

SMART-Treat™ Applications

Originally developed in Norway, the Moving Bed Biological Reactor (MBBR) process is marketed worldwide. Environmental/Health Products and Service worked with Dr. Bjorn Rusten of Aquateam-Norway during the late 1990s to develop a version of the process for small flows of 100,000 GPD or less, now marketed in the US as the SMART-Treat™ On-Site system.

SMART-Treat is especially suited for high-strength waste streams as it provides a large surface area for treatment within a small footprint. These high-strength waste applications include:

- » Restaurants
- » Convenience stores and truck stops
- » Industrial pretreatment systems

Other prime applications include:

- » Single-family homes
- » Mobile home parks
- » Condominiums and apartment complexes
- » Cluster homes in subdivisions and similar applications

With its proven efficiency, this small-flow, fixed-film wastewater treatment process is ideal for upgrading activated sludge or fixed-film systems.

Among the system's many operational advantages, the SMART-Treat MBBR system is:

- » Economical
- » Reliable
- » Easy to install and operate
- » Compact
- » Highly flexible with regard to influent hydraulic and organic loads
- » Easily integrated into a variety of different stages of infrastructure development to treat domestic, industrial or combined flow

The flexible, versatile treatment system

- » A huge microbe surface area in a small footprint
- » Custom combinations of tank sizing, biological surface area and air delivery to achieve specific treatment levels
- » Can be shipped fully assembled for immediate installation on site
- » Versatility in sizing: ability to expand treatment capacity by simply adding more surface area into the tank — in minutes!

LARGE CAPACITY SMALL FOOTPRINT

It's wastewater treatment evolved.



PRESENTING

SMART-Treat™ MBBR

Moving Bed Bio-Reactor for Small Flow
and On-Site Wastewater Treatment

Marketed, Assembled & Distributed by:
ENVIRONMENTAL / HEALTH
PRODUCTS & SERVICE

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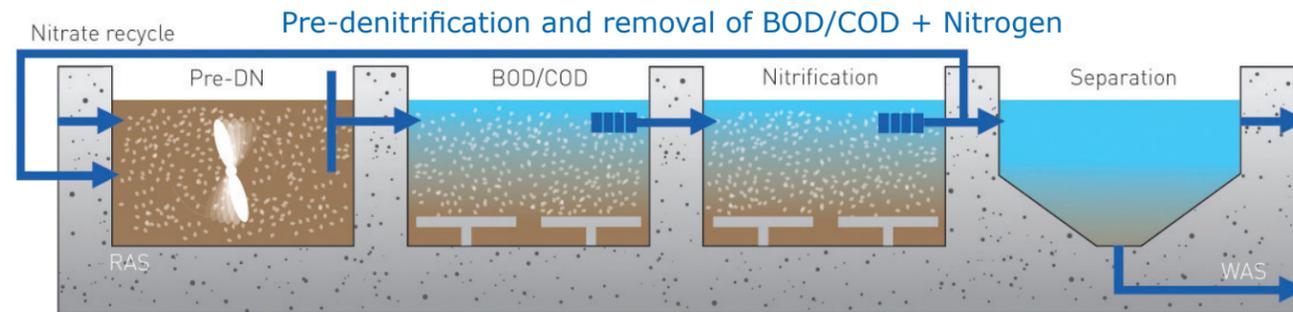
Richfield, WI

featuring
 **BIOWATER**
TECHNOLOGY
BIOFILM CARRIERS

Environmental/Health Products & Service

Richfield & Phillips, WI

THE SMARTER TREATMENT SOLUTION



System Components

- » Primary treatment: typical septic tank (and grease interceptor when needed) for primary solids separation. Surge flow equalization when needed.
- » Aerobic reactor tankage, single or multiple stages dependent on effluent goals.
 - » **Up to 70% denitrification** is achieved with recirculation and blower sequencing.
 - » **Total nitrogen below 10-15 mg/l** is achieved with specific engineering techniques.
- » Secondary (biological) solids separation and UV disinfection, if needed.

Process Components

Aerobic

- » Biofilm carriers
- » Aeration system
- » Retention sieves

Anoxic

- » Biofilm carriers
- » Mechanical mixers
- » Retention sieves

Innovative Operation

The SMART-Treat™ system uses an innovative combination of aeration and mechanical mixing inside wastewater tankage with small biofilm carrier elements to grow bacteria and treat wastewater flows.

The process at a glance:

- » Buoyant carrier elements are placed in a tank(s) in sufficient volume to match the treatment requirement
- » Compressed air is delivered to a header system near the bottom of the tank
- » A biofilm grows on the carrier elements
- » The biofilm carrier elements move at random throughout the aerobic reactor tank
- » As air passes through the water and past the media, the wastes in the water act as food for the microbes growing on the moving media
- » The carrier elements are self-cleaning
- » A retention screen is placed at the outlet of the reactor to keep the biofilm elements in the reactor
- » Cleaned water is discharged while settled biological solids are occasionally returned to the primary solids separation zone (septic tank) for routine disposal with primary settled solids

EXAMPLE INSTALLATION

RESTAURANT UPDATE

- » Installed fall of 2013
- » Single tank update
- » Design flow 2600 GPD, influent 1300 mg/L BOD / 645 mg/L TSS
- » Design effluent 170 mg/L BOD / 60 mg/L TSS

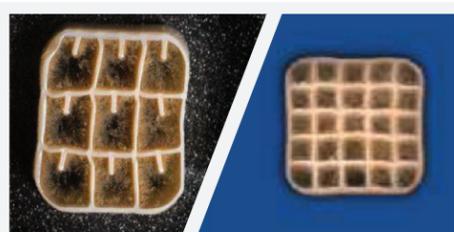


EXAMPLE INSTALLATION

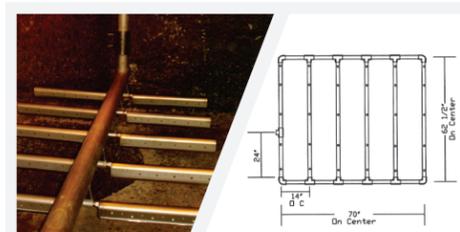
GOLF & SUPPER CLUB

- » Installed fall of 2001
- » Design wastewater flow 4500 GPD
- » Traditional septic tank was converted to active treatment via recirculation
- » Organic load was approximately 75% of design; hydraulic load was widely variable at up to 60% of design

VARIATIONS OF MAIN COMPONENTS



Biofilm Carrier Elements



Aeration Grids



Carrier Retention Screens

	Grease Trap Eff	Septic Tank Eff	Final	% Rem
BOD5 mg/l	1619	164	16.2	99.0
TSS mg/l	530	125	14.5	97.3
TKN mg/l	80.3	—	2.6	96.8
NH3-N mg/l	44.5	—	0.5	98.9
NO3-N mg/l	—	—	8.3 – 10.5	—
Temp -C	14.6	9.8	7.0	—
pH	5.3	6.9	7.1	—
DO mg/l	0.5	0.4	5.4	—