Decanters for SBR-Treatment Systems

Description of an Outstanding Technology

1. Components of the MDS-Decanting System

BIOGEST INTERNATIONAL GmbH developed the MDS-decanting system in order to avoid the well-known disadvantages of most of the effluent discharge technologies, which are offered on the market of wastewater treatment at present. The *most sensitive* part of moving decanting systems is the joint between the outlet pipe and the moveable arm.

Consequently, BIOGEST INTERNATIONAL GmbH developed a special joint-construction, which is 100 % watertight, free of wear and tear and lubricated for an operation period of more than 10 years. Moreover, the completely sealed joint construction is manufactured out of stainless steel with respect to those parts, which are in contact to the wastewater.

Beside this special joint construction, each decanting system consists of the following elements (compare illustration no. 1):

a) One (1) inlet pipe, designed as a horizontally arranged pipe construction with specially formed inlet slots. Moreover, this pipe is equipped with a special baffle, which prevents that floating sludge or other swimming material is entering the decanter.

b) One (1) vertical pipe, which connects the inlet pipe with the joint.

c) One (1) stainless steel joint (twisting link), which is equipped with a special ball-bearing, completely sealed and watertight and equipped with two connection pipes for inlet and outlet.

d) One (1) level switch, which is located at a special fastening construction. This construction allows the adjustment of the level switch in a range of 0 - 1,5 m.

e) One (1) electrical winch, which is located at the tank wall. This winch is equipped with a brake-motor as well as with four limit switches. By use of a stainless steel rope, the decanting construction can be moved upwards or downwards according to the process. Upon request, the winch construction could be delivered completely made of stainless steel.

2. The Operation of the MDS-Decanting System

As it is described with the illustrations no. 1 - 3, the decanting system of BIOGEST INTERNATIONAL GmbH (type MDS) operates according to the following basic principles:

a) Park Position

During the fill-up phase of the SBR the decanter is positioned at the so-called "park level". The inlet pipe is located above the maximum water level. This prevents that mixed liquid is entering the discharge system. It should be pointed out, that the inlet pipe of the decanter is at the same time an emergency overflow for the SBR.

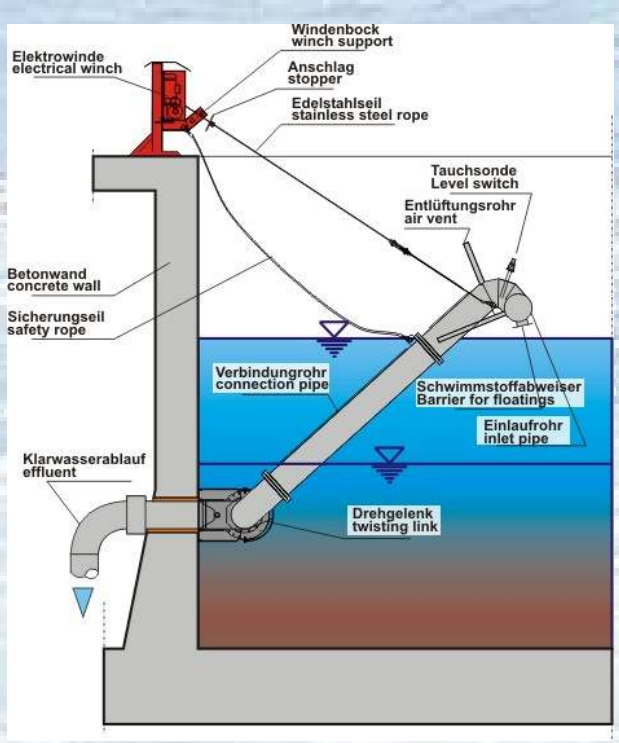

Illustration no. 1: Main parts of the MDS-decanting system (decanter in park-position).

b) First "Dip-In" Action

After the sedimentation phase in the SBR is over, the decanter-winch is switched on. Consequently, the MDS-decanter and its inlet pipe are moving downwards and enter the clear water zone. This movement will be stopped, when the level switch is activated (compare illustration no. 2). The position of the level switch is adjustable, so that the immersion depth of the inlet pipe can be pre-selected (standard immersion depth: 0,5 - 0,6 m).

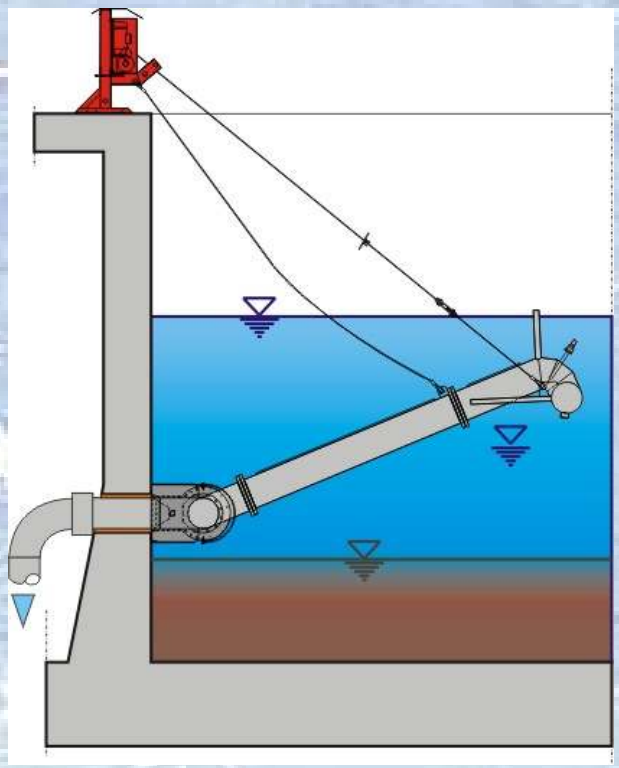

Illustration no. 2: Dip-in movement of the decanter until the level switch is activated.

c) "Stop and Go"-Operation During the Decanting Process (Discharge of Clear Water Out of the SBR)

The water level inside the tank is continuously falling. As a matter of fact, the level switch is activated again, so that the electrical winch-drive is starting again. Consequently, the decanter is moving downwards until the level switch has again reached the "switch-off"-position (compare illustration no. 3).

d) End of Decanting Process

As soon as the minimum water level is reached, the decanting process will be stopped. The level control within the SBR is carried out by the main level control unit (not delivered with the MDS-decanter). The winch-drive will be started again, however in the opposite direction, so that the MDS-decanter is pulled out of the clear water zone until the already described "park position" is reached.

It should be pointed out, that the electrical winch is equipped with four limit switches, which control the lowest position and the park-position. Two limit switches are for duty operation, two switches are for emergency stand-by.

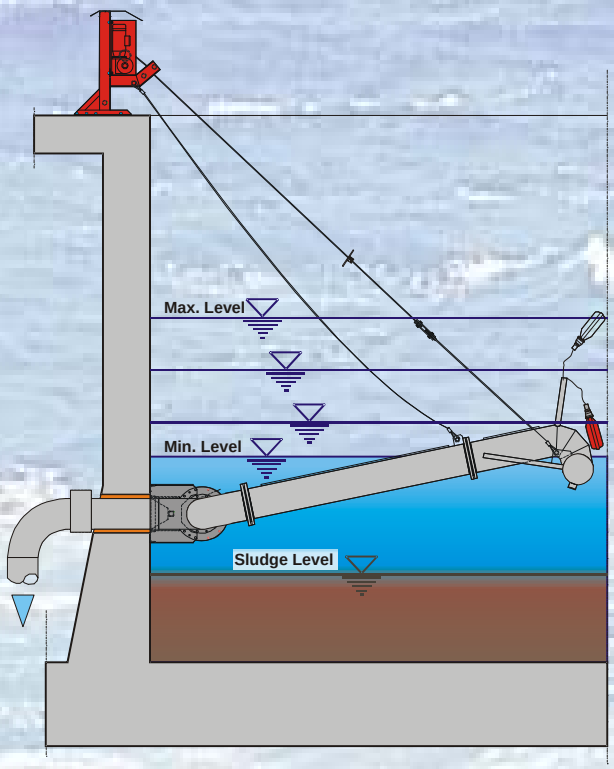

Illustration no. 3: Stop and go action of the decanter.

3. Variations of the Decanting Operation

The described "stop and go"-operation of the MDS-decanter is the most reliable and experienced way to perform the discharge process of the clear water out of a SBR. However, at a special request of our customer, it is also possible to control the winch-drive by use of a frequency converter. In this case, the first downwards movement from the park-position into the initial decanting position as well as the final movement from the deepest decanting position back into the "park-position" will be carried out by a higher speed of the winch-motor. This operation mode helps to shorten the decanting period, so that more time is available for the biological process. However, frequency converters are sensitive and increases the danger of a malfunction.

A third alternative operation mode is the control of the downwards-movement of the MDS-decanter strictly in relation to the effluent flow. By use of a flow-meter the immersion depth of the horizontal inlet pipe is adjusted in such a way, that the flow rate is nearly equal during the decanting process.

Such a control needs a flow meter (preferably a magnetic type) in the outlet of the SBR - as well as a frequency converter for the winch-control.

Finally, we would like to recommend the basic operation mode by use of a float switch.

4. Important Technical Data

* Pipe material:	Stainless steel
* Steel quality:	AISI 306 or better (upon request)
* Discharge capacity:	10 - 300 l/s
* Standard-pipe-Ø:	150 - 500 mm
* Length inlet pipe:	until 8 m
* Motor power:	0.37 - 1.3 kW
* Winch controlled by:	4 limit switches (ea. 2 for low and high position)
* Control of downwards movement by:	float switch
* Speed of downwards movement:	10 cm/m

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