

1. Pre-Start Checks

Pre start checks must be completed prior to the commencement of any air testing and shall include:

- Verification that all pipe, diffuser and floor fixing connections are tightened correctly
- Verification that all diffuser pipework is installed within level to +/- 25mm across the tank floor.
- Verification that the air delivery control system has been set appropriately to ensure no more than the maximum designed air flow volume can be supplied to the system causing damage to the diffuser membranes.
- Verification all isolation and control valves are operable and in their correct position for system operation.
- Document confirmation of all checks being satisfactorily completed on the project inspection and test documentation.

Bubble Testing

Bubble testing is completed to identify any system leaks and verify consistent air delivery to all diffusers. Bubble testing shall be completed to the following methodology:

- Submerge the diffusers with process water to 500mm above the top of the diffuser bodies.
- Apply air to the diffusers at a rate of 20% of the maximum designed air flow capacity.
- Inspect the bubble pattern produced to verify there are no signs of deformed bubbling in any areas of the tank. The appearance of any large deformed bubbling indicates leaks on pipe or diffuser connections. The bubble pattern should be reasonably even and continuous across the tank floor.
- Once it is confirmed by visual inspection there are no leaks, increase the air flow to 50% maximum capacity and commence filling of the tank with process water. Confirm the measured air flow volume being applied to the system correlates with the design air flow and document results on the Project installation inspection and test sheet.

Preliminary System Operation

- When the tank has been filled to the Bottom Water Level mark for normal process operation, increase the air flow to 75% of maximum capacity, and then to 100% once the process tanks Top Water Level is attained.
- Confirm the measured air flow volume and back pressure at 100% operational capacity correlates with the design capacities, and document the results achieved on the project installation inspection and test sheet.
- Monitor the measured oxygen transfer rate against process operational set points for achieving the maximum process oxygen levels required in the tank.
- Operate the system at 100% capacity continuously for 48 hours prior to completing Oxygen transfer testing or commencing intermittent operations. This is to ensure the diffuser membranes have been appropriately "Run In" and operating at design capacity.

Oxygen Transfer Efficiency Testing

O₂-Ecoflex membrane tubular diffusers shall be executed in accordance with the Project specifications referenced against national or international standards (e.g. ATV-guide-lines). Testing may be undertaken in potable or process waste water. The timing for testing commencement should be following the first 48hrs of operation as the diffuser membranes stretch to attain their optimum operating characteristics, with test water temperature to be in excess of 10degC.

Monitoring timing for attaining the maximum oxygen level set point within the tank upon commencement of air delivery at the optimum design air flow rate is a useful indicator of transfer efficiency as it correlates to the required treatment process.

Operation

O₂-Ecoflex membrane tubular diffusers can be operated continuously or intermittently. If not utilised for periods of 12 hours or more, it is recommended initial start-up is programmed at the maximum design air flow rate to eliminate membrane fouling due to sediment settling.

When the installation is operated for extended periods at low air flow rates, it is recommended increasing the air flow periodically to maximum design levels and sustaining this regime within process operational requirements. On-going visual checks of surface bubble patterns and the monitoring and recording of back pressure losses across the installation should be completed regularly to a confirmed schedule.

Maintenance

If operated to manufacturer design specifications, Diffuser Membrane life should be typically 6-8 years. O₂-Ecoflex Membranes can be cleaned if heavy fouling is suspected utilising a soft bristled brush and water. The manufacturer should be consulted on the best methods including utilisation of any chemicals prior to undertaking any membrane cleaning activities.