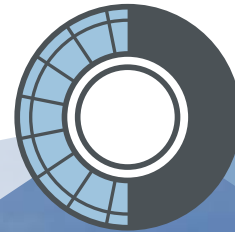
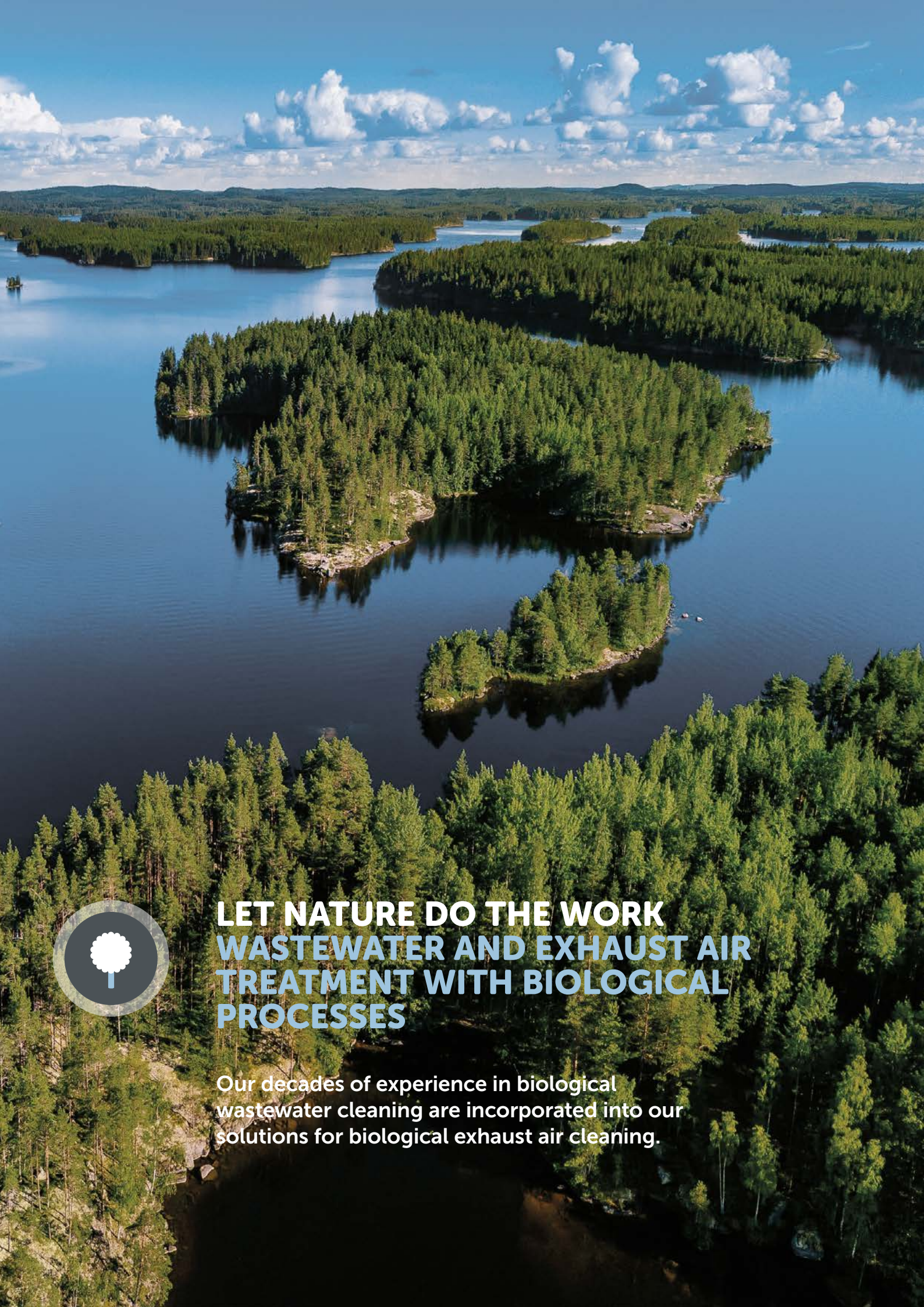


MARKET LEADER FOR FUNCTIONAL SURFACES EFFICIENT SOLUTIONS FOR WATER AND AIR TREATMENT

Biological Exhaust Air Treatment /
Odor Control





LET NATURE DO THE WORK WASTEWATER AND EXHAUST AIR TREATMENT WITH BIOLOGICAL PROCESSES

Our decades of experience in biological wastewater cleaning are incorporated into our solutions for biological exhaust air cleaning.

ENERGY. ENGINEERING. EXCELLENCE.

Since the takeover of the **Heat Exchangers segment** of the **GEA Group AG** by **Triton Partners**, the activities in the cooling tower business, water treatment, exhaust air cleaning and agricultural engineering were combined under the name of ENEXIO.

ENEXIO stands for **Energy. Engineering. Excellence.**

With our experience and pioneering spirit in engineering, manufacturing and service, we deliver state of the art solutions for power plants, water and wastewater

applications and exhaust air cleaning – always inspired by our profound sense of responsibility for the overall management of resources and a clean environment. We deliver excellence and achieve customer satisfaction everywhere in the world. Our global network of employees works with an unceasing commitment to high quality, ecology and cost effective products and services.

Our brands **BIOdek®**, **TUBEdek®**, **PLASdek®**, **MASSdek®**, **SANIPACKING®** and **HUMIPACKING®** stand for our know-how in different applications.

ENEXIO Water Technologies Areas of Activity



Biological water treatment



Sedimentation processes



Mass transfer (air treatment)



Cooling tower installations

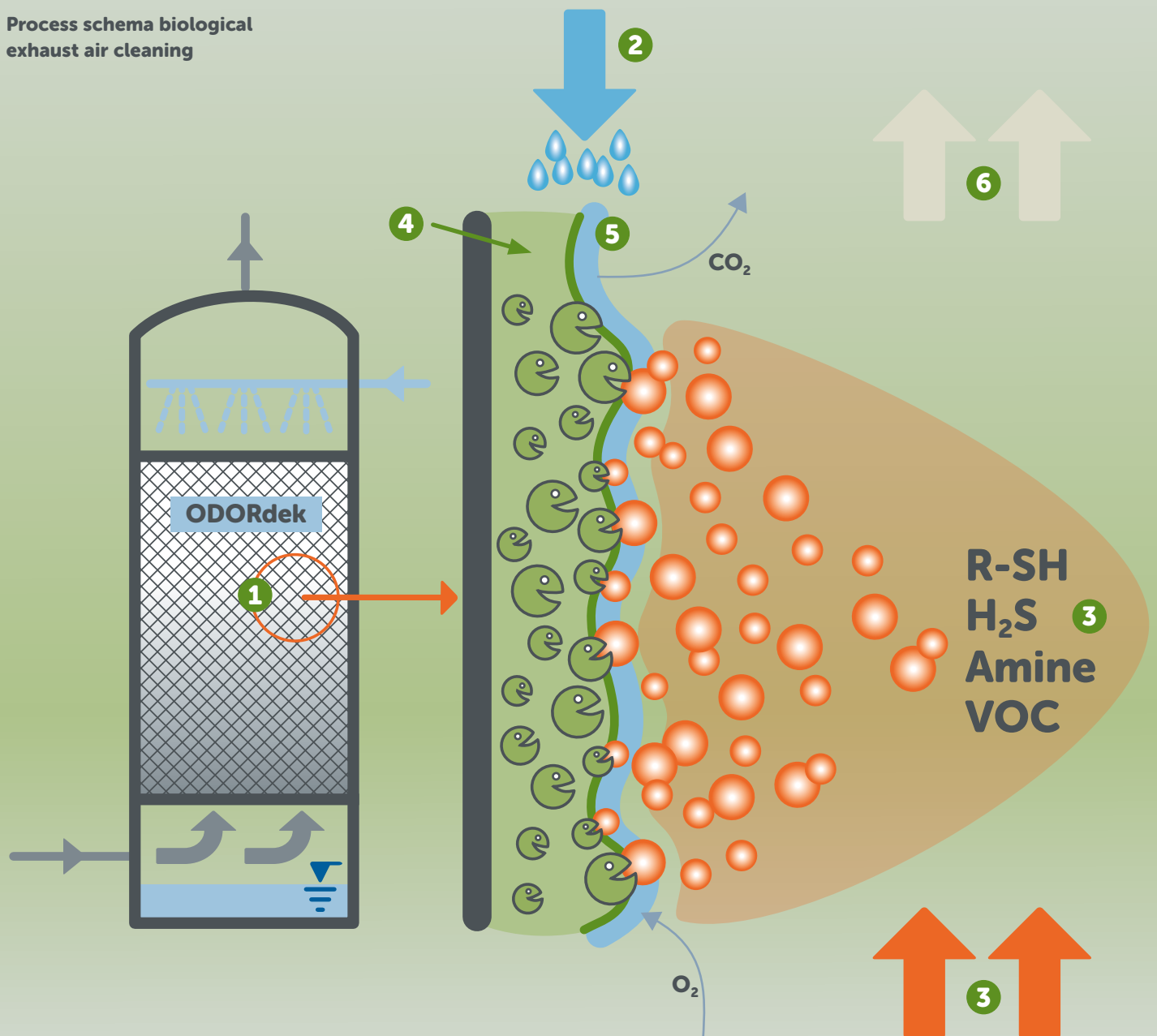


WE BANK ON BIOLOGY IN THE REMOVAL OF HARMFUL SUBSTANCES AND ODORS

A lot of things that are unpleasant or even harmful for us can be used as a nutrient by bacteria and transformed into harmless substances.

The requirements for clean air and the strict limits will continue to be tightened for example in Germany by the amendment of the "Technical Instructions on Air Quality Control (TA Luft)." For the good of us all. However, the amendment in many cases makes it necessary that the operator implements a costly new installation, expansion or modification of an exhaust air cleaning system.

Process schema biological
exhaust air cleaning

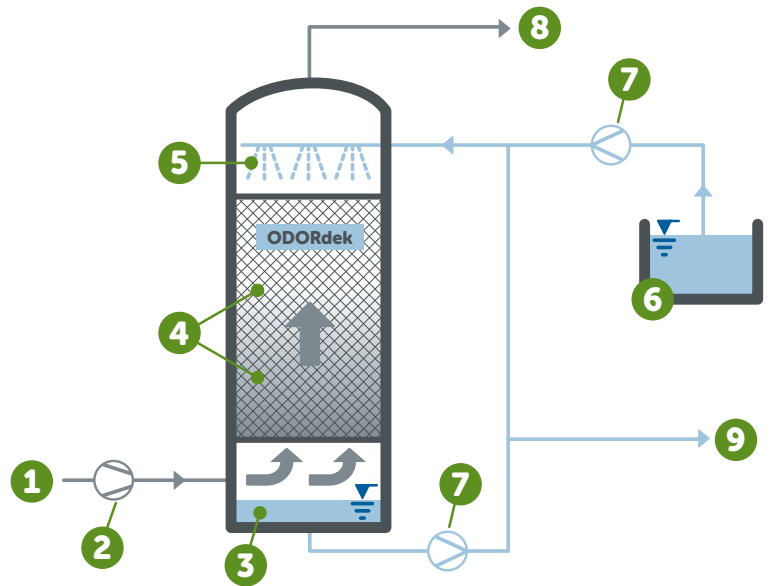


- 1 Inert ENEXIO ODORdek as settling area for biofilm growth
- 2 Humidification and nutrient fluid
- 3 Exhaust air loaded with odorous substances (amines, H₂S, R-SH, VOC)

- 4 Bio mass with bacteria
- 5 Water film
- 6 Cleaned exhaust air

Biotrickling Filter with ODORdek

- 1 Raw gas
- 2 Fan
- 3 Water storage
- 4 ODORdek packings with biomass
- 5 Water distribution
- 6 Nutrient salt solution
- 7 Pump
- 8 Clean gas
- 9 Sluiced scrubbing water



BIOTRICKLING FILTER EFFICIENT AND SUSTAINABLE

Biotrickling filter instead of biofilter

In light of the relatively high level of pressure drops and large footprints of biofilters, biotrickling filters are a logical further development. Instead of organic material, a chemically and biologically inert carrier material is used that serves biology as a growth area. The special surface properties of our ODORdek packings create ideal conditions for a rapid colonization of bacteria.

Unlike a biofilter that is only partially controllable, optimum conditions can be set in a biotrickling filter thanks to the exact dosage of the nutrient salts, making the biotrickling filter considerably more powerful than a biofilter. A liquid distribution matching the process requirements evenly trickles the circulating fluid, rich in nutrient salts, onto the packings. At the same time, excess biomass can be washed off, if needed. This biomass will be disposed of at regular intervals. Since it is not hazardous to water, it can be fed into the public sewage system or the in-house wastewater treatment plant.

In many applications, the water consumption of biotrickling filters is extremely low. There are no evaporative losses that occur in open biofilters.

Advantages of the biotrickling filter process:

- Long-lasting process stability
- Usually the most cost-effective method for odor elimination and pollutant decomposition for medium to very large quantities of exhaust air
- Low energy costs thanks to low ventilation power consumption
- Extremely high efficiency through optimized and controlled process technology (efficiency factors of over 99.5% can be achieved)
- Simple and easily operated system technology
- Low maintenance requirements due to an optimized cleaning concept
- Optimal packing selection for individual problem solutions
- Even complicated pollutant compositions are easily treatable
- Little or no use of chemical operating materials
- Small amounts of wastewater, no neutralization or post-treatment of hazardous substances



Plant for biological waste water treatment



Biotricklingfilter remove odorants of waste water treatment plant



ODORdek PACKINGS AS CARRIER MATERIAL LONG-LASTING AND MAINTENANCE-FRIENDLY

Robust packings allow for high beds
and reduce footprint.



**Comparison:
ENEXIO biotrickling filter –
conventional biofilter**

Features	ENEXIO Biotrickling filter / biotrickle bed reactor	Conventional biofilter
Pressure drop	low	high
Footprint	low	high
Design	allows for high packing beds	flat design
Replacement of filter material	after approx. 10 years	after approx. 1-3 years
Operating and energy costs	low	high
Efficiency	controllable process technology	process can be controlled only to a limited extent

ADVANTAGES OF THE PLASTIC PACKINGS COMPARED WITH ORGANIC MATERIAL

ENEXIO offers a cost- and performance-optimized solution for your exhaust air cleaning: Our specially developed structured ODORdek packings, populated with biologically active cultures, eliminate the contained odors and pollutants.

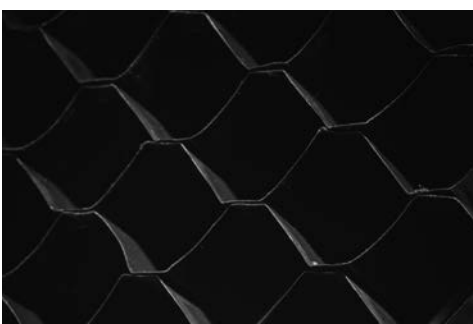
The open structure of the ODORdek packings reduces the pressure drops on the gas side significantly and ensures that the flow through the carrier material is free. We match the liquid distribution to the packing types, so the channels are kept free from deposits. This results in a long service life of 10 years and more compared to organic material, which needs to be replaced after 1-3 years in many cases. Operating and maintenance costs are saved.

Depending on the strength of pollutants or odors, special packing geometries and large surfaces are deployed. The high level of compressive strength allows for very large packing heights. This means they can be built upward, reducing space requirements and costs.

Areas of application

Exhaust air from:

- Sewage treatment plants
- Waste disposal plants
- Animal cadaver utilization plant
- Tobacco industry
- Luxury food industry (roasting plants, cocoa and chocolate production)
- PET food industry
- Breweries
- Casting
- Timber industry
- Paint and solvent industry
- Adhesive processing
- Feed production



ODORdek packing
before installation



ODORdek packing with
even distribution of
biofilm

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