Let our experience work for you!

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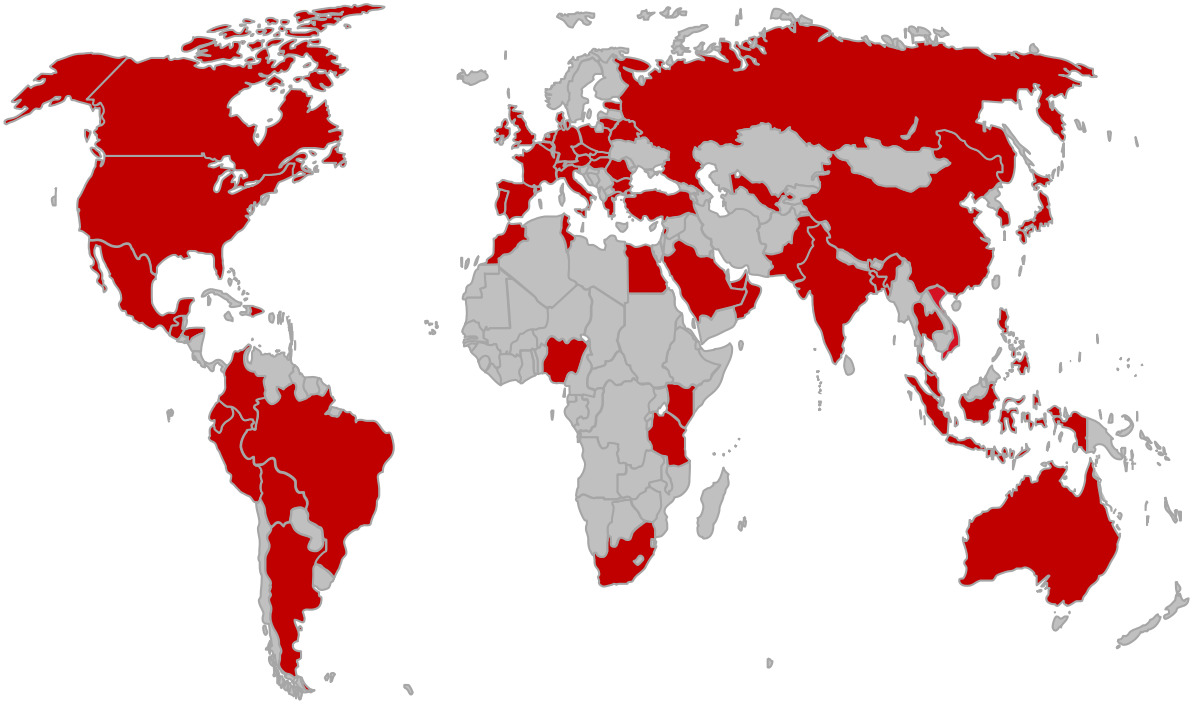
Sustainable food packaging made from recycled PET

PETCORE Europe
Thermoforms event, Bologna
14. - 15. June 2023

Markus Fellinger

355 STARLINGER rPET PLANTS INSTALLED

3.2 MILLION TONS OF ANNUAL rPET FOOD CAPACITY



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B2B RECYCLING

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foodgrade without compromise

RECYCLING TECHNOLOGY

PRE-AFTER-TREATMENT SOLUTIONS

NO COMPROMISE IN FOOD SAFETY

BENEFITS

- Crystallization
- Drying, dedusting
- Decontamination
- iV increase

crystallizer

deCON unit

viscoSTAR

ENTIRE SHEET EXTRUSION SOLUTIONS

viscoSHEET

BENEFITS

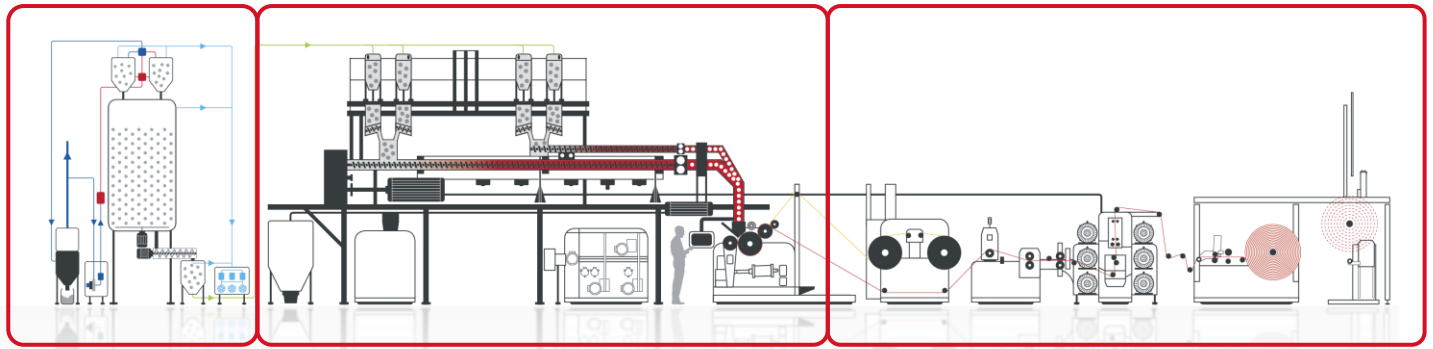
- Highly automated
- Constant, reproducible quality
- Safe & easy to operate
- Low maintenance

INTELLIGENCE BEYOND viscoSHEET TECHNOLOGY

Drying and Decontamination

Dosing, Extrusion, Filtration and Calendaring

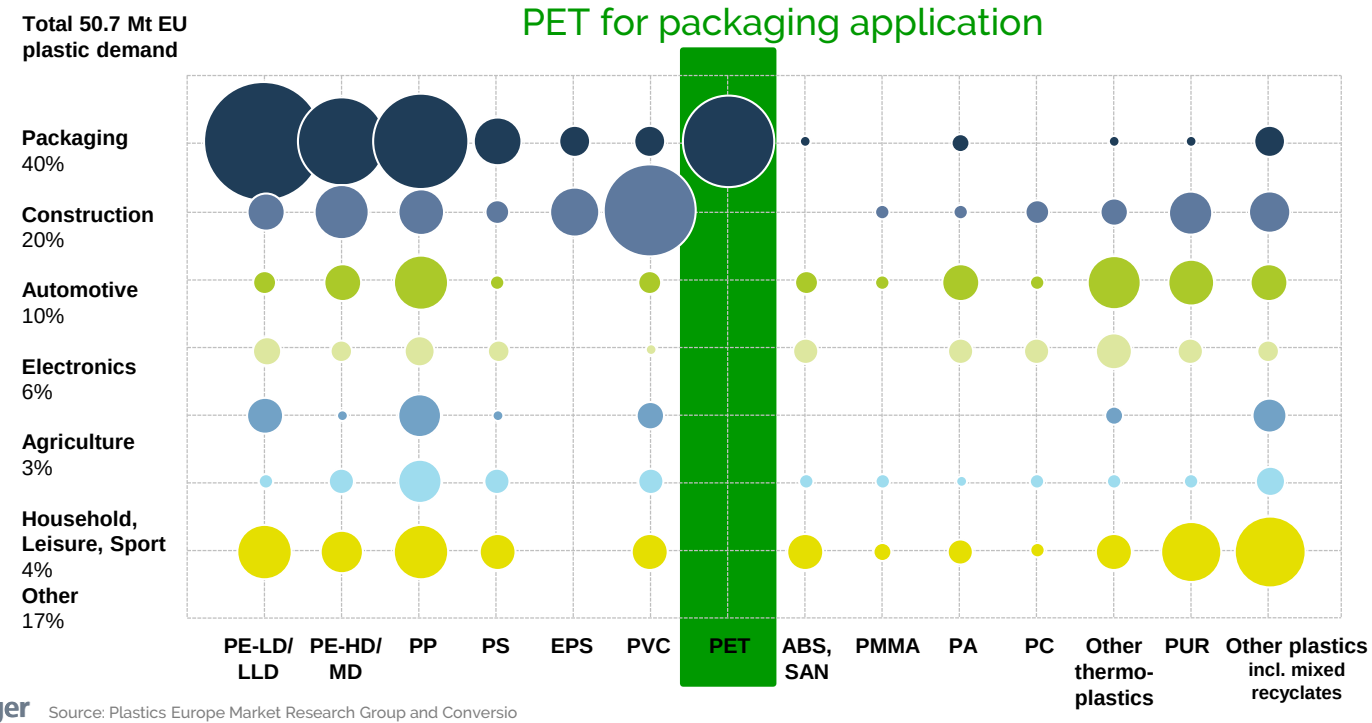
Downstream and Winding



Extrusion Control	autoGAGE	autoGAP & varioGAP
autoSTART	autoDIE	viscoLYZER

PLASTICS USE PER INDUSTRY (2019, EU27+GB+NO+CH)

RECYCLE EACH MATERIAL WITHIN APPLICATION / INDUSTRY !



Source: Plastics Europe Market Research Group and Conversio

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APPLICATION DEVELOPMENT

Sustainable Tray/FFS food packaging made from recycled PET

MONO-PET TRAYS

- Industrial scale trials were done for cheese, sausage and vegan products for shelf life
- Commercially sealing and reseal solutions are available by multiple companies

WE CAN REPLACE
80% PET/PE/(EVOH) LAMINATED FFS TRAYS WITH
MONO PET (400.000 TONS IN EU) AND RECYCLE IT

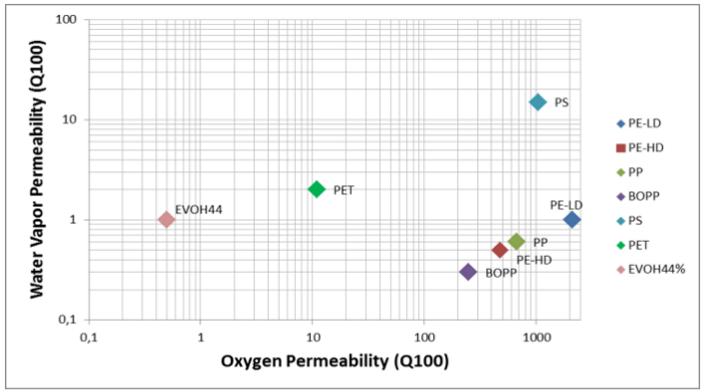

Figure 1: Oxygen and Water Vapor Permeability [Source: H.-C. Langowski TU Munich]

CO_2-FOOTPRINT TRAYS

rPET OUTPERFORMS ALL OTHER PACKAGING OPTIONS

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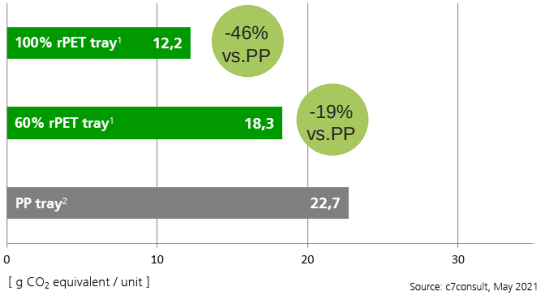
Ham Tray

Packaging unit for 120g content, analysis without sealing film

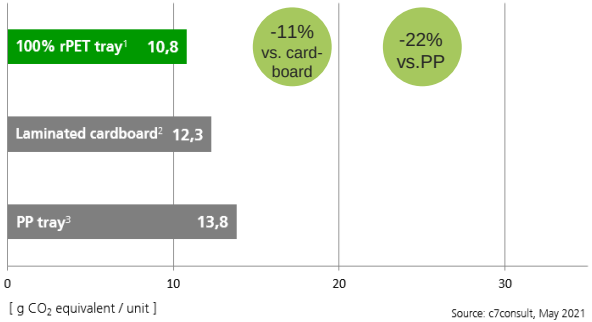


Source: c7consult, May 2021

¹ 80% separate collection and mechanical recycling (food-grade quality = closed-loop recycling)
² 80% separate collection and mechanical recycling (downcycling to end-of-life applications)

Cheese Tray

Packaging unit for 150g content, analysis without sealing film

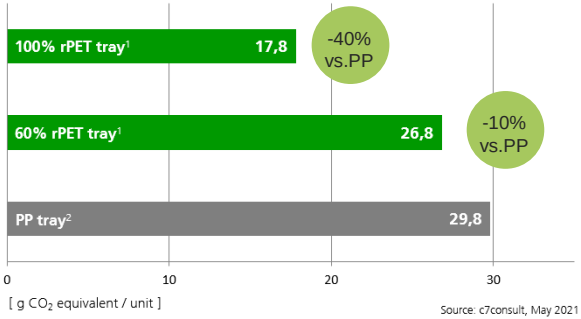


Source: c7consult, May 2021

¹ 50% separate collection and mechanical recycling (food-grade quality = closed-loop recycling)
² Collection via residual waste and and incineration in a waste incineration plant
³ 50% separate collection and mechanical recycling (downcycling to end-of-life applications)

Meat Tray

Packaging unit for 350g content, analysis without sealing film

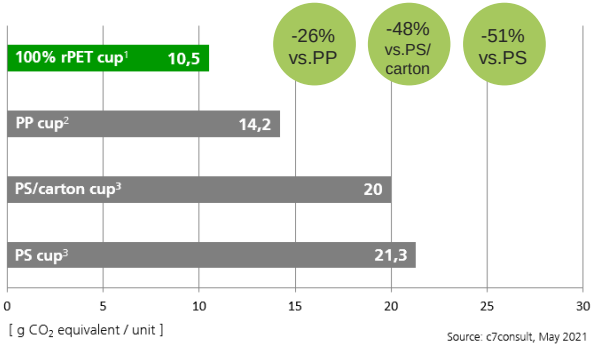


Source: c7consult, May 2021

¹ 80% separate collection and mechanical recycling (food-grade quality = closed-loop recycling)
² 80% separate collection and mechanical recycling (downcycling to end-of-life applications)

Yoghurt Cup

Packaging unit for 250ml content, analysis without sealing film



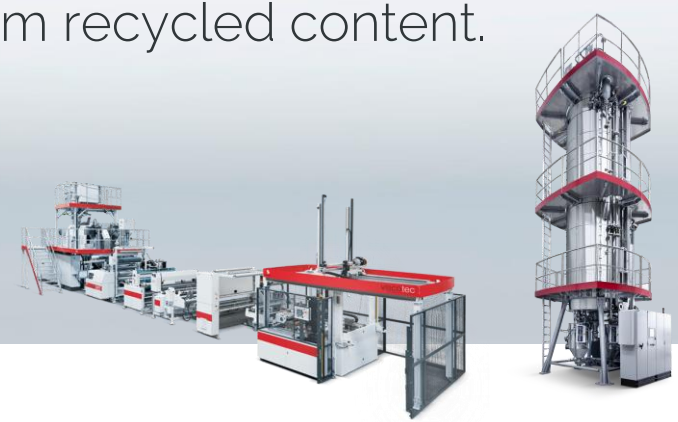
Source: c7consult, May 2021

¹ 75% separate collection and mechanical recycling (food-grade quality = closed-loop recycling)
² 50% separate collection and mechanical recycling (downcycling to end-of-life applications)
³ Collection via residual waste and and incineration in a waste incineration plant

APPLICATION DEVELOPMENT

rPET100

Designed for recycling.
Made from recycled content.



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Starlinger

rPET100 APPLICATIONS

HEAT RESISTANT PACKAGING MADE FROM MONO-PET

Dairy products | Hot cups | Instant soups | To-go meals | Coffee lids

ANTISTATIC PRODUCTS

HOW TO MAKE TECHNICAL PACKAGING ANTISTATIC ?

- How to **protect electrical components** and controller during transportation?
- How to reduces the **static charge**?
- How can the **flow behavior** of the different materials be used properly?

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viscoZERO

Melt phase decontamination

ZERO contamination
ZERO waste
ZERO odour
ZERO limits

PP PE PS PET

Starlinger

viscoZERO PROCESS

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Available as

01 stand alone

02 in combination with recycling extruder

Components

03 recycling extruder

04 pre-filtration

05 melt pump

06 start valve

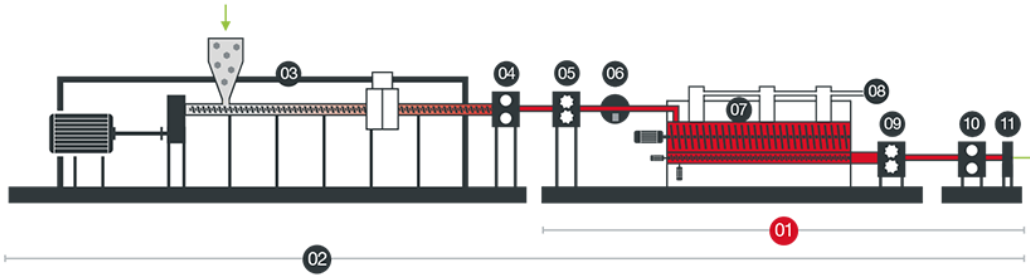
07 viscoZERO

08 vacuum system / degassing

09 melt pump

10 screen changer

11 viscometer



granulation

inline

fibre & yarn

extrusion blowmolding

injection molding

tapes

strapping

SHEET

GAS CHROMATOGRAPHIES

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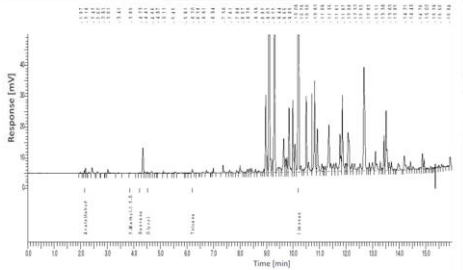
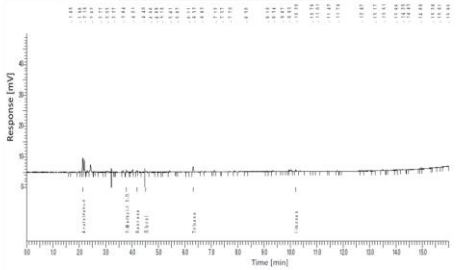
Comparison HDPE

HDPE PCR flakes

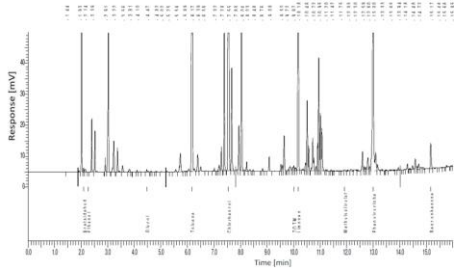


HDPE pellets after viscoZERO

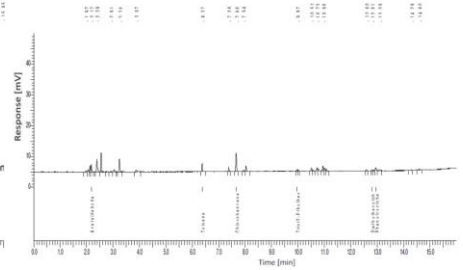


Comparison PP CT

PP CT flakes

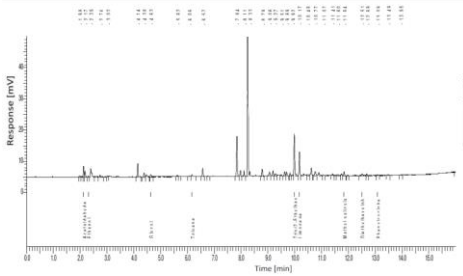


PP CT pellets after viscoZERO

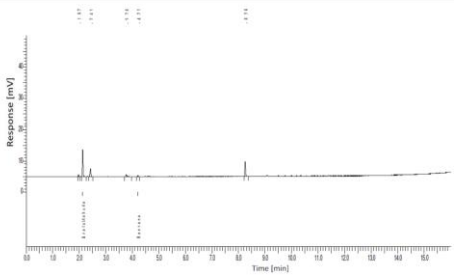


Comparison PS

PS PCR flakes

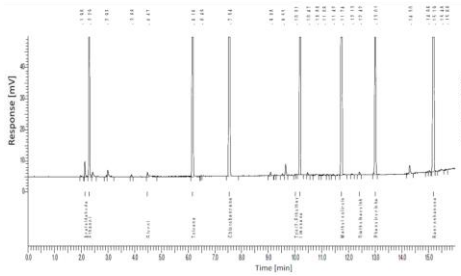


PS pellets after viscoZERO

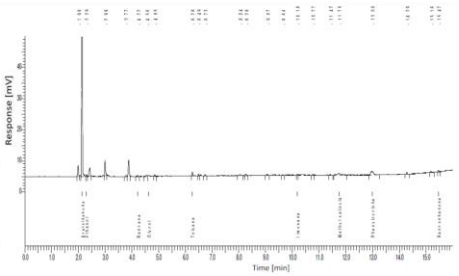


Comparison PET CT

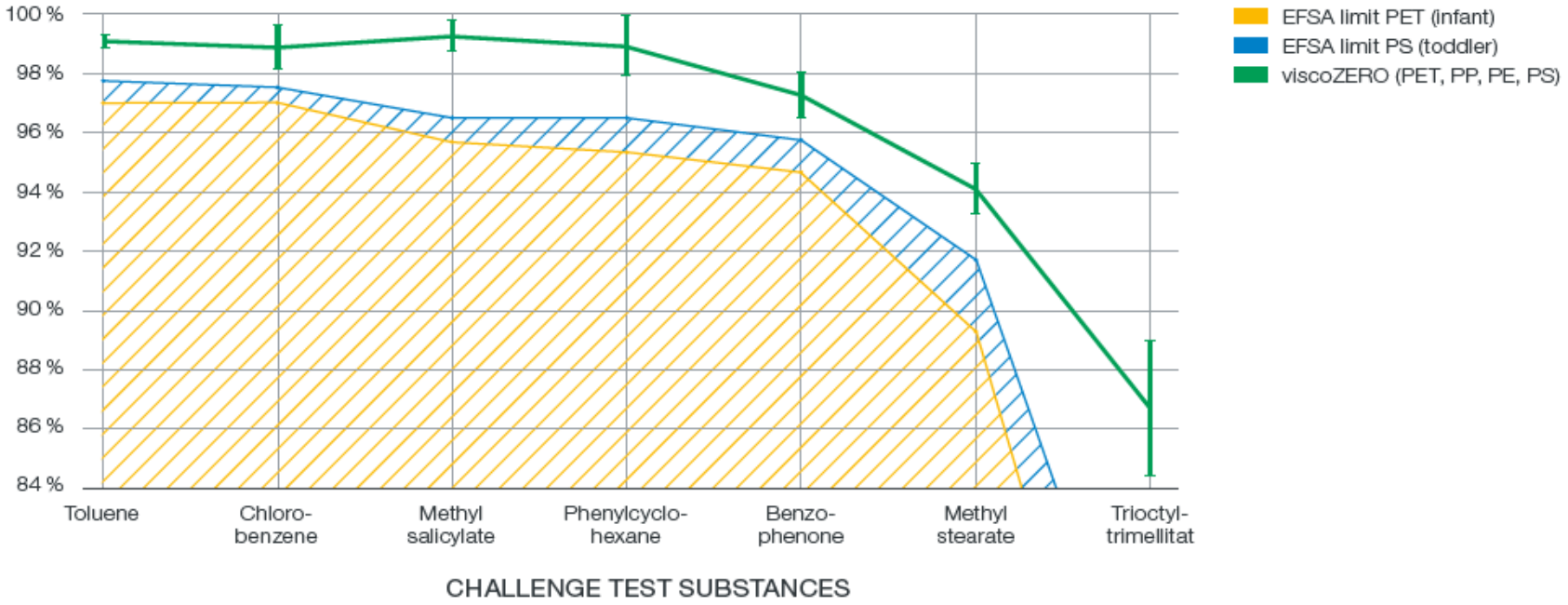
PET CT flakes



PET pellets after viscoZERO



CLEANING EFFICIENCIES



viscoZERO APPLICATIONS

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INPUT MATERIALS

- **PET food grade acc. To EFSA, FDA**
- **PET iV increase**
- **PE** odour removal and Food grade acc. To FDA, EFSA under novel Technology
- **PP, PS** odour removal and Food grade acc. To FDA, Efsa under novel technology

For PO, PS (EFSA, FDA) a steady control over the input material is necessary (e.g. >99% of food input, control of input contamination…)

viscoZERO FACTS

Model		600	1500
Max. output[1,2]	[kg/h]	400-800	800-1600
Residence times from/to[2]	[min]	10–40	15–40
Net volume of reactor	[dm^3]	600	1500
Equipment height	[m]	2.2	2.2
Floorspace	[m]	5 x 3	6 x 4
High-vacuum system	[mbar]	≤ 10	
Energy consumption	[kWh/kg]	0.03–0.05	
iV increase PET[3]	[dl/g/min]	0.004–0.007	
Food grade according to		FDA pending	

Above table represents general data and average values. We reserve the right of technical modifications.

[1] depending on material (PET, PP, PE, PS) and residence time
[2] recommended residence time 20 minutes
[3] iV increase equals 0.08 - 0.15 dl/g per 20 minutes

STARLINGER viscotec

CORE COMPETENCE IN rPET SHEET AND REFINEMENT

- founded 2005
- since 2012 in St. Martin, Austria
- 100 employees
- Increase of production capacity in 2016 and in 2020
- US subsidiary American Starlinger-Sahm in South Carolina

Starlinger viscotec
Starlinger & Co. Gesellschaft m.b.H.
Austria
4113 St. Martin im Mühlkreis
Adsdorf 38

viscotec.sales@starlinger.com
www.viscotec.at

CONTACT

MARKUS FELLINGER
+43 7232 3817-0
viscotec.sales@starlinger.com

www.viscotec.at