

Manufacturers of Emission Controls Association

Catalytic Control of Volatile Organic Compounds (VOCs): U.S. Technology Helping to Address Our Nation's Air Quality Challenges

Significant progress has been made during the past two decades in cleaning up the air we breathe, but serious air quality problems remain. Catalytic emission control technology is helping to meet the clean air challenge and at the same time has created an industry which has generated thousands of high skilled jobs.

◆ *Catalyst Technology Has a Track Record of Success*

The U.S. motor vehicle control program has rightly earned the reputation as one of this century's great environmental and technical success stories. Today, emissions of harmful pollutants from new cars are a small fraction of those emitted from cars made in the 1960s, while fuel economy has nearly doubled in the past 20 years and the availability of high performance vehicles has been preserved. Well known is the fact that the catalytic converter was the technological key to this success. First introduced in 1975, catalytic converters have now been equipped on over 200 million vehicles worldwide.

Less well known is the fact that catalytic controls are being used today to reduce volatile organic compounds (VOCs), carbon monoxide (CO) and oxides of nitrogen (NO_x) from such diverse stationary sources as power plants, commercial and industrial processes, and stationary engines. One technology -- catalytic oxidation -- has great potential for helping to address our urban smog and air toxics problems.

◆ *Catalytic Oxidation is an Available, Reliable and Cost-Effective VOC Control Technology*

Conservation and pollution prevention strategies must be an important component of our overall strategy to clean up the air we breathe. But the fact remains that even if we effectively employ these strategies, as an

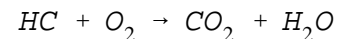
Catalytic oxidation is a proven, cost-effective technology that can control VOC emissions by up to 99% or more from industrial and commercial sources.

industrial society we will still generate pollution which must be controlled. Catalytic oxidation of VOCs is a proven and cost-effective control strategy.

Catalytic oxidation of VOCs can and will play a key role in cleaning up areas with unhealthy air quality. Applied to industrial and commercial facilities, it is a proven technology that has demonstrated a high level of efficiency in reducing VOCs by up to ninety-nine percent or more, and is cost competitive with - and in many cases, more cost efficient than - other available control technologies, such as

thermal incineration. Catalytic oxidation has been utilized successfully in a multitude of commercial and industrial applications for more than twenty years. Today there are well over 1000 catalytic oxidizers installed worldwide on such sources as surface coating, printing and solvent use operations, as well as chemical and petroleum manufacturing, to name a few.

Catalytic oxidation is a chemical oxidation process in which hydrocarbons (HC) are combined with oxygen at specific temperatures to yield carbon dioxide (CO₂) and water.



As its name suggests, catalytic oxidation uses a catalyst, a substance that accelerates the rate of a chemical reaction without itself being consumed.

The most important advantages of catalytic oxidation over thermal incineration are: 1) its much lower operating temperature, 2) its longer heat exchange life (due to lower thermal stress because of lower operating temperatures), and 3) its compactness and lighter weight which facilitates installations. These advantages translate into significant operating savings in fuel consumption and maintenance.

Another major advantage is that catalytic oxidation has a negligible effect on increased NO_x emissions. Thermal incineration, by comparison, relies on high temperature combustion which increases fuel consumption and so actually increases NO_x emissions - the pollutant which contributes significantly to atmospheric ozone. Also, since catalytic systems use less fuel than thermal systems, catalytic controls generate fewer CO₂ emissions, an important consideration given the contribution of CO₂ emissions to the global warming problem.

For many applications catalytic oxidation offers effective, reliable removal of VOCs with low maintenance costs and long-term performance. Often, catalytic controls will be shown to provide the most cost-effective alternative.

The Clean Air Act Amendments called for control of 189 different air toxics. Over 150 of these toxics can be controlled catalytically. Destruction efficiencies of 99.9+ percent are achievable. For example, catalytic oxidation can be used as a secondary treatment process from municipal waste incineration or hazardous waste incineration to significantly reduce emissions of air toxics, including dioxins and furans, as well as hydrocarbons and CO.

The catalyst, typically platinum group metals, is not consumed in the control process, and no harmful waste is produced with catalytic oxidation. When the catalyst itself loses enough activity to fall below the required control efficiency -- usually after years of operation -- the catalyst often is recycled and used again.

◆ ***The U.S. Is the World Leader in Catalytic Technology***

Today, the catalytic control industry is a multi-billion dollar industry. As noted, thousands of highly skilled jobs have been created in the U.S. and several thousand more will be generated before the end of the 1990s.

U.S. manufacturers are recognized world leaders in developing and producing catalytic control technologies for both mobile and stationary sources. For motor vehicles, U.S. companies got the jump in developing this technology because the United States led the rest of the world in requiring the clean-up of pollution from cars and trucks. Now, as the rest of the world seeks to control motor vehicle emissions, U.S. companies with extensive experience are poised to supply the world market for motor vehicle emission control products.

The U.S. likewise holds the technological edge in application of catalytic oxidation technology for industrial air pollution control. But this position is being challenged by Europe and Japan. The key to the health and growth of this industry will be how vigorously the mandates of the 1990 Clean Air Act Amendments are enforced. Effective enforcement will create market opportunities and provide the justification for continuing research and development efforts to keep the technology advancing in an extremely competitive worldwide market.

◆ ***The Catalytic Control Industry Stands Ready To Do Its Part To Help This Nation Meet Its Air Quality Challenges***

The U.S. catalytic control industry is proud of its contribution over the past 20 years in helping to clean up the air we breathe. Today, sophisticated catalytic controls are an integral part of high technology/high performance motor vehicles, and are helping to cost-effectively reduce harmful emissions from stationary sources. Our industry is now hard at work refining and improving these technologies to help the U.S. achieve its objective of clean air.



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