

## **ColdOx™ offers important advantages over biofilters in reducing airborne emissions of VOCs and odor from industrial processes.**

ColdOx™ is an industrial VOC and odor emission reduction solution for customers within food, waste water and solid waste handling, biogas and other industrial processes. ColdOx™ oxidizes VOCs and eliminates odor through the use of high intensity UV, excess ozone, and photo chemical oxidation supported by special purpose catalysts. The ColdOx™ reactor can be delivered stand alone or with active carbon as a final polishing filter.

ColdOx™ offers several advantages over biofilters. The system is designed and dimensioned based on clear and well understood scientific principles, not on poorly understood and highly sensitive microbiology. This translates into predictable, stable and high cleaning performance.

In waste applications, ColdOx™ achieves on average 98.8% odor reduction within a performance range of 98.0-99.6%. Unlike ColdOx™, biofilters are affected by a range of variables such as pH, humidity and temperature and the microbiological activity may be poisoned by compounds in the process gas. Moreover, the biofilters media bed may not be homogenous (due to for example uneven size distribution of material or uneven irrigation) resulting in areas where the retention time is significantly shorter. As a result, performance is highly variable, ranging from negative (due to biofilters background odor) to in best case levels comparable to ColdOx™.

The biological interaction between contaminants and the biofilters media bed is highly complex and poorly understood. Maintenance strategies are largely based on trial and error and frequently fail to maintain optimal microbiological activity in the bed. This results in uneven performance and in worst case that the media needs to be replaced, a very costly operation.

Contrary to biofilters, where pressure drop and flow rates are highly sensitive to the porosity of the media (porosity declines towards end of media life), ColdOx™ pressure drop and flow rate remain constant. This means that adequate process ventilation can be maintained at all times.

ColdOx™ is very compact, using only a fraction of the footprint required for biofilters, freeing up valuable space. Heat recovery is frequently installed after ColdOx™. This is usually not possible with biofilters where the excess heat is needed to maintain the microbiological activity.



Figure 1: Typical ColdOx™ vs. biofilter footprint

## ColdOx™ versus Biofilters

	ColdOx™ <sup>1</sup>	Biofilters <sup>2</sup>
Example flow rate	Stable at 10 000 m <sup>3</sup> /h	Highly variable, 10 000 m <sup>3</sup> /h or significantly lower
Footprint	20 sqm	110 - 1280 <sup>3</sup> sqm
Odor reduction (average)	98,8%	68% <sup>4</sup>
Odor reduction (range)	98,0-99,6% <sup>5</sup>	Negative to 97,6%
Maintenance	Low	Poor understanding of how to maintain microbiological activity, very significant when replacing media
Pressure drop	< 750 Pa	Highly variable ranging from low to > 5 000 Pa <sup>6</sup>
Heat recovery	Yes, frequently installed	Excess heat needed to maintain microbiological activity
Water use	Low at 25 l/h	Usually significant in order to maintain optimal humidity
System sensitivity	Low – not based on organic processes	High – microbiology sensitive to pH, temperature, humidity and poisoning
Dimensioning and design reliability	High – design based on clear scientific principles	Low – trial and error as microbiology is sensitive and poorly understood
Performance reliability	High – limited and predictable performance variables gives predictable and stable performance	Low – difficult to control performance variables, bed not homogenous gives zones with low efficiency, < 50% efficiency on hydrophobic compounds, high performance variability

<sup>1</sup> Centriair reference installations on waste applications.

<sup>2</sup> SP Sveriges Tekniska Forskningsinstitut, 2013, Evaluations and Recommendations for Odor Control Equipment at Waste Water Refinery Plants and Waste Water Treatment Plants

<sup>3</sup> Range based on 18 facilities in Sweden (range from 40 to 463 s retention time)

<sup>4</sup> Average based on measurements from 18 facilities.

<sup>5</sup> All Centriair reference installations on waste applications.

<sup>6</sup> Highly sensitive to media porosity which gets reduced over time as media gets compacted.

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