Polartec, LLC.

Fabric Manufacturer Employs Toxics Use Reduction and Energy Conservation to Reduce Costs

Summary

Polartec, LLC sought an alternative cleaning chemistry to remove knitting lubricating oils- one that would not require the use of caustic soda, a TURA listed chemical, and would remove contaminants at ambient temperature. The company identified and substituted a less toxic chemical that worked well at the low temperature required during processing. The substitute not only removed the extractable oils, but also removed 76% of the silicone oils contained in the spandex that is used to knit the Polartec fabric®. After changing to the new cleaning alternative, Polartec was able to significantly reduce the time required for many dye cycles without compromising product quality. The reduced dye cycle times allowed the company to improve manufacturing efficiency by 16%, reduce chemical use by 10%, and lower utility costs by 12% through reduced steam and water use. In addition to these reductions, the company also implemented a number of energy efficient changes, which resulted in annual savings of close to $1 million, and it is working on additional changes that will generate energy onsite.

Background

Polartec, LLC, located in Lawrence, Massachusetts, manufactures Polartec® fabrics used in the outdoor apparel and military industries. The company, previously known as Malden Mills, has manufactured the Polartec® fabrics since 1979 and is an industry leader in using recycled materials for its product lines. In addition to these efforts, the company has recently incorporated toxics use reduction and resource conservation into its operations, which provided significant benefits to Polartec. OTA has had a working relationship with the company since the mid 1990's, offering assistance on regulatory and other issues regarding its manufacturing operations.

Polartec Recycling Efforts

Polartec continues to expand its recycling efforts. The company uses Repreve 100 yarns, from Unifi Manufacturing. Repreve 100 yarns are made from 100% post-consumer recycled plastic bottles. Polartec used in excess of 30% Repreve for 2010, with a goal of 40% Repreve in 2011. Using the recycled materials allows the company to reduce the need to use virgin synthetic fibers and keep more than 21 billion plastic bottles from landfills.

Toxics Use Reduction

Polartec reviewed its operations to see if any changes could be made to reduce the use of toxic materials. The company successfully reduced sodium hydroxide, which is used for scouring oils from polyester yarns. Although the oils facilitate the knitting of yarns, if not removed after knitting, they cluster with the dyes and they redeposit on the fabric when the temperature is increased. Working with a specialty chemical supplier, Polartec selected a nonionic surfactant with low turbidity and a low temperature cloud point. Using atomic microscopy, it was determined that the substitute not only removed the extractable oils that were the target of the project, but also removed 76% of silicone oils contained in spandex fibers. Previously, it had been necessary to utilize multiple scouring baths containing sodium hydroxide to remove the oils at high temperature. There are several benefits of using the surfactant. It is less toxic than sodium hydroxide, which is better for the environment. In addition, it is significantly safer for workers, and reduces production costs. It also meets standards for fabric certifications as an environmentally preferable textile chemical.

"We appreciate the TURA program as it encourages employers like Polartec to seek alternatives that are environmentally friendly and that make economic sense. TURA can help businesses gain an edge from continuous improvements. The associates and management of Polartec recognize their responsibility to function as good corporate citizens by operating under an Environmental Policy dedicated to environmentally conscious manufacturing. Our Policy is predicated on the belief that a healthy environment can coexist with a strong manufacturing environment. We are sensitive to the environmental concerns of our associates, customers, neighbors and community, and believe in the adoption of technical, institutional and social policies that will reduce the ecological impact of manufacturing. Our commitment is to continuously reduce energy consumption and emissions, to minimize waste, and to increase the recycling of resources."

Andrew J. Vecchione, President, Polartec, LLC.

The time required for cleaning fabric was reduced by 16%, a significant dollar value for the company that also includes efficiency and savings in resources. Chemical use costs were reduced by 10%, based on purchase price and amount used. Utility savings, steam and water, were reduced by 12%. Although some of the reduction in total quantity of use is due to lower levels of production, Polartec has seen an overall 25% reduction in its NaOH use per yard of fabric processed. Finally, the company is also exploring alternatives to acetic acid, which could provide additional toxics use reductions and economic benefits.

Energy Conservation

Polartec initiated a number of energy efficiency programs over the last four years. The first project was the installation of a high efficiency lighting system throughout the plant. This new system provided 20% more light with half the electrical demand. The cost of the investment was $726,000, which resulted in a cost savings of $350,000 per year. Including $200,000 in rebates from its energy provider, the payback was only 18 months. The company also replaced its air compressors with more modern equipment. This saved close to $200,000 in fuel costs, with a payback period of two years. Polartec also developed an Energy Management System [EMS]. As part of the EMS, the company:

- Installed variable frequency drives on fans, which saved more than $400,000 per year and paid for itself in just over a year;
- Steam pressure was reduced from 100 to 60 psi, which saved an estimated $46,000 per year.

Polartec's combined savings for its energy conservation benefits is just under $1 million per year. While the cost of making these changes was $1.5 million, the company has already been paid back from the cost savings generated by the projects. In addition to the savings, Polartec's carbon footprint was reduced by about 21%, with nearly 12,000 tons of CO2 reduced since 2006. The use of recycled yarn reduced CO2 emissions at the site of their supplier by an estimated 27,000 tons. Finally, Polartec is currently working on the installation of a hydropower unit that will produce an estimated 175 kW of electricity, and is performing an analysis of using a backpressure steam turbine generator to generate 625 kW of power.

This case study is one in a series prepared by the Office of Technical Assistance and Technology (OTA), a branch of the Massachusetts Executive Office of Energy and Environmental Affairs. The Office of Technical Assistance and Technology (OTA), the Commonwealth's center for technical information and assistance, helps businesses and other organizations improve their environmental performance and conserve energy, water and other resources. OTA promotes the implementation of management strategies, systems and technologies that enable businesses to enhance their competitiveness as they reduce use of toxic chemicals, prevent pollution, conserve resources, and ensure worker health and safety. OTA's non-regulatory services are available at no charge to Massachusetts businesses and institutions. For additional information about this or other case studies, or about OTA's technical assistance services, contact:

Office of Technical Assistance and Technology, 100 Cambridge Street, Suite 900, Boston, MA 02114
Phone: (617) 626-1060 Fax: (617) 626-1095 Website: http://www.mass.gov/eea/ota
This information is available in alternate formats upon request.