

NYSP21 Performs Evaluation of Cleaning Alternatives to Trichloroethylene Vapor Degreasing

Located in Rochester, New York, Rochester Steel Treating Works, Inc. (Rochester Steel) is a commercial heat treating company, established in 1932. Rochester Steel offers a range of heating services to client companies for production parts or tooling. Heat treating processes include vacuum furnaces, nitrogen & oil quenching, case hardening, and induction hardening. The company also offers cryo-tempering services, a process that is performed under cold conditions at the opposite end of the temperature spectrum.

Challenge

Rochester Steel currently relies on trichloroethylene (TCE) vapor degreasing to clean metal parts in preparation for heat-treating or post oil quenching. In order to support this process, they spend approximately \$111,000 per year on purchasing, disposal, and management of TCE and TCE sludge. Rochester Steel approached NYSP21 for assistance in identifying sustainable alternative methods to vapor degreasing that eliminates the use of TCE.

Solution

The New York State Pollution Prevention Institute (NYSP21) was tasked with evaluating TCE chemical alternatives and aqueous cleaning methods (vacuum cycle nucleation (VCN) and ultrasonics) for potential use at Rochester Steel. To accomplish these tasks, NYSP21 collected baseline data, mapped the quench/heat treat process, evaluated alternative cleaners to TCE, identified and tested alternative cleaning methods, and performed an economic analysis for alternative chemistries and cleaning methods.

Results

Testing with the VCN and ultrasonic units verified the technology capabilities for cleanliness and rust resistance on the parts. The worked performed by NYSP21 led to finding feasible alternatives to TCE. These technologies are commercially available for Rochester Steel to consider.

- Investing in ultrasonic or VCN systems can potentially reduce cleaning operating costs by 85-87% with estimated paybacks of 3 months for the ultrasonic system and less than one year for the VCN.
 - > Investing in either technology eliminates hazardous waste management costs.
- Kyzen Metalnox M6314, an oil-splitting aqueous cleaner with rust inhibitors, proved to be an effective cleaner when used in either VCN or ultrasonics.

CHALLENGE

- Rochester Steel Treating Works wanted to identify sustainable alternative methods to vapor degreasing that would eliminate the use of trichloroethylene (TCE)

SOLUTION

- NYSP21 evaluated TCE chemical alternatives and aqueous cleaning methods vacuum cycle nucleation (VCN) and ultrasonics for potential use at Rochester Steel Treating Works

RESULTS

- Testing with the VCN and ultrasonic units verified the technology capabilities for cleanliness and rust resistance on the parts
- The worked performed by NYSP21 led to finding feasible alternatives to TCE
- Rochester Steel Treating Works intends to implement an alternative technology to replace TCE in 2019



- In some cases, parts may require a drying step after cleaning to prevent rust formation.
- After drying, visual inspection indicated no chemical residue issues after heating parts at 450° Fahrenheit for ten minutes.

The company intends to implement an alternative technology to replace TCE in the near future.

TESTIMONIAL

“The New York State Pollution Prevention Institute (NYSP2I) was instrumental in identifying more environmentally friendly solutions to our cleaning process. As an independent source, the NYSP2I evaluates all options and seeks what is best for your company. The members of the team were a pleasure to work with and we would highly recommend their services.”

– Brian Miller, Chief Operating Officer
Rochester Steel Treating Works, Inc.

NYSP2I PARTNERS



New York Manufacturing Extension Partnership

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