

 <p>Pollution Prevention Case Study</p>	<p align="center">Parker Pen USA, Ltd.</p> <p align="center">Apply total quality management (TQM) techniques to reduce solvent usage</p>
<p>Standard Industrial Classification (SIC)</p>	<p>Manufacturer and marketer of refillable writing instruments; SIC 3951.</p>
<p>Process</p>	<p>Solvent degreasing of metal parts.</p>
<p>Type of Waste</p>	<p>Trichloroethylene (TCE) solvent emissions.</p>
<p>Strategies</p>	<p>Apply total quality management (TQM) problem solving techniques, including quality improvement teams and statistical process control (SPC) analysis, to reduce solvent use.</p> <p>Parker found it helpful to involve their TCE supplier, Dow Chemical, in identifying inefficiencies in the usage of TCE.</p>
<p>Background</p>	<p>Parker Pen USA employs 575 people and produces millions of components, refills, and whole instruments annually.</p> <p>Numerous progressive die presses produce metal caps, barrels, buttons, and refill shells from strip stock. Solvents are used throughout the plant, mainly in vapor degreasers.</p> <p>Vapor degreasers are required to remove the drawing oils from the formed parts. Finishing operations within the plant require that contamination be removed from metal parts in vapor degreasers.</p>
<p>Motivation</p>	<p>When solvent usage and emissions data were summarized to complete Parker's first SARA Title III, Section 313 report, emissions numbers were higher than expected.</p> <p>At this same time, Parker had just begun experimenting with TQM concepts. Therefore, finding ways to reduce the excess solvent emissions seemed like an ideal opportunity to apply a TQM approach to produce environmental benefits and reduce the company's expenses.</p>
<p>Changes Implemented</p>	<p>Parker assembled a voluntary improvement process (VIP) team to research, recommend, and implement solutions to specific operational problems within the company.</p> <p>The VIP team determined that vapor degreasing of wire coil stock in a piece part degreaser was the main cause of excessive solvent usage because the anti-tarnish coating contaminated all the solvent in the degreaser after each use. Because of this practice, some solvent was being sent out for reclaim with only 10% contamination. To correct this inefficiency, Parker purchased a parts washer exclusively for the coil stock.</p> <p>Other changes the VIP team recommended for implementation were:</p>

	<ul style="list-style-type: none"> • Educating and training employees on methods to reduce the amount of oil getting on the parts in the first place. This resulted in less contamination getting into the degreasers. • Reducing the average heat input into the pumps by 50% because boiling sumps do not have to boil vigorously. This change produced a savings in both energy and solvent consumption. • Periodically transferring all solvent to the still to boil the solvent off, leaving only contamination to remain. This practice extends the life of the solvent. • Limiting the rate at which part baskets go to the degreasers to no more than two linear feet per minute, with a stop in the vapor zone to allow excess solvent to return to the sump.
<p><i>Problems Encountered</i></p>	<p>The greatest hurdle was getting all affected departments to agree to join the VIP team to address solvent reduction. The only other significant problem Parker encountered was getting the department that required the cleaning of the coil stock to stop using parts cleaner. This was solved by changing internal accounting procedures to make departments financially responsible for costs associated with cleaning their parts and for providing the necessary incentives for change to occur.</p>
<p><i>Material/Energy Balance</i></p>	<p><i>Original Approach</i></p> <p>Feedstock 25 drums of TCE monthly.</p> <p>Waste Used TCE, air emissions, and excess energy.</p> <p>Disposal 16 drums of TCE sent monthly for off-site recycling.</p> <p><i>Pollution Prevention Approach</i></p> <p>Feedstock 15 drums of TCE monthly.</p> <p>Waste To date, Parker has reduced their usage of TCE by 54%, saving over \$70,000 over a three year period.</p> <p>Disposal 10 drums of TCE sent monthly for off-site recycling.</p>
<p><i>Economics</i></p>	<p>Capital Costs \$10,000 For the aqueous cleaning system. \$ 4,500 For the automatic boil down controls for the two degreasers. \$14,500</p> <p>Operating/Maintenance Costs Minor equipment modifications and weekly team meeting costs were</p>

	<p>charged to normal departmental operating expense accounts.</p> <p>Payback Period Eight month payback based on an estimated annual savings of \$23,300</p>
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Additional Publications Available	<p><i>Aqueous Industrial Cleaning Chemicals</i> DNR publication #SW-147-91</p> <p><i>Aqueous Parts Washing Equipment</i> DNR publication #SW-148-91</p> <p><i>Industrial Cleaning Source Book</i> University of Wisconsin-Extension Solid and Hazardous Waste Education Center</p>
<div style="display: flex; justify-content: space-between; align-items: center;"> <div data-bbox="191 892 638 1199" data-label="Image"> </div> <div data-bbox="722 957 1398 1136" data-label="Text"> <p>Bureau of Cooperative Environmental Assistance Wisconsin Department of Natural Resources P.O. Box 7921 Madison, WI 53707 608/267-9700</p> </div> <div data-bbox="1274 1178 1445 1205" data-label="Text"> <p>PUBL-SW-240</p> </div> </div>	