

**Operation and Maintenance Manual of Deodorization Units of Sewage Pumping Station No. 3
at Pak Shek Kok**

*Ventilation
equipment*

- A (1) The ventilation system for the sewage pumping station comprises fans, ducting, air inlet louvers, grilles, dampers, etc. generally as shown on the Drawings.

- (2) Operation Criteria

All compartment of the pumping station shall be mechanically ventilated by an independent system of the following design criteria.

- (a) Transformer Room - Industrial Type propeller Exhaust Fan with G.I, with fresh air intake from external wall louver.
- (b) Pump Chamber / Dry Well - Industrial Type Axial fan with stainless steel grade 316 ductwork to provide up to 20 air change fresh air supply rate per hour, or the air quantity required to extract the heat generated by the sewage pumps when operated at full load at a maximum room temperature of 38°C. Two roof extraction fans of 110% fresh air supply rate which interlocked with the supply air fan shall be installed on roof.
- (c) Screening Chamber - Industrial type GRP dual speed Centrifugal Fan with stainless steel grade 316 ductwork and deodouriser to provide up to 10 air change extraction rate per hour in the screening chamber compartment when the fan is run at low speed. A dual speed industrial type fresh air supply axial fan of 80% extraction rate which interlocked with the deodouriser shall also be provided.

- (d) Equalization Tank - Industrial Type dual speed GRP Centrifugal Fan with stainless steel grade 316 ductwork and deodouriser to provide up to 2 air change rate per hour when the tank is half full or double the total ejector aeration rate, whichever is greater, when the fan is run at low speed. Fresh air will be taken from the stainless steel air duct extended to roof level fitted with intake bird guard.
- (e) Toilet - Extraction fan is able to provide up to 15 air change rate per hour.
- (f) Store room - Industrial Type Propeller Exhaust Fan to provide up to 5 air change rate per hour.

All fresh air intake louver shall be fitted with 12mm woven mesh detachable stainless steel rat guard.

(3) Fans

- (a) The fan motor shall have a minimum degree of enclosure protection to IP 55 and cooling to IC 041 to BS 4999. It shall be protected for location and operation in a dust laden atmosphere with 98% relative humidity for all applications, and shall be flameproof when conveying inflammable foul air.
- (b) Fan bearings shall have facilities for greases lubrication through the casing.
- (c) Fans shall be sized with due regard to all system pressure losses and for the output to be increased by 20 per cent adjustment.
- (d) The fan speed shall not exceed 1000 rpm.
- (e) Fan and duct systems shall be acoustically insulated where necessary to ensure that noise levels with all the fans running at full speed does not exceed the noise limit set under the Noise Control Ordinance.

TP 31/99
Specification for the operation and maintenance of
deodorization units of Sewage Pumping Station No. 3 at Pak
Shek Kok

Advance Engineering Infrastructure
Works for Pak Shek Kok Development

*Exhaust air
treatment system*

- B
- (1) Two (2) sets of deodourising system are installed. Each deodourising system shall include one (1) number of deodouriser complete with one (1) number of mist eliminator one (1) number of centrifugal fan, volume control dampers, stainless steel duct works, discharge hood and one (1) set of hydrogen sulphide detection system.
 - (2) The deodourising systems shall be designed to extract foul air from the equalization tank and screening chamber at an air flow rate not less the flow rate as specified in Clause A2, deodourise the foul air by passing through an activated carbon filter bed and discharge the deodourised air to atmosphere.
 - (3) The deodourising system shall be able to continuously handle an air flow as specified with hydrogen sulphide concentration of 5ppm. The removal efficiency of the deodourising system for hydrogen sulphide shall not be less than 99.5% at the specified air flow with hydrogen sulphide concentration of 5ppm. For any inlet gas concentration below the specified air flow, the hydrogen sulphide concentration of the deodourised air discharged from the system shall not exceed 0.025ppm.
 - (4) Deodouriser (Activated Carbon Filter)
 - (a) The deodouriser shall use activated carbon as filter media to treat the extracted foul air.
 - (5) Hydrogen Sulphide Detection System

The hydrogen sulphide concentration of the foul air and the deodourised air shall be monitored by the hydrogen sulphide detection system. The system shall be able to determine the hydrogen sulphide concentration in the range from 0.5ppm to 20ppm and give a visual indication of the concentration.
 - (6) Control and Alarm
 - (a) General Operation
 - (i) The deodourisation system shall be running continuously at low speed in normal operation and able to manually select to high speed more if required.
 - (ii) A selector shall be provided on the control panel for low/high speed selections.

(b) Manual Control

- (1) Under "Manual-remote" control mode, the deodourisation system shall be controlled by the "Start/Stop" push buttons on the control panel.
- (2) Under "Manual-local" control mode, the deodourisation system shall be controlled by the "Start/Emergency Stop" push buttons installed adjacent to the system, on a suitable rigid steel framework solidly anchored to the concrete foundation, or at locations as approved by the Engineer.

- End -