

Combustion Upgrades and Optimization

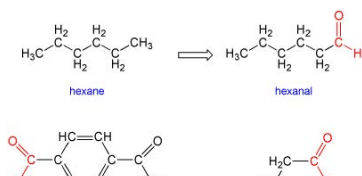
Certain areas of the country have new more stringent regulations for NO_x and CO emissions. Lowering one can have an increasing affect on the other. CPI has the experience to upgrade your combustion system to meet any NO_x or CO emission need.

Background

Catalytic Products International worked with a California tape manufacturer to modernize their thermal oxidizer and meet more stringent oxides of nitrogen (NO_x) and carbon monoxide (CO) emissions.

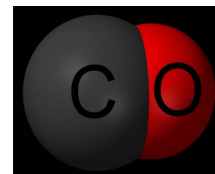
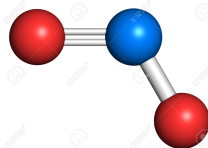
The client originally contacted Catalytic Products International (CPI) with the intention of changing the thermal oxidizer to a new type, but one that was sure to include a combustion system capable of meeting challenging low emission standards put into place by the South Coast Air Quality Management District (SCAQMD). CPI design and application engineers worked with the client to first evaluate the existing thermal oxidizer for suitability to process demands and a thorough analysis of the systems structural suitability for the intended purpose.

The purpose of the evaluation was to determine if the current thermal oxidizer system could be retrofitted to a low emissions combustion system while meeting the VOC destruction efficiency necessary to meet overall compliance. CPI engineers were able to present an engineering retrofit plan that eliminated the need to install new equipment, but rather modernize the current system to meet the challenging overall compliance needs for high VOC destruction with very low NO_x and CO emission byproducts.



VOC - Requires a specific time, temperature, and turbulence (mixing) to optimize destruction capability. The thermal oxidizer should employ features that work to thoroughly mix the air stream, have a defined residence time, and a control system that can precisely control and monitor the combustion temperature.

NO_x - Requires specialized burner systems that use excess combustion air sources to lower NO_x emissions. Older combustion systems that do not rely on excess combustion air are very efficient but also create high concentrations of NO_x.



CO - Carbon monoxide is a common byproduct of combustion and can be destroyed just like VOC's. However, CO requires a higher amount of energy (temperature) in order to destroy. When faced with CO emission regulations, care has to be taken in the evaluation to make certain the thermal oxidizer can operate at somewhat higher temperatures.

Volatile Organic Compounds (VOC's) are pre-cursors to Ozone pollution and subject to EPA regulations. Thermal and catalytic oxidizers are routinely used to destroy VOC emissions from a variety of industrial sources. In this client's case, the thermal oxidizer has been in service for almost 10 years with great success. New emission regulations enacted by SCAQMD required the client to lower the emissions byproducts in order to obtain the appropriate operating permits. NO_x and CO are common byproducts created in the burning of natural gas. All of these pollutants can be effectively minimized, but the challenge is engineering a solution that has to work within constraints of an existing system and can be cost effective to operate.



The Plan

Utilize a low NO_x combustion system with excess air design. The challenge here was twofold: 1) insure the new flame geometry worked with the existing thermal oxidizer and would not cause damage and 2) provide modifications to the combustion chamber that addressed mixing and turbulence while insuring adequate residence times are maintained.

Increase the combustion temperature during operation to at least 1,450° F. CPI has found that CO will be destroyed in a well designed combustion chamber when the temperature is at least 1,450°F and the residence time is at least 0.7 seconds.



The Results

The results of this modernization project are summarized below:

- Saved the client nearly one million dollars by avoiding the purchase and installation of a new thermal oxidizer.
- Reduced the lead time for compliance from 8 months to 3 months
- VOC destruction was increased from 98% DRE to 99.3% DRE
- NO_x emissions were certified to less than 60 ppmv
- CO emissions were certified to less than 20 ppmv

Catalytic Products International is a leader in the design and supply of innovative air pollution control systems. We excel at meeting the most challenging applications, even applications that include aftermarket engineering and support.

For more information about this or any of our other custom engineered solutions, please contact us.

Thermal Oxidizers, Regenerative Thermal Oxidizers, Catalytic Oxidizers, Heat Recovery Systems, Energy Conservation, Repair and Retrofit Services, Maintenance Services, Engineering

