



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 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.

- **optional** with a – **outside horizontal around** - steel frame for **onfloor** installation of the tank in steel bar 80 mm x 40 mm (underground **inside** reinforcement is standard)
- **optional** domeshaft access
- in-/ outlet connection, DN100
- Water depth about 1,40 cm

Equipment parts:

Tank:	1250 l Tank	2250 l Tank	3500 l Tank
Measures: (l,w,h) in cm (with outside frame)	90/122/171 (106/138/171)	154/122/171 (170/138/171)	243/122/171 (259/138/171)
Required space:	1,25 m ³	2,25 m ³	3,5 m ³
Transport weight:	130 kg	200 kg	250 kg
Max. operation weight:	1300 kg (with water filling)	2300 kg (with water filling)	3550 kg (with water filling)
Inlet connection:	DN 100	DN 100	DN 100
Outlet connection:	DN 100	DN 100	DN 100
blower:	250 W	250 W	350 W
Entry:	Lid (60 cm diameter)	Lid (60 cm diameter)	Lid (60 cm diameter)

performance rate per tank @ 20 hours equilised feeding

carbonreduction

performance specific surface area of media 100-150 [m ² /m ³]	1250 l	2250 l	3500 l
max. feedrate [m ³ /d]	6,6	11,1	18,3
p.e.	44	74	122
carbon reduction (COD) [kg/d]	4,4	7,4	12,2

carbonreduction and nitrification

performance specific surface area of media 100-150 [m ² /m ³]	1250 l	2250 l	3500 l
max. feedrate [m ³ /d]	2,7	4,6	7,6
p.e.	18	31	51
carbon reduction (COD) [kg/d]	1,8	3,1	5,1
nitrification (NH ₄ -N) [kg/d]	0,18	0,31	0,51

(50g BOD/p.e.; 100g COD/p.e.; 10g N/p.e.)

The specific surface depends on the concentrations 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 the TSS are reduced by clarifying.

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