

Cleaner Production Case Study

Cleaner production involves reducing the consumption of raw materials (including water and energy) and reducing the volume and toxicity of waste and other emissions.

Industry:

Anodising

Universal Anodisers

Universal Anodisers specialises in adding protective treatments to aluminium sections. Customers send their sections to the plant, where they are put through a treatment process which forms a dense oxide layer around the aluminium section.

Known as anodising, this treatment makes the aluminium abrasion resistant and protects the underlying metal. The company also does colour anodising and can further treat an anodised extrusion with a range of processes, including polishing, finishing, stripping and heavy etching.

Company characteristics

Universal Anodisers is the trading name for Universal Aluminium Co. Pty Ltd, a family-run company founded by Peter Morrison in 1963. The plant is located in an industrial estate in Wetherill Park in Sydney's western suburbs. The company employs 20 workers in the factory and four office staff.

Environmental successes

This is one of a series of case studies featuring companies that participated in the Department of Environment and Conservation (NSW) \$5 million 'Profiting from Cleaner Production' – Industry Partnership Program.

NSW companies are discovering that cleaner production not only protects the environment but also reduces operating costs, streamlines processes, boosts profits and improves staff engagement and morale.

Cleaner way forward for anodising company

Universal Anodisers joined a group of thirteen other businesses from the Smithfield Wetherill Park Industrial Estate to work with Fairfield City Council and the local Chamber of Commerce on a cleaner production project. With the support of the Council and a specialist environmental consultant, Universal Anodisers established its own cleaner production team, bringing together staff from across the business to identify and implement plans for improving the plant's environmental performance.

With a major focus on raising productivity, the results have been extremely rewarding for the company. So far it has saved \$100,000 through improved productivity and reductions to its annual power bill.

What did they do?

Improve heat transfer

The anodising process is exothermic. Heat must be removed from process fluid by heat exchangers. A modelling study of heat transfer performance revealed that pressure drop through pipe work was higher than pressure drop through the heat exchangers. Also, the cooling water flow was found to be less than the corresponding anodising solution flow, and this reduced the overall heat transfer rate. By replacing a number of pipe runs and replacing undersized piping, Universal Anodisers managed to increase flow rates and improve heat transfer.

Improve mixing in the anodising tank

Agitation within the anodising tank is a critical element in creating a uniform, high-quality coating. Traditionally agitation is produced by low pressure air being emitted through a series of diffusers as fine bubbles. However, this process consumes large amounts of energy. Universal Anodisers trialled mixing the solution through circulating liquid jets rather than air bubbles. This new process improves mixing and cuts the energy used by 9%. Follow-up research and development will be conducted to see if costs can be reduced even further.

Repair and replace the rectifier

The anodising process requires significant electrical energy to power anodising tanks, and this is supplied by a simple rectifier unit. The company knew that one of its rectifiers was less energy efficient than others, but it was unable to find the root cause. After first assessing the system, the cleaner production team initially overhauled the less efficient rectifier, improving its efficiency and generating significant energy savings. However, it proved even more advantageous to replace the unit, with the new system saving \$16,000 in annual energy costs.

Conserve water

When Universal Anodisers overhauled their rectifier, water consumption increased. However, by installing a new water pump to cool the rectifier via a cooling tower, water consumption was cut by 8% per annum, with projected savings of 2 million litres each year.

Discussing improvements to the anodising tank: introducing a new mixing process cut energy costs by 9%, with further cost savings expected as the process is improved.



Why did they do it?

Company Director, Tony Case, acknowledges that in small business "... it's often difficult to get past putting out the brush fires—but with the guidance and enthusiasm of the Council and the consultancy provided through this program we have achieved much. We have managed to analyse our processes and identify a number of real areas where resource consumption has been reduced. Some processes were redesigned at minimum cost, thereby making significant improvements to our bottom-line."

What are the environmental gains?

On original production rates Universal Anodisers has achieved:

- **Energy reduction:** 700,000 kW.h per year
- **Reduction in CO₂ emissions:** 708 tonnes per year
- **Water saving:** 2 ML per year

What were the costs and savings?

<i>Initiative</i>	<i>One-off investment</i>	<i>Savings</i>
Improving the rectifier	\$1,000	\$5,000 one off saving
Improving heat transfer and mixing, and upgrading pipe work	\$30,000	\$100,000 per year
Installing a new water pump	\$10,000	\$31,500 per year
Total	\$41,000	\$131,500 per year + \$5,000 one off saving

Where to now?

Universal Anodisers continues to implement its cleaner production plan, and following the Council-supported project, the company has implemented a number of new initiatives. These include replacing the old rectifier at a cost of \$70,000. The new rectifier is now generating annual savings of \$16,000.

In addition, the company installed an extra power factor correction module at a cost of \$2,000. With a payback period of under 12 months the module will save the company \$2,400 in energy bills each year.

As a result of the project a culture of quality control and progress review in economic terms has emerged, and has been integrated into the way the

company does business. The cleaner production team continues to meet regularly to identify new cost saving opportunities and to review progress. One current project involves seeking further reductions in wastewater discharge and investigating waste sludge recycling to cut disposal costs.

More information

Tony Case
Universal Anodisers
207 Newton Road
Wetherill Park NSW 2164
Phone 02 9756 6333

Department of Environment
and Conservation (NSW)
Business Partnerships Section
Phone 02 8837 6000
cleanind@environment.nsw.gov.au



Department of
**Environment and
Conservation (NSW)**

Published by: Department of Environment and Conservation (NSW)
59-61 Goulburn Street Sydney; PO Box A290 Sydney South 1232
Ph: (02) 9995 5000 (switchboard); Ph: 131 555 (information/publication requests)
Fax: (02) 9995 5911; Email: info@environment.nsw.gov.au;
Website: www.environment.nsw.gov.au; ISSN 1445-2332 DEC April 2005

