



Waste Decanter Module For Palm Oil Mill Effluent (POME)

The solution to a cleaner environment.



Effluent From Palm Oil Mills

The main source of raw effluents from the palm oil mills are water used for dilution and water from the fruits itself. It is estimated that 0.65 tonnes of raw POME is produced for every ton of fresh fruit bunches (FFB).

Generally, all the palm oil mills' effluent treatment system adopt the two stage biological process of anaerobic digestion followed by extended aeration. Anaerobic process gives excellent pollutant destruction of up to 90% efficiency while the extended aeration ensures that the final pollutant meets the discharge limits stipulated by the Department of Environment.

In the anaerobic process, the micro-organism breaks-down biodegradable material in the absence of oxygen. In the course of this biological process, methane, carbon dioxide and digested solids are formed. The CH₄ and CO₂ will be released as gases while the digested solids are retained in the anaerobic ponds. After a period of time, the solids will silt up the ponds and reduce its hydraulic retention capacity. The efficiency of the anaerobic ponds will drastically be reduced and the aerobic ponds will not be able to cope and achieve the discharge criterias.

Alfa Laval's Modular De-sludging System

Alfa Laval has designed a de-sludging system for the anaerobic ponds that is compact and highly efficient. It is in a modular form to be installed close to the effluent ponds and can be operated with minimal supervision.

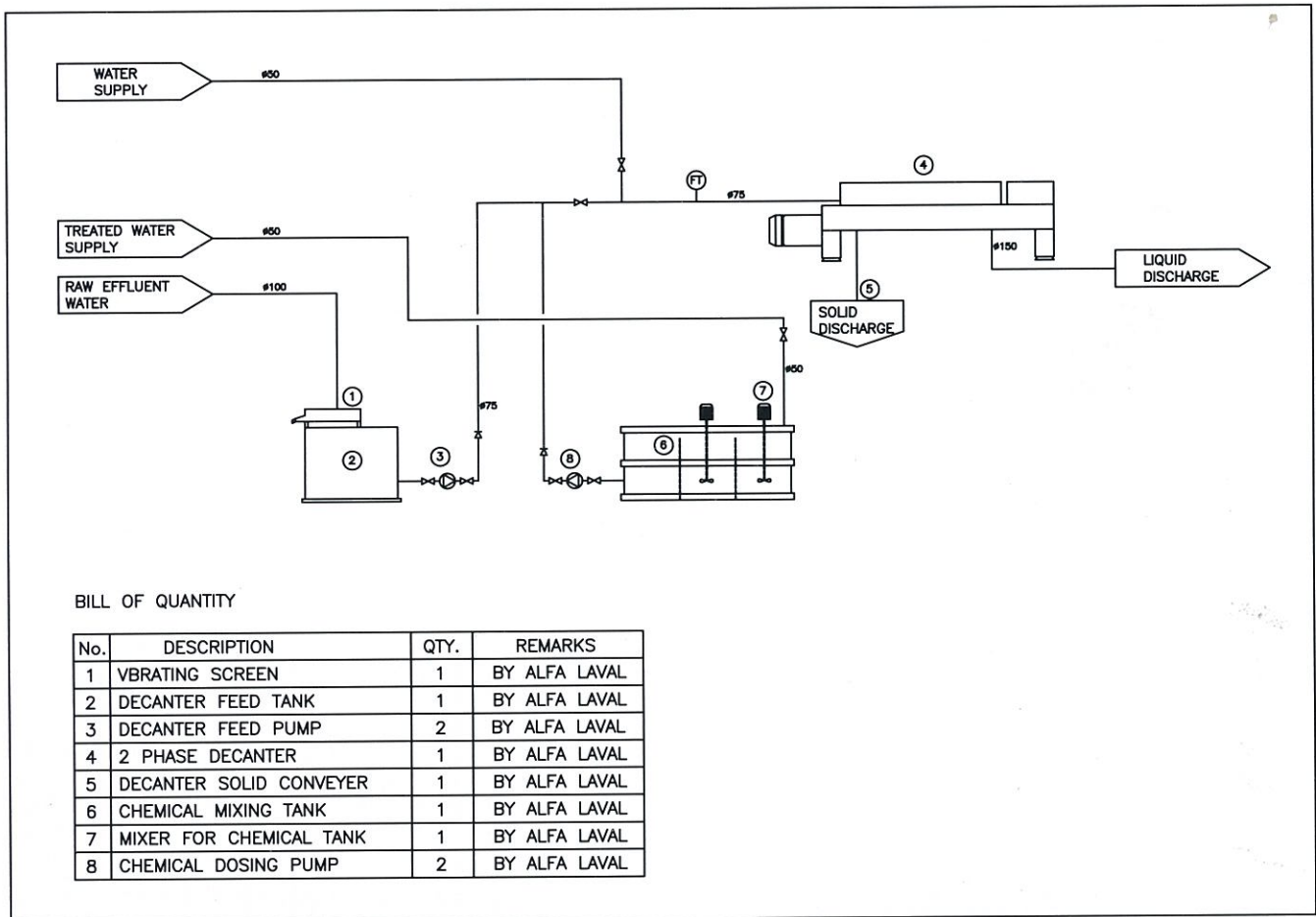
System Description

Effluent is drawn from the ponds using a submersible pump mounted on top of a pontoon. The pump and pontoon can be moved around for de-sludging from one pond to another.

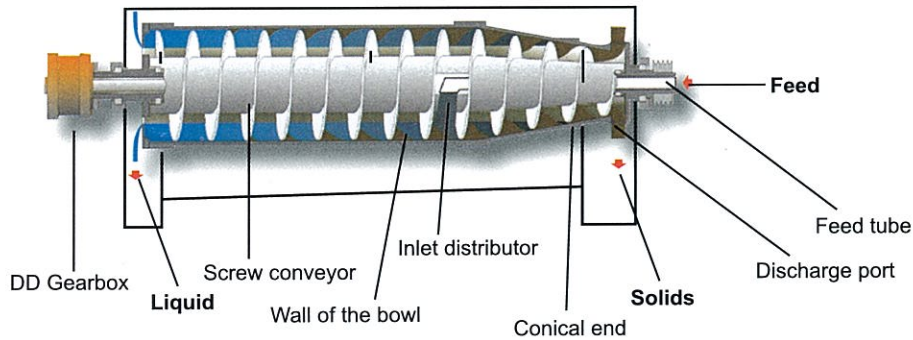
The chemical dosing unit consists of chemical preparation tanks, mixers, dosing pumps and flow metering devices.

When the effluent is pumped into the decanter, there shall be in-line polymer dosing to systematically inject chemical to the effluent to assist in the flocculation of the solids.

The decanter shall be two-phase, one phase being the solids/cake and the other a clarified liquid. The solids will drop into a conveyor that will scroll it out into a waiting hopper or collecting pit. The clarified liquid will be sent back to the effluent pond or into a separate aerobic tank for further BOD removal.



Schematic Layout of the Waste Decanter System



Sectional view of decanter

Working Principal of the Decanter

The heart of the complete de-sludging system is the ALDEC G2 decanter.

Separation takes place in a horizontal cylindrical bowl equipped with a screw conveyor. The feed enters the bowl through a stationary inlet tube and is accelerated smoothly by an inlet rotor. Centrifugal forces cause sedimentation of the solids on the wall of the bowl. The conveyor rotates in the same direction as the bowl, but at a differential speed, thus moving the solids towards the conical end of the bowl.

Process Optimization

The ALDEC G2 decanter centrifuge can be adjusted to suit specific requirements by varying

- the bowl speed to ensure the exact G force required for the most efficient separation
- the conveying speed for the best possible balance between liquid clarity and solids dryness
- the pond depth in the bowl for the best possible balance between liquid clarity and solids dryness



Decanter modular system installed for POME

Alfa Laval's Waste Decanter System

The Alfa Laval's desludging system is designed for fast and ease of installation. The complete system is mounted on a skid (2.35m width x 7.6m length x 3.3m high) and can easily be located next to the effluent ponds. The main components on the skids are;

- ALDEC G2 Decanter
- Polymer Dosing System c/w mixers and polymer make-up tanks
- Cake Conveyor
- Feed pumps
- Chemical Dosing Pumps
- Central Control Panel

Capacity

The waste decanter system will be supplied in 2 different capacities, mounted on the same platform.

- ALDEC G2 - 45 - 15 m³/hr of sludge
- ALDEC G2 - 75 - 25 m³/hr of sludge

Performance

Feed Conditions

- Solids Content: max. 3% to sample

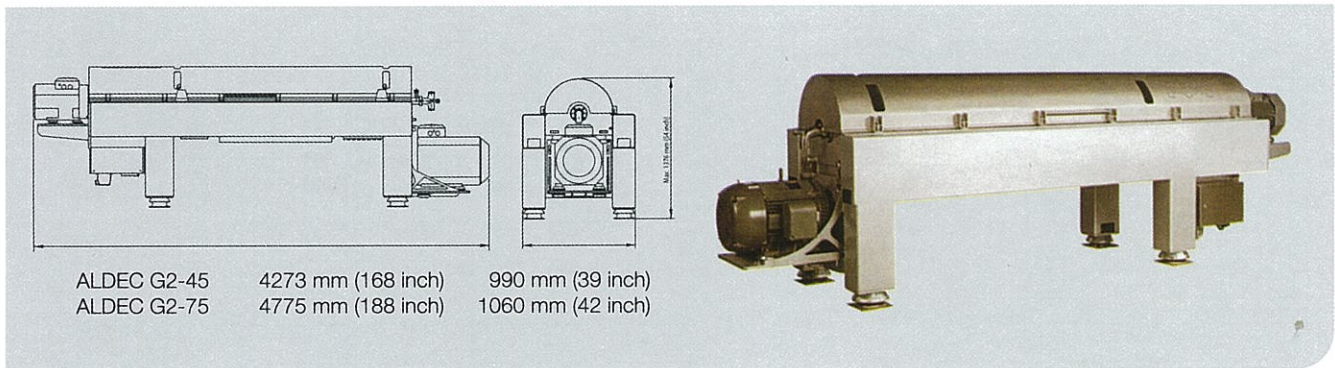
Solid Output

- The solid from the decanter is expected to have a moisture content of between 75-78%.
The quantity of solid is expected to be 10% (wet) of the feed capacity. This means that there will be a recovery of 100kg of wet solids for every tonne of effluent feed into the decanter.

Liquid Output

- The separation efficiency of the decanter is proportional to the amount of dosing chemical used. Higher quantity of chemical used will lead to higher solid recovery and a more clarified liquid phase. It is possible to recover up to 90% of the total solid present in the feed depending on the quantity of chemical used.

Dimensions



Technical Data

Designation	Max. Weight kg (lbs)	Bowl Material	Other product and liquid wetted parts	Typical Main drive Size kW (HP)	Typical Back drive Size kW (HP)	Back drive control
ALDEC G2-45	2300 (5071)	duplex stainless steel	AISI 316	11-37 (15-50)	5.5/11 (7.5/15)	VFD
ALDEC G2-75	3560 (7849)	duplex stainless steel	AISI 316	18.5-55 (25-75)	7.5/15 (10/20)	VFD