BIO-BLOK® INTELLIGENT FIXED FILM BIOLOGICAL FILTER MEDIA

2.1.8. Case Studies

1. Biological gas-treatment of biogas by means of trickling filters

Technical information	Trickling filter constructed in the summer of 1996
Type	BIO-BLOK® 100
Client	BIOGAS ANLÆG Århus N. Bjergagervej 4 DK-8380 Trige
Consulting Engineers	BIOPLAN A/S Livøvej 21 DK-8800 Viborg Tel.: +45 86 61 38 33 / Fax: +45 86 62 68 36

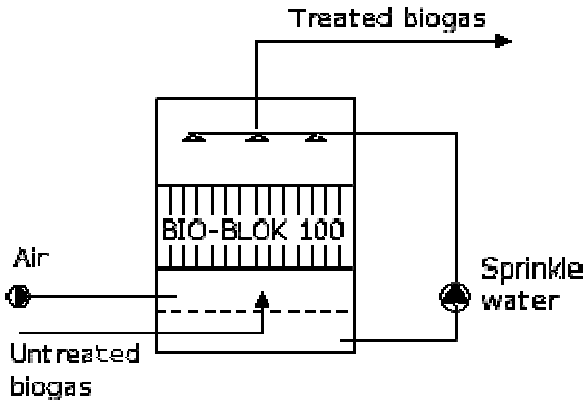

Figure 1: Biogas Treatment - Process Diagram

Brief description of plant and process

Treatment of biogas for hydrogen sulphide happens through a biological process. The untreated biogas is led through a filter medium consisting of BIO-BLOK® 100 (in smooth version). In intervals, the filter medium is sprinkled with a fluid containing chemotrofe bacteria. When supplying atmospheric air to the process, the bacteria oxidize the hydrogen sulphide to S and SO_4^{-2} according to the following process:

$H_2S + ½O_2 \rightarrow S + H_2O$
$S + 1½O_2 + H_2O \rightarrow 2H^+ + SO_4^{-2}$

Sprinkling of the filters is partly done to supply new bacteria and partly to wash the bacteriamass and the sulphur off the filters so that clogging is avoided. The process can be optimized by control of the pH value and the temperature of the fluid sprinkling the filter.

The process is carried out in a 80 m3 steel tank in which 40 m3 BIO-BLOK® 100 are installed. The biogas is supplied at the bottom of the tank and is led up through the filter where the sulphur treatment takes place. The treated biogas is removed in the top of the tank.

The capacity of a sprinkling system is approx. 80 m3 per hour.

Treatment results

When the gas treatment plant is run in, it will be able to treat approx. 700 m3 biogas per hour from a content of approx. 7.000 to 10.000 ppm hydrogen sulphide down to below 100 ppm, corresponding to a reduction of hydrogen sulphide of approx. 98%.

2. Upgrading of Storvik WWTW, Sweden

Storvik WWTW in Sandviken County, Sweden is designed for 2500 PE. The average flow to treatment is 1440 m3/d. Unlike most sewer systems in Sweden, regular sewage water shares the same pipeline system as surface run off and storm-water, thus explaining the relatively large average water volume per person (approx. 575 l/person).

The biological treatment stage was originally based on a random packed media. Storvik WWTW was, however, never able to meet consent standards, and it was decided to upgrade the biological treatment stage by replacing the random packed media with BIO-BLOK® 150 structured filter media.

VAT Registration Number 491201374
HEAD OFFICE: 4 Mill Hill, Gamlingay, Sandy, Bedfordshire SG19 3LW Contact details 01767 651151-
Fax: 01767 651269 e-mail: andygostling@cougarwastewater.co.uk

Photo 1: Storvik Wastewater Treatment Works, Sweden

Photo 2: Storvik Wastewater Treatment Works - Operating

On the pictures above, the bio-tower at Storvik WWTW is seen as a circular concrete structure. The filter volume is 90m3. On the right, we are inside the bio-tower, which has now been retrofitted with BIO-BLOK® 150 and a rotating water distributor. The objective of the bio-filter is reduction of BOD to consent levels.

The resilience of BIO-BLOK® fixed film systems has proved excellent even in the face of the relative harsh climatic conditions in Northern Sweden.

Conclusion

After upgrading of the biological treatment stage with BIO-BLOK® 150, Storvik WWTW has been meeting consent standards with regard to effluent concentrations for suspended solids and BOD. Hence the client, the Municipality of Sandviken, has expressed great satisfaction with the operational characteristics of the BIO-BLOK® filter system.

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