

# Eflo SBR - Filandraw Sequential Batch Reactor

## General Description

### EfloSBR Treatment Process

Probably one of the oldest forms of waste water treatment, covering both domestic sewage and industrial waste waters.

50 - 50,000 m<sup>3</sup> per day capacity.

The process, on the surface, is deceptively simple and initially was an advance on oxidation lagoons.

The process is in effect the very well proven extended aeration biological oxidation technology.

Being a "Batch" process, the entire treatment process can be undertaken in a single tank - making it very attractive, especially as it avoids the requirement for complicated settlement tanks.

Assuming adequate inlet works are provided in terms of screening, the process flow is this:

Waste water enters the process tank and is aerated. The biomass oxidise the organic matter. After a period of time, the aeration is switched off and the entire tank is allowed to act as a settlement tank, whereby, the biomass sinks to the bottom. After a period of settlement, the clean treated water is pumped away and the process returns to the aeration phase.

All very simple but of course there are certain process complications that have to be correctly addressed for the process to be successful. These principally involve the process control and the clean water decanter. Neither is simple and if incorrect will cripple the entire process.

Eflo have designed and manufactured their Filandraw SBR process since the 1970's and they have proven very popular in developing regions, particularly as small, easy to ship, package plants. Latterly, Eflo have completed much larger projects using complex mechanical decanters and PLC process control equipment.

In every plant, the effluent quality can meet 10:10:5 (BOD, SS, NH<sub>4</sub>) mg/l with the addition of multi-media tertiary treatment.

The footprint and sludge production is generally large and in line with conventional activated sludge plants. Modern processes such as the EfloSAF and EfloMBR significantly reduce footprint and sludge as well as improve effluent quality.



Effluent Decanters - Raised Position in Aeration Phase



Effluent Decanters - Showing Worm Drive Decanter Lifting Mechanism

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## Process Improvements and Design Advances

At first, SBR treatment plants were simple processes utilising a single tank for all functions. However, design advances have been made and Eflo now offer the Continuous Feed SBR to overcome the problem of the “un-controlled” incoming sewage flow from disturbing the treated water during the settlement and pump out phases. For this, and their Pneumatic Submerged Effluent Decanter, Eflo was awarded a Patent under UK no. 1549400.

Additional improvements are available to include fine bubble aeration for high efficiency oxygen transfer and lower power demands.

The requirement for nitrification and de nitrification can be designed for in the process PLC and by the inclusion of mechanical mixers combined with on Off period for the aeration system.

But ultimately, the successful operation of an SBR is largely dependent upon an excellent and correctly designed effluent decanter. If this is too small or has undersized weir lengths for the effluent withdrawal batch, then settled solids will be drawn up from the base of the tank a pass out with the effluent causing a breach in the effluent quality.

Further, the decanter must have suitable scum baffles to prevent surface scums form destroying the effluent quality.

All of this is a moving variable depth decanter coupled with complicated process phasing are the challenges Eflo have overcome in the SBR designs.

The EfloSBR is excellent for fitting into spare tanks to increase works capacity.

**Eflo International Ltd**, the UK designer and of wastewater treatment technologies, offer innovative treatment solutions.

Eflo has designed & installed treatment plants in the Middle East, Africa, Caribbean the Indian Ocean islands over a period of more than 30 years.

As well as the **EfloSBR**, Eflo offers a range of other waste water treatment products for both sewage, industrial waste water & water re-use.

Eflo is part of the Concorde Corodex Group of companies and through this group can offer bespoke potable water treatment systems including River Water Treatment and Seawater Reverse Osmosis. Water treatment plants for small communities to large towns.

EFLO Products :

**EfloCT** Extended Aeration

**EfloSAF** Submerged Aerated Filter

**EfloSBR** Sequential Batch Reactor

**EfloMBR** Membrane Bio-Reactor

**EfloDAF** Dissolved Air Floatation

**EfloSEP** Oil Water Separator

**EfloGREY** Grey Water Re cycling



Typical Fine Bubble Aeration System

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