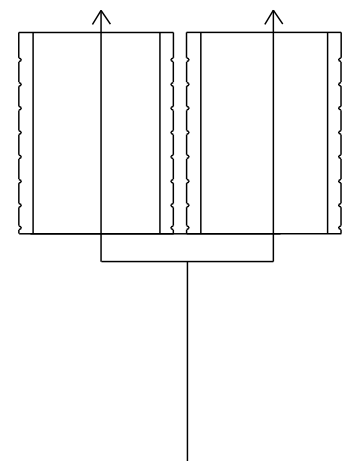


in seria



parallel

## Description fixed bed reactor (FBR) modul

Clearfox FBR modules are fully equipped bioreactors with a high quality PE shape. All equipment is preinstalled in a cubical tank, such as aeration membranes, distributor system, blank holders and all support for positioning grid tube blocks in order to get a high performance bioreactor for waste water treatment. The typical application is reduce carbon and nitrogen concentration from any kind of pretreated (removed solids) wastewater industrial or municipal nature. The shape of the tank and most of the equipment is made by rotomoulding in one piece, out of high resistible polyethylene or stainless steel 1.4571. The modules are designed for installation in client's tank (concrete chambers, steel frame systems, HC seacontainers (*i.e. Clearfox containerised container modules*)). Interfaces to client are designed for a fast and simple plug&play connection onsite.

Two modules can be connected for a water flow in series, for a parallel installation the water has to be splitted. Included in the scope is a blower and airsplitters (pro rata), which are suitable to the number of units and the kind of connection. Client must provide mechanical screened wastewater ( $\leq 3\text{mm}$ ). In order to reduce TSS a clarifying unit after the modules is advised. According to client's requirements (inlet concentration, effluent requirement, carbon and/or nitrogen removal) inside the modules there are different bio carriers implemented.

The design is according to DWA guidelines, the cleaning efficiency is approved in field tests, made by external waste water institutes. Test reports and certificates for static, performance, origin, DWA guidelines are available on request.

## specification:

1 unit biomodule:	50% of HC Container	max. operation weight: [kg]	15.000 (water filled)
number of chambers:	1	inlet connection@height:	DN 100@2.40 m
measures: (l,w,h) / unit [m]	2.74 x 2.10 x 2.57	outlet connection@height:	DN 100@2.40 m
footprint: [m <sup>2</sup> ]	5.75	inlet aeration tube:	DN50@ 2.74
max. transport weight: [kg]	650 empty	roofopening:	60 cm x 60 cm
Power connected for blower class C	1.350 Watt	Power connected for blower class N	1.500 Watt

## performance rate per module @ 20 hours

performance	max. feedrate [m³/h]				degradation per day [kg]				specific surface area of media [m²/m³]
	units (parallel)		units (series)		units (parallel)		units (series)		
number of units	1	2	1	2	1	2	1	2	
carbon reduction (COD)	2	4	2	5	40	80	40	100	100-150
nitrification (NH4-N)	2	4	2	5	8	16	8	20	150-300

The specific surface depends on concentration of the inflow. The degradation is calculated for municipal/domestic concentrations; **higher concentration, as for industrial applications will give higher performance rates.**

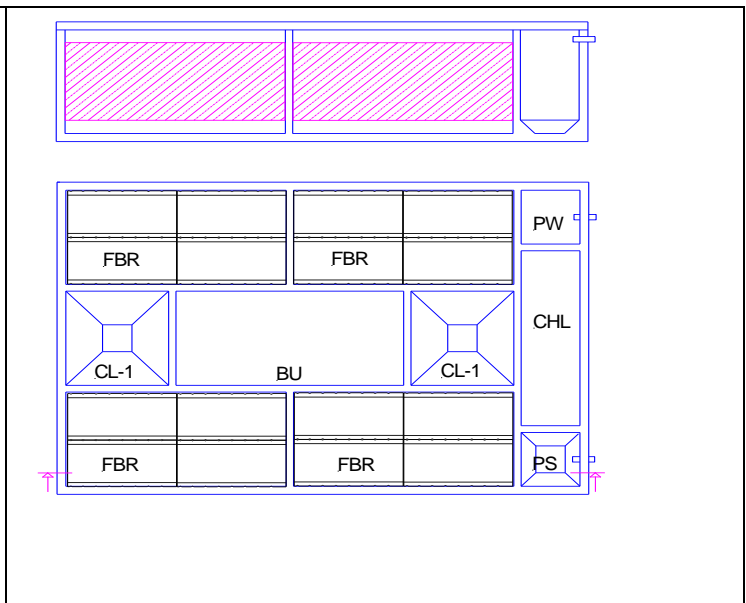
Units in series are working with an higher treatment efficiency, that results in an higher degradation per day

Nitrification requires COD reduction in advance. It must be secured, that after every reactor are the TSS reduced by clarifying.

## application



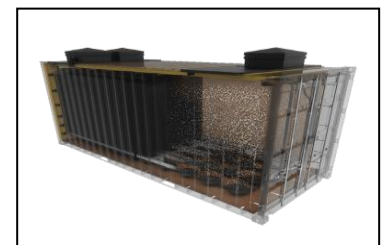
biomodule installation into a seacontainer



treatment system 8.000 p.e in concrete with FBR-biomodules

## PPU version: seacontainer HighCube 20 feet

PPU Umwelttechnik installs 2x FBR modules in reinforced seacontainer. The two Biomodules are switched in seria. The container has ready installed flanges IN:DN80-PN10, OUT:DN 100-PN6,@height = 2.45m, first Biomodule is cascade Nr.1  
The second Biomodule is cascade Nr. 2 -3. the seacontainer is including an airsplitter for all cascades individuell aeration and optional backflush@high load, 3 access holes 600x600 mm with lids and a foam discharge tube



## Benefits for Clearfox FBR modules

fast startup, cost saving in installation, small footprint	flexible against underload and overload
modular system, adaptable at every application	industrial as well as municipal wastewater
high performance with high quality, Made in Germany	stable and very robust process technology