

 <p>Pollution Prevention Case Study</p>	<p align="center">Pierce Manufacturing, Inc</p> <p align="center">Voluntary Reduction in VOC Emissions</p>
Industry/SIC Code	Standard Industrial Code 3713 Truck and Bus Bodies
Type of Waste	Volatile Organic Compounds (VOCs) air emissions from fire truck painting operations.
Strategy	Hundreds of different colors of paints used by Pierce were reformulated while still meeting the high demands of the paint appearance, durability, and color matching required in the Fire Truck Industry.
Company Background	The Company was originally founded in 1913 by Humphrey Pierce and his son Dudley, as the Auto Body Works Inc., and concentrated on building custom truck bodies for the Ford Model T. Today, Pierce Manufacturing Inc., is the leader in the manufacturing of custom fire and emergency rescue vehicles in the industry and employees over 1,500 people in the Fox Valley area. Pierce also operates a fire truck refurbishment center in Weyauwega, WI, and Ontario, CA.
Original Process	Wisconsin Administration Code NR 422.155, allows fire truck and emergency response vehicle manufacturers such as Pierce Manufacturing, to spray primers and topcoats with a maximum VOC content of 4.44 and 6.0 pounds per gallon, respectively. NR 422.155 was adopted in 1989 in order for Wisconsin manufacturers of fire trucks to remain competitive in the industry by providing the high quality paint finish demanded in the fire apparatus market. At the time, the required high quality paint finish was only attainable with high VOC, low solids coatings.
Motivation	When Wisconsin Admin. NR 422.155 Code was adopted, Pierce committed to use high solids/low VOC coatings when they became available to industry. However, rather than waiting for the technology to develop, Pierce made it a priority to work with its' paint supplier on achieving 3.5 pounds of VOC per gallon for all topcoats and primers. Each time that a color was approved for use, it marked the first time the color was applied in a high solids formula in the industry.
Pollution Prevention Process	<p>Since 1989, Pierce has been engaged in an effort to develop a long term, cost effective solution to the continued use of high VOC coatings. Pierce teamed up with Sikkens Paint, a division of Akzo Nobel, as their sole source paint supplier. Soon after, Pierce and Sikkens began conducting extensive research on the reformulation of the hundreds of different paints.</p> <p>As a result, Pierce is the first Wisconsin manufacturer in the industry to successfully use a low VOC coating. In 1999, while working with the WDNR on one of its Title V Air Operating Permits, Pierce voluntarily committed to using low VOC coatings.</p>
Stage of Development	All primers and top coats currently utilized at the Company's Industrial Parts Plant and Assembly Plant are 3.5 # VOC/gal or lower.
Level of Commercialization	Parties interested should contact Sikkens Paint for availability.

Obstacles	<p>Maintaining appearance, durability and color match capabilities are paramount to the customers of this industry and these were key components of the research work.</p> <p>Obstacles in developing a high solid low VOC coating included:</p> <ul style="list-style-type: none"> • The degree of sprayability • Amount of cure time • Durability of the finish • Corrosion protection • Warranty against defects • The need for in-line drying booths due to the slower cure time • Required physical space for the drying booths <p>Extensive employee training which included a customer-focused quality control program was necessary after implementing the use of high solid coatings.</p>
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Material/Energy Balance	<table border="1"> <thead> <tr> <th>Description</th> <th>Old Process</th> <th>New Process</th> </tr> </thead> <tbody> <tr> <td>Painting process</td> <td>Low solids high VOC</td> <td>High solids low VOC</td> </tr> </tbody> </table>	Description	Old Process	New Process	Painting process	Low solids high VOC	High solids low VOC
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Summary

This project was based on Pierce’s proactive commitment to reduce VOC air emissions to 3.5 pounds per gallon for all topcoats and primers. Pierce and its paint supplier, Akzo Nobel-Sikkens, conducted exhaustive research to reformulate hundreds of different paints to a lower-emission formula. Pierce’s investment in this research to develop high solids/low VOC coatings was approximately \$200,000. Key to the research effort was the overriding need to

	<p>maintain the appearance, durability and color match capabilities of the paint, all of which are vital to fire-and-emergency customers.</p> <p>In 1994, Pierce confirmed its commitment to this environmental effort by investing \$9 million to construct an addition to its paint facility that made it possible to use the new high solids/low VOC coatings. The paint facility expansion included \$600,000 for three new in-line paint-curing booths. The booths were required because the new high solids/low VOC coatings require increased cure times.</p> <p>The \$9 million expansion project enabled Pierce to be the first and only fire and emergency vehicle manufacturer to voluntarily use a low-VOC paint. The facility was also designed to accommodate future growth of the company. Since 1994, Pierce has voluntarily reduced its VOC emissions by 32 percent, or 230 tons. This calculation takes into account the fact that production today is almost twice what it was in 1994.</p> <p>Pierce is starting to see a return on investment for its initial R & D efforts and the new facility in the form of reductions in the amount of paint required. During the timeframe of 1994 through 1999, Pierce estimates it has realized cost savings in excess of \$2 million.</p>
<p><i>Benefits</i></p>	<p>The use of lower VOC/higher solids paints has had several beneficial effects.</p> <ul style="list-style-type: none"> • Pierce found that with the use of high solid/low VOC content paint, the total amount of paint per truck was reduced by 25% since 1994. • At the same time the total VOC emissions per truck dropped by 47%. <p>While not directly related to lower VOC/higher solids paint, Pierce's truck production increased from 790 custom fire and emergency response trucks in 1994, to 1,062 vehicles in 1999.</p> <p>If no changes were implemented, and Pierce would have used the same paint in 1999 as was used in 1994, 230 more tons of VOC's would have been emitted from the priming and topcoating processes.</p>
<p><i>Technology Transfer</i></p>	<p>These reformulations have already been applied to all of our priming and topcoating processes company-wide.</p> <p>The paints should be available to others through Sikkens Paint.</p>
<p><i>Other Environmental Programs</i></p>	<p>Pierce Manufacturing continues to evaluate and implement a number of proactive pollution prevention and environmental stewardship projects including:</p> <ul style="list-style-type: none"> • testing of water-based cleaners and paint line purging material • on-site recycling of clean-up and line purging solvents • metal treatment product substitution in order to facilitate zero wastewater discharge status • reducing parts packaging material
<p><i>Company Address</i></p>	<p>Pierce Manufacturing Inc.</p>

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Waste Reduction Resources	<p>Free, On-Site Technical Assistance University of Wisconsin Extension Solid and Hazardous Waste Education Center Milwaukee area: 414/227-3175 Remainder of state: 608/262-0385</p> <p>Environmental Assistance Publications Order Form Wisconsin Department of Natural Resources Bureau of Cooperative Environmental Assistance 608/267-9700</p>