

# LINPOR® TECHNOLOGY

## for wastewater treatment plants

### Boosting performance without new construction

The LINPOR® Technology was developed for wastewater plants that need higher treatment capacity without adding new tanks – ideal for overloaded municipal and industrial wastewater treatment plants, or new plants with limited space.

#### How LINPOR® works

- Uses high-porosity foam cubes as mobile bio-carriers
- Biomass concentration in the tank increases significantly
- Sludge age increases
- Sludge loading decreases

#### System characteristics

- LINPOR® cubes: 10–30 % of tank volume
- Fine bubble aeration ensures oxygen supply and mixing
- A screen wall keeps cubes inside the basin
- Airlift pumps periodically de-sludge the cubes



1 LINPOR® cubes  
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STRABAG / 2 STRABAG  
laboratory © Rudi Froese /  
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#### Process advantages

- Higher performance without structural modifications
- Less sensitivity to load peaks
- Improved elimination efficiency
- Fulfilment of strict water-quality limits (e.g.,  $\text{NH}_4\text{-N} < 1 \text{ mg/l}$ )
- Breakdown of hard-to-degrade or low-bioavailability substances



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# LINPOR® SYSTEMATICS

## Biology of LINPOR® Cubes

### Analyses of plants using LINPOR®-CN reveal:

- Dense bacterial growth on the cube surfaces
- Biofilm also develops deep within the foam structure

### Fixed biomass vs. suspended sludge comparison shows:

- Nitrospira (key bacteria for nitrogen removal):  
~7% on cubes vs. ~3% in suspended sludge
- No negative changes in ammonia-oxidizing bacteria or other important microbial groups

This confirms stable, efficient biological conditions.

## Simultaneous Denitrification

Inside the LINPOR® cubes, areas with low oxygen form naturally.

This makes it possible to:

- Treat organic matter and nitrogen in one step
- Carry out denitrification without a separate tank
- Achieve strong nitrogen-removal performance

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## LINPOR® System Types

### LINPOR®-C

For elimination of easily biodegradable carbon compounds. Ideal for industrial wastewater (e.g., pulp and paper).

### LINPOR®-CN

Best for municipal wastewater.

Expands existing plants without new structures, enabling:

- Carbon removal
- Nitrification
- Denitrification

Also suitable for temporary capacity upgrades.

### LINPOR®-N

Fully fixed biomass system - no sedimentation tank needed.

Used for (re-)nitrification and persistent substance removal.

A downstream sand filter and precipitant dosing enable high solid and phosphorus removal.



1 Water quality monitoring  
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2 Bacteria in LINPOR®  
Cube © Kamyar Ashgari  
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