



**AKVA-TEK SDN BHD** (9606-H)

**OUR COMMITMENT TOWARDS  
PROTECTION OF THE ENVIRONMENT**

# **Polishing Plant**

for BOD reduction on  
Palm Oil Mill Effluents & Wastewater

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## **INNOVATIVE TECHNOLOGY FOR POLISHING: COMBINATION OF OZONE & SUBMERGED FIXED FILM BIOLOGICAL PROCESS**

### The objective:

To treat the algae- and aerobic-pond discharge water to a level below **20ppm Biochemical Oxygen Demand (BOD<sub>3</sub>)** limit safely, controlled and consistently.

### The company behind:

**Akva-Tek Sdn Bhd** is a Malaysian, private joint-venture (JV) company between **Hooker Chemical Sdn Bhd** (HCSB), Malaysia and **BIO-AQUA as**, Denmark.

HCSB has been primarily involved in industrial wastewater treatment offering complete turnkey waste water treatment plants since 1989 and is a wholly owned subsidiary of Brite-Tech Bhd listed on ACE Market of Bursa Malaysia. BIO-AQUA has been involved in ozone technology for years especially in the aquaculture and agriculture, in particular animal manure in waste water in Denmark.

Danida, via Partnership Facility Program(Danish Government) has supported the JV and set-up of a demo polishing plant in Jugra palm oil mill, Banting, Malaysia .

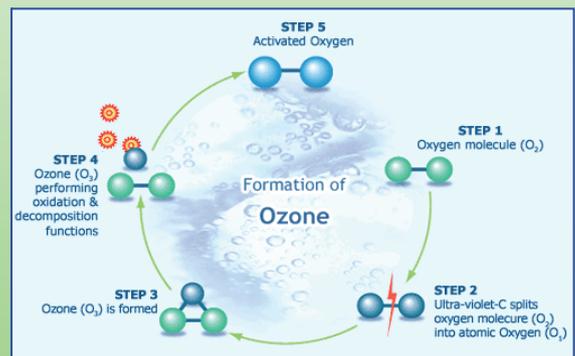
### The technology:

#### Why Ozone?

One of the features of using ozone is, that it can oxidise otherwise non-biodegradable or difficult biodegradable into biodegradable organic substances. By this treatment, the by-products from the ozone-treatment becomes easier biodegradable organic substances plus oxygen. This means, that the BOD actually increases during the ozonation and the color is reduced.

#### Ozone system

Ozone (O<sub>3</sub>), the three atom form of oxygen is a naturally occurring compound in the earth's atmosphere. The life cycle of ozone is generation(high voltage-electricity + oxygen)→ oxidation→ return to oxygen. Ozone is one of the strongest oxidants commercially available for waste water oxidation process. Systems capacity available up to 1000gr/hr per unit with air or water cooling feature.



### Why fixed film aeration?

After the ozone-treatment, the water is released into a submerged Fixed Film biological reactor, where the BOD is reduced by bacterial decomposition. The biological reactor has several sections, where the BOD is treated and decreases, as the water flows through the sections. If the water after first section has too high BOD<sub>3</sub>, the lower section water will be re-ozonated and recirculated once more in to the first section. After the water has flowed through the last section of the biological reactor, sludge is collected by gravitation, and the water is pumped into a sand and carbon filtration system which removes particles, including small particles of sludge and trace organic matter from the bio-reactor.



### Submerged Fixed Film Biological Process

The bio-media is constructed as square blocks consisting of Polyethylene Net tubes that are welded together. The special rough surface makes quick accumulation of the bacteria (bio-film) possible. Furthermore, with round or oval threads, a growth on the threads will increase the diameter and thus increase the active surface. The product is available in 100m<sup>2</sup>, 150m<sup>2</sup> and 300m<sup>2</sup>/m<sup>3</sup> to be used in all kinds of biological wastewater treatment.

The fixed film media makes the filter adaptable to variations of the incoming BOD-loading, and it also give a significant sludge reductions (>50%).

A polymer/DAF system is installed to reduce incoming suspended solids to the system.

Air Dissolving Pump (ADP) is a pump used in Dissolved Air Flootation process (DAF), that eliminates the need for the ancillary components required in the conventional DAF system. This pump eliminates the need for a saturation tank, air compressor and air control panel. The system provides quick, simple installation and energy saving in DAF system for solid removal. The pump flow capacity is available up to 60m<sup>3</sup> per hour.

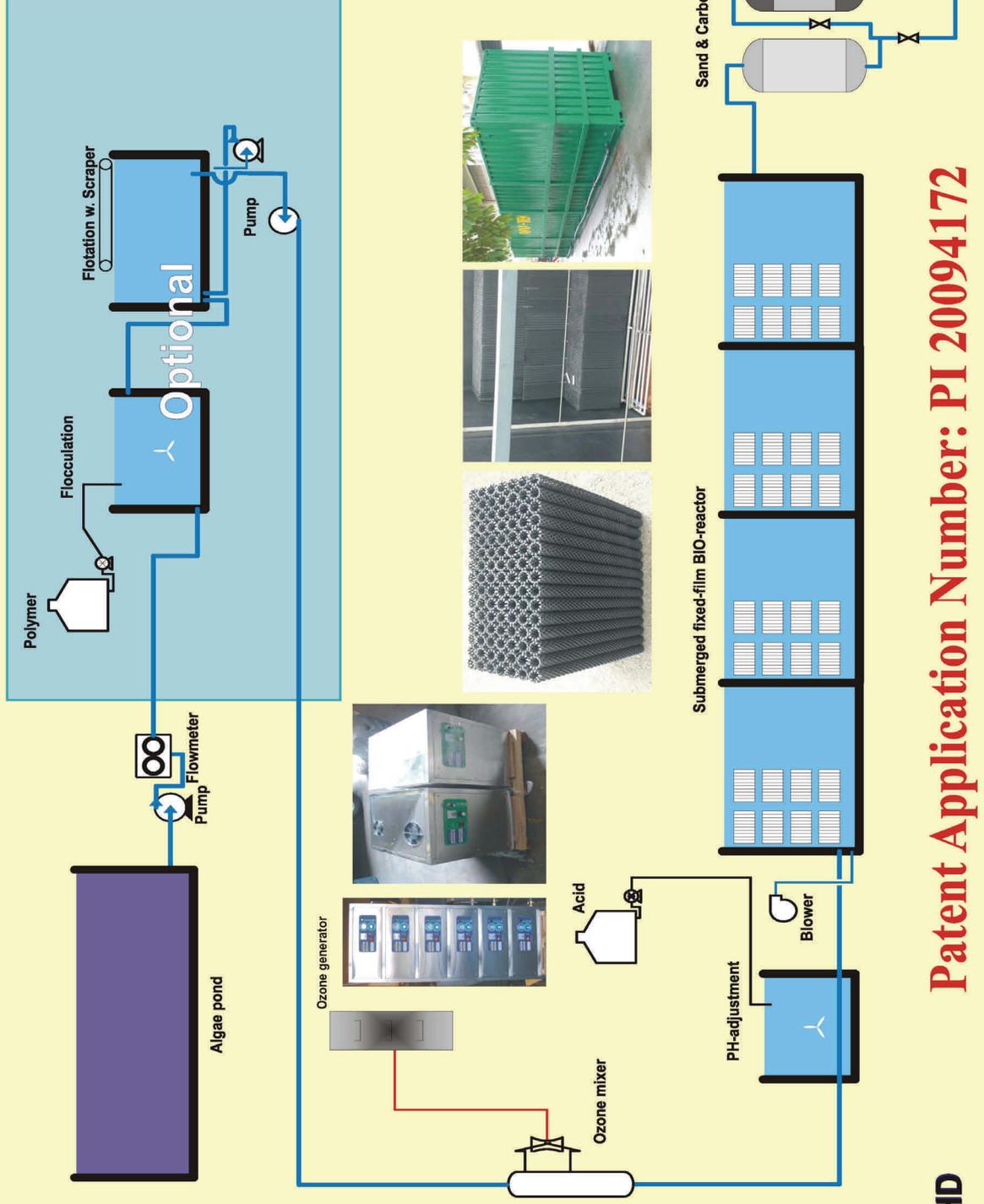


The combination of Ozone treatment process as a POME polishing plant, has been tested in operation for more than 9 months using the pilot R&D polishing plant, and results have shown to be able to treat the POME from the algae or aerobic pond discharge water to achieve the 20ppm BOD<sub>3</sub> limit.

Subsequently, Akva-Tek Sdn Bhd has submitted a Patent application (**Patent Application number: PI20094172**)

The principal process flow diagram shows the process equipment as detailed in the following page.

# 20ppm BOD<sub>3</sub> POME TREATMENT FLOW DIAGRAM- DANIDA PARTNERSHIP FACILITY PROGRAM (PFP)



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