	>56%
CR3030	PBT-GF30 HB	>37%
CR4130	PBT-GF30 FR	>30%

Post-Consumer Recycled (PCR) - rPBT (Chemical)

The PCR-rPBT comes from waste and flows into the circular economy. Unchanged shrinkage properties allow replacement in existing PBT moulds. Provides a closed loop for circular production. Unbiased shrinkage offers a drop.in solution for replacement.

Grade	Description	PCR Content (wt%)
MR1100	Unfilled, General Purpose	>30
MR3030	PBT-GF30 HB	>30
MR4130	PBT-GF30 FR	>30

Chang Chun Plastics

- **PBT with recycled content for food applications**
- **PBT with recycled content for E&E applications**

Key Facts
- Meets the requirements for food approval
- Reduced carbon footprint
- No loss of material properties

Applications
- Kitchen gadgets
- White goods
- Baby goods

Key Facts
- Brominated and halogen-free flame retardant grades
- Reduced carbon footprint
- No loss in material properties

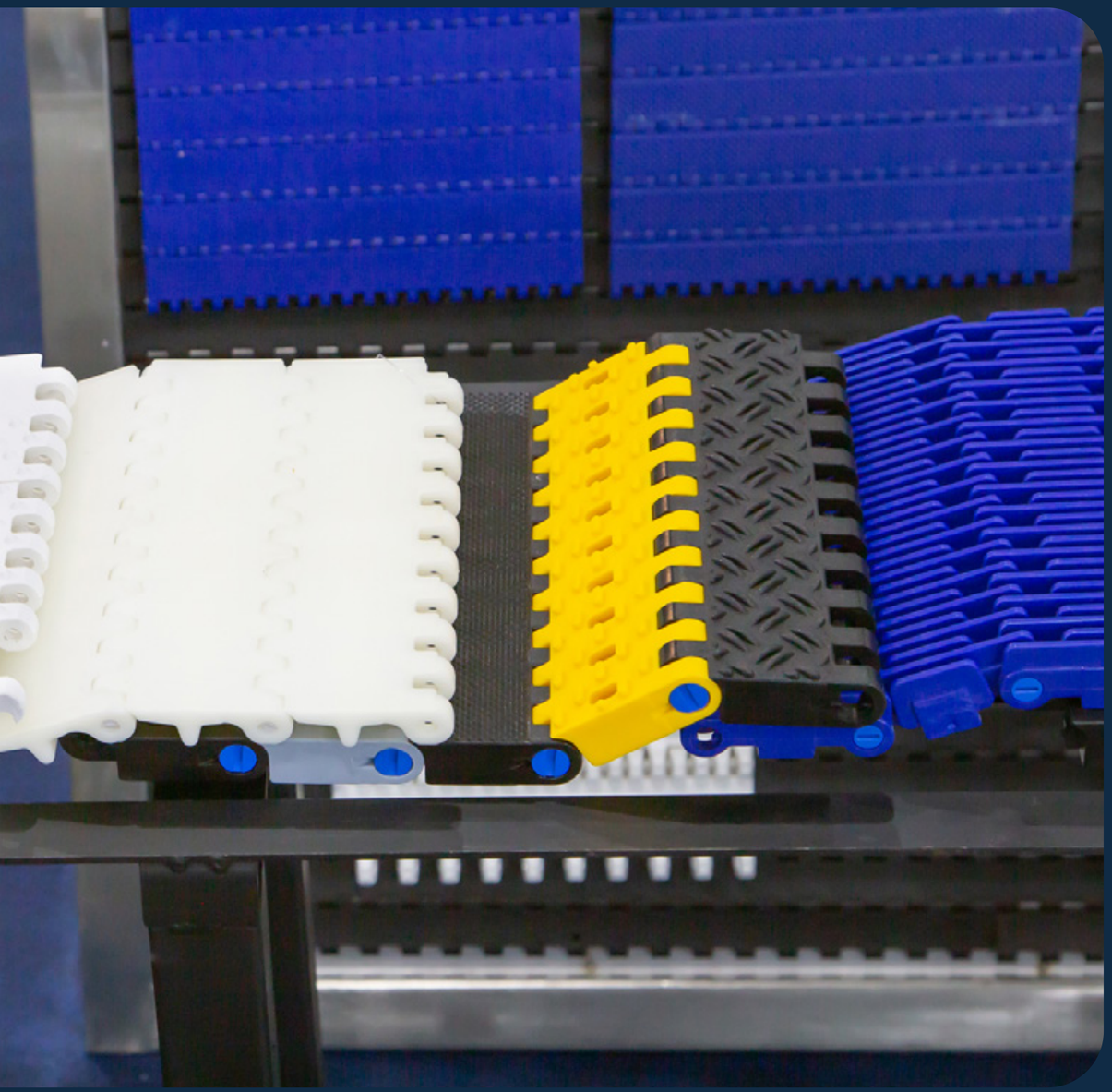
Applications
- Computers
- Connectors
- E-mobility

Grade list	Unit	PBT 1200-225NP	PBT 1200-233NP	PBT 3020-225NP	PBT 3020-233NP
Characteristic	-	25% OCEAN BOUND PLASTIC	33% OCEAN BOUND PLASTIC	25% OCEAN BOUND PLASTIC	33% OCEAN BOUND PLASTIC
Glass fiber	%	-	-	20	20
Color	-	natural	natural	natural	natural
Desity	g/cm3	1,31	1,32	1,421	1,449
Tensile stress	Mpa	59,6	59,2	120,5	118,8
Tensile stress at break	%	9,56	9,3	3,533	3,529
Flexural Strength	MPa	89	87,2	173,8	176,3
Flexural Modulus	MPa	2498	2442	5834	5871
Charpy Impact Notched	kj/m2	4,6	4,7	8,5	9,11

Grade list	Unit	PBT 4130E-125	PBT 4830E-125	PBT 5530E-135W	PBT 5530E-135
Characteristic	-	25% PCR	25% PCR	*EPEAT 2	*EPEAT 3
	-			35% OCEAN BOUND	
Flame retardance		Brominated		Halogen free	
Glass Fiber	%	30	30	30	30
Flammability	-	0,8mm-V0 CCP test	3,0mm-V0 CCP test	8,0mm-V0 CCP test	8,0mm-V0 CCP test
Color	-	black	black	black	black
Density	g/cm3	1,61	1,59	1,51	1,53
Tensile Stress	Mpa	130	130	105	100
Tensile Stress (@break)	%	2,1	2,3	2,3	1,48
Flexural Strength	MPa	190	190	150	145
Flexural Modulus	MPa	8600	8500	7800	10000
Charpy Impact Notched	kj/m2	9,5	9	9	7

* The EPEAT IT environmental seal is awarded by the Green Electronics Council. The EPEAT seal is awarded to compuTERs that have a lower environmental impact than conventional products.

Polylan®
Mechanical Recycling



Polytherm

The Polylan-ECO product range represents over 25 years of experience in the mechanical recycling of TPU. Excellent access to industrial waste streams is the basis for good availability and excellent qualities.

Main feature
- Available hardness from ShoreA 75 to ShoreD 60
- Natural and black
- Odorless
- Matt, high quality surfaces
- Density 1,15 - 1,20 gr / cm^3
- REACH, RoHS, IMDS, DIN ISO 9001

Applications
- Wheels and rollers
- Cables, hoses
- Handles
- Shoe soles
- Agricultural equipment

Process
- Injection molding, extrusion, injection blow molding

Versalis Balance®

ISCC PLUS-certified Balance® products are **'Bio Attributed (BA)'** and **'Bio-Circular Attributed (BCA)'** when made from bio naphtha, and **'Circular attributed (CA)'** if made from 'recycled oil' (r-Oil), the pyrolysis oil obtained from the chemical recycling process of mixed plastic waste materials.

BA, BCA and CA raw materials can be used in production processes together with conventional raw materials. To attribute sustainable characteristics to the final product, we applied the **Mass Balance** approach, a recognized methodology that guarantees a match between the sustainability characteristics of the alternative raw materials, mixed with traditional naphtha, and that of the final product.

BA, BCA and CA products guarantee identical **performance, quality and properties,** as they do not differ in chemical composition and physical-mechanical performance from standard products.

We have obtained **ISCC PLUS** certification to produce monomers, intermediates, polymers (polyethylene and styrenics) and elastomers made from sustainable raw materials, from bio naphtha and from chemical recycling, at all production sites, with the exception of the Crescentino plant, which has obtained ISCC EU certification.

ISCC PLUS is part of the ISCC (International Sustainability & Carbon Certification) certification scheme. It is voluntary in nature and allows companies throughout the supply chain to monitor and be able to demonstrate the sustainability of their products by checking sustainability, traceability and mass balance requirements.

STYRENICS

Balance® BA and BCA grades are currently available with the following bio-attribution shares:

Product family	Trade name	% Attribution*
ABS	Sinkral® Balance®	65%
SAN	Korstil® Balance®	75%
PS	Edistir®N Balance®	100%
HIPS	Edistir®R Balance®	90%
EPS	Extir® Balance®	90%
EPS	Extir®CM Balance®	80 - 90%

Versalis Revive® is the range of products with different polymer bases (styrenics, elastomers and polyethylene) containing recycled raw material, developed at Versalis' research laboratories.
With this range, we have taken up one of the most difficult and virtuous technological challenges of the circular economy: **to give new life to plastic waste materials through recycling**, to obtain new products for use in multiple quality applications.

Versalis Revive® ABS is the new gamma of compact copolymers containing secondary raw material.
The high level of purity of recycled ABS and the use of specific Versalis virgin styrenic polymers lead to a compound containing recycled ABS, ensuring performances that match the needs of multiple applications.
Within Versalis Revive® family, Versalis Revive® ABS is developed in collaboration with European companies leader in the recovery and recycling of post-consumer and post-industrial plastics. Through a specialized supply chain, it is possible to separate the fraction of ABS coming from waste products from converters and / or WEEE recovery chain.

The Versalis Revive® ABS portfolio consists of one product:

VERSALIS REVIVE® L322 black
Versalis Revive® ABS contains 70% rps from post-consumer industrial waste and it is designed for injection moulded applications.

versalis revive®

Commodities
Mechanical Recyclates

There are good reasons to use mechanically recycled plastics:
they are created from previously collected and processed waste plastic parts that do not remain in the environment.

The CO2-footprint of mechanical recyclates is only 30% of the footprint of primary plastics. Throughout the EU, there will be penalties on plastic packaging that does not contain a minimum proportion of mechanical recyclates.

England has already implemented a regulation, as well as Italy and Spain, which will follow soon.

Recycled
Plastics

Producer		Recycled	Application	Colour
terXene® eco	LDPE Film	98-100% PCR	blow film	natural, amber, various colours
	HDPE BM	100% PIR, 98-100% PCR	blow molding, blow fi lm, pipes + profi les	natural, amber, various colours
	HDPE Pipe	98-100% PCR	pipes	black
	PP Extrusion	98-100% PCR	pipes + profi les	black
	PP l05			
	PP l10	98-100%	injection moulding	off -white, grey, black, TERracotta
	PP l20		MFI 5-40	customized coloration
	PP l30			
versalis revive	LDPE Film HDPE BM	70-100% PCR 70% PCR	blow film blow molding	amber amber
TotalEnergies	HDPE	50% PCR	blow molding	amber
LG Chem	LLDPE	60-80%	blow fi lm, stretch fi lm, heavy fi lm	amber

TER Plastics POLYMER GROUP
Alte Wittener Str. 50 · 44803 Bochum · Germany
T +49 (0)234 54154-0
F +49 (0)234 54154-333
info@TERplastics.com
www.TERplastics.com

TEREZ® mechanically recycled Compounds
Now available in recycled PE bags

ISSUE: OCTOBER 2025