



*"We've been able to develop a highly effective waste water treatment system which has all the benefits of oxygenation, but none of the inconvenience of gas storage and delivery and at operating efficiencies normally associated with conventional air based systems."*

# ***The Halia<sup>®</sup> Modular Aeration System***

*for effective treatment of waste water*

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## Introduction

At Air Products we understand the pressure companies are under to meet environmental legislation relating to waste water treatment. It is widely recognised that the oxygenation process is one of the most effective for treating aqueous waste, but for some companies, the costs of supplying oxygen on-site can be prohibitive. That's why we've developed the Halia Modular Aeration System, based on VSA technology capable of providing your oxygen requirements from 5000 kg/day.

## How does it work?

The Halia Modular Aeration System comprises a Vacuum Swing Adsorption oxygen generator (the VSA) integrated with a low energy mixer/oxygenator.

The mixer is mast-mounted allowing easy installation and access. The VSA is based upon robust rotary-lobe blower technology. Together they form a novel, efficient, yet easily maintained package capable of delivering dissolved oxygen to any wastewater basin or oxidation vessel.

The VSA works by passing a stream of air onto a molecular sieve bed. As air passes through the bed, nitrogen is adsorbed leaving high purity oxygen, which feeds forward into the buffer tank. Once the bed is saturated a vacuum is pulled on the bed, which causes the nitrogen to be de-adsorbed and vented. A final backwash of oxygen flushes out the last of the nitrogen and leaves the bed clean to begin another cycle.



A typical stainless steel mixer oxygenator



Halia Modular Aeration System

## What does it mean to my process?

### Low emissions

Compared to air-based aeration with typical oxygen transfer efficiencies below 20%, the Halia Modular Aeration System reduces the volume of gas leaving the surface of the treatment basin by as much as 99%. This gives dramatic reduction in the levels of VOCs and odours originating from the basin.

### High shock load resistance

The high rates of biological treatment and rapid dissolution possible with oxygen generally give rise to higher levels of biomass solids (sludge) in a biological treatment basin. This gives the system resistance to shock loads that would typically cause process failure in an air dependent system.

### High efficiency

Specific oxygen transfer rates up to 2kg/kWh can be achieved under operating conditions in the basin environment. This is better than most air based technologies, for which high clean water test figures are usually quoted, but which operate at much reduced efficiency in dirty water and at normal effluent treatment temperatures.

### High treatment rates

Up to 10kg COD/m<sup>3</sup>/day can be achieved with oxygen-enhanced systems; the rest of the treatment system is usually the limiting factor. This allows simple and cost effective "turbo charging" of existing overloaded plants. New plants can be designed with a much smaller footprint, especially if advantage is taken of complimentary technology such as membrane solids separation.

### Easy installation

The VSA is designed to be part of the Air Products Halia Modular Aeration Systems philosophy with the VSA containerised for easy installation onto a prepared surface. The submerged mixer can be mounted onto a guide rail and installed without draining the aeration basin.

## Technical overview

### Mixer – Oxygenator

Depending on your aeration basin characteristics we will recommend the correct requirements for your process.

### T-Series VSA

<b>Oxygen Flow Rate</b>	From 5000 kg per day
<b>Purity</b>	Up to 93% oxygen purity
<b>Power Consumption</b>	Dependent on customer requirements
<b>Electrical Power</b>	Single 3ph 400 VAC power supply
<b>Turndown</b>	As required. Power will turn down with capacity

Please contact us for more information and for a specific process analysis.

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