



Adaptive Compounding

Challenges & Innovative Technology for Compounds
Based on Mechanically Recycled Polymers

September, 25th 2025

Webinar

Meet Your Speakers



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Head of Sales

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- Multiple business development positions for consumer, building and automotive
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Agenda

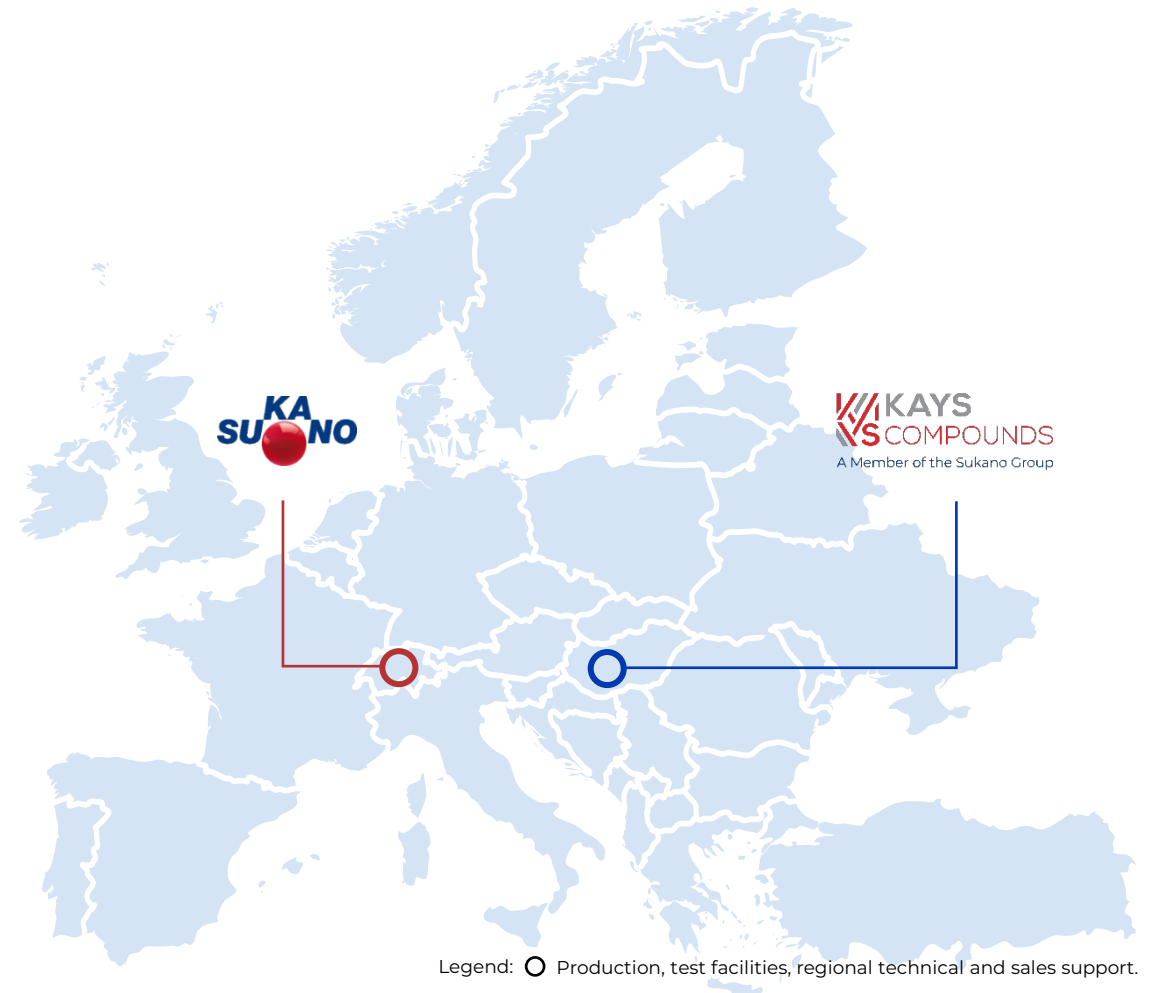
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2	Drivers supporting recycled materials	5	Positive sustainability impact of recycled compounds
3	Recycling Technologies	6	Business cases

Meet Sukano Group

We aspire to redefine **masterbatch** and **compounding excellence in polyesters, biopolymers, and specialty resins** — integrating **recycled content** and **technical expertise**, creating **sustainable value** for our customers, our planet, and our society.

Sukano: Leading position in Packaging, expansion into Consumer Durables, Building & Construction, Fibers, and Healthcare for masterbatches and specialized compounds.

KAYS: Specialized in Mobility, E&E, Furniture, and Building & Construction with engineering plastics compounds containing recycled materials.



Drivers & Trends Supporting Recyclates

Regulatory Framework Driving Recycled Materials Adoption

End-of-Life Vehicles (ELV) Directive (under revision)

- Regulation on circularity requirements for vehicle design and on management of ELV recycled content targets
- September 9th 2025: minimum of 20% of plastic recycled from post-consumer plastic waste. These 20% recycled content targets can also be met with max. 10% of pre-consumer waste

Ecodesign for Sustainable Products Regulation (ESPR)

- Framework for setting minimum recycled content and circularity requirements
- Will apply to nearly all consumer durables

Construction Products Regulation (CPR)

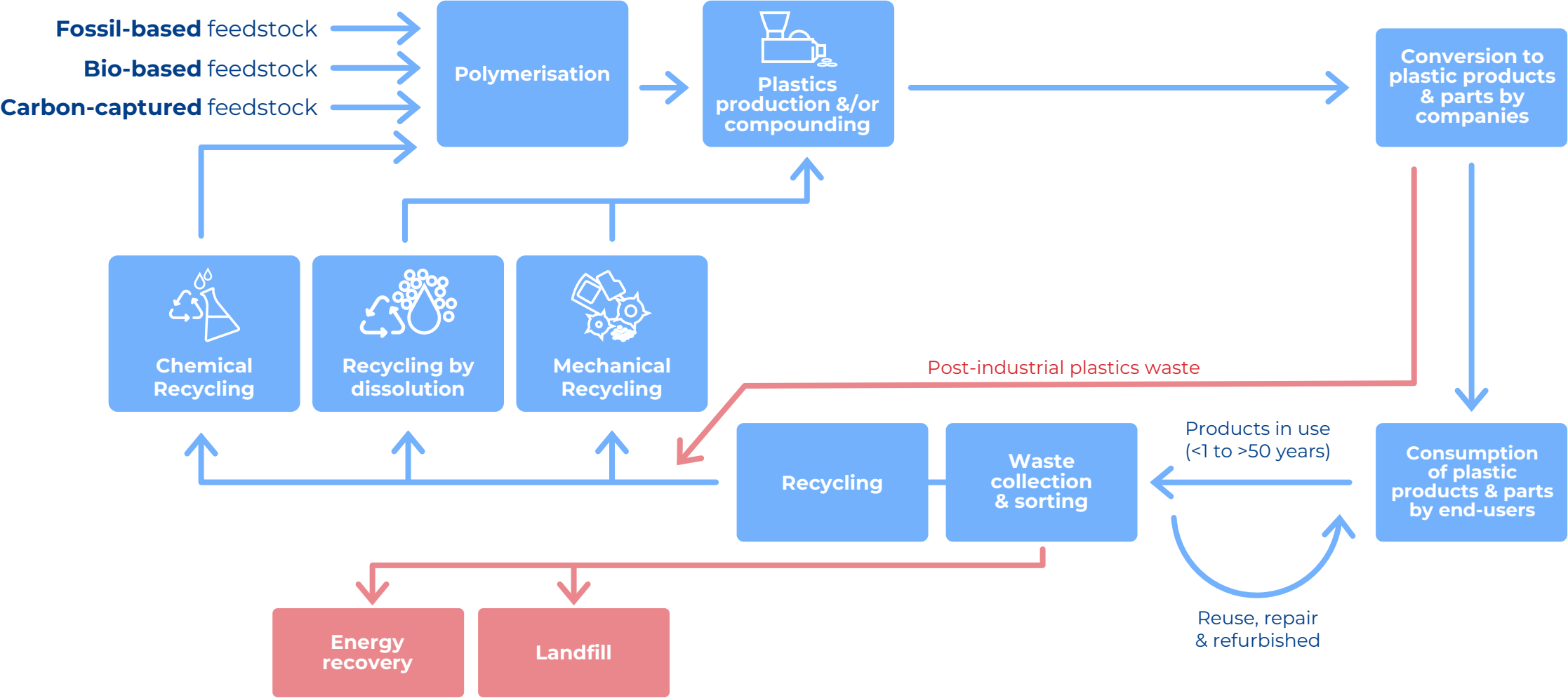
- Revised regulation includes potential mandates for recycled content in construction materials

Packaging and Packaging Waste Regulation (PPWR)

- Binding recycled content targets for plastic packaging by 2030 and beyond

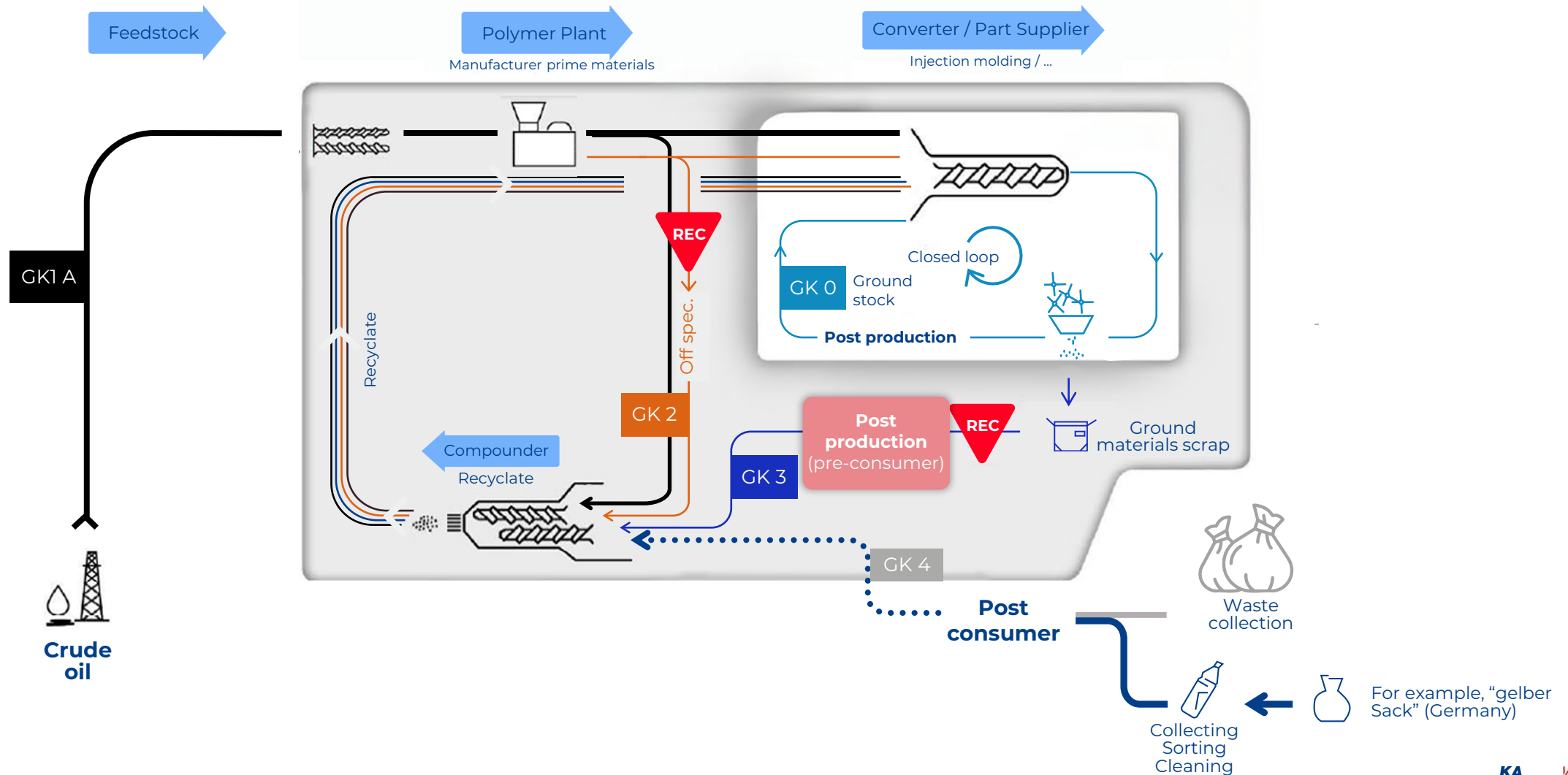


Recycling Technologies Overview



The Different Types of Feedstock

PIR : post-industrial GK3 / PCR : post-consumer GK4



Poll

What is your actual experience level with recycled materials?

(Multiple Answers Question)

- a) Scouting phase
- b) Re-use of production waste (in-house loop)
- c) At validation phase of recycled materials (PIR/PCR)
- d) Already in use of recycled materials (PIR/PCR) in serial production
- e) No experience so far

What is “Adaptive Compounding”?

Development steps for Tailormade Compounds

Challenges of engineering recyclates

- Recyclates can vary a lot in quality, color, and properties due to:
 - Mixed sources (e.g. packaging, automotive, electronics)
 - Aging and previous use
 - Contaminants presence and quality mainly due to inconsistent polymer types



What we can offer

- Strategic raw material sourcing and selection for consistent quality
- **Incoming material inspection** (e.g. melt flow, color, rheology testing, mechanical properties, thermal, physical, contamination)
- **Finetune** the compounding recipe
- **Customize performance** of recycled compound with virgin polymers and additives

“Adaptive Compounding” Development

Critical Steps to Overcome the Challenges of PIR

Availability Post Industrial Recyclate (PIR)

- Injection molding wastes
- Extrusion molding wastes (limited quantity)
- Blow molding (usually directly re-used)

Constraints PIR

- Limited Sources
- Quality Consistency
- Type of Contaminations
- Presence of multiple fillers, colors, additives, etc.
- Multimaterial



Kays knowhow and expertise



Robust processes to select supplier, material and in depth material inspection **to avoid contamination of incompatible polymer** are key in adaptive compounding

“Adaptive Compounding” Development

Critical Steps to Overcome the Challenges of PCR

Availability Post Consumer Recyclate (PCR)

- Fishing nets (PA6)
- Textiles
- Household appliances (WEEE Waste Electrical and Electronic Equipment)
- Yellow bags
- End of life Vehicles (ELV)

Constraints PCR

- Limited sources for some polymers
- Polymer ageing (ELV ca. 15years)
- Quality Consistency
- Type of Contaminations
 - Feedstock source
 - Odor, Emissions
- Collection costs



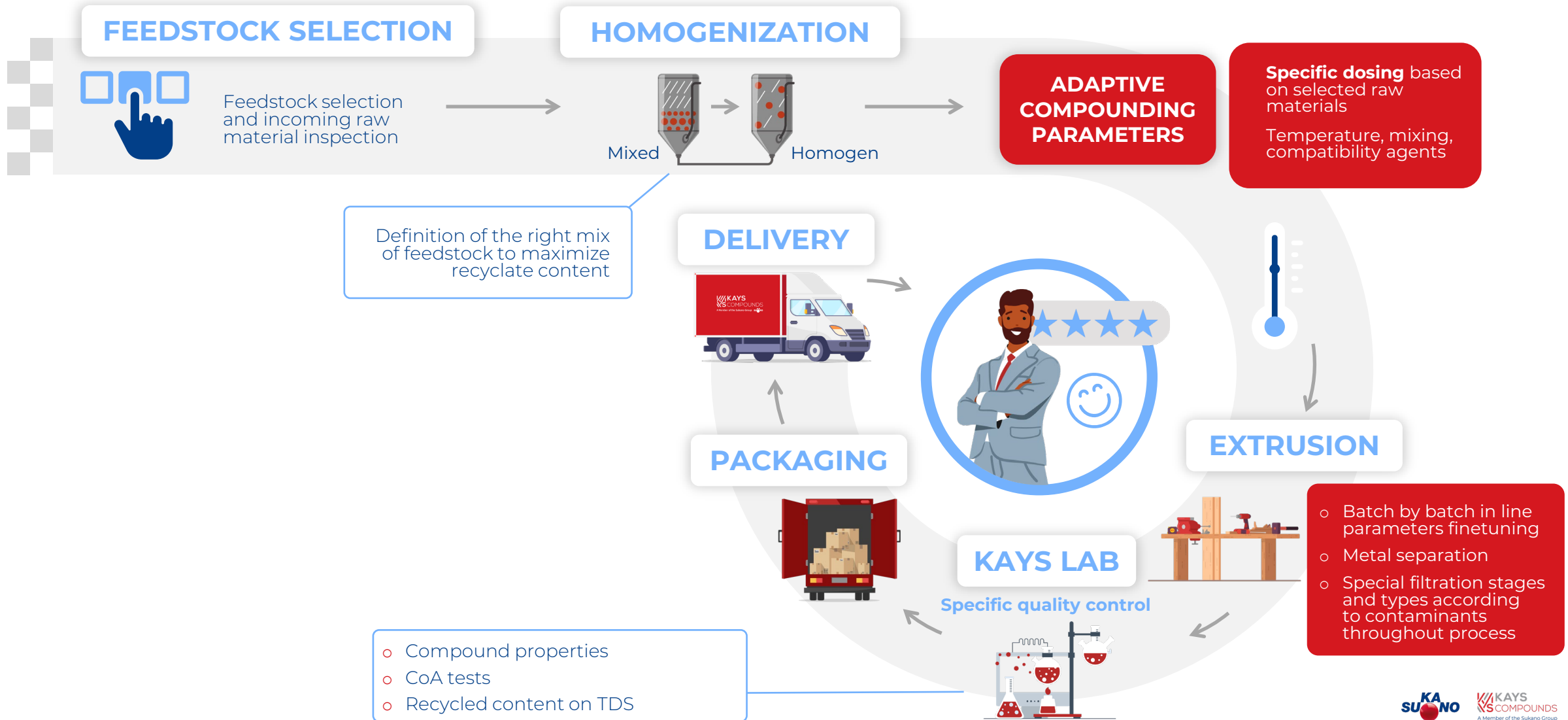
Kays knowhow and expertise



Robust processes to select supplier, material and in depth material inspection **to avoid contamination of incompatible polymer** are key in adaptive compounding

Kays Unique Technique and Process

Benefit from Experience and Knowhow



Color Masterbatch Lab

Tailored Solutions



Challenges of recyclates

Thermal & UV degradation

→ inherent yellowness of recycled clear polymers

Purity of the recyclates

→ presence of incoming black specks

Presence of multiple pigments

→ color shades must be carefully selected

Color variations, pigment concentrations

→ adaptive formulations

Availability and continuity of recyclates supply

Variety of incoming recyclates: importance of selection and tests of recyclates



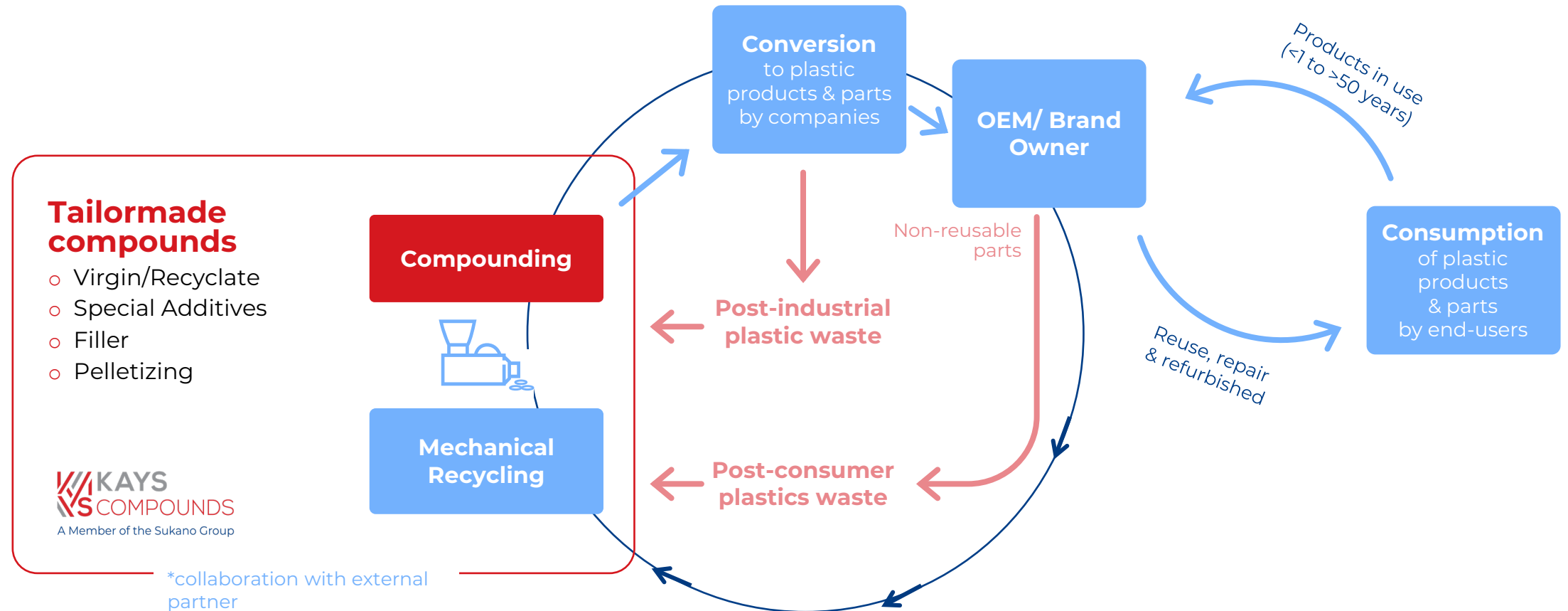
Kays methods ensure stable recycled colors by overcoming these challenges

Expertise in colorants selection



Additional Possibility for Adaptive Compounding

Repurposing Your Waste into New Products



Poll

What is the most common market request for product carbon footprint reductions? (Single Answer Question)

- a) So far we have no target in place
- b) At least 30%
- c) At least 50%
- d) At least 70%
- e) 100%

Poll

What kind of certifications will you need in the next 3 years?

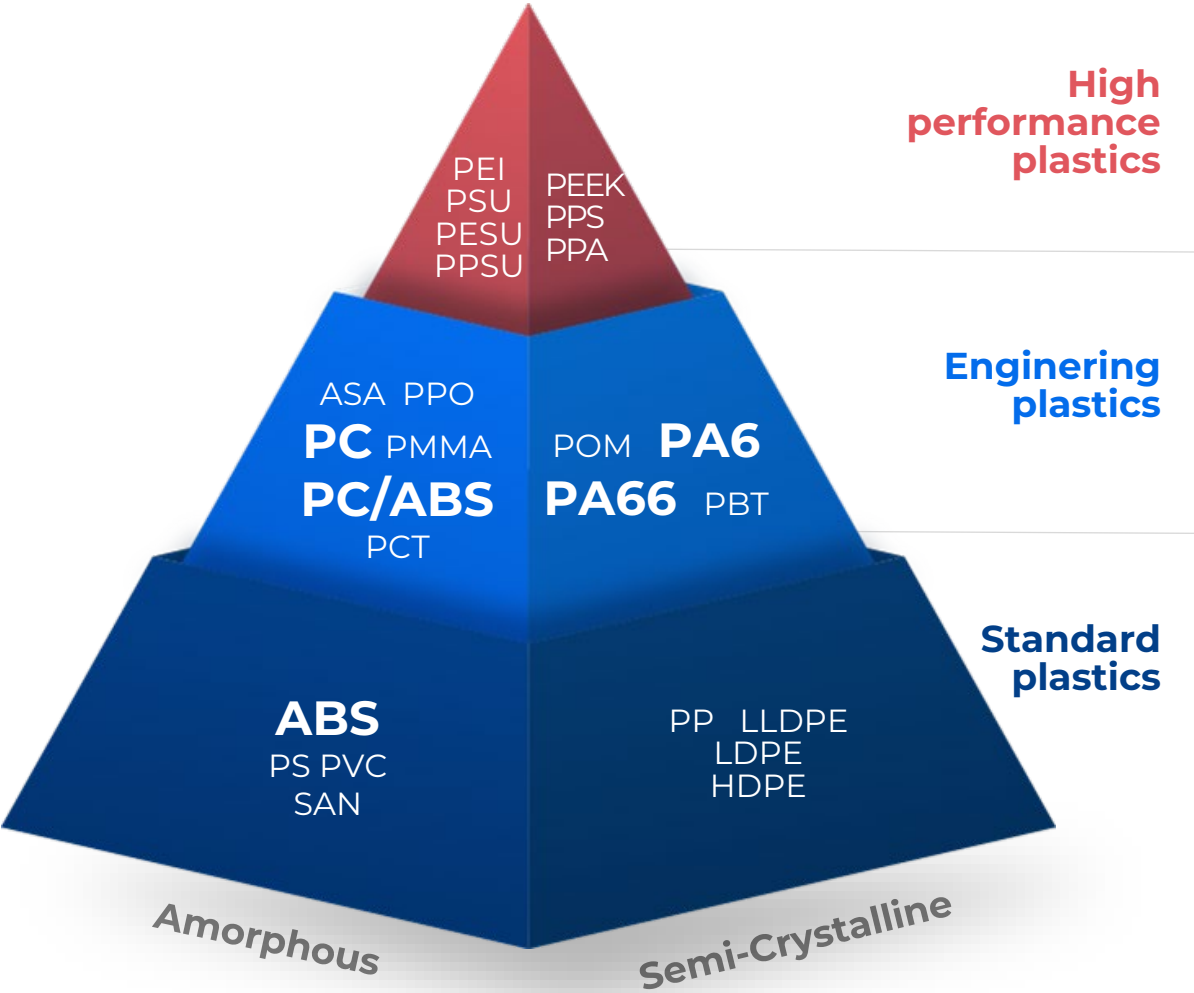
(Multiple Answer Question)

- a) Recyclate contents self declaration
- b) Recyclate content third party declaration
- c) Carbon footprint declaration
- d) LCA declaration
- e) ISCC+
- f) None

Tailormade Compound Applications

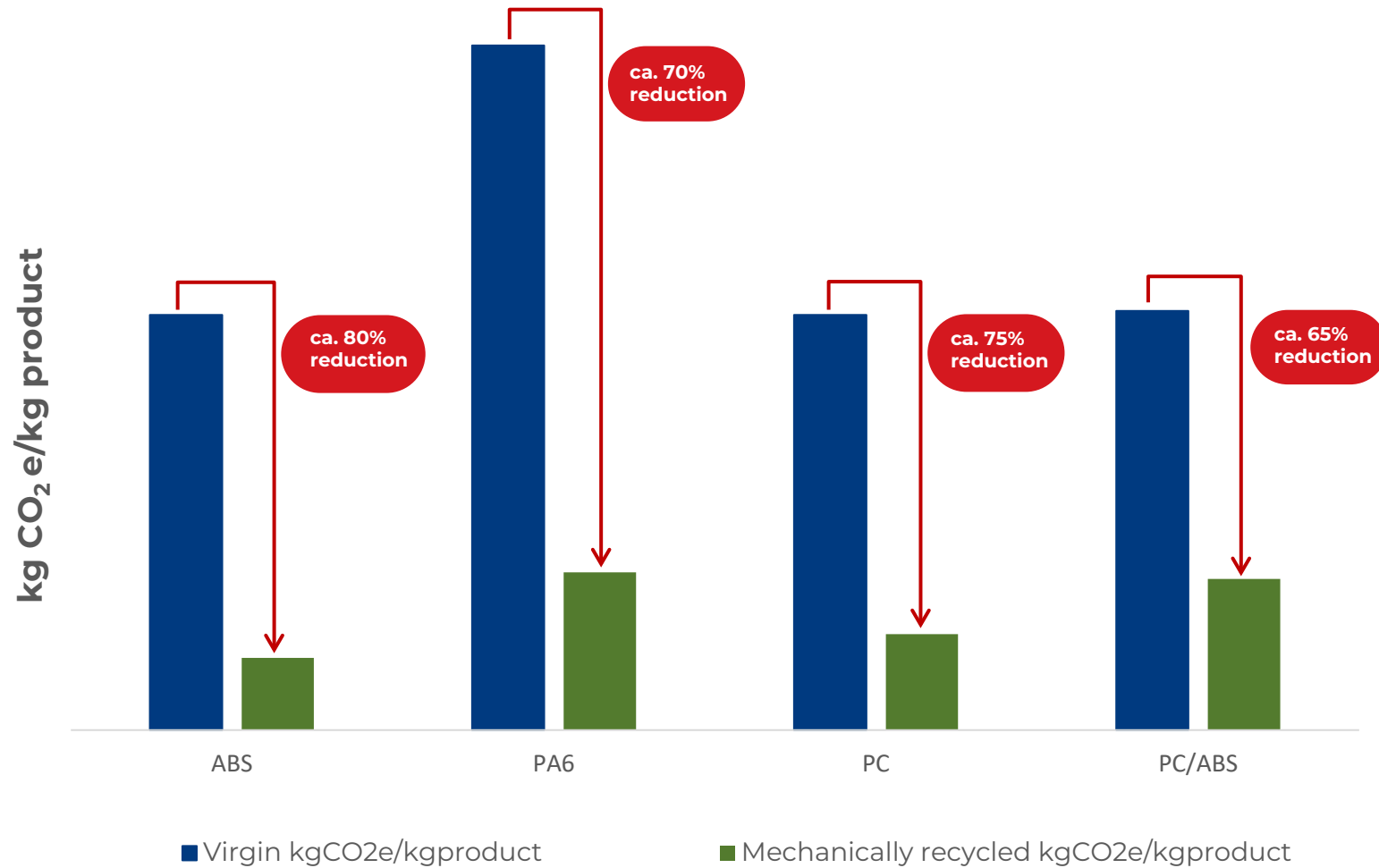
Material Focus

Main Applications	Mobility	Building & Construction	Consumer Durables
ABS	X	X	X
PA6 – PA66	X	X	X
PC	X	X	X
PC/ABS	X	X	X



Carbon Footprint per Polymer Group

Positive Impact of Mechanical Recycled Material



Source: calculation range based on primary data from Kays Kft and suppliers

Business Case Scenario Automotive

Rear View Mirror



Application Requirements

- High dimensional stability
- Strict flowability control
- Excellent vibration resistance
- High stiffness and impact absorption

Material reference: Kaycom PA6 GF50¹

Product Carbon Footprint
reduction of more than
70% achieved

Typical Properties	Standard	Unit	Typical Value
Mechanical:			
Tensile Modulus (2mm/min) @ 23°C	ISO 527-2	MPa	13500-9400
Tensile Strength (5mm/min) @ 23°C	ISO 527-2	MPa	135-110
Tensile Strain at break (5mm/min) @ 23°C	ISO 527-2	%	2.5-3.8
Flexural Modulus (2mm/min) @ 23°C	ISO 178/A	MPa	13000/9000
Flexural Strength (2mm/min) @ 23°C	ISO 178/A	MPa	205/155
Impact:			
Charpy unnotched impact strength ² @23°C	ISO 179/1eU	KJ/m ²	50/70
Charpy notched impact strength ² @23°C	ISO 179/1eA	KJ/m ²	8/18
Granular Material Class			
According to VW 50026	VW 50026:2020-10	GK1 (39%) GK3 (61%)	

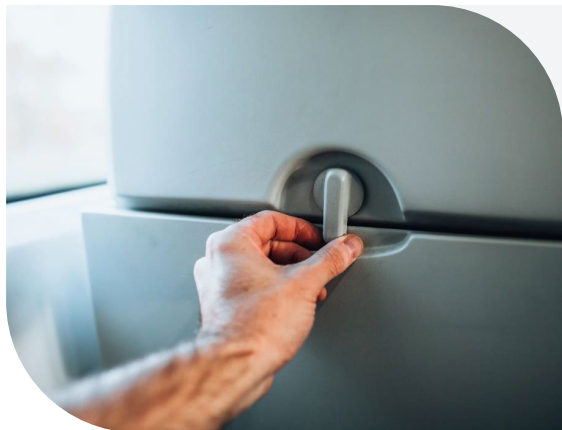
¹ REACH and RoHS compliant

² Measurement with 4J hammer

Disclaimer: Typical values only. Variations within normal tolerances are possible for various colors. They are based on our general experience and given in good faith, but we are unable to accept responsibility in respect of factors which are outside our knowledge or control.

Business Case Scenario Automotive

Rear Seat Tray



Application Requirements

- Durable
- Lightweight
- High impact resistance
- Good stiffness

Material reference: Kaycom PC-ABS¹

Product Carbon Footprint
reduction of more than
65% achieved

Typical Properties	Standard	Unit	Typical Value
Mechanical:			
Tensile Modulus (1mm/min) @ 23°C	ISO 527-2	MPa	2150
Tensile Strength (50mm/min) @ 23°C	ISO 527-2	MPa	50
Tensile Strain at break (50mm/min) @ 23°C	ISO 527-2	%	30
Flexural Modulus (2mm/min) @ 23°C	ISO 178/A	MPa	2150
Impact:			
Charpy unnotched impact strength ² @23°C	ISO 179/1eU	KJ/m ²	N.B.
Charpy notched impact strength ² @23°C	ISO 179/1eA	KJ/m ²	25
Granular Material Class			
According to VW 50026	VW 50026:2020-10	GK1 (10%) GK3 (90%)	

¹ REACH and RoHS compliant

² Measurement with 4J hammer

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Business Case Consumer Durables

Coffee Maschine Housing



Application Requirements

- High stiffness and impact resistance
- Good flowability
- Low warpage
- Defect free surface finish
- Homogenous color appearance (jet black), delta E <1

Material reference: Kaycom ABS¹

Product Carbon Footprint
reduction of more than
80% achieved

Typical Properties	Standard	Unit	Typical Value
Mechanical:			
Tensile Modulus (1mm/min) @ 23°C	ISO 527-1,2	MPa	2200
Tensile Strength (50mm/min) @ 23°C	ISO 527-1,2	MPa	40
Tensile Strain at break (50mm/min) @ 23°C	ISO 527-1,2	%	8
Flexural Modulus (2mm/min) @ 23°C	ISO 178	MPa	2200
Impact:			
Charpy unnotched impact strength ²	ISO 179/1eU	KJ/m²	85
Charpy notched impact strength ²	ISO 179/1eA	KJ/m²	15
Granular Material Class			
According to VW 50026	VW 50026:2020-10	GK1 (5%) GK3 (45%) GK4 (50%)	

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The Future is in Our Hands

Road to Circularity with Plastics

- Transition from virgin to recycle
- Save Plastics scrap from incineration or landfilling

Let's meet at K2025 to discuss how you can switch from virgin to recycle for your application

Visit us at K2025
Hall 8A / Booth H28

Q&A

Thank You for Your Attention!
We are Happy to Answer Any Questions You May Have.



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