



Esso Hong Kong Tsing Yi Oil Terminal Using Dunwell Chemical & Physical Wastewater Treatment System



Introduction

Dunwell Chemical & Physical Wastewater Treatment system has produced high quality effluent since 1995 with 95 – 99% removal of COD, Suspended Solids and Oil & Grease while treating maximum daily flow of 80 -100 metric tons of oily wastewater.

The state-of-art Dunwell system consists of the chemical and physical processes. The chemical process including chemicals dosing and mixing is used to solidify the emulsified oil and other COD contaminants inside the wastewater. The solids will be removed by an Induced Air Flotation unit which generates enormous tiny bubbles from its tank bottom while the wastewater enters the unit. The bubbles will lift the solids to the water surface, and a mechanical wiper will remove the solids from the wastewater and transfer to a sludge holding for dewatering.

Treatment Process

The whole treatment process will be mainly divided into four (4) parts :

- a) Separation of free oil & Pre-filtration of solids
- b) Emulsion breaking
- c) Solid Liquid Separation
- d) Polishing for discharge



a) Separation of free oil & Pre-filtration of solids

When the oily wastewater from the tank farm of Esso Tsing Yi Oil Terminal enters the reception tank and accumulates to the top water level, a wastewater transfer pump will start to transfer the oily wastewater to an above ground oil/ Water separator for removing maximum 90% of free oil from the wastewater. The free oil will be pumped to a waste oil storage tank for storage, and it will be picked up by the licensed contractor for recycling. Since the wastewater still contains a lot of emulsified oil, the effluent from the oil/ Water separator cannot be discharged directly.

b) Emulsion breaking

After the free oil is separated from the wastewater by the above ground oil/ Water separator, the emulsified wastewater will be transferred into the static mixers where dosing of filtering aids, polymer, caustic and coagulant will be controlled by batch controllers. The mixing of the chemicals will be done by static mixers. After the static mixers, the flocs and the clear water will be carried away to an IAF (Induced Air Flotation unit) for solid liquid separation.

c) Solid Liquid Separation

The induced air flotation unit is the simple and highly removal solids from wastewater. The system will generate enormous tiny air bubbles to lift the flocs to the surface of water. A mechanical wiper will remove the flocs from the water when the flocs float to the surface water. The flocs will be removed by a wiper and an auger from the IAF unit and will be transferred to a filter press for dewatering. The treated effluent from the IAF unit will be transferred to a clarified water holding tank.

d) Polishing for discharge

In order to ensure that the discharge from the wastewater treatment system can meet the discharge standards, a carbon filter will be used for polishing the effluent from IAF. Since the surface of activated carbon contains lots of tiny pores which can help trapping the rest COD contaminants, the treated effluent from carbon filter can meet the Hong Kong EPD's standard discharge



Treatment Quality

Influent Flow rate: 10m³/ hr. (max.)

Operation Hours: 8 - 10 hrs. / day

Sludge cake dryness % : > 30%

Space requirements: 3 m(W) x 6 m(L)

Parameters	Influent	Effluent
pH	5.0 - 7.0	6.0-9.0
COD, ppm	< 3,000	< 80
TSS, ppm	< 300	< 30
Oil & Grease, ppm	< 100	< 10