



VACUREMA® BOTTLE-TO-BOTTLE

Food Contact Approved Recycling.
With highly efficient decontamination BEFORE the extrusion process.

CHOOSE THE NUMBER ONE.

VACUREMA®

The modular technology.
For your application.

Different requirements call for different solutions. Modular solutions which are configured exactly for your particular application. VACUREMA® gives you this flexibility in impressive style. With this patented process you can count on the best established and most used technology for the recycling of post consumer PET bottle flakes, PET in-house waste and also PE-HD bottle flakes.

There are currently more than 150 VACUREMA® systems in use around the world, producing high-quality pellets and end products with an overall capacity of over 1 million tonnes. A wealth of experience which guarantees you maximum operational reliability of your system with flexibility in the application at the same time. In the form of a turnkey recycling solution which is customised for the requirements of your end product. One that also runs with the lowest possible energy and production costs.

VACUREMA® – one system, three application fields.



VACUREMA® Bottle-to-Bottle



VACUREMA® Pelletising



VACUREMA® Inline Applications



The decisive benefits for the customer:

1. Decontamination and ultrafine filtration for direct food contact – in accordance with the criteria of the FDA, EFSA and many major brand owners:

Thanks to highly efficient and fast decontamination together with large area ultrafine melt filtration, the recycled pellets produced using VACUREMA® technology are approved for food contact.

2. Flexibility, variable input, ideal for mixing with virgin material:

Thanks to Counter Current technology, EREMA systems are extremely flexible and process a notably wide variety of input materials (in line with the end application) such as PET bottle flakes from a multitude of sources (water bottles, oil bottles, carbonated soft drinks, etc.) with differing bulk densities (bottle light weighting).

3. IV stability through vacuum treatment:

Despite varying moisture levels and different IV values in the input material, stable IV values are achieved through the patented pre-treatment method. This means, therefore, that input materials with higher material moisture levels can also be recycled.



VACUREMA® – the Number One technology

VACUREMA® basic principles

Extremely flexible with input material

Depending on the end application the system processes PET bottle flakes, ground amorphous skeleton waste/edge trim and virgin material (also in mixtures), i.e. bulk densities of 250 to 850 kg/m³.

Highly efficient food contact compliant decontamination

Thanks to the patented pre-treatment of PET flakes, IV increase and decontamination are fast, reliable and energy-saving. This means that FDA quality (among other things) can be ensured for the end products produced.

IV stability through vacuum treatment

Despite varying moisture levels and different IV values in the input material, stable IV values are achieved through the patented pre-treatment method. This means, therefore, that input materials with higher material moisture levels can also be recycled.

Melting under vacuum

The patented pre-treatment at raised temperature and in high vacuum before the extrusion process removes moisture and migration materials from the feedstock very effectively and in a stable process environment. This prevents any hydrolytic and oxidative decomposition of the melt in the extruder.

Low thermal stress

The very short extruder screw without additional extruder degassing reduces the thermal stress on the material through minimised dwell time.

Large area ultrafine melt filtration

EREMA filter systems have very large active filter surfaces. This enables filtration with up to 32 µm fineness at low pressure. The result is highly clean pellets.

Compact design

Thanks to their compact design, VACUREMA® systems require much less space than other systems.

Minimum production costs with ecoSAVE®

Electricity accounts for 38 % of the costs of bottle-to-bottle recycling. Thanks to integrated ecoSAVE® technology, VACUREMA® systems stand out through the lowest production costs of all systems on the market.

Smart Start principle

The plant's software-based process control system gives you extremely easy and reliable operation and premium user-friendliness including automatic start-up at the press of a button, fully automatic continuous operation, permanent monitoring for direct food contact (FCC) and the storage of all relevant process parameters.

Turnkey solutions

We deliver you turnkey systems with competent support from one contact for the entire recycling process: sorting – washing – decontamination – extrusion – quality control – end product.

Highly efficient decontamination

Surface to volume ratio for flakes is 2.5 times higher than for pellets



Bottle flakes

Pre-ground with 12 mm screen,
average wall thickness approx.
0.1 to 0.4 mm



Pellets

Typical dimensions: diameter approx.
2.5 mm x 3 mm length or ball shape



EREMA vacuum reactor. Flake decontamination BEFORE extrusion.

The patented pre-treatment at high temperature and in high vacuum before the extrusion process makes VACUREMA®

technology considerably more efficient compared to the decontamination of pellets which have already been extruded.



decontaminates



homogenises



heats



dries



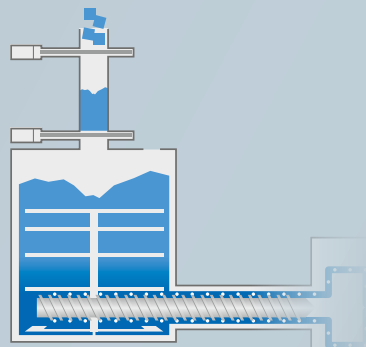
compacts



buffers



doses



Counter Current – a groundbreaking innovation.



In the past the material inside the vacuum reactor turned in the same direction as the extruder - forwards. The patented Counter Current technology now changes the direction of rotation inside the vacuum reactor: the plastic material thus moves in the opposite direction to that of the extruder screw. A simple effect with a major impact. Thanks to the improved material intake the VACUREMA® system ensures even greater flexibility and operational reliability in the processing of an extremely wide variety of materials.

VACUREMA®

Bottle-to-Bottle

rPET pellets, extremely clean with IV like virgin material.

VACUREMA® Prime

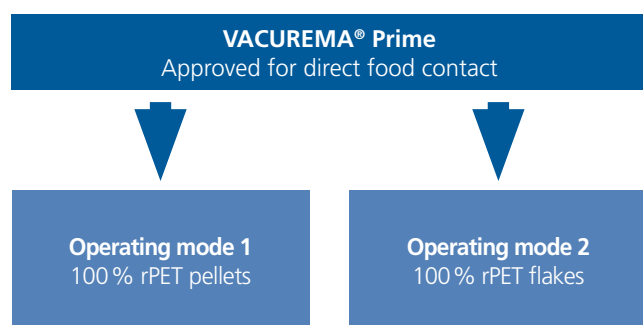
rPET pellets which not only fulfil but exceed all current minimum requirements with regard to direct food contact for PET packaging solutions: that is the end product in bottle-to-bottle recycling with VACUREMA® Prime technology. This high-end PET extrusion system features two crystallisation dryers operating in batch mode. A compact, space-saving all-in-one solution which achieves IV increases and a remarkable cleaning effect.

As the user you are flexible at all times and can react quickly to current market requirements: whether it's decontaminated, pre-dried and crystallised rPET flakes or high-quality, melt-filtered rPET pellets – products produced using VACUREMA® Prime technology fulfil the respective criteria of the FDA, EFSA and many major brand owners.

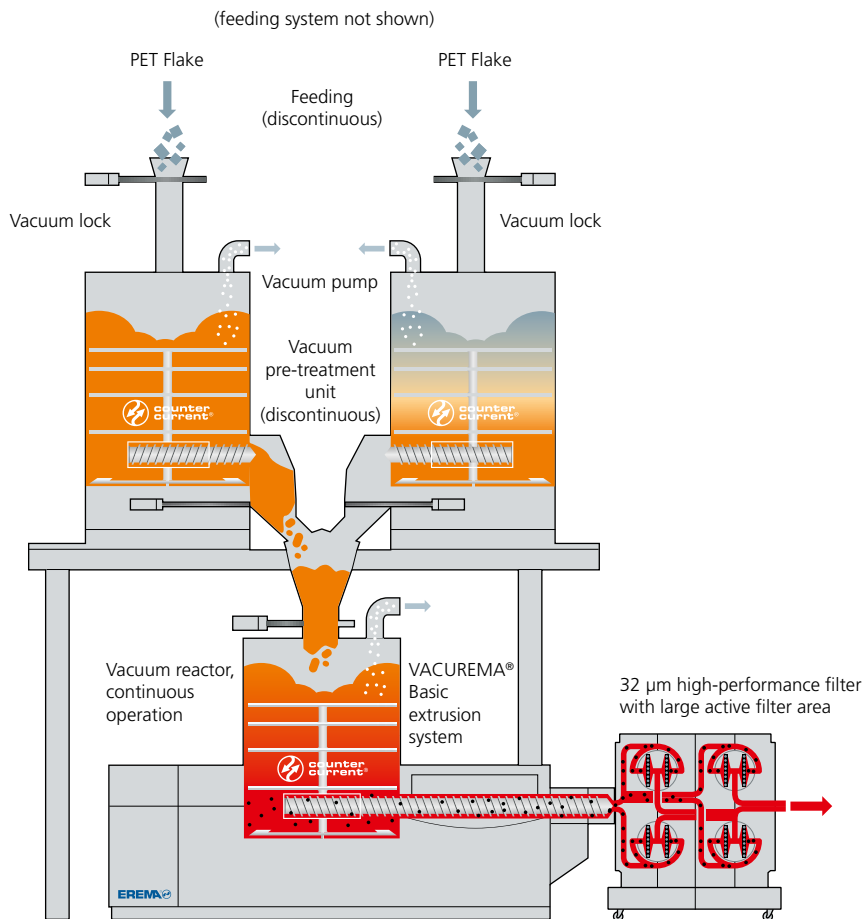
If IV values of > 0.9 dl/g or very high throughputs (> 2500 kg/h) are required, EREMA can offer you VACUREMA® technology also in combination with an SSP solution from the global market leader in this field.



Bühler Thermal Processes AG
a former Bühler Group Company







How it works

Two parallel vacuum crystallisation dryers are each filled with amorphous, washed PET flakes via a vacuum lock. The crystallisation dryers operate in what is referred to as batch mode. The exceptionally high level of purity of the rPET that is produced is achieved by an **exactly defined and guaranteed minimum treatment time for every single thin-walled PET flake** in high vacuum and at high temperature.

Purity and IV requirements placed on the end product (rPET pellets) can be adapted individually by selecting appropriate batch times.

The two identical crystallisation dryers are placed immediately upstream of a continuous VACUREMA® Basic extrusion system.



Technical benefits

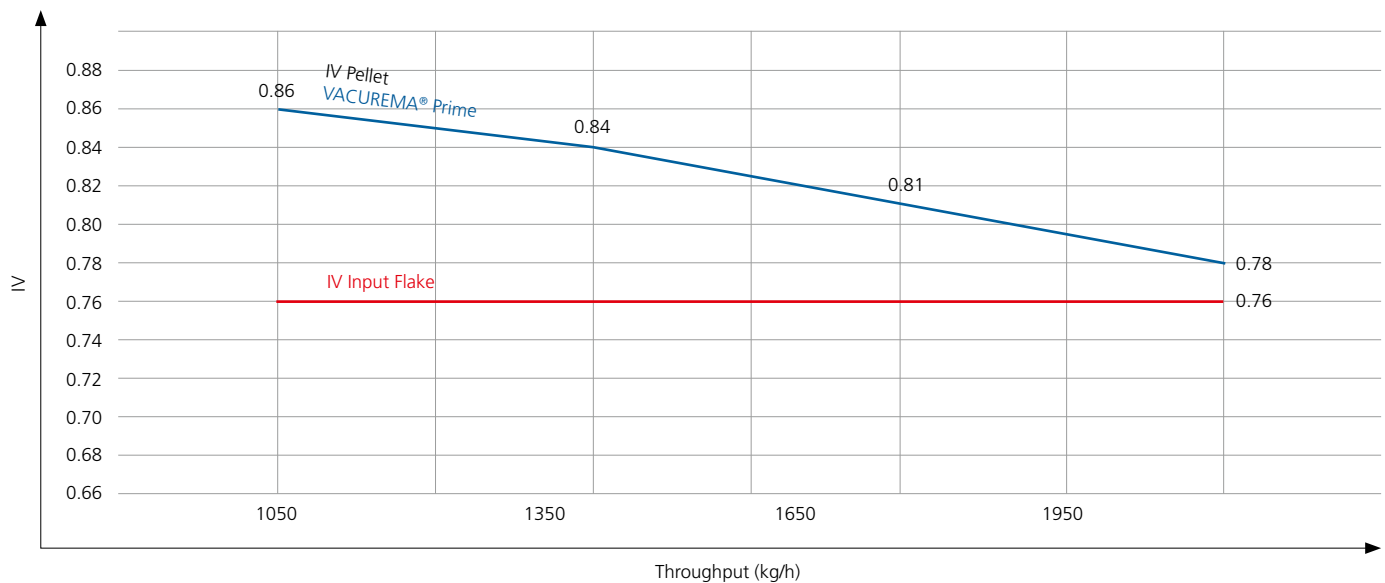
- **Minimum thermal stress and minimum discoloration** thanks to single energy input, preheated material and shortened extruder length
- **Batch operation** – guaranteed, adjustable dwell times for every single flake in the two crystallisation dryers ensure maximum cleaning efficiency
- **Highly efficient decontamination** fulfils and also far exceeds all well-known minimum purity requirements for direct food contact already after the batch process
- **FDA approved** (EFSA approval requested via customers and obtained), certification from major brand owners
- **Large area ultrafine melt filtration**
- **Stable PET melt processing** with IV increase of up to 6 to 10 %
- **AA (acetaldehyde) content in pellets less than 1 ppm** – possible in combination with optional pellet flusher (no flusher required in the case of pre-drying before preform production)
- **Possible to process flakes from cooking oil bottles**

Economic benefits

- **rPET pellets identical in consistency and appearance to virgin material**, choice of amorphous or crystalline
- **Low production costs** through specific energy consumption of 0.32 to 0.36 kWh/kg
- **Total production costs for rPET from PET flake only approx. 0.10 euros per kg of finished BTB pellets**
- **Compact, space-saving design**

IV values attainable in pellets – variable according to chosen throughput

IV increase according to plant type and set throughput; example based on VACUREMA 2018 T:



VACUREMA® quality control

IV values in real time

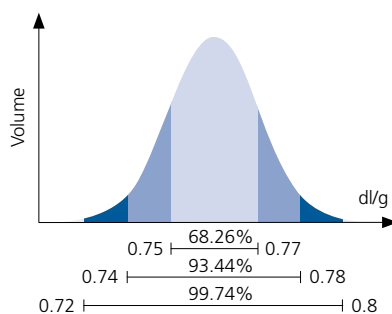
The continuous online IV measurement, combined with the fully automatic plant control system, means you can influence processing parameters such as throughput, processing temperatures, etc.

FCC – Food Contact Control – automatic operation mode

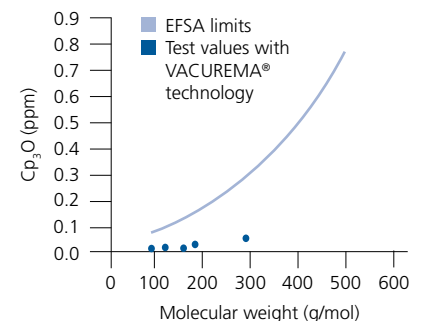
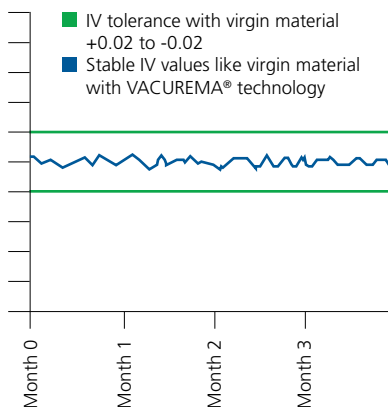
The parameters for direct food contact compliance are monitored and archived continuously in the recycling process on all VACUREMA® systems. Food Contact Control (FCC) supervises the recipe data stored.

This enables the flexible change to the process parameters required for the production of the respective recycle. If levels go beyond defined limits an alarm is triggered automatically and (optionally) material flow is diverted away from the production line. This guarantees traceability.

Input IV – typical distribution



Output IV – with VACUREMA®



Approvals for the food trade

	VACUREMA® Prime
Approved for direct food contact by/in: *	US FDA (category A-H & J), Austria, Switzerland, Canada, Brazil, Argentina, Uruguay, Paraguay, etc.*
Fulfil the following decontamination requirements/migration threshold specifications	EFSA approval requested via customers and obtained
	European ILSI guidelines
	German BGBI guidelines
	French afssa guidelines
	Brand owner guidelines

*Other countries to follow further to applications by the respective VACUREMA® users.

Technical data VACUREMA® PET extrusion systems

Systems available	max. output	output for 8 % IV increase
VACUREMA Prime 1310 T	600 kg/h	500 kg/h
VACUREMA Prime 1512 T	900 kg/h	700 kg/h
VACUREMA Prime 1714 T	1000 kg/h	1000 kg/h
VACUREMA Prime 1716 T	1450 kg/h	1350 kg/h
VACUREMA Prime 2018 T	1900 kg/h	1650 kg/h
VACUREMA Prime 2021 T	2200 kg/h	2000 kg/h
VACUREMA Prime 2321 T	2600 kg/h	2300 kg/h
VACUREMA Prime 2625 T	3300 kg/h	3000 kg/h
VACUREMA Prime 2628 T	4000 kg/h	3500 kg/h

The specialists in plastic recycling systems.

Headquarters & Production Facilities

EREMA Engineering Recycling
Maschinen und Anlagen Ges.m.b.H.
Unterfeldstraße 3 / A-4052 Ansfelden / Austria
Phone: +43 (0)732/31 90-0 / Fax: -23
erema@erema.at / www.erema.at

Subsidiaries

3S
SCHNECKEN + SPINDELN + SPIRALEN
Bearbeitungsges.m.b.H.
Pühretstraße 3 / A-4661 Roitham / Austria
Phone: +43 (0)7613/5004 / Fax: -5005
office@3s-gmbh.at / www.3s-gmbh.at

EREMA NORTH AMERICA INC.
23 Old Right Road - Unit#2 / Ipswich, MA 01938 / USA
Phone: +1 978 356-3771 / Fax: -9003
erema@erema.net / www.erema.net

EREMA Shanghai Office
Room 1009 / Tomson Financial Building
710 Dong Fang Road / Pudong / Shanghai China (200122)
Phone: +86 21 6876-6201, -6204 / Fax: -6203
erema@erema.com.cn / www.erema.at

More questions?

We would be pleased to answer them!

Your EREMA advisor will be pleased to attend to your request personally and quickly. If you are interested in a demonstration or a test run with your specific material it would be a pleasure for us to make an appointment and welcome you to our EREMA Customer Centre at the headquarters in Ansfelden, near Linz in Austria.

We look forward to seeing you at EREMA!

For worldwide representatives please visit www.erema.at

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English

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