

SEG

**Pig Manure
Wastewater Treatment Plant – 2 m³ \ hr**

Typica Proposal

SEG Technologies

GreenFloat NR, Pig manure

Capacity – 48 ton/ day – about 5000 animals

1. Introduction

The concerned proposal is associated with full fresh “manure” treatment, to provide safe environment discharged to local WWTP or land application at low nutrients loads.

The solution is based on short chemical/physical controlled process, executed at the farm level, or centralized location.

The package is composed of three modules:

- I) Chemical/physical separation.
- II) Sludge drying.
- III) Further Thermal/Chemical/Physical polishing process to achieve 90 % reduction in total N.

Both process are integrated in one unit operation in one 12 m container or 2X6 m container.

Typical Manure parameters as obtain in Spain:

PH	7
COD	40000 mgl
COB5	12000 mgl
P	1600 mgl
N Kendal	3300 mgl
Ammonia	2300 mgl
TSS	35000 mgl
TS	50000 mgl

SEG process dramatically reduces the loads of SS, COD, P,N.

2. Specifications

Inlet

Capacity - 2 ton / hr max.

Outlet

TSS reduction - > 95%
COD - > 90 %
P - > 90%
N_t - > 90%

Sludge - 6-8% DS after the COCUF

DS after centrifugation - 25 - 30%

General

Floor area	- 2.5 X 12 in container, 8X 6 m floor mounted
Max height	- 4 m
Mounting weight	-Approx. 3 ton
Effluent discharge height	- approx. 3m above the mounting surface

Chemicals, subject to true influent analysis

Flocculant	- Special flocculent - confidential -of active material, including Centrifuge.
Coagulant	- Metal salt, or -confidential, approx. –confidential- ppm
Acid /Base	- to be checked

Electricity

Consumption	-Approx. 15 kW (including centrifuge)
Protection	-IP 55

Heat

- 40 kW at 25 C manure tem. - diesel fuel

Air

Pressure	-6 Bar minimum, 8 bar maximum
Consumption	-Approx. 25 Lit \ min STP

Water, fresh

Pressure	-3 bar minimum
Consumption	-Approx. 90 Lit \ hr for polymer wetting , lime preparation and ammonia scrubbing

The liquid phase is discharged by gravity and two alternatives for the solids:

- Directly after the stage 6-8 % Dry Solids (DS)
- After centrifugation at about 30% DS

3. Module I, GreenFloat

3.1. Description

Ultra compact DAF plant, Continuous & automatic floor or skid mounted

Sludge is accumulated in a disposal container, placed under the sludge conveyor, if containerized unit is selected.

3.2. Storage and feeding management

Raw untreated wastewater collected from all locations, after coarse solids separation..

The buffer tank must be mixed during the GreenFloat operation.

SEG will control the mixing device by the main GreenFloat controller and will instruct further requirements after receipt of order.

The GreenFloat treats the wastewater and reduces levels of suspended solids, Solid P &N, COD and BOD. The purification process is started by pressing the start button and continues until the buffer tank(s) are emptied.

The flow is continuously adjusted, according the actual wastewater generation rate or determined, manually, by the operator.

3.3. Clarification with counter current Air Flotation (COCUF)

Our unique COCUF System works on the counter current principle. This principle ensures excellent solids separation in an easily controllable process.

The main components are the circular stainless steel vessels, divided into two zones: flocculation and separation, its geometry design ensures premium solids separation and sludge thickening. The hydraulic circuit is very simple, employ 100 % circulation rate, fine bubbles production is controlled by the diaphragm expansion valve, that also ensures constant expansion pressure at variable flow operation.

In this special application, a larger cell at a increased circulation rate is used, to achieve good separation, the floated sludge is dewater in the centrifugal decanter and the clear phase flows to the cell inlet, hence the cell coupled with the decanter act as an efficient solids extractor.

The thickened sludge is accumulated at the COCUF top section and skimmed of by the rotating scraper.

4. Module II, Sludge Dewatering

Sludge treatment is an essential stage in any wastewater treatment solution.

The centrifuge dewatering process will further increase the dry solids (DS) content of the sludge from 6 - 8% to approx. 30%. The sludge then is suitable for disposal, the clear phase return to the floatation cell.

5. Module III, NR (Nitrogen Removal module)

Solid bearing N was primarily remove in the first stage, about 30% of N total .

The clarified phase which is already at pH of about –confidential-, is heated to –confidential- degree, and circulated in a spray tower, at a partial vacuum that is created by the venturi pump, this pump that creates the vacuum is also used to dissolved the ammonia vapors into the motive acidic stream, operates as wet scrubber.

This process uses the typical ammonia behavior of elevated vapors pressure at pH > confidential.

Which is increased in elevated temperature or vacuum, the design will optimize the evaporation point in terms of pressure and temperature.

All units operation is synchronized to yield maximum ammonium removal at optimum conditions and minimum ammonia released to the atmosphere.

The scrubbed ammonia solution will be reused directly as rich nitrogen fertilizer or will shipped to fertilizer plant for further processing

6. Control & power system

The GreenFloat NR (both modules) is a fully controlled system, all actuator and accessories are wired to the main power & control cabinet, from where all the treatment processes are executed and monitored by the PLC program.

Hardware	- PLC, and MMI interface.
Display	- Panel mount – touch screen
Interface	- From touch screen

Full MMI control, dynamic process with variable process flow rate, per wastewater viability.
Start / Stop capability with no effluent quality deterioration.

7. Scope of supply

COCUF cell Ø 1.6, SS 304 or RFP , with rotating scraper

Pressure vessel 100 Li, SS 304, certified

Coagulation tank 300 liters, galvanized steel or FRP, no pressure.

Feed pump mono pump Seepex or EQ

High-pressure circulation pump

Pressure vessel mixing pump

Static mixer

Diaphragm expansion valve DOROT Israel, 1 ½ “

2 X flocculant dosing pumps

1X coagulant dosing pump

Based dosing pump if required (lime may be used)

Ph control set

Automatic liquid flocculant preparation unit

Sludge pump with local hopper tank and no sludge protection sensor

Centrifuge – Peralisi Baby II

Stand for centrifuge - SS 304 on request

Sludge conveyor (only in containerized version)

Buffer mix tank in NR module

Transfer pump

Spray tower

Recycling pump

Heat exchanger

Jet vacuum pump

Motive liquid pump

Scrubbing tank

Acid dosing pump

Base dosing pump

Control cabinet - PLC and touch screen interface and dynamic process control terminal
including MMI software

Pneumatic control panel

Piping fittings and valves as required

Documentation and manuals

Not included

Civil works, installation, chemical storage, piping to plant, sludge bin, heater.

Customer will prepare: Agitated buffer tank, surface, power, wastewater inlet, water, air connections, heat source - per SEG specifications.

8. Price , please get a quote

8.1 First module only, floor mounted

8.2 Complete, two modules

8.3 Complete (two modules) in 12 m container

In case tow types of flocculant (process and centrifuge) will have to be used, the price of the second unit will be 3000 EURO, based on liquid flocculant type.

9. Terms of payment

To be discussed

9. Delivery

First module – 10 weeks

Second module – 14 week

10. Equipment warranty

The system supplied is covered by SEG warranty against breakage under normal operation and is valid for 12 months from delivery of goods.

11. Validity

The conditions of this agreement are valid for 60 days form date at head of this document unless signed beforehand, in which case it will be considered a fully binding agreement.

In this event that the parties do not sign the document within 30 days then it bill be considered null and void.