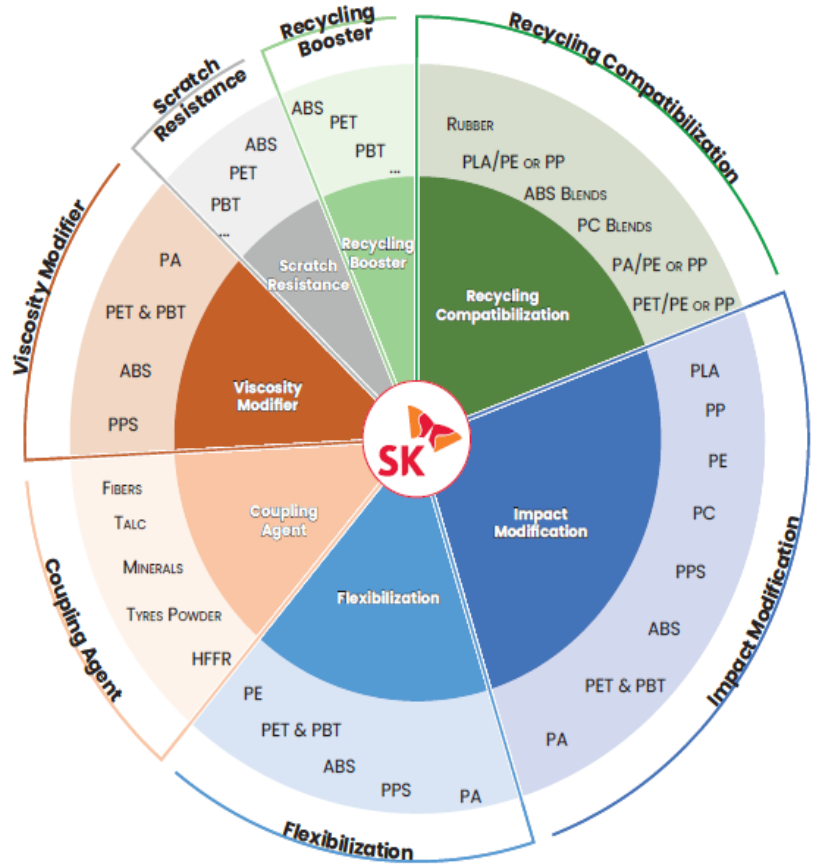
INNOVATIVE SOLUTIONS FOR RECYCLED PLASTIC

SK functional polymer

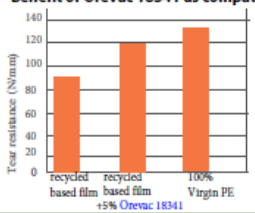
SKFP SOLUTIONS DISK



PE/EVOH PLASTIC FILMS

Multilayer structures based polyolefins, PE or PP, and barrier resins, EVOH or PA, are widely used in food packaging, agriculture or fuel tanks. Because of their poor recyclability, most multilayer structures are usually incinerated or landfilled. With more strict regulations to increase the recovery of products, it is becoming urgent to develop recycling solutions for multilayer structures.

Benefit of Orevac 18341 as compatibilizer



SKFP Solutions

With SKFP recycling boosters, multilayer structures have been successfully reprocessed for use in molding, film and extrusion.

Orevac® 18341 or **Lotader® 4210** allow an easier processing of such recycled structures, leading to less gels, higher mechanical properties and applicative performance.

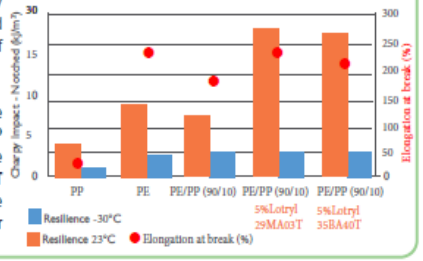
RECYCLING HDPE/PP BLENDS

The volume of recycling materials is continuously growing and despite the quality of the recycled Polyethylene (rPE), the risk of having contamination of Polypropylene is still high. PE and PP are not compatible.

SKFP Solutions

SKFP finds a solution to compatibilize them but also to use this issue as a solution to boost the properties of HDPE/PP (90/10) blend to have better properties than HDPE and be reintegrated in virgin stream. Using 5% **Lotryl® 29MA03T** or **Lotryl® 35BA40T** improve the impact properties while maintaining the mechanical properties of the major component of the blend.

Benefit of Lotryl® as compatibilizer & impact modifier

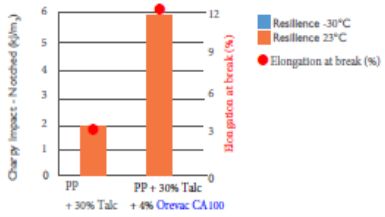


PP & rPP COUPLING AGENTS

Talc filled PP compounds are widely used in the automotive industry for interior and exterior injection molded parts.

SKFP Solutions

Using **OREVAC® CA100** as coupling agent significantly enhances filler dispersion and improves impact performance with balanced stiffness. This technology also applies to rPP compounds.



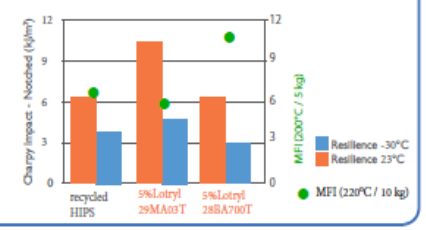
UPCYCLING rHIPS WASTE

High Impact PolyStyrene (HIPS) are used for home appliance fridges, toys, cups and automotive... Even though it can be easily sorted, rHIPS mechanical properties like impact strength or fluidity are negatively affected in the recycling loop.

SKFP Solutions

SKFP recycling solutions, such as **Lotryl® EMA**, can boost rHIPS properties. rHIPS impact performance is increased by adding **Lotryl® 29MA03T**. rHIPS luidity can be improved by using **Lotryl® 28BA700T.**

Benefit of Lotryl® 29MA03T & 28BA700T In rHIPS



UPCYCLING rABS WASTE

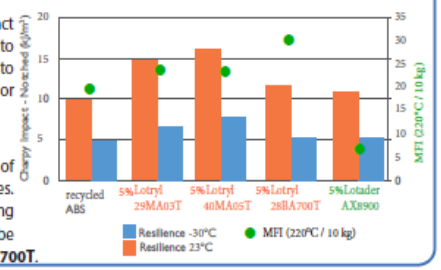
Acrylonitrile – Butadiene – Styrene resins (ABS) are widely used for applications in Automotive, E&E and Home appliance.

These generate a large source of wastes. Impact performance of recycled ABS (rABS) often requires to be improved. Their viscosity may not be adapted to converting processes such as injection molding or extrusion.

SKFP Solutions

SK Functional Polymer offers a large range of additives to rejuvenate ABS recyclates. rABS impact performance is increased by adding **Lotryl® 29MA03T** & **40MA05T**. Its viscosity can be controlled by adding **Lotader AX8900** or **Lotryl® 28 BA700T**.

Benefit of Lotader® & Lotryl® In rABS



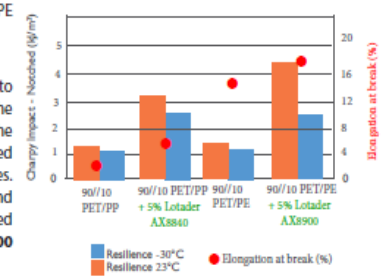
RECYCLING PET/PE & PET/PP BLENDS

Despite advances in separation technology, contamination of PET streams with PE and PP is very common.

SKFP Solutions

By allowing incompatible PET and PE or PP plastics to mix in the melt, SKFP recycling boosters reduce the need for separation and give manufacturers the possibility of cost reduction due to increased recycled content and access to low-cost sources. New products such as pipes, films, plastic pallets and monofilaments made of recycled PET/PE and recycled PET/PP alloys using **Lotader®AX8840 & AX8900** compatibilizers have been a success.

Benefit of Lotader® AX8900 & AX8840



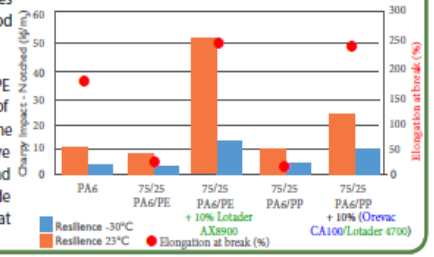
RECYCLING PA6/PE & PA6/PP BLENDS

Polyamides (PA) are difficult to sort due to different wastes origins. It then becomes a challenge to maintain good properties of the recycled feedstock.

SKFP Solutions

In presence of 25% PP or PE contaminants, **Lotader®3410** in PA6/PE or a blend of **Lotader®4700/Orevac CA100** in PA6/PP increase the elongation at break and impact strength above those of the virgin PA6. Other **Lotader®** and **Orevac®** grades can also provide combination of processability and toughening at room or low temperature with optimum stiffness.

Benefit of Lotader® & Orevac® in rPA



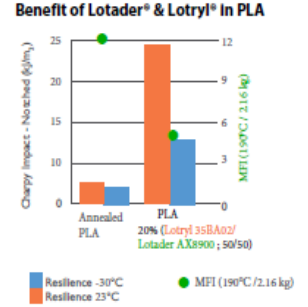
PLA BIOPLASTIC BOOSTER

Polylactic acid (PLA) is one of the most popular bioplastic. PLA is well known due to its origin from renewable resources. It is widely used as plastic filament material in 3D printing, due to its low melting point, high strength, low thermal expansion, and good adhesion, although its poor in impact strength.

SKFp SoLutIonS

SK functional polymer is deeply involved in improving biopolymers toughness. 20% of a blend **LotryL® 30BA02** and **Lotader® AX8900** can boost the impact strength by more than four times at 23°C meanwhile decreasing the MFI.

Benefit of Lotader® & Lotryl® In PLA



PP/ TYRES RUBBER COMPATIBILITY

Less than 2% Tyres rubber products are recycled or reused. This ratio needs to grow up.

SKFP SoLutIonS

Using 5% **Orevac® CA100** or **Lotryl® 29MA03T** as compatibilizer brings 15-30% improvement of the elongation at break and 80% on the impact strength properties at 23°C while maintaining the elastic modulus.

SK FUNCTIONAL POLYMER OFFERS

SK functional polymer offers a full range of recycling boosters for mixed waste streams, targeting high added-value applications.

SK FUNCTIONAL POLYMER RECYCLING

Mechanical properties, and in particularly impact strength and elongation at break, are significantly improved opening up recycling opportunities in various extrusion and injection moulding applications. Recycling of post-consumer (PCR) and post-industrial (PIR) waste is a major challenge for the plastic industry. The presence of a wide variety of incompatible polymers in waste streams leads inevitably to phase separation and poor mechanical properties.

Improvements in the procedures in separating waste streams may lead to more effective recycling but those procedures are time consuming and rarely fully effective. Pressure from legislation as well as consumer more and more drive the industry to increase recycling rate and green initiatives.

COMPREHENSIVE PRODUCT PORTFOLIO

Lotader®

Ethylene acrylate - maleic anhydride (MAH) or glycidyl methacrylate (GMA) terpolymers

Grades	Reactive Group (%)	Comonomer (%)	Melt index (g/10 min) (190°C-2.16 kg)	Melting Point (°C)	Vicat softening temp. (°C)	Flexural Modulus (MPa)
AX8900	8% GMA - Epoxide	MA (24%)	6	65	< 40	<30
AX8840	8% GMA - Epoxide	-	5	104	87	85
AX8850	12% GMA - Epoxide	-	40	98	62	90
3210	3.1 % MAH	BA (6%)	5	107	76	120
3410	3.1 % MAH	BA (17%)	5	89	47	60
4210	3.6 % MAH	BA (6.5%)	10	105	69	120
4700	1.3 % MAH	EA (29%)	7	65	< 40	<30

Lotryl®

Ethylene-acrylate copolymers (EMA, EBA)

Grades	Type	Comonomer (%)	Melt index (g/10 min) (190°C-2.16 kg)	Melting Point (°C)	Vicat softening temp. (°C)	Flexural Modulus (MPa)
30BA02	EBA	30	2	73	41	< 10
35BA40	EBA	35	40	66	< 40	< 10
29MA03T	EMA	29	3	92	< 40	12
40MA05T	EMA	40	5	70	< 40	< 10
28BA700T	EBA	28	700	94	< 40	< 10
35BA40T	EBA	35	40	89	< 40	< 10

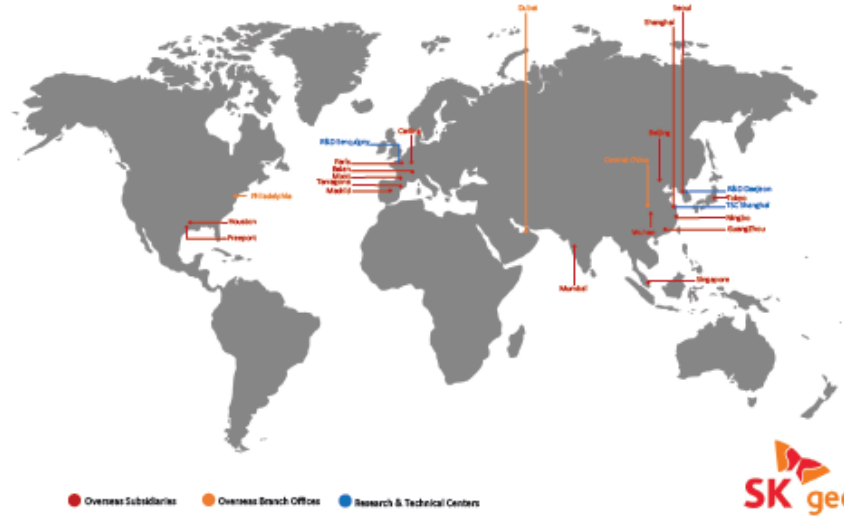
Orevac®

Maleic anhydride grafted polyolefins (PE, PP)

Grades	Base Polymer	Reactivity (%)	Melt index (g/10 min) (190°C-2.16 kg)	Melting Point (°C)	Vicat softening temp. (°C)	Density
CA100	Copo PP	> 1	10*	167	147	0.91
IM800	VLDPE	0.4 to 0.6	0.8	55	< 40	0.87
18341	LLDPE	> 1	1.5	121	95	0.92
18507	HDPE	0.6 to 1	5.0	128	126	0.95

MA: methyl acrylate; BA: butyl acrylate ; EA: ethyl acrylate. * Melt index (g/10 min) (190°C-325 g)

SK GEO CENTRIC (SKGC) WORLDWIDE PRESENCE



SK geo centric

THE INNOVATIVE CHEMICAL COMPANY: CREATING VALUES WITH TECHNOLOGY & SOLUTIONS

Since its foundation in 1972, SK geo centric (SKGC), member of the SK conglomerate, has enhanced its productivity and the quality of its products based on its optimized production and operation systems. It is also upgrading its business portfolio with increasing focus on high value-added products.

SK functional polymer (SKFP) extensive range of specialty resins are suited to a large number of applications in packaging, automotive and construction. These products are widely used as plastic additives, recycling compatibilizers, impact modifiers, viscosity enhancers, scratch resistance, tie resin, sealing resins, …

SKFP resins are sold globally. They are marketed under the following brand names:

- LOTADER® reactive ethylene-acrylate terpolymers
- LOTRYL® ethylene-acrylate copolymers
- EVATANE® ethylene-vinyl acetate copolymers
- OREVAC® reactive anhydride maleic modified polyolefins.

SKFP next challenge is to transform into a major actor in the plastic circular economy by growing applications where its products help to recycle plastic wastes or are involved in the production of green energy. SK functional polymer has more than 50 years of experience in the development and supply of specialty and functional polymers.

The statements, technical information and recommendations contained herein are believed to be accurate as of the date hereof. Since the conditions and methods of use of the product and of the information referred to herein are beyond our control, SKFP expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information; NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE GOODS DESCRIBED OR THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be applicable when such product is used in combination with other materials or in any process. The user should thoroughly test any application before commercialization. Nothing contained herein constitutes a license to practice under any patent and it should not be construed as an inducement to infringe any patent and the user is advised to take appropriate steps to be sure that any proposed use of the product will not result in patent infringement. See SDS for Health & Safety Considerations.

Visit our website sk-fp.com

Follow us on LinkedIn

More details on our catalog

CYCLUS

SK functional polymer

Headquarters: SK functional polymer
La Défense
92400 Courbevoie - France

Photo credits: all rights reserved - adobestock.com - Design by MAS Compagnie

INNOVATIVE SOLUTIONS FOR RECYCLED PLASTIC

SK functional polymer