

Case Study - Rinse Water Conductivity and Flow Control System

Toye, Kenning and Spencer Limited

Toye, Kenning and Spencer Limited of Birmingham were established over 300 years ago. The company produces high value products including:

- Masonic products and military regalia including medals and badges,
- Giftware including cufflinks, pendants and presentation jewellery,
- Pewter including hand painted figurines,
- Products for automotive manufacturers including badges and banners.

They utilise a mixture of traditional skills and modern technology, thus maintaining an enviable reputation for high quality products and excellent customer service. Toye, Kenning and Spencer have always sought continual process improvements to ensure continued success. However in recent years increasing raw materials costs has led to an increased focus on improving energy and resource efficiency. With this in mind, in February 2007 they joined The Accelerate Energy Challenge Project run by Pro Enviro Limited.

Through the Accelerate Energy Challenge Project, Pro Enviro benchmarked and monitored Toye, Kenning and Spencer's processes and energy and resource utilisation. A number of potential areas for efficiency improvements, and thus cost reductions, were identified and investigated. These included a cost-benefit analysis of installing a new high-efficiency boiler and investigation into potential eligibility for participation in a Climate Change Levy Agreement.

The Project

Due to the short pay-back time and relative ease of implementation, it was however decided to first implement a water reduction project on two metal finishing lines. Products are finished in-house with a number of treatments including copper, copper-tin, gold, immersion gold, nickel, platinum and silver.

Before the implementation of a water consumption reduction project, water input into the plating lines consisted of a manual on/off valve to each rinse water tank and a manual master on/off valve to both plating lines. During an initial site survey, it was noted that each individual valve was left fully open at all times with the master valve being turned on during each working shift and off at the end of each shift.

This manual method ensured that the water in each tank was always pure enough to satisfy Toye, Kenning and Spencer's plating quality requirements. However, measuring the conductivity of each rinse tank showed they were continually running at near town water conductivity levels. Wasteful consumption during out of working hours consumption was also likely with the possibility of human error leading to the master valve being left on overnight and weekends. Water readings taken during May 2007 showed an average consumption of 37 cubic meters per working day.

Toye, Kenning and Spencer were clearly operating a very inefficient method of ensuring plating quality. Pro Enviro recommended that a large water saving could be achieved with implementation of new end of shift shutdown procedures and the installation of a rinse water conductivity control system on both their plating line and an acid dipping system. Such a control system, once correctly commissioned, would offer quality control by ensuring consistency in the purity of the rinse water.

On Pro Enviro's recommendation, an automated rinse water control system was installed on their plating line. This system constantly monitors the conductivity of the rinse tank into which it is placed, comparing this to a conductivity figure set by the user. It then controls water flow accordingly.



Pro Enviro Ltd secured a month long sale-or-return deal for Toye, Kenning and Spencer for the rinse water control system and suggested that it be placed in the most often used plating line rinse on a conservative conductivity setting of 600 micro-siemens. This allowed a good demonstration of the consumption reducing potential of the system, whilst ensuring a good initial buffer for the quality of plating. Additionally a shutdown procedure was also put into place, and importantly one individual was placed directly responsible for ensuring this procedure was carried out.

The Benefits

The water control system was duly installed on 5th June 2007 and a large reduction in water running into each plating tank was noticed instantly. As can be seen installation of the system is very straightforward and quick. As well as controlling water flows the system also measures flow through an integral water meter system.

In September 2007, the average consumption was 22.21 cubic metres per working day, 14.82 cubic metres per working day less than before the system was installed. This was a saving of £16.11 per working day or £3,866.40 per annum on water costs, plus significantly reduced on-site effluent treatment costs.

The payback for the water control system was 43 working days.

More recently, Pro Enviro recommended to Toye, Kenning and Spencer that the conductivity set-point is increased to 800 micro-siemens, which would not negatively affect plating quality whilst achieving significant further water and effluent savings.

Water consumption (cu. m/day) before (red) and after (green) project implementation

