

IR-FRESH®: ODOUR REDUCTION TECHNOLOGY

SOLUTIONS FOR PLASTICS RECYCLING



ODOUR-REDUCED RECYCLED FLAKES & PELLETS FROM POST-CONSUMER MATERIAL





FRESH

ADVANTAGES!

ADVANTAGES OF OUR SYSTEM

- ✓ High-performance odour reduction
- ✓ Easy retrofitting for existing extrusion lines
- ✓ No pre-heating of the system required
- ✓ Short processing & residence times
- ✓ No vacuum system required
- ✓ First-in / First-out
- ✓ Constant surface exchange
- ✓ Continuous process

BENEFITS TO YOU

- ✓ High-quality recycled flakes & pellets
- ✓ Up-cycling of post-consumer plastics
- ✓ Customized design
- ✓ Uniform treatment of material
- ✓ Energy efficiency
- ✓ Easy & cost-effective maintenance
- ✓ Same system can be used with other materials for drying & crystallizing
- ✓ Protection of polymer structure
- ✓ Expand the use of recycling materials to new applications
- ✓ Volatile organic compounds (VOCs) removed from your product
- ✓ Control of process parameters for consistent results
- ✓ Pre-heating & drying before extrusion process

POST-CONSUMER PLASTIC WASTE

Post-consumer plastic packaging has absorbed intense odours due to its direct contact to food, cleaning agents, chemicals, cosmetics, fuel, etc. These migrated substances are not completely removable during the washing phase. So, in support of the recycling process chain, odour reduction is a critical step to guarantee a high-quality end product.

With the IR-FRESH® system, KREYENBORG offers a high-performance, innovative and cost-effective technology for the odour reduction in post-consumer plastics – without using any vacuum technology, and as a retrofit solution for existing extrusion lines.



CLEANING AGENTS
DETERGENTS



COSMETICS
PACKAGING



FUEL
BOTTLES



FLAKES & PELLETS

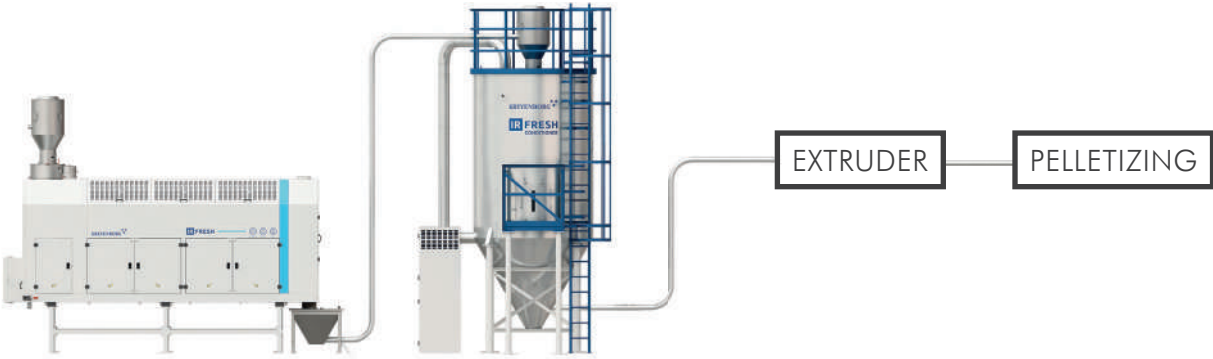
PP	PS
HDPE	PA
LDPE	And many more!
TPE	



IR-FRESH® SYSTEM

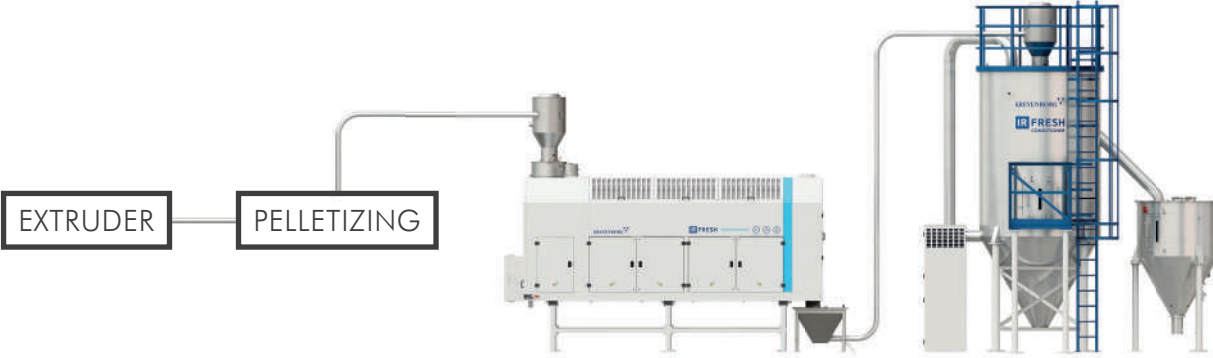
ODOUR REDUCTION OF FLAKES & PELLETS

APPLICATION FOR FLAKES



▶ IR-FRESH® + IR-FRESH® CONDITIONER before extrusion

APPLICATION FOR PELLETS



▶ IR-FRESH® + IR-FRESH® CONDITIONER after extrusion

APPLICATION FOR PELLETS AS STAND-ALONE SOLUTION



▶ IR-FRESH® CONDITIONER

PROCESS STEPS

STEP 1: IR-FRESH®

High temperature, short residence time

The infrared light module installed above the material bed heats the material quickly and directly to the required temperature level.

Meanwhile, the constant rotation of the drum ensures a homogeneous mass flow with a defined residence time. Due to its rotation and mixing elements integrated in the coils, the material inside the drum is continuously mixed with a constant surface exchange. This, combined with a controlled heating, ensures considerable elimination of odour.

STEP 2: IR-FRESH® CONDITIONER

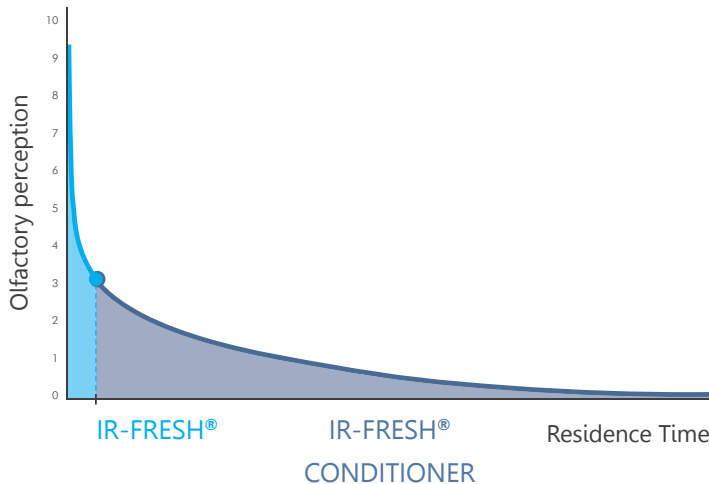
Elimination of the residual odour

The remaining odours in flakes or pellets can be eliminated during a thermal-physical cleaning process inside the IR-FRESH® CONDITIONER. The insulated hopper maintains the material at the required temperature.

Excellent deodorization results can be achieved through the interaction of the main process parameters: air flow, temperature, and residence time.

Recovered heat from the exhausted air from the STEP 1 is applied to STEP 2, offering greater energy efficiency.



ODOUR-REDUCTION EFFICIENCY OF IR-FRESH® SYSTEM



During the IR-FRESH® step, drastic odour reduction can be achieved in a very short time. Rapid heating of the plastic material in STEP 1 results in reduced residence time in STEP 2.

- IR-FRESH®
- IR-FRESH® CONDITIONER



-
- 
Short processing time
- 
Easy retrofitting
- 
Continuous process
-

MEASURING VOC REDUCTION

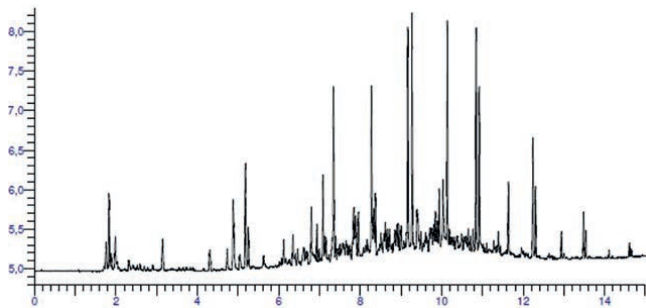
The efficiency of the IR-FRESH® system has been verified by many gas chromatographic analyses and sensory panels (groups of trained inspectors).

The gas chromatographic graphs below show the considerable reduction of VOCs after the IR-FRESH® process.

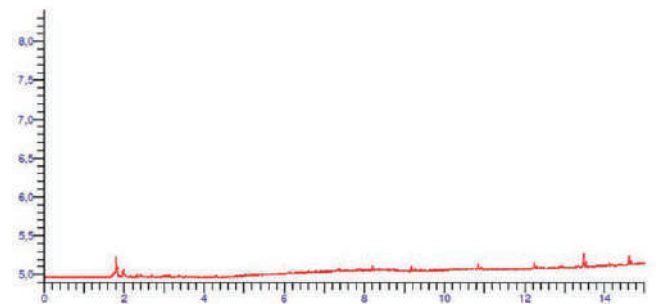
Volatile substances that cause odours can be detected in various ways:

- by means of gas chromatographic analyses
- by sensory panels with trained inspectors

▶ EXAMPLE: Gas chromatography analysis in PP from motor oil containers



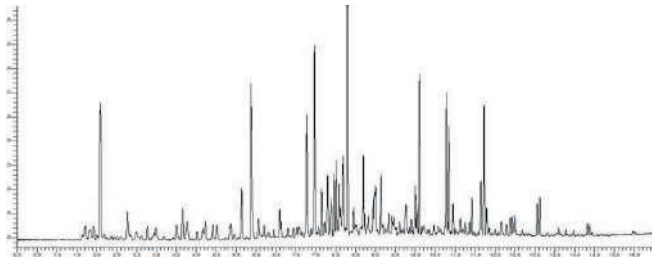
▶ Input material before odour treatment



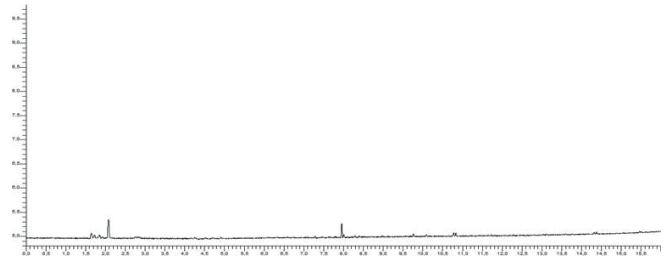
▶ Output material after IR-FRESH® + IR-FRESH® CONDITIONER

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

▶ EXAMPLE: Gas chromatography analysis in HDPE from yellow bin for cosmetics packaging



▶ Input material before odour treatment



▶ Output material after IR-FRESH® + IR-FRESH® CONDITIONER
▶ Cleaning efficiency Limonene 99%

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



TRIAL CENTER



Book a trial
using your
material!



WE PROVIDE SOLUTIONS!

At our plastics test facility in Germany we can perform **continuous** and **batch** trials, either at lab scale or at production scale.

We provide the following services and processes:

- Odour reduction
- Crystallization
- Drying
- Coating
- Heat treatment
- Developing new applications
- Storage
- Mixing
- Conveying
- Dosing
- Densifying



For trials, please contact us at:

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ONSITE



ONLINE

KREYENBORG solutions for the recycling industry

- ▶ IRD: Crystallizing & drying
- ▶ IR-FRESH® System: Odour reduction
- ▶ IR-CLEAN® System: rPET decontamination food grade
- ▶ MIXER
- ▶ SILOS
- ▶ DOSING
- ▶ CONVEYING
- ▶ DENSIFYING
- ▶ BIG-BAG STATIONS
- ▶ TURN-KEY SOLUTIONS



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KREYENBORG has been designing and manufacturing machinery and custom-made, turn-key solutions for bulk material handling for over 60 years. Throughout the plastic recycling industry we specialize in solutions for odour reduction, decontamination of PCR-PET, crystallizing, drying, and heating of bulk materials. Our core competencies also include mixing, storing, dosing, and conveying.



Supplier for:

Plastic industry

Food industry

Bulk material handling

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