

CATALYTIC COMBUSTION

www.CatalyticCombustion.com

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Rotary Concentrator Systems

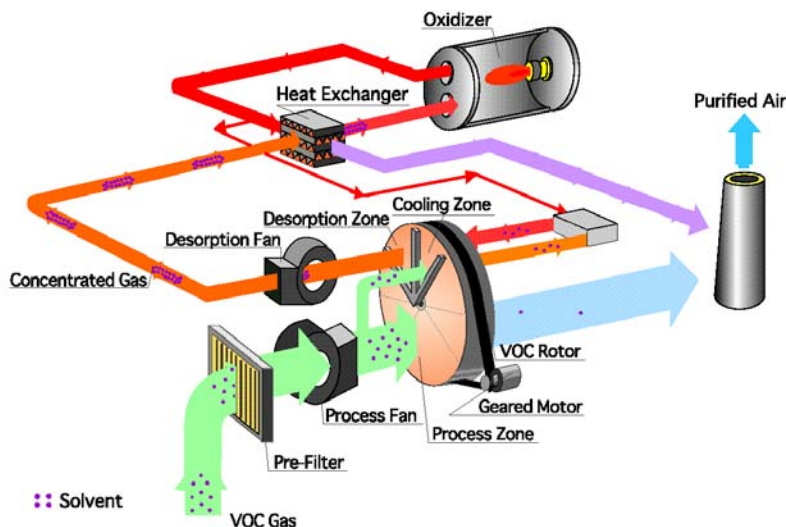
The **LOWEST COST** Technology

for controlling VOC emissions
from low concentration exhaust streams.

For a typical application, using a volatile organic compound (VOC) concentrator system will save on utility costs around \$10,000 per year for each 1000 standard cubic feet per minute (SCFM) of process flow. As an example, applying concentrator technology for VOC emission control on a 100,000 SCFM process fume stream could **save \$1,000,000** in annual utility expenses compared to other standard control technologies.

The operating costs of the system are lowered by concentrating the dilute VOCs in the exhaust stream into a lower volume fume stream to be processed by oxidation. The primary areas in which this reduces costs are:

1. A lower volume fume stream must be heated to the high temperatures required for oxidation significantly decreasing the overall thermal energy and, therefore, auxiliary fuel needed.
2. The VOCs in the fume stream are at a higher concentration. This correlates to the extra VOC heat of combustion energy released per volume of fume stream. This effect combined with the preceding makes it easier for the system to operate with little to no auxiliary fuel flow.
3. A majority of the exhaust stream must only pass through the relatively low flow resistance provided by the concentrator system versus the high flow resistance of typical oxidation heat recovery systems. This allows for savings in electrical utilities due to the smaller fans and motors needed to provide flow through the system.



2009 installation of a 40,000 SCFM Concentrator with RTO system with integrated building make up air heat recovery for a surface coating operation in North Dakota.



A Hybrid 22,000 SCFM Concentrator and 12,000 SCFM RTO System installed at a Michigan facility.



36,000 SCFM Concentrator with Catalytic Oxidizer system installed at an Oregon facility.

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Save Money while Saving the Environment

If considerable utility savings were always guaranteed and all exhaust streams containing VOCs could be properly treated by concentrator technology, all other technologies would be obsolete. Like all technologies, the money that is saved and the ability to properly treat emission problems is specific to the application. It's important to utilize the experience and expertise of a company like Catalytic Combustion Corporation (CCC) that understands the detailed limitations and how to maximize the benefits of concentrator technology. An evaluation is essential to ensure that the technology is properly applied and efficiently solves the emissions problems. An evaluation can also quantify the detailed cost savings as compared to other technologies. The following describes some of the general initial process conditions that can be assessed to determine the applicability of concentrator technology.

<p>Temperature</p>	<p>Since the concentrator uses the principle of chemical adsorption, the pollutants and the conditions of the inlet stream must meet the necessary adsorption conditions. This limits the practical use of concentrator technology to lower temperature process streams. When the process stream temperatures reach 120°F and above, the removal efficiency of some solvents can be negatively affected. Cooling the process stream can be used to expand the applicability of concentrator technology, but this adds additional costs which can decrease the advantages of a concentrating system.</p>
<p>Humidity</p>	<p>Hydrophobic manufactured zeolite adsorbents have been designed to minimize the effects of humidity, but extremely high humidity can still temporarily degrade performance. When the water vapor is present at levels around 2.5% by volume or greater, water adsorption can noticeably begin to affect the short term removal efficiency of the VOCs.</p>
<p>Destruction and Removal Efficiency (DRE)</p>	<p>Typical systems economically provide over 95% DRE (with 96-97% adsorption capture and 99% oxidizer destruction), but systems up to 99% DRE are possible.</p>
<p>Particulate Matter</p>	<p>Particulate matter and aerosols can cover and mask the adsorption sites and degrade the removal efficiency. Proper pre-treatment is required to effectively remove particulate.</p>
<p>VOC Composition</p>	<p><i>Low Boiling Point VOCs:</i> Organic compounds with high vapor pressures (e.g. methane) can be difficult (or not feasible) to effectively adsorb under normal process conditions. <i>High Boiling Point VOCs:</i> Organic compounds with low vapor pressures can be difficult to clean and can build up on the adsorption sites. Using zeolite adsorbents and special construction allows for special high temperature cleaning cycles to remove such build up. <i>Reactive Molecules:</i> Certain reactive monomers and oligomers can easily be polymerized, permanently build-up, and degrade the removal efficiency. Special zeolite adsorbents have been developed and applied to effectively treat common solvents such as styrene.</p>



250,000 SCFM Concentrator and RTO System installed at an Ohio facility.



30,000 SCFM Concentrator and Catalytic Oxidizer System installed at an Illinois facility.