



ReFresher

Optimised recycled pellet odour
in premium quality

CHOOSE THE NUMBER ONE.

ReFresher

High-efficiency anti-odour technology.

For more value added and completely new sales markets

Odour-optimised premium recycled pellets directly from contaminated post consumer material? The efficient interplay of the innovative ReFresher technology with the proven INTAREMA® TVEplus® machine makes it possible. The unbeatable combination of top pellet quality and odour optimisation opens up completely new application opportunities for recycled plastics. In other words: innovative premium products in living space, automotive, design and lifestyle sectors.



Odour-optimised pellets
New products
New sales markets



Odour-optimised pellets
More value added



100 % food contact compliant post consumer HDPE containers

- Milk and juice bottles



HDPE



PCR-HDPE

Food contact compliant PCR-HDPE pellets

- Suitable for different food packaging, e.g. milk and juice bottles, meat trays, etc.
- With up to 100 % PCR-HDPE content in the end product



INTAREMA® TVEplus® ReGrindPro®

with ReFresher



100 % recycled HDPE pellets



100 % post consumer PCR-HDPE from the yellow bag

In a joint project, Werner & Mertz, EREMA and The Group with the Green Dot developed the first 100% PCR-HDPE shower gel bottle approved for use in cosmetics.



INPUT MATERIAL

The challenge of post consumer packaging (from the household sector, for example)

- Strong contamination
- Degree of contamination and moisture vary
- Intensive odours: high and low volatile odour substances

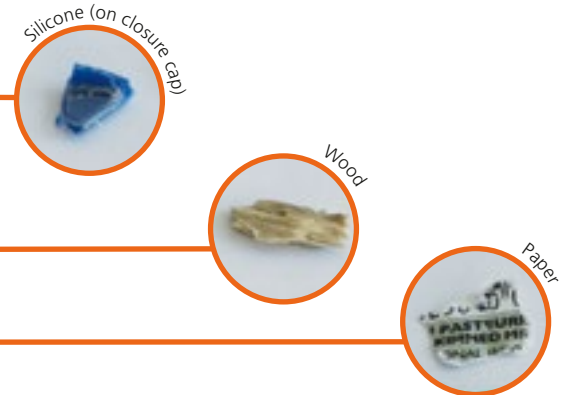
Problem: Odours in household waste

Solution: INTAREMA® TVEplus® mit ReFreshner

A typical problem of household waste: it develops intense odours. These are caused on the one hand not only by contaminants adhering to the surface but also by so-called migrated odour substances. The latter are caused by the packaging absorbing the odour of the food, cosmetics or cleaning agents inside it. The substances which migrate like this into the plastic are particularly stubborn.

Removing the entire spectrum of odours again as effectively as possible requires the support of the entire recycling process chain. This includes sorting and washing, plus the mechanical recycling process. Thanks to the effective interplay of the INTAREMA® TVEplus® with the innovative ReFreshner technology it is possible to effectively eliminate a considerable amount of these odour substances again.

While the TVEplus® extruder system primarily takes care of the high volatility, low molecular substances, the ReFreshner also reduces the low volatile, high molecular odour matter.



Risk of odour through wood, paper and rubber

Small pieces of wood, paper – left behind from labels for example – or rubber and silicone contaminants are potential sources of odour, because in conventional processes these impurities can burn slightly during extrusion and in turn transfer the odour to the plastic. The patented TVEplus® extruder system of the INTAREMA® counteracts this odour development in a targeted way.

STAGE 1

INTAREMA® TVEplus®

- Reducing high volatility, low-molecular odorous substances before extrusion
- Avoiding formation of new odours

EFFICIENT ODOUR REDUCTION

STAGE 2

ReFreshner

Reducing low volatility, high-molecular odorous substances in recycled pellets.

HIGH VOLATILITY ODOURS OUT

PRECONDITIONING UNIT

UP TO 1 H MATERIAL RESIDENCE TIME

HOT AIR FLUSH

3 DEGASSING STEPS

Odour reduction already at the beginning of the process: high volatility residues are eliminated

The large-volume preconditioning unit ensures a long material residence time at high temperature. In combination with Air Flush technology – which flushes the plastic with a continuous, hot stream of air – and the accompanying degassing, this results in the high volatility odour substances being eliminated prior to extrusion. An additional bonus: high residual moisture in the material vaporises.

Powerful extruder degassing

The reverse degassing and final double venting degassing zone at the extruder are particularly effective and remove any gas inclusions which are still present from the melt. One secret of success of the strong performance here is the homogenisation zone which is located downstream of the filter and upstream of the final degassing and brings the melt to the degassing temperature required for the end product.

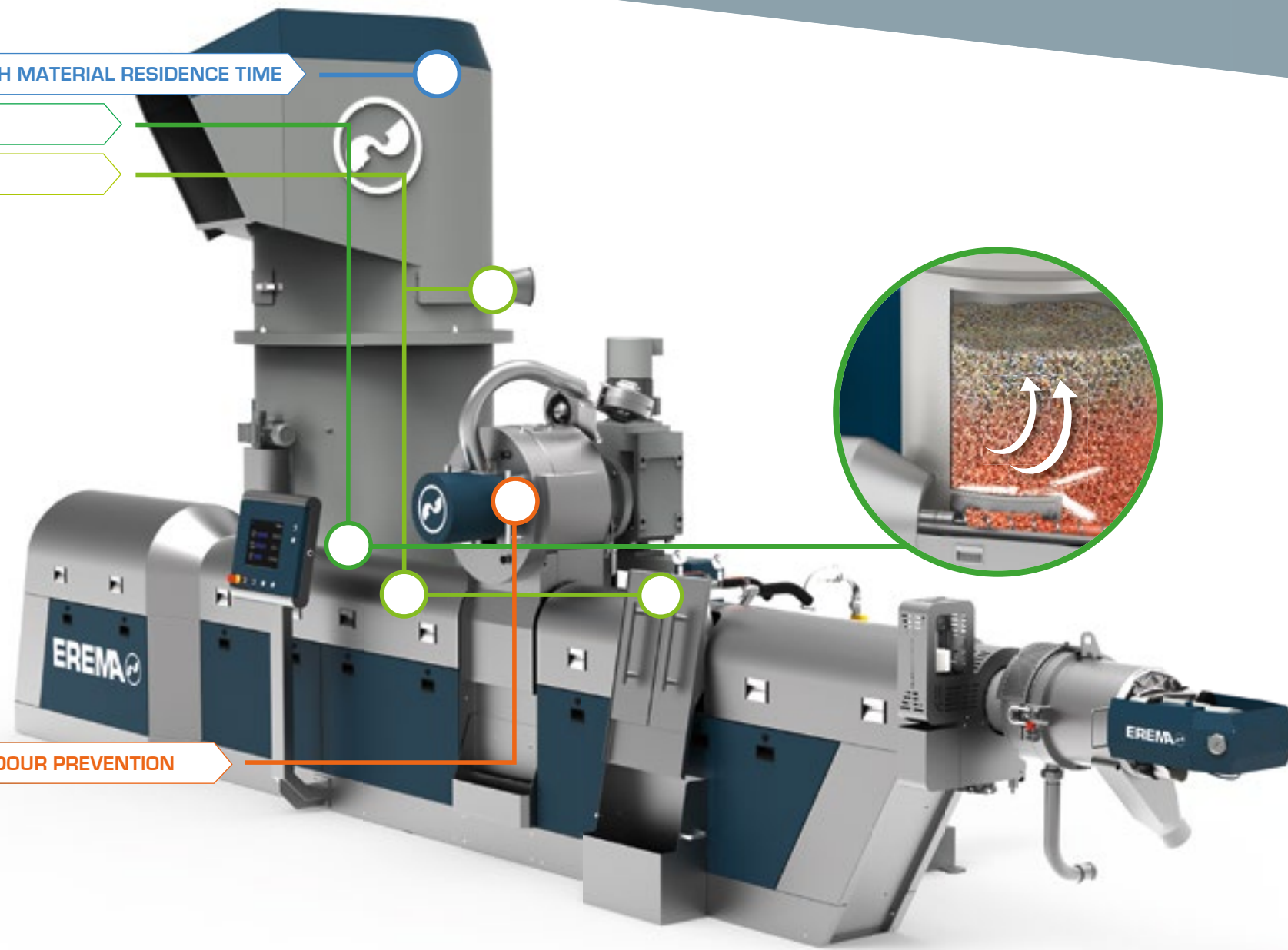
PREVENTS NEW ODOURS

HIGH-PERFORMANCE FILTRATION

ODOUR PREVENTION

Gentle melt treatment and high-performance filtration = effective odour prevention

Gentle melting and a short extruder up to filtration – what is good for the melt quality is also effective against additional odour development. This is because the gentle treatment at a low melt temperature and low shear forces means that impurities such as cellulose (wood, paper), rubber or silicone firstly do not burn and secondly are scarcely reduced in size. They remain large enough to be easily removed by the Laserfilter – before they can form unpleasant odours. This is intelligent odour prevention, as offered only by the TVEplus® system.



INTAREMA® TVEplus®

OUTPUT STAGE 1

QUALITY PELLETS

Perfectly filtered, homogenised and degassed – ideal for a multitude of applications.

An additional bonus when using the continuous quality monitoring system QualityOn: only exactly specified pellets enter the ReFreshner.

OUTPUT STAGE 2

ODOUR-OPTIMISED

For even higher quality applications including automotive, living space and design sectors.

PREMIUM PELLETS

LOW VOLATILITY ODOURS OUT

Continuous odour discharge with hot flush gas

No complex vacuum system required

First in, first out: same treatment for all pellets

Thermal-physical cleaning process – without additives

The ReFreshner cleaning process reduces odours caused by low volatility, high molecular substances. The technology keeps the pellets at the required temperature at which volatile materials can be discharged quickly and in depth. Particularly energy-saving: The ReFreshner uses the system's own energy from the pellets which are preheated during the extrusion process (at least 60 °C required). Thanks to the ideal, process-stable process preparation in the INTAREMA® TVEplus® only relatively short residence times are required inside the ReFreshner.

ReFreshner



Refreshing benefits

Your benefits at a glance



Higher value added and new sales markets

The direct way from post consumer material to odour-optimised premium pellets

- Opens up completely new application opportunities for recyclates in products, e.g. in living space, automotive, design and lifestyle sectors
- Ideal for particularly high-quality end products

Premium quality through unique technology combination INTAREMA® TVEplus® & ReFresher

- **INTAREMA® TVEplus®**: the quality of the pellets is extraordinarily high and stable directly after extrusion – including partial odour reduction
- **ReFresher**: targeted, intense odour reduction raises pellet quality to a premium level

High economic efficiency and productivity

- High, constant throughput and stable quality ensure low pellet costs per tonne
- No vacuum necessary in the ReFresher, i.e. lower operating and maintenance costs
- Odour treatment without the use of additional, expensive additives

High energy efficiency saves costs

- INTAREMA® TVEplus® with energy-saving ecoSAVE® technology
- ReFresher technology uses its own energy from the pellets which are preheated through the extrusion process
- Closed energy loops – ReFresher can use heat from other production processes
- Energy-saving, fully insulated ReFresher equipment

Mobile ReFresher for trials

Use the compact ReFresher for onsite trials at your production facility – this makes sure the investment is customised exactly in line with the specific odour requirements of your end application

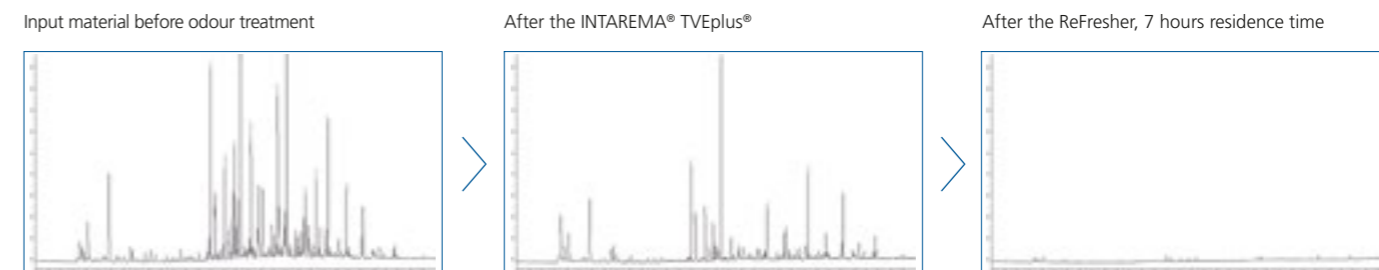
Odour optimisation

From post consumer material to premium pellets.
Example: HDPE regrind from shampoo bottles.

Gas chromatographic analysis

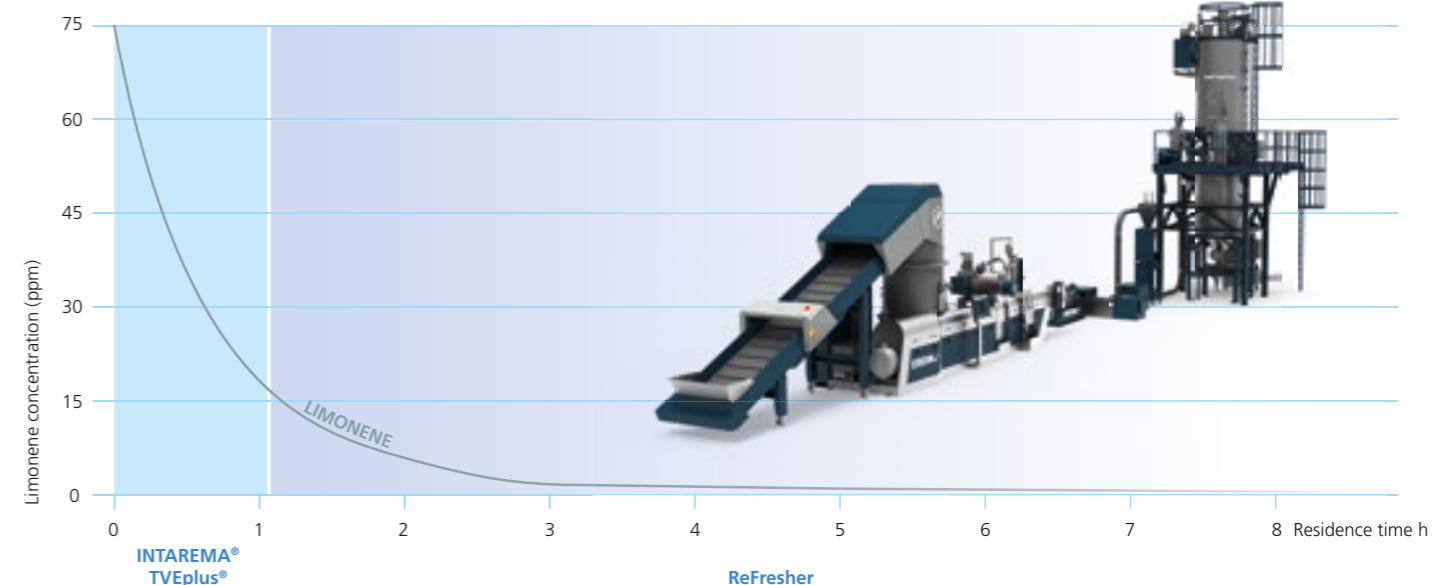
of odour-producing volatile substances (such as limonene, ethyl acetate, hexyl salicylate, isopropyl myristate, etc.). The sequence of the gas chromatographic pictures shows that with every step the total amount of odour-producing substances decreases considerably.

Additional information including a detailed sensory panel test can be found on the EREMA website at:
www.erema.com/en/publications



Source: Fraunhofer Institute for Process Engineering and Packaging IVV, Germany

Concentration of indicator substance limonene (136g/mol) as a function of residence time in INTAREMA® TVEplus®/ReFresher.



Technical data ReFresher

ReFresher MODEL	Capacity (kg/h)	Process window (h)	Process Unit (m ³)	Dimensions* l x b x h (m)
ReFresher 600 / 7	350 - 600	7 - 12	8.8	7.5 x 4.4 x 7.3
ReFresher 1100 / 7	650 - 1100	7 - 12	14	8 x 4.7 x 8.2
ReFresher 1900 / 7	1100 - 1900	7 - 12	26	8.5 x 5.1 x 9.5
ReFresher 2800 / 7	1600 - 2800	7 - 12	35	9.6 x 5.4 x 10.3
ReFresher 4000 / 7	2300 - 4000	7 - 12	51	10.5 x 5.7 x 11.3

*Dimensions incl. transfer container

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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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