

NYSP21 Assists Sydor Optics with Recovery of Cerium Oxide

Stefan Sydor Optics (Sydor) is a precision manufacturer of custom flat-surfaced, parallel and wedged optics specializing in double-sided polishing, continuous pad & pitch polishing, CNC machining and laser machining. Their 40,000 sq. ft. facility that is located in Rochester, NY is the largest double-sided polishing operation in North America.^{1,2}

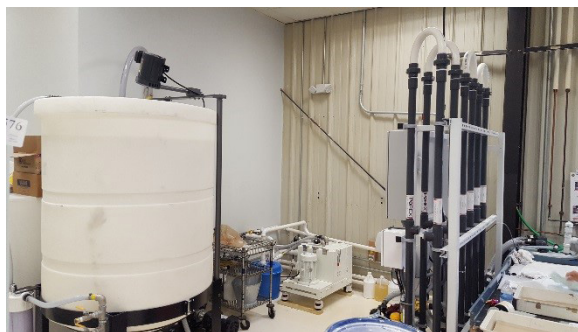
A critical process material used in their operations is a polishing compound that contains CeO_2 (cerium oxide or “ceria”), which is expensive. Sydor had installed a small centrifuge system to recover as much of the used compound as possible from the machine washwater so it could be sent back to the ceria supplier for materials recovery and purchase credits.

CHALLENGE

Despite the use of a centrifuge to recover ceria material from the wastewater, it was determined that Sydor was losing about 42% of its used ceria to the sewer. Sydor wanted to investigate options to reduce the amount of ceria lost to the sewer and increase the recovery rate. Besides the economic loss (estimated at \$20,000/year), the level of total suspended solids in the discharged wastewater was high.

SOLUTION

The New York State Pollution Prevention Institute (NYSP21) at the Rochester Institute of Technology (RIT) assisted Sydor Optics with a feasibility study to identify possible options to recover more ceria and reduce wastewater loadings. Higher speed centrifugation tests (higher G forces) and microfiltration membrane trials were conducted, the results of which indicated that these two technologies in combination could recover up to 100% of the valuable CeO_2 polishing compound. NYSP21 provided guidance to the company in finalizing the process design and identifying the appropriate equipment. Sydor and a vendor assembled the system, and NYSP21 assisted in the start-up and debugging of the production-scale system.



Complete Cerium Oxide Recovery System (process tank, left; centrifuge, center; membrane system, right)



Sydor's Lens Polishing Equipment

CHALLENGE

- Sydor wanted to investigate options to reduce the amount of ceria lost to the sewer and increase the recovery rate

SOLUTION

- NYSP21 assisted Sydor Optics with a feasibility study to identify possible options to recover more ceria and reduce wastewater loadings
- NYSP21 provided guidance to the company in finalizing the process design and identifying the appropriate equipment

RESULTS

- Sydor implemented a system that can recover more of the cerium oxide that is used to polish lenses



RESULTS

With assistance from NYPS2I, Sydor implemented a system that can recover more of the cerium oxide that is used to polish lenses. Instead of discharging over 40% of this valuable polishing compound to sewer and creating high levels of total suspended solids, the company is able to recover up to 100% of the polishing material. Based on the investment for the capital equipment, the simple payback is estimated to be 2 years.

TESTIMONIAL

“Sydor Optics utilizes significant amounts of cerium oxide (ceria) in the polishing of our flat optics. When the availability of this resource became limited, costs rose significantly, and we were forced to consider ways to enhance the value of this material. We began collection and recycling efforts that initially were only able to collect up to 50% of the ceria that was used. The engineers at the New York State Pollution Prevention Institute helped design and implement methods to not only significantly increase the reclaimed cerium oxide but also ensured a much cleaner wastewater discharge. The implementation of these innovative strategies will allow Sydor Optics to save up to \$20,000/year.”

- Zachary Hobbs, Process Engineer
Stefan Sydor Optics

NYSP2I PARTNERS

R·I·T  **Rensselaer**


University at Buffalo
The State University of New York

Clarkson
UNIVERSITY

New York Manufacturing Extension Partnership

Funding provided by the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation.

© 2017 Rochester Institute of Technology
Any opinions, results, findings, and/or interpretations of data contained herein are the responsibility of Rochester Institute of Technology and its NYS Pollution Prevention Institute and do not represent the opinions, interpretation or policy of the State.

For more information please contact us:

111 Lomb Memorial Drive, Bldg. 78
Rochester, NY 14623

Tel: 585-475-2512

Web: nysp2i.rit.edu

E-mail: nysp2i@rit.edu

Resources

¹ <http://www.rrpc-ny.org/members/profile.aspx?memID=1313>

² <https://www.linkedin.com/company/sydor-optics>