

# LEVAPOR - GRACE

## A BATCH CLARIFIER BASED IFAS PROCESS FOR BNR AND COD REDUCTION



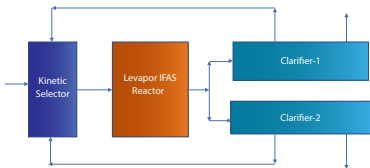
### LEVAPOR - GRACE THE PROCESS

LEVAPOR - GRACE is an innovative process which combines both MBBR/IFAS and SBR (Sequencing Batch Reactor) technologies in a single process. The process is based on utilizing kinetic selector and Levapor carriers based IFAS reactor in a continuous mode of operation as main treatment step. While the final polishing treatment and settling is carried out in two aerated SBRs which act as polishing reactor as well as settling basin in alternating mode.



### HOW IT WORKS

LEVAPOR - GRACE process agglomerates a kinetic selector, LEVAPOR IFAS reactor and two aerated clarifiers operated in batch mode for the treatment of sewage and industrial effluents. The process is based on utilizing kinetic selector and IFAS reactor in continuous mode of operation while the two clarifiers are operated in alternate mode.



The inlet wastewater is received at the selector in continuous mode which then is further treated in the LEVAPOR IFAS reactor. LEVAPOR IFAS reactor utilizes porous, activated carbon impregnated PU foam based LEVAPOR carriers with biomass also maintained in the suspended phase as per the requirement. Both selector and IFAS reactors receive wastewater on continuous basis.

From IFAS reactor, the treated effluent with MLSS goes to one of the empty clarifier which is continuously aerated during entire fill cycle. As soon as the fill cycle starts, aeration and RAS (Returned Activated Sludge) pumping using air lift pumps are also started. The RAS is returned to the selector phase for either denitrification or for Bio-P uptake based on the kinetics and process requirement. Once the clarifier has reached high liquid level, it enters in settling mode and after pre-determined settling time, decanting of clear effluent is done using decanters. The whole aerate fill, settling and decant cycle is then repeated for the other clarifier.



## LEVAPOR - GRACE BENEFITS

- Due to batch mode of operation for the clarifiers, excellent settling properties of MLSS can be achieved.
- Plants can be operated at much higher MLSS levels compared to conventional CAS and MBBR/IFAS Processes.
- Due to kinetic selector, IFAS reactor with fine pore carriers and aerated clarifier during fill phase, a wide range of F/M ratios and kinetic conditions can be achieved which allow for higher removal rates and development of highly active fast settling biomass.
- Clarifiers can be configured as post anoxic denitrification reactors during the start of the fill phase and thus higher nitrogen removal rates can be achieved without formal nitrogen recycle or internal recycle arrangement.
- Due to unhindered batch settling, a very high quality treated effluent can be achieved with lowest TSS levels possible.



## LEVAPOR - GRACE ADVANTAGES

- Lower footprint compared to CAS and MBBR/IFAS Technology
- Higher nitrogen and Bio-P removal
- Superior quality of treated water reducing post treatment costs
- Lower energy consumption compared to conventional single clarifier based systems incorporating IR and RAS
- Fully automatized operation
- Highly stabilized sludge for further processing

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