This is how J L Clark exceeded the US EPA's VOC abatement requirements at its Rockford, Illinois, litho plant: a PLC-controlled RTO from Anguil Environmental Systems

COST-EFFECTIVE COMPLIANCE

Environmental legislation and control of air quality are forcing canmakers in the US to review their VOC recovery systems. Mónica Higuera reports

Canmakers in the US are increasingly concerned about the need to comply with regulations issued by the Environmental Protection Agency (EPA) on air quality, specifically volatile organic compound (VOC) and hazardous air pollutant (HAP) control.

Last November the EPA issued a final rule that established national emission standards for coating operations in regions that generated large volumes of VOCs. The standards (5,700 litres or 1,500 gallons of coatings per year) outline various control requirements based on usage of affected VOCs but also provide for emission reduction by using a capture system in conjunction with pollution control devices.

With legislation looming on the horizon, Rockford, Illinois-based lithographer and canmaker J L Clark last year began a thorough review to find a system that would exceed the minimum EPA requirements cost-effectively.

"This was not the first time that J L Clark had taken steps to control their emissions," said Gordon VerWeyst, J L Clark's vice president of product development & engineering.

"Years earlier, the company had installed several recuperative thermal oxidiser (RTO) systems that had satisfied earlier requirements but had, over the years, become outdated and were a significant drain on the plant's operations budget. Costs to operate the systems had become a major component of J L Clark's annual fuel usage."

J L Clark chose Anguil Environmental Systems, based at Milwaukee in Wisconsin, to supply a bigger 50,000 scfm regenerative thermal oxidiser to control the emissions, and a permanent total enclosure (PTE) to capture the emissions from the plant's six printing and coating lines.

The RTO destroys VOCs with high-temperature oxidation, converting them to carbon dioxide and water vapour, and re-using the released energy. Anguil's vice president of sales & marketing, Chris Anguil explains how it works: "Process gas with VOC contaminants enters the two-chamber RTO through an inlet manifold. A flow-control valve directs this gas into an energy recovery chamber which pre-heats the process stream. The process gas and contaminants are progressively heated in the ceramic bed as they move toward the combustion chamber.

"The VOCs are then oxidised, releasing energy in the second ceramic bed, thereby reducing any auxiliary fuel requirement. The ceramic bed is heated and the gas is cooled so that the outlet gas temperature is only slightly higher than the inlet temperature. The flow-control valve switches and alternates the ceramic beds so each is in inlet and outlet mode.

"If the process gas contains enough VOCs, the energy released from their combustion allows self-sustained operation. For example, at 95 percent thermal energy recovery, the outlet temperature may be only 77 deg F (25 deg C) higher than the inlet process gas temperature," he says.

PLC-based electronics automatically control the RTO's operation, from startup to shutdown, reducing the necessity for operators to be involved.

Meanwhile, the permanent total enclosure contributes significantly to the reduction in VOCs released to the atmosphere.

VerWeyst says: "We selected the PTE system because it enabled our litho lines to run without individual burdensome enclosures and exhaust hoods over each line. This allowed the operators room to do their job without interference. The PTE also allowed us to forgo the yearly EPA capture inspections that are required on a singularly captured line."

Adds Anguil: "The PTE at J L Clark has proven effective at capturing the emissions from the wet-end coating operations of the process lines: that exhaust is combined with the exhaust from the ovens at the inlet of the RTO. This results in 100 percent capture efficiency of the VOC/HAP emissions assuring capture efficiency requirements and eventual destruction.

"The RTO itself has proven to be similarly effective, achieving destruction efficiency in excess of 99 percent while exceeding all fuel usage reduction objectives. The combined capture and destruction efficiency has therefore exceeded 99 percent for the facility, minimising the overall VOC/HAP emissions from the plant and allowing it to meet their emissions cap," he says.

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