

# Vermeer Corporation

## COMPANY BACKGROUND



Located in Pella, Iowa, Vermeer Corporation has grown from a one-person operation in 1948 to become a leading manufacturer of environmental, construction, agricultural and industrial equipment. The Iowa production facility employs approximately 2,000 people across seven production plants and provides equipment for more than 150 dealerships worldwide.

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## PROJECT BACKGROUND

As a supplement to its corporate environmental policy, Vermeer utilized the Pollution Prevention Intern Program to decrease its overall environmental impact in all areas of production.

A previous year's intern devised a process by which the sludge produced in the on-site water treatment system could be land-applied. In addition to the cost savings through eliminated labor and disposal fees, the discontinued operation of the sludge filter press produces a cleaner environment for the process water treatment plant employees.

The 2009 intern focused mainly on water reduction projects throughout the production plants.

## INCENTIVES TO CHANGE

Environmental efforts have been and continue to be a focus at Vermeer. An extensive recycling program is already in place and annually diverts hundreds of tons from the local landfill. In a time of increasing environmental awareness and water costs, water conservation can provide not only significant cost savings but can help promote environmental stewardship as well.

## RESULTS

**Distiller Cooling Water Loop:** Solvents used in the painting process at Vermeer are recycled in-house using a solvent distiller apparatus. In order to condense the solvent vapors back into a usable liquid form, cooling water is used as a heat exchange medium. It was found that the distiller's condenser operates with a single-pass cooling water system and operates at 6 gallons per minute or 3.1 million gallons per year. The



conversion of the single pass system to a recirculation loop will reduce the amount of water consumed by the distiller to almost zero and in the process reduce the total amount of water used at Vermeer by 12 percent.

**Rainwater Harvesting:** Because Vermeer's buildings are covered by more than one million square feet of steel roofing, rainwater harvesting has the potential to provide a significant portion of the source water needed by the in-house reverse osmosis (RO) systems. Based on the average rainfall rate for central Iowa, each of the seven production plants at Vermeer could collect 2.2 million gallons per year. The rainwater collected would contain fewer contaminants than the water provided by the city and would reduce water purchases. In addition, the membranes used in the RO systems would need to be replaced less often, providing further cost savings.



**Reverse Osmosis Membrane Replacement:** The reverse osmosis systems that provide water to the automated parts washers operate with a rejection rate of 40 percent. The chlorine and high amounts of total dissolved solids (TDS) make lower rejection rates uneconomical as the cost of replacing the membranes becomes excessive. Replacing the current membranes with cellulose acetate based membranes offers a solution. These types of membranes can withstand higher amounts of chlorine while still operating at rejection rates of between 10 and 15 percent. Replacing the membranes would save 1.4 million gallons of water annually.

**Automated Landscape Watering Controls:** Often overlooked, the amount of water spent for landscaping purposes can quickly reach substantial volumes especially at large manufacturing facilities. Automated water controls that utilize weather and soil data can provide water savings of 30 percent simply by preventing over-watering.

## AIR POLLUTANTS DIVERTED IN TONS

Total for all sectors	
SO <sub>2</sub>	0.04
CO	0.07
NO <sub>x</sub>	0.03
VOC	0.11
PM	0.01

## GREEN HOUSE GASES DIVERTED IN TONS (CO<sub>2</sub> Equivalent)

Total for all sectors	
CO <sub>2</sub>	21.74
CH <sub>4</sub>	143.52
N <sub>2</sub> O	75.15
CFC	0.21

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
DISTILLER COOLING WATER LOOP	\$13,400	3,100,000 GALLONS	IMPLEMENTING
RAINWATER HARVESTING (SINGLE PLANT)	\$7,500	2,200,000 GALLONS*	RECOMMENDED
RAINWATER HARVESTING (ALL PLANTS)	\$53,040	15,600,000 GALLONS	RECOMMENDED
REVERSE OSMOSIS MEMBRANE REPLACEMENT	\$5,160	1,400,000 GALLONS	RECOMMENDED
AUTOMATED LANDSCAPE WATERING CONTROLS	\$1,980	450,000 GALLONS	RECOMMENDED

*\*Volume of water is calculated for a single production area. Total volume of water would depend on the amount of production areas converted for rainwater harvesting.*