

CASE STUDY

Sam Shing Sewage Pumping Station, Hong Kong
Air Purification - High Density Scrubber System - H.D.S.



Sewage Odor Control System for Pumping Station

In Hong Kong, land comes at a premium. Placing sewage pumping stations in the city or at the outer regions becomes a major engineering task, as very expensive housing complexes or commercial buildings share the same property line as sewage pumping stations.

The Sam Shing Sewage Pumping Station incorporated an open wet well and dry well. The cause of odor is H₂S (hydrogen sulfide) that could potentially escape from the station and create major nuisance problems to the surrounding area. Wet wells, if not ventilated, can potentially be extremely hazardous areas for operations personnel. H₂S levels can easily reach 50 to 100 ppm if no ventilation is used to remove gas generation caused by sewage flow. Therefore, the requirement was twofold, providing neighbors with an odorless environment, and providing pumping station operators with ventilation to keep the inside hydrogen sulphide steady state concentrations below toxic levels when the wells are serviced for maintenance.

Inorganic gases produced from domestic waste-water decomposition commonly include hydrogen sulphide as mentioned, but also include ammonia, carbon dioxide, mercaptans and methane. The perceived gas levels were to be low enough that even hypersensitive people would not detect the odor. The system design required 99.5% removal efficiency for all potential malodorous gas generation.



Pumping station located in city center

Gas Phase Filtration: The Solution to Sewage Odor Control

Dry granular gas phase filtration is the technology used to remove malodorous gas from the internal wet or dry well. The contaminants are controlled via a chemical reaction that occurs with the potassium hydroxide to chemically destroy the malodorous gases.

The extraction flow rate was designed at 15 air changes per hour. The system design was based on 3950 CFM with 3,800 lb. of MM-9000 chemical media. The chemical media quantity will provide the customer with a minimum of one year operating life at 3 ppm H₂S challenge. The system's total mass transfer zone is designed to handle a peak of up to 10,000 ppm.

Pumping station mechanical unit location



Total Air Treatment - The Solution to Environmental Air Quality Control

The system design incorporated both dehumidification and odor control. The dehumidification system was used to reduce the 100% RH air flow to 80% RH, whenever required. This assured the highest potential capacity for chemical media life.

The dehumidification process was handled by an in-line direct expansion refrigeration system. The refrigeration condenser heat rejection is used for air reheat to maintain the relative humidity to the preset level.

The odor control system is a vertical counter flow design manufactured of fiberglass reinforced plastic (FRP). The unit is complete with prefilters, after-filters and extraction fan. The prefilters consist of a stainless steel mesh to remove any particulates that may enter the chemical filtration section. The prefilter can also be used to remove water droplets should the dehumidification system be shut down.

After-filters are used to control carbon dusting that could be exhausted during media service, or attrition caused by air flow across the media.

The extraction fan is manufactured of FRP and designed to handle the total static pressure drop of the ductwork and system.

Each unit is designed with sample ports for chemical media monitoring and hydrogen sulphide analysis.

Tech-Chek™ Service for Maintenance Monitoring

The maintenance of the odor control unit has also been simplified with the Tech-Chek™ Service supplied by Circul-Aire. With this exclusive service, media samples are tested in order to verify consumption rates. This lifetime service is monitored by a computerized program from Circul-Aire that indicates the appropriate schedule for media replacement. The laboratory analysis, supplied at no additional charge, not only provides a precise maintenance schedule, but also ensures the highest performance of the odor control unit installed at the Sam Shing Sewage Pumping Station.



Circul-Aire Model: HDS-34C-919

FOR MORE INFORMATION ON A SPECIFIC APPLICATION, PLEASE CONTACT YOUR LOCAL REPRESENTATIVE OR CIRCUL-AIRE.

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