Orchard Environmental Systems

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04 / 10 / 2016

Appendix F2

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For the attention of Mulkh Mehta

Dear Sirs

Thank you for you correspondence concerning our proposed odour scrubbing system
May I confirm the following design criteria for our proposal 216604

(1) Stack height will be a minimum of 3.0mtr above the scrubber or the apex of the building whichever is the higher, the scrubber will be 9.0mtr high = stack height minimum of 12 mtr

(2) We recommend installing a galvanised steel platform, with safety rail and kick plate, accessed by a ladder with safety hoops,
This will allow the safe access to the monitoring point, installed in the stack approximately 1.0mtr above the branch from the fan into the stack,
This platform is usually about 4.0mtr high

(3) The stack discharge air speed will be designed at 10 - 12mtr per second, with an accelerator cone up to 13 – 15mtr per second, this to push the scrubbed air up into the atmosphere for dispersal
8mtr per second is minimum required from food outlets, kitchens etc
We recommend the air speed of the duct runs will be 13 – 15mtr per second to prevent build up of particles etc in the duct,

(4) Our scrubbing unit will be designed as follows:

Five Stage Odour Scrubbing Unit

The Odour Scrubber is designed to neutralise the odours and any remaining solids from the gas stream and operates in five stages.

Stage 1 & 2

The first stage is the scrubber tower, where the gas stream is met by an opposing stream of neutralising reagent, which falls from 2 banks of spray nozzles at the top and the middle section off the scrubber. The sections below the spray nozzles is packed with the "Pall Rings", which are designed to give a maximum surface area of contact between the
neutralising reagent and the gas stream to ensure the maximum neutralising effect
then, to a reagent tank at the foot of the scrubber from where it is re-circulated to the spray nozzles by the pumps.

The spray nozzles are designed and arranged to give a uniform spray over the complete cross section of the Scrubber.

The two re-circulation pumps are a single stage vertical shaft configuration, allowing the pumps to be completely submerged in the reagent while the motor is above the tank and away from the reagent. This configuration allows all suction pipe work to be internal within the reagent tank. The pump body and internals are all constructed from corrosion resistant materials. A pressure switch will sound an alarm if the water pressure fails (pump stops running) in normal operation.

The Scrubber will be constructed from polypropylene sheet, formed and fusion welded, then reinforced with GRP all designed and constructed in accordance with BS EN 131 21 The reagent tank is of similar construction an will also have stiffeners around the body. The scrubber tower shell will extend through to the floor of the reagent tank for additional strength.

The three remaining scrubber stages are all necessary to remove from the gas stream the moisture droplets formed in the scrubbing process.

Stage 3

The third stage is a 150 mm thick woven polypropylene filament pad, situated above the spray nozzles, and is designed to remove the largest moisture droplets from the gas stream, turning them back to fall down the scrubber with the rest of the reagent.

Stage 4

The forth stage comprises 2 banks of specially designed droplet eliminator blades, in series. These will remove moisture droplets down to 12 micron.
The eliminator blades have a scientifically designed aerodynamic profile which forces the moisture droplets sideways into an integral drainage channel. At the foot of the eliminator blades the droplets collect in a small sump, which in turn drains back to the reagent tank at the foot of the scrubber.

Stage 5

The fifth and final stage of the scrubber is a finely woven polypropylene filament pad, situated immediately after the eliminator blades at the foot of the filament pad the droplets collect in a small sump, in common with stage 4. this to remove the finer droplets down to 5 micron.

Dosing
To supply an automatic reagent dosing system and instrumentation,
Excluding chemicals.

Chemicals required
1 off IBC Sodium Hypochlorite
1 off IBC Sodium Hydroxide

(5) The scrubber and dosing system will include a control panel

The control system above would control one fan, via an inverter to allow easy start and complete speed control,
The panel will also control two reagent pumps and two dosing pumps.
The level relay would inhibit the reagent pumps and dosing pumps.
The reagent pumps would start up first then the fan would run.
Once the fan is running the dosing pumps would operate as needed by the pH and Redox levels.
The dosing pump 4-20 mA signal will feed straight to the indicators on the panel door, to indicate the stroke length.
Remote Monitoring.
The remote monitoring and GSM unit will send out SMS messages when an alarm is generated to the unit, such as pump/fan fault. Also the pH and Redox levels will be fed to the unit and will be able to see in real time the actual pH and Redox levels.
Please note that the end user will need to supply a machine to machine SIM card so that the SIM remains active with little use, domestic SIM cards expire if they are not used within a certain time.
The remote monitoring unit has built in, one user account that will send text alerts to only one mobile number. If multiple users/mobile numbers are required a yearly subscription of £48.00 is needed to text multiple people,
The set up fee for the sim card and first years subscription will be part of the package, then passed on to the purchaser after that.

A local alarm sound and light will also sound if power to the fan or pumps fail,
Please see attached panel front drawing attached,

(6) The scrubber will remove 99% of sulphur dioxide and other odours,

We have presumed that we are extracting from 4 off process rooms (these are essential) with an option on the 5th
(1) Kill room
(2) Scald room
(3) EV room
(4) Offal room

(5) Lairage – can create a large odour problem and due to the movement of traffic, is open most of the time,

We recommend all these rooms abated via the scrubber,

We also recommend a minimum of 4 changes an hour, with fully adjustable dampers in the duct above each inlet, (not louvres)

Our Odour scrubbers can be designed up to 50,000 ^{3}mtr/hr
If a higher extraction rate is required we recommend going to two scrubbers

I trust the foregoing meets with your approval, should you wish for more information please do not hesitate to contact me,

Kind regards

Ray Smith

For Orchard Environmental Systems