Colt Technologies, Inc.
Air Quality Control Group

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Case Study: Designing for High and Low VOC Levels

Since our founding over 30 years ago, Colt's customers have experienced outstanding service life and continuous reliable performance from our MAXIM family of industrial air pollution control technologies.

Colt's MAXIM™ III Regenerative Thermal Oxidizer is a three (3) chamber design, utilizing three vertical heat recovery chambers connected to a common horizontal combustion chamber. The exhaust flow is controlled into and out of the chambers by pneumatically actuated valves located at ground level. Each chamber cycles through an inlet, purge, and outlet mode of operation on a timed cycle to maintain a uniform chamber thermal profile, to maintain high thermal energy recovery efficiency, and to provide consistently high VOC and odor destruction efficiencies.

Figure - MAXIM III Regenerative Thermal Oxidizer

A natural gas burner system maintains the required 1400^{o} to 1500^{o} F combustion chamber temperature, controlled by a Honeywell burner system with a UV scanner. The RTO system is controlled and monitored by an Allen-Bradley Compact Logix processor. The burner provides the energy needed to raise the chamber temperatures from ambient conditions to EPA mandated operating temperature.

Process exhaust VOC (Volatile Organic Compounds) contribute to the energy required to operate the system by releasing the heat of combustion to the RTO during oxidation. With sufficient VOC concentration (above 3% LEL for many VOC's) the RTO will operate without requiring heat input from the burner system, termed 'Self-Sustaining'.

Many of Colt's Chemical Process Industry applications present a totally different problem: much too high an inlet VOC concentration. Because the MAXIM III RTO is designed to provide extremely high thermal energy recovery, high VOC concentrations will cause the combustion chamber temperatures to rise until a maximum allowable chamber temperature is reached, shutting the RTO system down as a safety precaution.

Colt offers options designed to assist in controlling high chamber temperatures, including a 'Hot Side By-Pass'. The 'Hot Side By-Pass' is a heat exchanger by-pass that allows the combustion chamber gases to go directly to the stack, by-passing the RTO heat exchanger beds. This option is utilized for applications with periodic VOC spikes of process VOC. After the spike has diminished, the chamber by-pass valve is closed and normal burner operation resumes automatically.

For additional information on any of Colt's products and services, please contact us at 972-385-7770