

# COUGAR COATINGS Estd. 1988 WASTEWATER DIVISION

Supplying unique solutions for the water and waste water industry

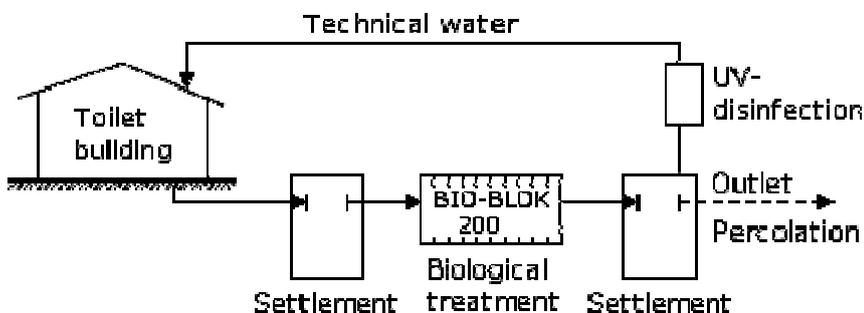


## BIO-BLOK® INTELLIGENT FIXED FILM BIOLOGICAL FILTER MEDIA

### 2.2.9. Case Stories

#### 1. Biological treatment of wastewater from a camping site

<b>Technical information</b>	Submerged, aerated filters constructed in August 1996
<b>Type</b>	BIO-BLOK® 200
<b>Client</b>	Camping site in Fyn, Denmark
<b>Consulting Engineers</b>	Sloth Møller A/S Møllegade 56 DK-6400 Sønderborg Tel.: +45 73 42 31 31 / Fax: +45 73 42 31 32



**Treatment plant for domestic sewage**

Process diagram

VAT Registration Number 491201374

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## BIO-BLOK® INTELLIGENT FIXED FILM BIOLOGICAL FILTER MEDIA

### Brief description of plant and process

Above mentioned camping site has been prescribed to 150 persons. The biological treatment plant has been dimensioned to 50 PE. The treatment plant consists of a normal settlement plant followed by 8 tanks connected in series in which BIO-BLOK® 200 blocks have been established working as submerged, aerated filters. After a UV-disinfection, the treated water is used as technical waster e.g. for toilet flushing. The surplus water is lead to a garden irrigation system consisting of approx. 200 metres distributing mains buried in approx. 20-30 cm depth.

### Test results

The biological treatment plant meets the requirements made on small treatment plants with outlet to marine recipient, i.e. a BOD less than 15 mg/l, an ammonia/ammonium less than 5 mg/l, and a content of suspended solids of less than 20 mg/l.

In this specific case, the water is treated even better as the treated wastewater is used e.g. for watering/percolation in green areas. Therefore, there is no direct outlet to recipient.

## 2. Biological treatment of industrial wastewater from a laundry

<b>Technical information</b>	Submerged, aerated filters constructed in the autumn of 1996
<b>Type</b>	BIO-BLOK® 200 & BIO-BLOK® 300
<b>Client</b>	Cai Als & Sønner GmbH, Germany
<b>Consulting Engineers</b>	Sloth Møller A/S Møllegade 56 DK-6400 Sønderborg Tel.: +45 73 42 31 31 / Fax: +45 73 42 31 32

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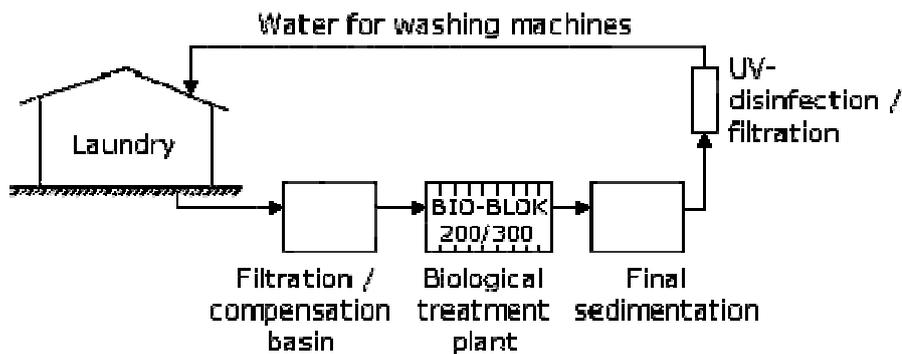
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**Treatment plant for laundry with reused water**

Process diagram

### Brief description of plant and process

In the autumn of 1996 the laundry chain "Schell und Sauber" in Germany had a biological water treatment plant installed in a laundry in Hamburg for treatment of the outlet water from the washing machines in a coin-operated laundry. This water treatment plant has made it possible to reuse by up to 80% of the treated outlet water.

After pre-filtration, the wastewater is lead into the biological treatment plant which consists of submerged, aerated systems connected in series. The systems are constructed of BIO-BLOK® 200 and BIO-BLOK® 300 respectively. In this filter the organic matters are decomposed and thereafter - after settlement and disinfection - the treated water is reused in the washing machines in the coin-operated laundry.

### Test results

The biological treatment plant is dimensioned to treat wastewater from 22 washing machines corresponding to a daily consumption of approx. 34 m<sup>3</sup> water. The content of COD in the outlet water has been reduced from approx. 400 mg/l to approx. 20 mg/l. The content of bacteria has been reduced from approx. 10,000 germ/ml to approx. 300 germ/ml, and the water is completely without smell and clear as tap water.

The plant reduces the water consumption by approx. 5-7,000 m<sup>3</sup> water per year. The expected running cutback is approx. DKK 150,000.00 per year corresponding to a time of refund of approx. five years.

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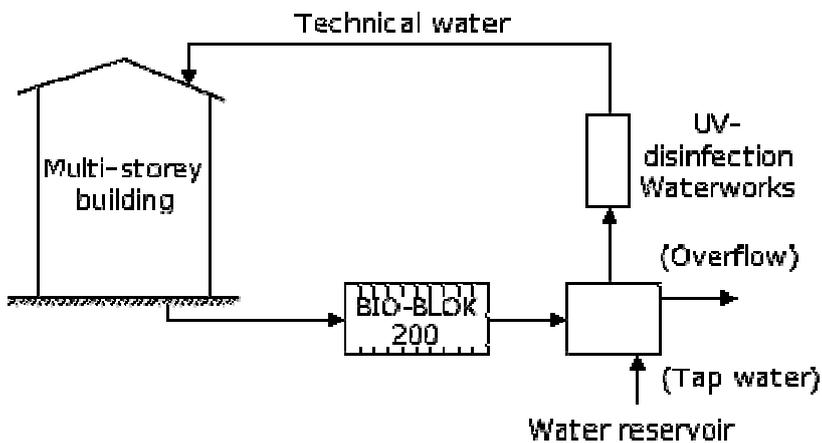
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#### 3. Biological treatment of grey wastewater from a multi-storey building

<b>Technical information</b>	Submerged, aerated filters constructed in 1993
<b>Type</b>	BIO-BLOK® 200
<b>Client</b>	Pension Fund in Copenhagen, Denmark
<b>Consulting Engineers</b>	Sloth Møller A/S Møllegade 56 DK-6400 Sønderborg Tel.: +45 73 42 31 31 / Fax: +45 73 42 31 32



#### Treatment plant for grey wastewater

Process diagram

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## BIO-BLOK® INTELLIGENT FIXED FILM BIOLOGICAL FILTER MEDIA

### Brief description of plant and process

In each of 5 staircases in a new building near Christianshavn Kanal in Copenhagen, a biological treatment plant has been installed which treats grey wastewater. After a UV-disinfection, the treated wastewater is reused as toilet flushing water. Each plant "works" 10 flats which are all equipped with a washing machine. BIO-BLOK® 200 has been used as filter medium in these biological treatment plants as there has been attached great importance to reliable and optimum running.

### Test results

The treated, disinfected reuse water and drinking water are hardly distinguishable. As a minimum, the quality of the reuse water has to be in line with the requirements on Danish bath water .

The plants reduce the water consumption by approx. 1,200 m<sup>3</sup> per year corresponding to a running cutback of approx. DKK 25,000.- per year. The time of refund is approx. five years.

### 4. Biological treatment of wastewater from 1 household (5 PE)

<b>Technical information</b>	Submerged, aerated filter constructed in the summer of 1993
<b>Type</b>	BIO-BLOK® 200
<b>Client</b>	Villa Vision, DTI Taastrup, Denmark
<b>Consulting Engineers</b>	Sloth Møller A/S Møllegade 56 DK-6400 Sønderborg Tel.: +45 73 42 31 31 / Fax: +45 73 42 31 32

### Brief description of plant and process

The future house Villa Vision is equipped with a sedimentation basin followed by a biological treatment plant which is based on the fixed film technology. This filter medium is constructed of BIO-BLOK® 200. BIO-BLOK® 200 is made of polyethylene net tubes which have been developed with a special surface structure that results in a quicker development of the biological growth. This - together with the big accessible surface - gives an optimum and unproblematic biological decomposition in the filter.

After a UV-disinfection, the treated water can be reused as toilet flushing water or it can be discharged into the following root zone plant which is constructed with BIO-BLOK® 100.

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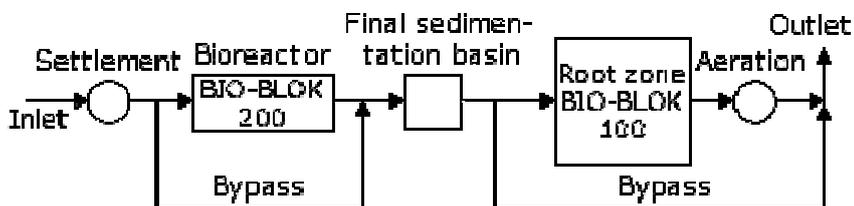
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### Treatment results

Above mentioned biological treatment plant treats wastewater from one household corresponding to a load of 5 PE. Through the biological process, the content of COD and ammonia is reduced by approx. 95%. The treated water is being used for watering of green areas. The plant has been running since the summer of 1993.

### 5. Biological treatment plant with aeration pallets and root zone plant

<b>Technical information</b>	Submerged, aerated filter constructed in 1996
<b>Type</b>	BIO-BLOK® 100 & BIO-BLOK® 200
<b>Client</b>	Ligatne Municipality, Latvia
<b>Consulting Engineers</b>	ENERGI & MILJØGRUPPEN A/S Skanderborgvej 238 DK-8260 Viby Tel.: +45 86 28 89 88 / Fax: +45 86 28 89 39



Flow / Process diagram

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## BIO-BLOK® INTELLIGENT FIXED FILM BIOLOGICAL FILTER MEDIA

### Brief description of plant and process

The treatment plant in Latvia has been dimensioned to treat 75 m<sup>3</sup> domestic sewage per day corresponding to approx. 500 PE. The biological part of the treatment plant, the bioreactor, is constructed as a submerged, aerated filter. This filter consists of 32 m<sup>3</sup> BIO-BLOK® 200 which are fixed on aeration pallets. This filter decomposes the content of ammonia and organic matters in the wastewater.

The treatment plant is equipped with a 130 m<sup>2</sup> big root zone plant which is constructed of BIO-BLOK® 100. Willow plants have been planted in the root zone. This root zone plant works as an anaerobic final sedimentation plant for the biological treated wastewater. The root zone plant reduces the content of nitrogen and phosphorus in the wastewater.

### Treatment results

As the treatment plant was only started the 1st of December 1996, we do not have many test results. After approx. three weeks' operation, it was noted that the treatment plant was able to reduce the pollution by approx. 83%, this in spite of cold wastewater when starting. When the root zone plant is attached in the spring of 1997 and the biology has grown even more, it is expected that the grade of purification will reach approx. 95% to 99%.

### 6. Example of reconstruction of an existing active sludge plant

<b>Technical information</b>	Submerged, aerated filter constructed in 1997
<b>Type</b>	BIO-BLOK® 150 HD
<b>Client</b>	Kandava Municipality, Latvia
<b>Consulting Engineers</b>	SIA LAKALME Ulmapa gatve 3 LV- 1004 Riga Latvia Director Juris Vitols, Tel./fax. +371 7606 360

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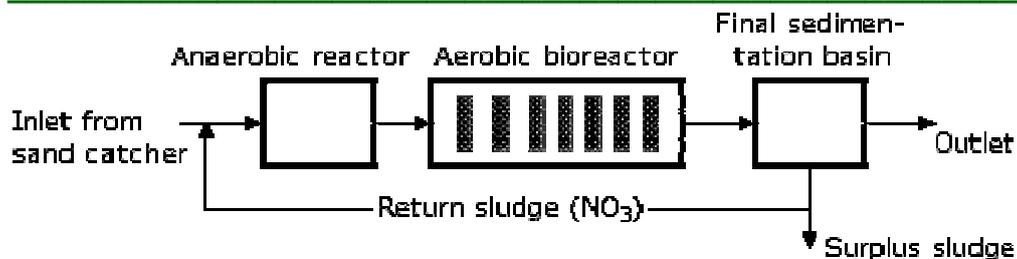
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Flow / Process diagram

### Brief description of plant and process

The treatment plant receives approx. 850 m<sup>3</sup> domestic sewage/day. In rainy weather it receives approx. 4,000 m<sup>3</sup>/day.

Before the reconstruction, the treatment plant was an old, active sludge plant that could not treat the wastewater sufficiently due to occasional big variations of the volume of wastewater and due to occasional cold wastewater.

The reconstruction of this wastewater treatment plant is a good example of how an existing sludge plant easily can be reconstructed into the fixed film technology. This has resulted in a better treatment process and a bigger capacity in the existing basins.

As the purpose was to reconstruct the treatment plant so that a better process and a bigger capacity were achieved, the job was very simple as only approx. 128 m<sup>3</sup> filter media (BIO-BLOK® 150 HD) were installed in the existing aeration tank. Thus there was created room enough for big volumes of fixed bacteria that could treat the wastewater under all occurring loads.

### Treatment results

The treatment plant was started in the autumn of 1997. Already now it has been noted that the following outlet requirements can be kept:

BOD <sub>7</sub>	8 mg/l
COD	40-70 mg/l
SS	8 mg/l
N <sub>total</sub>	< 25 mg/l

This corresponds to a decomposition of BOD<sub>7</sub> of approx. 8 gr./m<sup>2</sup> x day in the used filter medium BIO-BLOK® 150 HD.

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