

RecyClass Unwrapped How to boost recyclability for Automotive and Electrical & Electronic appliances?

12 February 2025

RecyClass

Meet our speakers



Augusto Bruno, Technical Manager Plastics Recyclers Europe

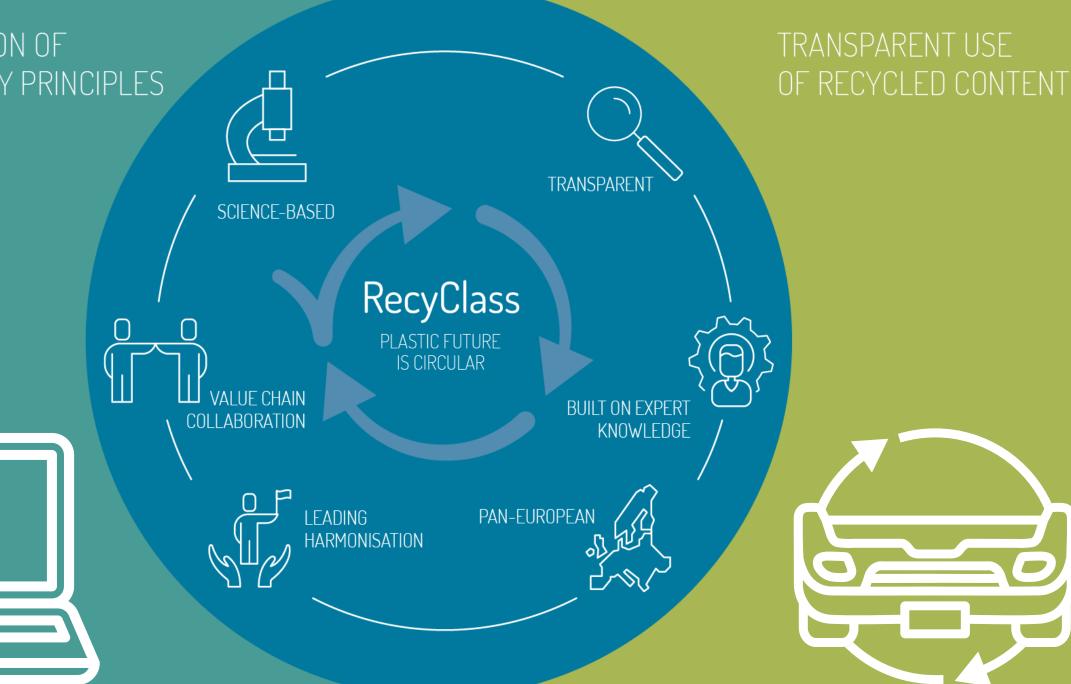
Leonardo Forner, Group Marketing & Sustainability Coordinator **Sirmax**

Ignacio Buezas Sierra, Business Development Manager **Elix Polymers**

RecyClass

The session is moderated by Tom Caris, Manager Engineering and Business Development **Coolrec BV**

HARMONISATION OF RECYCLABILITY PRINCIPLES



RecyClass | Automotive & EEE TECHNICAL COMMITTEE

RECYCLASS MEMBERS ADVANCING CIRCULAR SOLUTIONS FOR TECHNICAL PLASTICS



RecyClass | How DOES RECYCLASS WORK?

TESTING PROTOCOLS



- ?
- Lab testing of innovative plastic products vs control material
- Comparison of properties
- Outcome: Recyclability Approval

DESIGN FOR RECYCLING GUIDELINES



- Design guide & recommendations for plastic products
- Design for Recycling (DfR) Guidelines transposed in the Online Tool

RECYCLABILITY METHODOLOGY



- Recyclability Self-Assessment with the **RecyClass Online Tool**
- Assessing **overall recyclability** of a finished product
- RecyClass Team support
- Recyclability Certification

RecyClass | How DOES RECYCLASS WORK?

TESTING PROTOCOLS



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DESIGN FOR RECYCLING GUIDELINES

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- Design for Recycling (DfR) Guidelines transposed in the Online Tool
- Assessing overall recyclability of a finished product

RECYCLABILITY METHODOLOGY

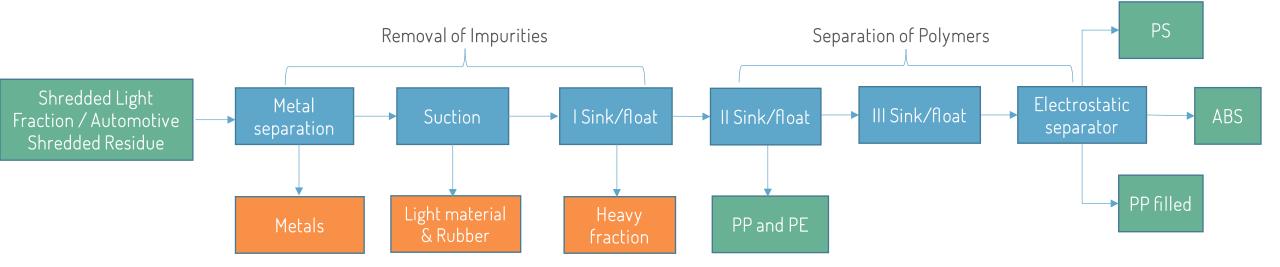


- Recyclability Self-Assessment with the **RecyClass Online Tool**
- RecyClass Team support
- Recyclability Certification

RecyClass | OVERVIEW OF THE RECYCLING PROCESS FOR TECHNICAL PLASTICS

The plastic recycling process for ELV and WEEE consists of two major phases:

- Removal of impurities (metals, light materials, and rubbers)
- Plastics are separated into different polymer categories: PP, PP+filler, PE, ABS, and PS

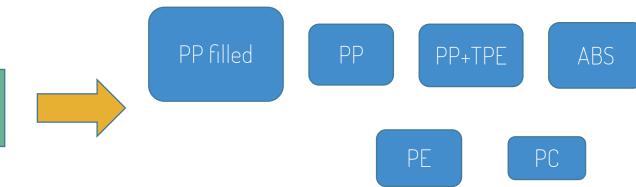


RecyClass | PLASTICS RECYCLED TODAY





Automotive Shredded Residue



PP PS ABS filled Shredded Light Fraction EEE PC-PP PE PC

ABS

RecyClass | PROTOCOL DEFINITION

TESTING PROTOCOLS



?

- Lab testing of innovative plastic products vs control material
- Comparison of properties
- Outcome: Recyclability Approval

OBJECTIVES AUTOMOTIVE :

Develop Recyclability Protocol:

- Polypropylene
- Polypropylene + Fillers

ABS

🗖 PE

DC-ABS

D PC

OBJECTIVES EEE :

Develop Recyclability Protocol:

Polystyrene (PS)

ABS

Polypropylene

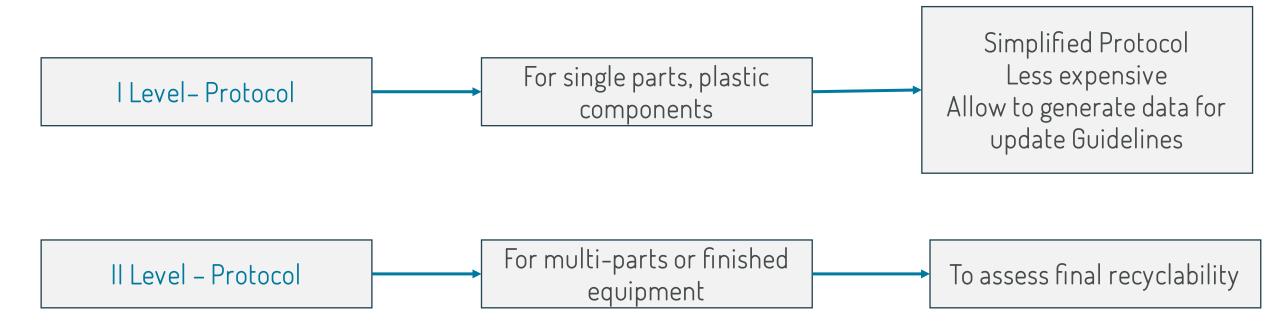
Polypropylene + Fillers

D PE

PC-ABS

D PC

RecyClass | protocol definition



Protocols are expected to be released in the second semester of 2025

RecyClass | How DOES RECYCLASS WORK?

TESTING PROTOCOLS



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DESIGN FOR RECYCLING GUIDELINES

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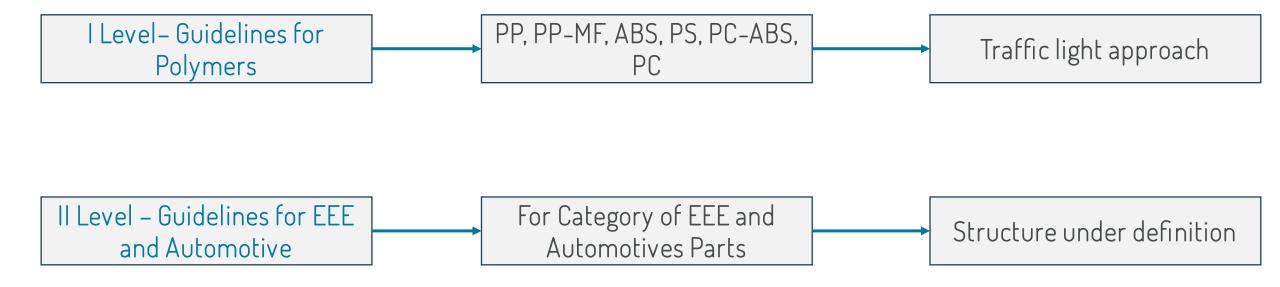
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RECYCLABILITY METHODOLOGY



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RecyClass | DFR GUIDELINES PROPOSAL



First DfR Guidelines are expected to be released in Q4 2025

Recyclass PLASTICS FUTURE IS CIRCULAR





RecyClass Unwrapped

How to boost recyclability for Automotive and Electrical & Electronic appliances?

12/02/2025

Leonardo Forner – Group Marketing & Sustainability Coordinator



Agenda

Company overview

- □ Sirmax Circular strategy on PCR and RecyClass role
- □ Application development in automotive & home appliance markets

Facts and figures

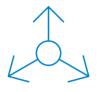


Among the first 5 independent **polypropylene compounders** in the world.



Among the largest **engineering plastics compounders**

in Europe.



3 new sustainable business lines:

Thermoplastic elastomers Post-consumer circular polymers Biocompounds



SIRMAX

Sirmax around the world





Sirmax S.p.A. Headquarters Cittadella, PD PP and rPP Compounds,

🖉 50 kton/yr



Sirmax S.p.A. San Vito al Tagliamento, PN

EPC and rEPC Compounds,

23 kton/yr

Mellaredo di Pianiga, VE



Sirmax S.p.A. Isola Vicentina, VI Logistics Hub



Sirmax S.p.A. Tombolo, PD

EPC and rEPC Compounds

🖉 35 kton/yr

Kutno 2. Łódź



Sirmax New Life S.r.l. Salsomaggiore Terme, PR rPP rHDPE Polymers,

🕢 35 kton/yr

R&D



R&D 🧭 24 kton/yr

Sirmax S.p.A.

Biocompounds,



Sirmax Polska Sp. z o.o. Kutno 1. Łódź

PP and rPP Compounds

🖉 85 kton/yr



PP, TPE, EPC and rTPE Compounds, R&D

Sirmax Polska Sp. z o.o.

🧭 30 kton/yr

AMERICAS



Sirmax North America Inc. Anderson, IN

PP and rPP Compounds,

🕢 48 kton/yr



USA

💉 18 kton/yr



São Paulo, JundiaÍ PP Compounds





Autotech-Sirmax India Pvt Ltd Valsad, Gujarat

PP, EPC Compounds,

🖉 20 kton/yr



Autotech-Sirmax India Pvt Ltd Hosur, Tamil Nadu

New plant by 2026

Green Materials Production Plant

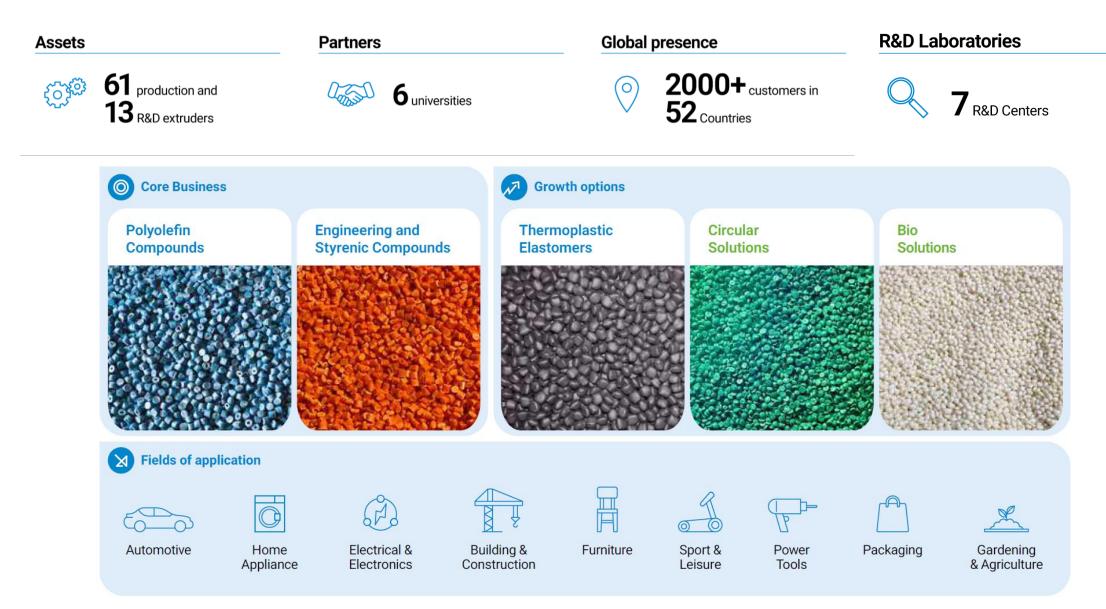


Production capacity

Sirma

A broad and sustainable product portfolio









SIRMAX GROUP CIRCULAR PRODUCTS STRATEGY

Circular Product Strategy: our vertical integration ensures certified quality and traceability





Salsomaggiore Terme (PR) Recycling plant **35 kton/yr**



Anderson, IN Recycling plant **18 kton/yr**



Cittadella (PD) – Kutno (PL) Compounding plants



Anderson, IN Compounding plant





Product co-design activities

supported by Smart Mold expertise



Certified plastic waste sourcing

from national suppliers

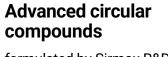


and post-industrial sources



In-house production process

Sirmax New Life/Sirmax North America circular polymers



formulated by Sirmax R&D

PP – Cittadella

TPE - Kutno

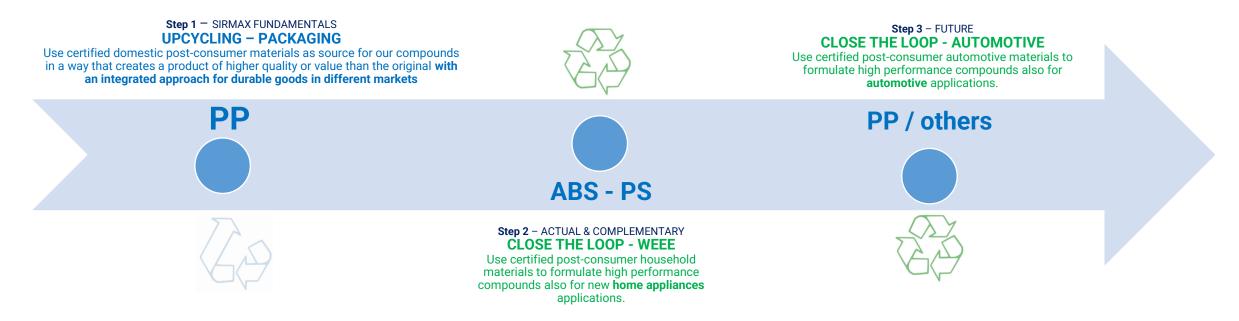
Tailor-made products and services

Our annual capacity of green compound (with 30% recycled material) is around 150kton.

Sirmax - Internal Document

Sirmax strategy on PCR materials



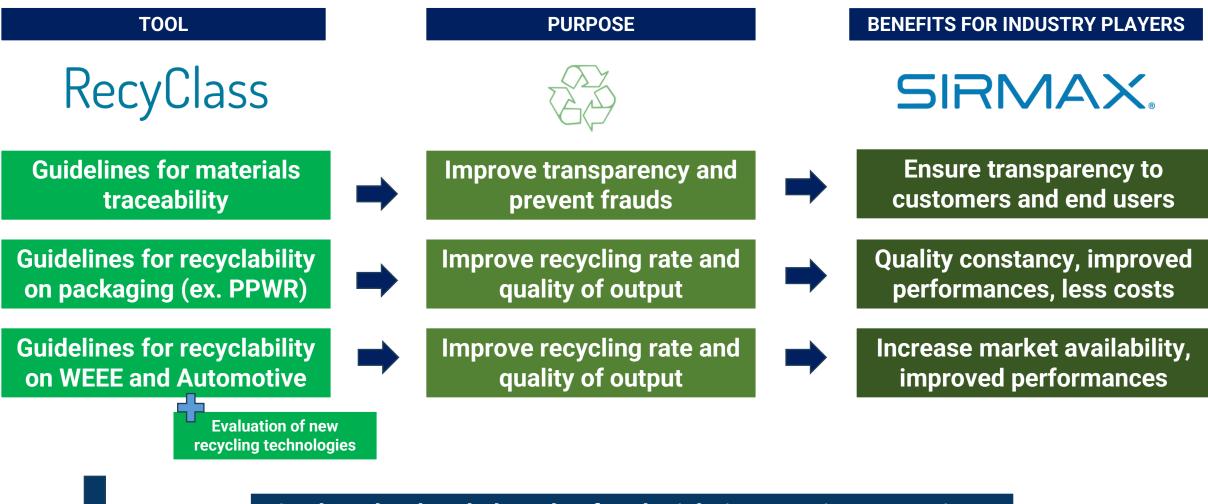


We are open to developing specific closed-loop projects with our customers and suppliers within Sirmax materials. RecyClass

Helps us to establish standard rules on traceability of PCR materials and improve quality of PCR!

SIRMAX How Sirmax is enhancing its capabilities on PCR with "Aurora Project" Initiatives Status / Challenge Goal **C.O.E.** From critical separation of films... ...to accurate sorting SORTING APIENZA Ineffective direct separation of flexible Hyperspectral analysis and deep learning film. algorithms. 2 From perceptible odor... ...to partner supporting its selection WASHING GHENT High contamination of volatile organic **Optimized washing** with new ٠ UNIVERSITY compounds (VOC), ink, adhesives. technologies including deinking. 3 From «basic» rPP.... ...to high quality PP compound COMPOUNDING SIRMA New technologies on compatibilization Limited mechanical properties and ٠ and compounding. critical emissions. From the difficulty of molding rPP... ...to an efficient and robust molding • SMART MOLD MOLDING Robust design of parts and molds. ٠ Frequent setups of the process due to Part guality insensitive to material ٠ rPP properties variations. properties variations.

How RecyClass can help us boosting our strategy on PCR materials



SIRMAX

On the other hand, the role of EU legislation remains strategic to stimulate demand and investment in new technologies.





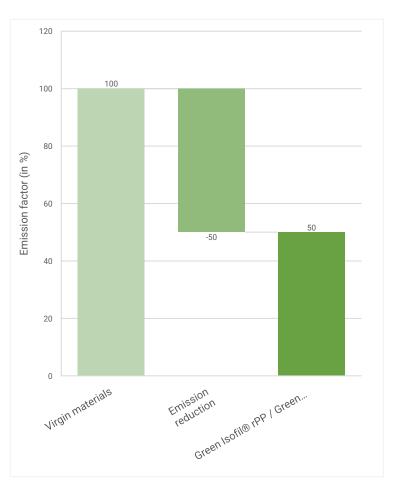
MARKET APPLICATIONS EXAMPLES

Coffee Machine Chassis & Aesthetical parts – rPP and rABS compounds



How to replace virgin material to green – including closed loop **GREEN ISOFIL® CUSTOM GRADE GREEN ISOTER® CUSTOM GRADE** NAME ABS Compound. UV stabilized. Black Talc filled polypropylene. Heat stabilized. DESCRIPTION colour. Black colour. RECYCLED (% 45% of total formula 70% of total formula CONTENT Emission factor (in SOURCE Post-consumer from WEEE - Closed Loop Post-consumer from municipal waste

Emissions Reduction*



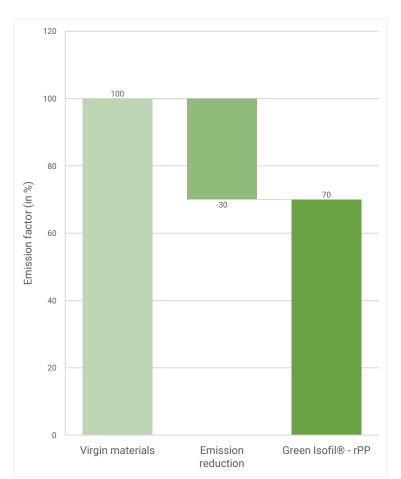
*LCA study based on ISO 14040 conducted with University of Padua [2019]. Single data available on customer request.

Automotive Door Panel – rPP



How to replace virgin material to green **GREEN ISOFIL® CUSTOM OEM GRADE** NAME 120 Talc filled copolymer polypropylene. UV stabilized. Scratch Resistant. Black DESCRIPTION colour. 100 **RECYCLED CONTENT** 30% on total formula 80 SOURCE Post-consumer from municipal waste Emission factor (in %) 60 40 20 0

Emissions Reduction*



*LCA study based on ISO 14040 conducted with University of Padua [2019]. Single CFP data available on customer request.



Sirmax has certified UL YC HB green compounds



- **Component Plastics** Yellow Card GREEN ISOGLASS H (nn)(g) (rr)(g)(k) GREEN ISOGLASS H (nn)(g) (rr)(g)(k) Polypropylene (PP), Recycled, furnished as pellets [contains mechanically recycled content] RTI Imp (°C) RTI Str (°C) Min. Thk Flame **RTI Elec** Color Class HWI HAI (mm) (°C) ALL 1.2 HB 65 65 65 . . 65 65 3.0 HB 65 Comparative Tracking Index (CTI): -Inclined Plane Tracking (IPT) kV: -Dielectric Strength (kV/mm): -Volume Resistivity (10^x ohm-cm): High-Voltage Arc Tracking Rate (HVTR): -Surface Resistivity (10^x ohms/square): Dimensional Change (%): -High Volt, Low Current Arc Resis (D495): -(g) - one letter or digit denoting manufacturing process (k) - represents one digit number 0, 1 or 2 (nn) - one digit number or letter denoting the ratio between glass fiber and talc
 - (rr) two digit number from 01 to 10 denoting total glass-fiber and talc content from 5% to 50% by weight
- ✓ Recycled content: 10-99% ✓ Fillers: Unfilled;

✓ All colors

Talc (max 50%); Carbonate (max 50%); Glass fiber (max 50%); Mixed glass fiber/talc (max 50%)

	omponent - Plastic REEN ISOT)			Yell	ow Card™
GREEN ISOT	ER (p) (b)						
Acrylonitrile Buta	adiene Styrene (ABS), f	urnished as pellets	s [contains m	echanically ree	cycled content]		
<u>Color</u> ALL	<u>Min. Thk</u> <u>(mm)</u> 1.5 3.0	<u>Flame</u> <u>Class</u> HB HB	<u>HWI</u> - -	<u>HAI</u> - -	<u>RTI Elec</u> (<u>°C)</u> 60 60	<u>RTI Imp</u> <u>(°C)</u> 60 60	<u>RTI Str</u> <u>(°C)</u> 60 60
	Comparative Tracking	Index (CTI): -		Inclined Plane Tracking (IPT) kV: -			
Dielectric Strength (kV/mm): -				Volume Resistivity (10 ^x ohm-cm): -			
High	-Voltage Arc Tracking F	Rate (HVTR): -		Surfac	e Resistivity (10 ^x ohm	ns/square): -	
Dimensional Change (%): -				High Volt, Low Current Arc Resis (D495): -			
	otes color code of product onal marking consisting of a	code from 1 to 4 letter	s or numbers or	alphanumeric ref	erring to manufacturing pro	ocess information	

✓ Recycled PCR & PIR (Pre-consumer) content: 10-99%

- ✓ HB at 1.5 mm and 3.0 mm
- ✓ All colors



SIRMAX

Closing remarks

Looking ahead, we recognize that the future of recycled materials depends on **regulatory frameworks, technological advancements, and industry-wide cooperation.**

EU regulations on recycled content will further drive demand and investments in new recycling technologies.

We at Sirmax are continuously expanding our green material portfolio, ensuring we stay ahead of evolving sustainability goals. By working with partners like **RecyClass**, we are building a **circular future** where PCR materials are the standard, not the exception.





THANK YOU

For more information Iforner@sirmax.com Sirmax.com



How to boost recyclability for Automotive and Electrical & Electronic appliances?

Ignacio Buezas



ELIX POLYMERS: CIRCULAR ECONOMY STRATEGY

Committed to a sustainable future

Our sustainability strategy contributes to the achievement of the sustainable development goals included in the **United Nations 2030 agenda.**







ELIX Circular Plastics Strategy



MISSION

/ To offer top-of-the-line sustainable solutions in our markets, promoting the transformation of the value chain towards a circular economy model.



VISION

- / To be a driving force of the new plastics economy, participating in the redefinition of plastic waste as raw material.
- To support an ecosystem of collaboration with companies who have common goals.



COMMITMENT

- To establish collaborations for developing new business models, including opportunities stemming from our membership of Styrenics Circular Solutions
- To offer innovative up-cycling solutions which preserve functionality in final customer applications in our ABS markets.

Reduce risks inherent to the use of sustainable feedstocks

Keep original functionality + improving sustainability of our materials

Identification and implementation of more sustainable feedstocks





ISCC+ CR sustainable ABS

E.g. Bio-circular P2H-AT CR50, Biocompatible ABS M203FC CR50, FOOD CONTACT GRADES, ABS/PC CR, PC/ABS CR etc..

Mechanical recycled grades: E.g. ELIX ABS/PC H801 MR ELIX PC/ABS 5120 MR, ELIX PC/ABS 5130 MR, ELIX P2H-AT MR black etc..



RECYCLASS: CERTIFICATION SCHEME & BENEFITS



RECYCLASS SCHEMES

RECYCLABILITY

- DESIGN FOR RECYCLING GUIDELINES
- RECYCLABILITY EVALUATION PROTOCOLS

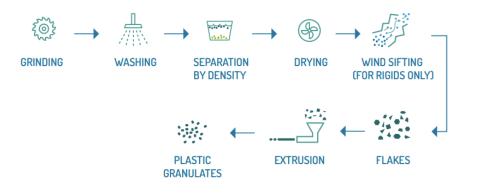
SORTING PROCESS



RECYCLED PLASTICS

- RECYCLING PROCESS CERTIFICATION
- RECYCLED PLASTICS TRACEABILITY CERTIFICATION

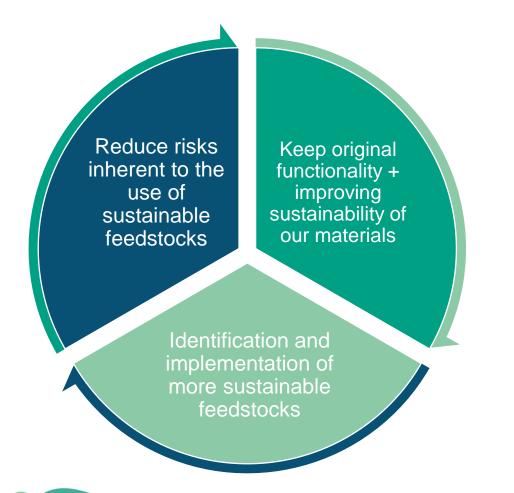
RECYCLING PROCESS







RECYCLASS BENEFITS IN CIRCULAR PLASTICS IMPLEMENTATION



RECYCLASS BENEFITS

- CONSOLIDATED EXPERIENCE FROM
 PACKAGING INDUSTRY.
- STATE OF THE ART RECYCLING PROCESSES.
- DEDICATED RULES FOR EACH POLYMER.
- HARMONIZATION OF STANDARDS & PROCESSES.



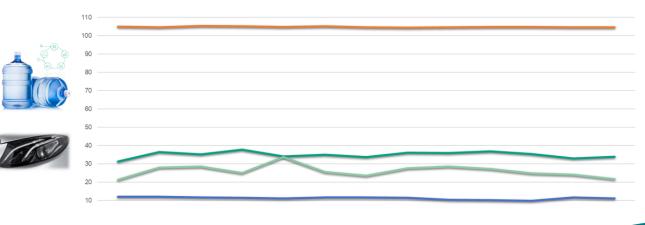
RECYCLASS SCHEME BENEFITS IN CIRCULAR ECONOMY

RECYCLED PLASTICS STRATEGY IMPLEMENTATION KEY POINTS

- SELECTION OF RAW MATERIALS.
- QUALITY OF RAW MATERIALS.
- CUSTOMER & CONSUMERS
 CONFIDENCE IN RECYCLED PLASTICS.
- COMPLIANCE WITH REGULATIONS & GOOD PRACTICES.

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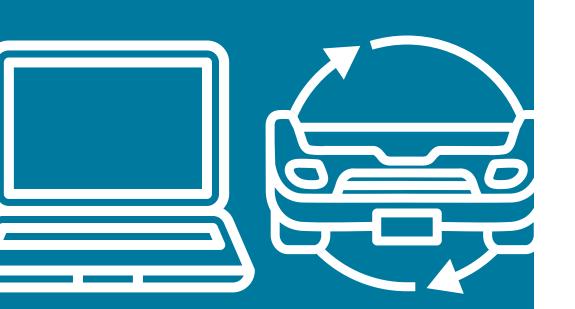
E-LOOP MR LOT-TO-LOT PROPERTY STABILITY





elix-polymers.com





Questions & Answers

Use the Q&A box at the top-right corner of your screen



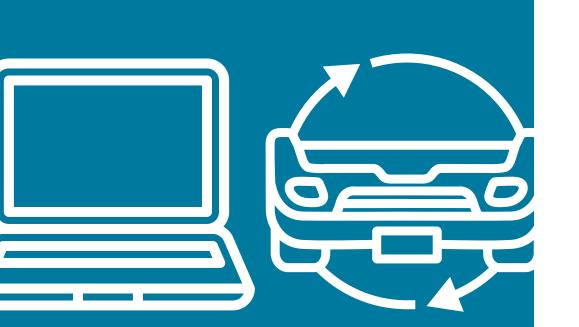


DO YOU WANT TO CONTRIBUTE TO PLASTICS CIRCULARITY FOR AUTOMOTIVE AND EEE?

JOIN RECYCLASS NEW BRANCH!







Thank you for participating!

Save the date for the next webinar:

29 April | RecyClass for Beginners: Staying ahead of PPWR with RecyClass Methodology



LEARN MORE!

Registrations will open soon

