Anguil supplied a regenerative thermal oxidiser (RTO) and concentrator similar to this system at a new US metal bottle manufacturing plant

Clearing the air

A metal bottle manufacturing plant being built in the US recently installed systems to control VOC emissions. Daniel Searle reports

A state-of-the-art D&I metal container manufacturing facility in the US recently took another step towards project completion with the installation of volatile organic compound (VOC) control equipment.

Consisting of a combined solvent concentrator, regenerative thermal oxidizer (RTO) and dust collector, the combined system is designed to treat air pollution from the various metal decorating processes in the plant. The canmaker – which could not be disclosed – sourced the equipment from Anguil Environmental Systems, through its project management company.

Anguil specialises in designing and supplying turnkey oxidizers, energy recovery systems and permanent total enclosures for metal decorating operations, which capture and destroy more than 99 percent of the VOCs emitted by ovens and driers, says the company. The systems also reduce energy consumption and greenhouse gas emissions.

"Typically, emissions from a can coating process are treated by a thermal oxidizer only," says Kevin Summ at Anguil.

"Even though RTOs are extremely efficient, they rely on a steady stream of emissions from the process to fuel combustion of incoming contaminants. When coupled with a concentrator, the RTO will operate with very little additional natural gas consumption. At higher concentration values, it even has sufficient 'free energy' to provide the adsorption energy for the concentrator.

"Since oxidizers are sized and specified for a given project based on the maximum amount of airflow being sent to the device, manufacturers can also save a significant amount of money on capital equipment costs. To enhance equipment operation, Anguil implemented a solvent concentrator to collect and concentrate ambient solvent streams from the aluminium bottle line, reducing the total volume of exhaust while concentrating the emissions within that stream to significantly reduce overall operating cost of the smaller RTO destruction device.

"This system is designed for an overall destruction efficiency of more than 97 percent."

The rotor concentrator operates by drawing in VOC-laden air exhausted from the decorating operation, where VOCs are removed from the air by adsorption. The system uses proprietary adsorbents in a honeycomb structure to remove VOCs from dilute high volume air streams and converting them into a smaller concentrated stream for cost effective destruction by the RTO, explains Summ.

The cleaned air then passes through the rotor and is discharged to the atmosphere, while the concentrated air stream containing VOCs is combined with the heated oven sources and sent to the RTO where the VOCs are oxidized. The enhanced energy content of the VOC contributes to the oxidation process, reducing the supplemental energy requirements.

Origins of the VOCs

The systems which produce VOCs are divided into two categories – 'hot source' and 'cold source'. Within a canmaking plant, the hot sources include several ovens. The VOC emissions recovered from these process systems are sent directly to the RTO for destruction.

Meanwhile, the cold sources of VOCs at the plant include spray can conveyors, base coaters, decorating machinery and spray coaters. Emissions from the spray coaters are discharged to a dust collection system which removes the particulate before being sent to the concentrator and then on to the RTO.

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