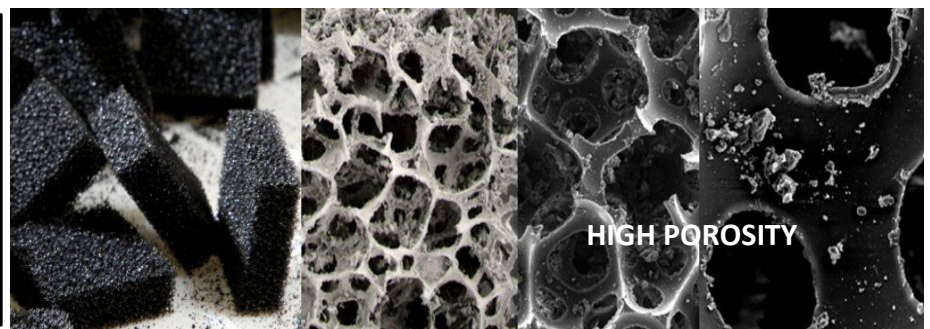
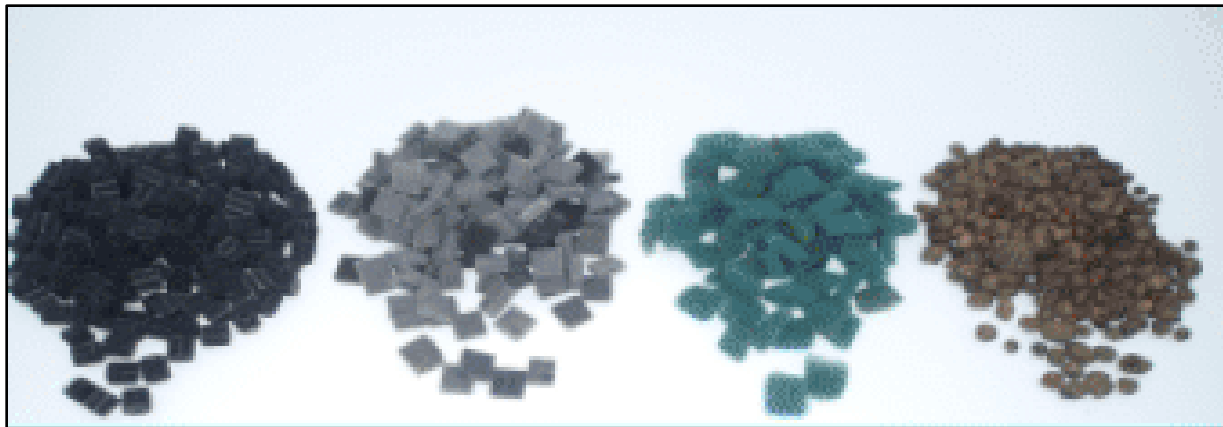


The Levapor Advantage

Differences Between Levapor and Polyethylene Bio-Carriers

PROPERTY	LEVAPOR	PLASTIC BIO-CARRIER (PE)
Material	Reticulated Poly Ether based PU Foam impregnated with activated carbon	High Density Polyethylene (PE)
Individual Cube Size	20 x 20 x 7 mm	15 mm +/-0.76 mm Diameter 9.5 mm +/-0.76 Height
Weight of media	65-80 kg / m ³ of colonized carriers 143 - 176 lbs. per 1.3yrd ³	170 kg - 1 m ³ 374 lbs - 1.3 yrd ³
Surface Area	>20,000 m ² / m ³	780 m ² /m ³
Specific Gravity	1.1g / cm ³	Unknown
Porosity	>90%	Unknown
% of Reactor Filling Required	10 - 15%	25% to 65%
Full Fluidization energy	4 - 7 Nm ³ / m ² .hr air	Unknown
Wetting Period	1 - 3 days	Unknown
Colonization	60 - 90 minutes	Unknown





PE-Carrier 780 m ² /m ³	LEVAPOR >20,000 m ² /m ³	PU-Foam 1,500 m ² /m ³	Ceramics 400 m ² /m ³
Different surface areas of carriers compared at Dabie Hatchery, Poland			

Lower Degree of Reactor Filling (10-15% of total Aerated volume)

The Levapor MBBR has an extremely high amount of available surface area for the colonization of active biomass compared to conventional plastic MBBR carrier elements. The high surface area of the Levapor carriers require only 10-15% reactor filling to achieve efficient and reliable process performance. This lower degree of filling allows for better movement of carriers required for optimum mixing and mass transfer within the aerobic biological reactor. Plastic MBBR carriers often require 40% to 60% merely to achieve a similar biomass concentration.

Very high amount of active biomass (18-25 kg/m³) and higher process performance

Due to high amount of available surface area, fine pore structure, high adsorbing capacity and favourable ionic charges for better colonization and biofilm formation, the Levapor carriers allow for retention of up to 18-25 kg of active biomass per cubic metre of carrier elements to be added to the reactor.

This combination of Levapor properties provides a better mass transfer, optimum biofilm thickness and a diverse range of bacterial community development, enabling the Levapor reactors to deliver 50-400% higher process performance when compared to suspended growth conventional activated sludge reactor or plastic media based MBBR for the same volumetric area.

The high amount of active biomass fraction retained within the reactor on the Levapor carriers also facilitates a relatively higher MCRT (Mean Cell Retention Time) / SRT (Sludge Retention Time) at lower Hydraulic Retention time.

Smaller Foot Print and Compact Treatment Plants

Due to the higher performance achievable with Levapor carrier based bioreactors, the volumetric and organic loading rates observed with the Levapor carriers are much higher compared to

conventional technologies. One of the many benefits is the reduction in the Aerobic Reactor volume requirement, resulting in a smaller foot print for the plant and potential energy savings.

Faster Wetting, Colonization and lower fluidization energy

Due to the hydrophilic nature of Poly Ether based PU foams, the wetting of Levapor carriers occurs significantly faster when compared to the conventional hydrophobic plastic material. Upon adding the Levapor carriers to the reactor filled with liquid, within 3-5 days complete wetting can be observed. The shape and density of the Levapor carriers allow for smoother fluidization within the reactor. With an energy requirement as low as 4-7 Nm³/m².hr, the reactor bed with Levapor carriers can be fluidized efficiently.

The development of the Levapor carrier includes the combination of PE-PU foam and carbon impregnation, the fine pore structure allows for colonization to take place very quickly. Upon seeding, the reactor begins delivering remarkable organic removal rates within just a few days.

Higher Process stability against toxic shock loads

The presence of activated carbon on the Levapor carriers offers remarkable process stability to the Levapor based bioreactors against toxic shock loads compared to conventional activated sludge and plastic media based MBBR processes. The specific advantage of the PACT system reduces the toxicity levels of toxic substances thus allowing a smoother and higher process. This specific characteristic of the Levapor carrier enables the biological treatment of toxic and inhibitory substances contained within the effluent at a much higher removal rate, creating better process economies.



The inner porosity of the Levapor carriers offer added protection for biofilms against toxic shock loads. Consequently the Levapor carriers provides greater stability and assurance against effluents containing toxic substances.

Reduced, well settled sludge production and improved clarifier performance

The optimal combination of characteristics developed with the Levapor carriers result in highly efficient environmental conditions for biofilm, these include;

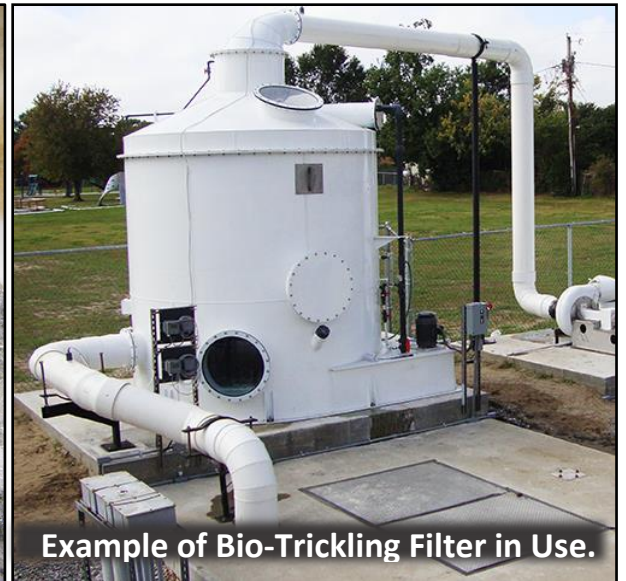
- thickness,
- substrate/diffusion gradients,
- attachment/detachment of biomass,
- maintenance of biofilm thickness and higher activities within the Levapor based bioreactors

This combination of these favourable conditions results in the development of a diverse microbial community structure possessing better settling properties. Better settling properties dramatically improves the performance of conventional clarifiers with excellent solids separation being achieved.

Benefits of Levapor Technology:

- Smaller foot print
- Reduced CAPEX
- Remarkable process stability against toxic shock loads
- 50-400% higher process performance compared to conventional technologies
- Reduced process start up and commissioning periods
- Lower energy consumption
- Reduced sludge production
- Improved clarifier performance
- Better results under all operating conditions

3.8 One Carrier, many process configurations



Due to the versatility of Levapor carriers with a hybrid IFAS configuration, the carrier can be configured into any process of the suspended growth technology including SBR, Step Feed, Barden-Pho Process , RBC, Plug Flow Type Activated Sludge process and many more.

3.8a Advantage Levapor carriers:

- Any suspended growth process can be upgraded for better removal and higher treatment capacity without making major changes in it
- Maximum utilization of existing equipment
- Ease of upgrading and/or retrofitting existing system
- Site specific designs and process configuration selection
- Lower CAPEX, lower OPEX

***Find out more about the many advantages of the Levapor Technology
www.wettechenvironmental.com / www.levapor.com***