

PROCECO ÉCO-SMART[®]: THE MOST RELIABLE AND COST-EFFECTIVE SYSTEM FOR INDUSTRIAL WASTEWATER DISPOSAL



Executive Summary

Location: Canada

Application: Wastewater recycling from cleaning and machining processes

Challenges:

- Determining if an MVR system was suitable for the wastewater
- Ensuring distillate would be reusable

Solution: PROCECO Éco-Smart[®], Model: ES-1500

PROCECO ÉCO-SMART[®]: THE MOST RELIABLE AND COST-EFFECTIVE SYSTEM FOR INDUSTRIAL WASTEWATER DISPOSAL

Introduction

Our client manufactures hydraulic cylinders used in transportation and various other industries. Their primary focus is telescopic cylinders used in mobile hydraulic applications such as dump trucks and lifting equipment. A surface treatment to ensure the durability of the cylinders is an essential step in their manufacturing process. Since this operation generates a great deal of wastewater, the customer required an internal wastewater treatment and reuse system to avoid high-cost third-party waste management.

The wastewater contains various substances, including oil, alkaline detergents, metalworking fluids, and different metals. The daily volume is approximately 1,400 gallons, with an anticipated increase with future plant expansion.

For management's consideration, the solution would have to be cost-effective with a quick payback. Subsequently, the system would have to run unattended and require minimal intervention.

Challenge

The first challenge PROCECO faced was to properly qualify the wastewater stream and determine if a mechanical vapor recompression (MVR) process was feasible and if pre- and post-treatment should also be considered.

To perform a proper assessment, PROCECO reviewed the various waste streams with the customer, who provided a comprehensive lab analysis for each. The lab results identified the presence of such compounds as oil and grease, COD, pH, chlorides, fluorides, phosphates, and metals.

After thorough analysis, PROCECO determined that MVR was a suitable process. To reduce the amount of free oil entering the MVR, PROCECO recommended adding an oil skimmer to the customer's wastewater collection tank.

The second challenge was to ensure the distillate would be suitable for reuse after the MVR process. A PROCECO factory test with the customer's wastewater determined that a post-treatment of granular-activated carbon was required to reduce some trace hydrocarbons found in the distillate that were contributing to an elevated COD level.

This is a typical phenomenon in the distillation process, where some elements have evaporation temperatures near that of water.

Further laboratory testing results indicated that the distillate was suitable for reuse and complied with city discharge limits.

Solution

PROCECO proposed the Éco-Smart[®] model ES-1500 MVR evaporator.

The Éco-Smart[®] is capable of reclaiming up to 98% of the processed wastewater. The remaining 2%, in the form of concentrate, is discharged for disposal.



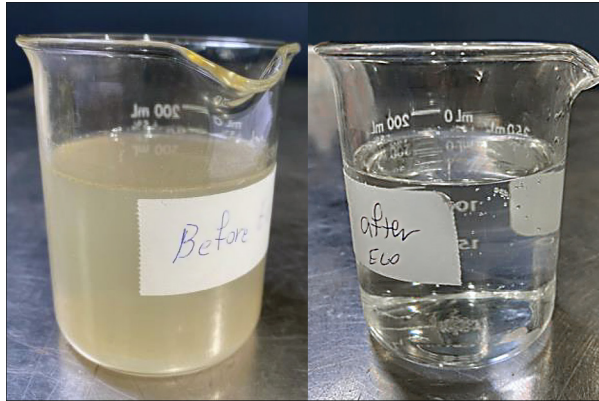
A FULLY INTEGRATED ÉCO-SMART[®]

The Éco-Smart[®] principle of operation consists of the reuse of the latent heat generated during its distillation process. A steam compressor creates a pressure differential between the evaporation and condensation sides of a heat exchanging apparatus. Evaporation occurs in a partial vacuum, whereas condensation occurs at a pressure slightly above atmospheric. This increase in pressure creates a differential between the evaporation and condensation temperatures. The resulting temperature difference enables a highly efficient heat transfer to occur. As the steam delivered by the compressor condenses, its energy is released from the latent heat to further promote evaporation.

Since the system's high efficiency originates from the reuse of the latent heat of vaporization, the Éco-Smart[®] is an ideal solution for recycling diluted industrial wastewaters.

PROCECO ÉCO-SMART[®]: THE MOST RELIABLE AND COST-EFFECTIVE SYSTEM FOR INDUSTRIAL WASTEWATER DISPOSAL

The Éco-Smart[®] is PLC controlled and monitors performance to ensure the maximum efficiency. Additionally, the unit has an automatic clean-in-place system (CIP) to descale the heat exchanger at regular intervals, which ensures a long service life and reduces maintenance downtime.



BEFORE & AFTER TESTS

Business Benefits

Compared to third-party waste management, the Éco-Smart[®] processes wastewater at the cost of \$0.03 per gallon or \$330 per week; a 96% reduction in the actual treatment cost. With this cost reduction and after considering the equipment's up-front cost, the payback period is less than a year.

The closed-loop automatic system operates unattended and reduces hazardous waste handling for greater operator safety.

An added benefit to the manufacturing process due to the Éco-Smart's low operating cost and water reuse is the ability to refresh cleaning and surface treatment tanks more frequently, providing a more stable operation and enhanced quality.

FOR MORE INFORMATION, CLICK HERE TO VISIT OUR WEB SITE

