CASE STUDY

New York State Pollution Prevention Institute

VOC Emission Reduction via Solvent Recovery

Challenge
A precision parts manufacturer wanted to reduce solvent losses and/or prevent solvent emissions associated with their testing processes.

Solution
NYSP2I investigated sources and amounts of solvent being lost as well as identifying potential improvement pathways.

Results
- Significant amounts of solvent were lost from handling and management of the solvent.
- Carbon capture, heat exchange condensation, and coalescing units were investigated for their potential to assist the company in targeting solvent vapor.
- More feasibility studies are needed to determine the technical and economic viability of the options identified.

Challenge

A company that produces and tests specialty products for the aerospace industry performs certain rigorous tests using a solvent to meet strict quality control requirements. During testing, much of the solvent vaporizes and is lost to the environment. The company wanted to identify viable solutions to decrease solvent loss, thus reducing its environmental footprint and saving money.

Solutions

The New York State Pollution Prevention Institute (NYSP2I) worked with the company to establish a baseline by determining how much solvent was lost during testing. Sampling data were collected at various locations around the facility to ascertain solvent vapor content data. This information was used and compared with solvent purchases and waste disposal amounts to determine estimated losses. To minimize losses and recover solvent where possible, an analysis of several technologies and methodologies was performed, along with an economic analysis to determine the feasibility of each option considered.

Results

The work performed by NYSP2I led to key findings that can help reduce the company's solvent loss moving forward:

- It was determined that a significant amount of solvent was lost in areas not directly related to the testing itself, providing guidance to the company to target improvement efforts in these areas.
- Each capture technology considered had its own strengths and weaknesses:
  - » Activated carbon can potentially purify the air streams by adsorbing solvent; however, besides initial capital costs, spent carbon would need to be replaced periodically and disposed of accordingly. Solvent would not be recovered. More evaluation is needed to determine cost-effectiveness.
  - » Condensing the solvent via a heat exchanger would provide potentially reusable solvent, though the recovered solvent would have to be evaluated to determine whether it meets the testing requirements.
  - » Coalescing units could be installed at each point source location to capture and recover solvent; feasibility testing would be needed to determine the extent of effectiveness.
- A simple economic analysis indicated that potential savings can be achieved if the cost to implement changes provides for a reasonable payback. Lowering solvent air emissions would also help to reduce liabilities and the company's environmental footprint.

Partners

RIT · Binghamton University, State University of New York · Clarkson University · Cornell CALS, College of Agriculture and Life Sciences · Rensselaer · New York Manufacturing Extension Partnership

For more information please contact us:

585-475-2512
nysp2i@rit.edu
rit.edu/nysp2i
111 Lomb Memorial Drive, Bldg 78
Rochester, NY 14623

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