Applications

Trickling Filter Technology





Trickling Filters Solutions for the Twenty First Century

2H BIOdek®

Trickling filters have provided valuable service in treating waste water for many years. They have proven to be simple to run, reliable, energy efficient and have met the treatment levels required.

Today Trickling filters are a modern and highly attractive process due to the development of different kinds of plastic media, especially such as GEA 2H Water Technologies provides.

- Full carbonaceous treatment
- Nitrification to very low concentrations
- Denitrification
- High rate applications



2H BIOdek®
Municipal WWTP
Ernesettle, Great Britain

Filter Design

Know-How

Although many equations and design rules for the trickling filter process have been published – it needs a lot of know-how and experience to find the best solution. This know-how has been gathered together by GEA 2H Water Technologies's specialists during 25 years of filter design and operational experience. GEA 2H makes it available for you to ensure your project provides:

- reliable compliance with effluent standards
- maximum economic benefit for customers
- optimum operation reliability
- accurate hydraulic parameters for rotary distributors and nozzles



2H BIOdek®
Nitrification Filters
Gothenburg, Sweden

Different Requirements

Process Engineering

Secondary Treatment Filters

This treatment process reduces the levels of BOD and Ammonia within the waste water to levels that can be discharged into watercourses without compromising the condition of the receiving waters. The loading rates applied to 2H BIOdek® secondary filters are typically between 0.2 kgBOD/ m^3/d to 1.0 kgBOD/m^3/d – depending on the required effluent quality. With appropriate topographic layout 2H BIOdek® filters can operate in gravity feed mode without the supply of additional energy. No other aerobic water treatment process offers this advantage.

Tertiary Nitrification Filters

This type of filter is installed following an existing process to enable the works to meet tighter ammonia discharge consents. The nature and type of biomass that establishes itself within tertiary nitrification filters produces negligible amounts of solids. Provided the works is within its suspended solids consent, no additional capital expenditure is required for post filter settlement. 2H BIOdek® is particularly effective for this application due to its long retention times, crossflow structure and high specific surface area which all combine to produce a very high specific nitrification rate producing very low ammonia concentrations in the effluent.



2H BIOdek®
Trickling filter in industry with 16 m media depth
Region Basel, Switzerland

High Rate Filters

Extremely high treatment rates can be achieved by using high rate filters thus minimising the site footprint. High rate filters are loaded at rates of 1.0 kg BOD/m³/d up to 5.0 kg BOD/m³/d. They are normally designed to reduce the BOD loads by between 50% to 70%. The energy input is less than 0,2 Kwh per kg reduction in BOD. Particularly when dealing with an easily treatable waste, a strong biomass growth will be created. 2H BIOdek® vertical flow media structure has the optimal structure to steadily expel the excess sludge.

Denitrification

Research through the past decade has proven that anoxic trickling filters are a reliable process for denitrification. Based on our research, GEA 2H Water Technologies has patented a process solution, which even enables shallow filters to efficiently denitrify. By a simple method the filter media is sealed against atmospheric oxygen, forcing the biomass to use nitrate within the effluent stream for the supply of oxygen.

Application Area

Typical Applications

Municipal

Trickling filters with GEA 2H media can be designed to meet stringent standards of new works. Therefore they are the ideal process for full secondary treatment. They are also utilised as a cost effective add on stage either to decrease the load as pre-treatment where the capacity of an existing works has to be increased or as a special treatment stage to meet new standards dictated by legislation.

The versatility of the GEA 2H media range enables existing assets and treatment systems to be upgraded to meet future needs with minimum costs and disruptions to the treatment capacity.

Industrial

Industrial waste water is characterized by special features like increased salinity or temperature or unbalanced organic loads and differing pH levels. 2H BIOdek® filters are able to treat such waste with little sludge production and high energy efficiency utilising small plant footprint and little supervision. Temperature reduction of the waste water through the filter is often welcome as an additional effect. The 2H BIOdek® filters are particularly efficient in applications requiring partial treatment to meet consents for discharge into municipal sewers.

Upgrading Existing Filters

One cost effective solution to increase the treatment capacity of an existing filter works is to replace the existing rock media or random media with GEA 2H media. Due to the more open structure and high effective surface area, around 3 times the organic load and up to 10 times the hydraulic flow, can be applied to GEA 2H media than to rock media.



2H BIOdek®
Upgraded Trickling Filter
with gravity feed

Leading Competence

Worldwide Presence





2H BIOdek®

Nitrifying filter at the board of Lake Géneva (F) with 2 stages in one tank; Ammonia Discharge <1mg/l



2H BIOdek®

Managua: Trickling filter plant for a design load of 1,5 M Population. Equivalents with 6 filters and 30.000m³ BIOdek under construction in 2007



2H BIOdek®

Namibia: Trickling filter proves to be the most reliable process for small towns in areas with low energy supply

GEA Heat Exchangers

GEA 2H Water Technologies GmbH

Dieselweg 5
48493 Wettringen · Germany
Telephone +49 25 57 / 93 90-0 · Telefax +49 25 57 / 93 90-49
www.gea-2h.com · info.2h.de@geagroup.com

Contact / accredited dealer