

NYSP2I Performs Water Assessment for Finishing Operations

Crosman Corporation was founded as Crosman Rifle Company (Crosman) in 1923 in Rochester, New York. Crosman is an international designer, manufacturer and marketer of Crosman pellet and BB rifles and pistols, Copperhead ammunition, high quality Benjamin pellet rifles and ammunition, airsoft rifles and pistols, and precision optics. With a developing brand recognition in over 63 countries, Crosman employs more than 350 people domestically, markets its products around the world and is seen as a leader in the airgun industry.

CHALLENGE

Crosman wanted to consider source reduction opportunities to reduce process water use and subsequent wastewater generation. Crosman has four major finishing line operations that consume 4,785,000 total gallons/year of water (from both a private well and municipal water supply). Water use among the different finishing line operations is broken down as follows: zinc plating 55%, copper plating 23%, bluing 19%, and mass finishing 1%. Crosman wanted to identify viable options to reduce and reuse process water in all of the lines.

SOLUTION

New York State Pollution Prevention Institute (NYSP2I) worked with Crosman to assess water use in their four finishing lines. The assessment included measurement of rinse water flows, where possible, and measurement of pH and conductivity in rinse tanks to determine rinsing efficiency. NYSP2I focused on a baseline analysis of process water and costs, and identification of options to reduce and/or reuse rinse water.

RESULTS

Based on the assessment, there appears to be significant potential for Crosman to reduce water use by 39%. Implementation of PRO-pHx in the bluing line acid etch tank would provide another potential chemical savings opportunity; the use of microfiltration or ultrafiltration on the bluing line's caustic cleaning tank to remove oil could extend the lifetime of the cleaning solution. As part of a follow-up project, NYSP2I would be able to assist in evaluation of these options by running bench/pilot tests.

Maximum potential water reduction is 41% or approximately 2 million gallons per year. Of this water savings, approximately 1 million gallons would be municipal water which is equivalent to an annual cost savings of \$6,000. If some of the options are implemented, at least 30% reduction in water use can be realized, resulting in savings of \$3,600 per year.

There were several key findings for the potential to reduce and reuse process water.

CHALLENGE

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SOLUTION

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RESULTS

- Significant potential for Crosman to reduce water use by 39%
- Implementation of PRO-pHx in the bluing line acid etch tank would provide potential chemical savings opportunity
- Rinse water in the zinc line can be reduced by using counterflow and reactive rinsing
- Eliminate sludge accumulation problems in the discharge piping
- Reducing dragout from the caustic cleaning tank along with the use of membrane filtration in the rinse may reduce or eliminate waste rinse water and keep the cleaning tank free of oil
- A volume-controlled shutoff switch set to 395 gallons would automatically shut the feed water off when volume for the copper coating process is reached
- Water softening may be very beneficial for general plant maintenance

- Rinse water in the zinc line can be reduced by using counterflow and reactive rinsing, resulting in overall water use reduction between 16% and 27%.
- To eliminate sludge accumulation problems in the discharge piping, the mass finishing operation can be close-looped by installing a second set of settling tanks and reusing the clarified water (1% reduction in water use).
- A volume-controlled shutoff switch set to 395 gallons would automatically shut the feed water off when volume for the copper coating process is reached; excessive water use can be avoided.
- The bluing line rinses can be linked to reduce the line's water use by two thirds, and a 13% reduction in wastewater volume to 629,000 gallons per year. The bluing line could potentially use an acid extension product called PRO-pHx which would potentially eliminate acid tank dumps.
- Reducing dragout from the caustic cleaning tank along with the use of membrane filtration in the rinse may reduce or eliminate waste rinse water and keep the cleaning tank free of oil. This approach also extends the life of this tank, again reducing tank dumps.
- Water softening may be very beneficial for general plant maintenance since the hard water is causing serious plumbing issues with scale buildup.

Although there are implementation costs associated with the various water saving methods described above, most of the costs are piping modifications to allow for counterflow rinsing and close-looping.

NYSP2I PARTNERS



New York Manufacturing Extension Partnership

Funding provided by the New York State Department of Environmental Conservation.

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