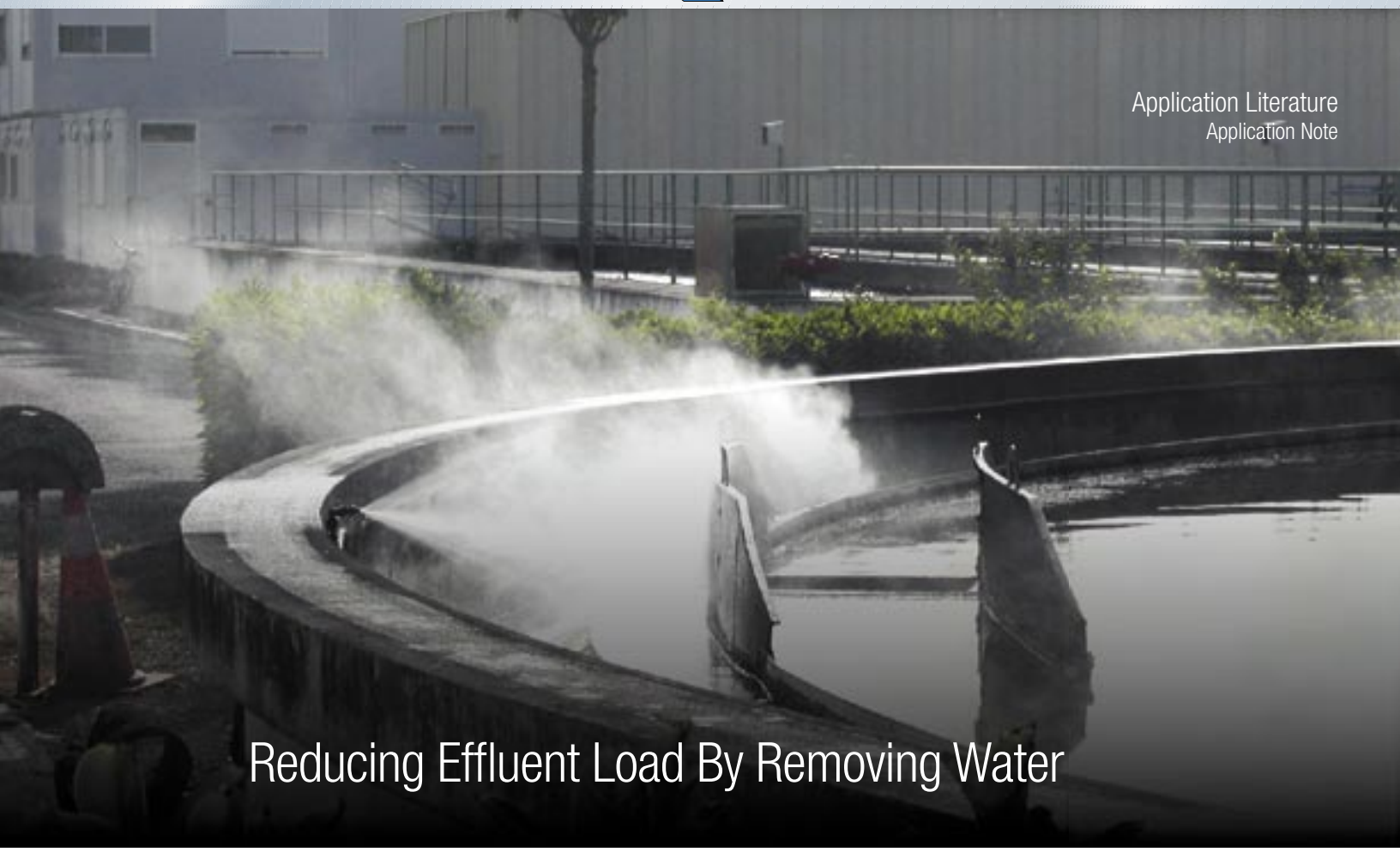


Application Literature
Application Note

Reducing Effluent Load By Removing Water

High-performance, space-efficient Tranter PHEs help remove water from corrosive waste streams by vacuum distillation.

Water plays a large role in many manufacturing industries, from aerospace and automotive parts to pharmaceutical and gas utility. Yet it is only recently that the environmental and legal issues surrounding water availability, ownership, treatment and scarcity have propelled water processing into a $400 billion-a-year business.

Although water is a necessary element in manufacturing processes, it can overburden effluent treatment systems. The farther upstream in the process water can be eliminated or removed, the lower the cost of the overall treatment.

One method of processing water, distillation, uses evaporation to separate water from contaminants. However, atmospheric heated distillation of many waste streams can cause rapid corrosion of heat exchange surfaces. An alternate approach is to employ cold or vacuum vaporization to recover water. In this continuous process, the effluent is drawn into a vaporization chamber, under vacuum, where evaporation occurs. The chemical concentrates remain in the evaporation chamber where they can be reclaimed for reuse or recycling, while the distillate can be collected for discharge, sent for additional treatment or reused.

The ULTRAMAX® Welded Plate and SUPERMAX® Shell & Plate Heat Exchangers utilize high heat transfer and high flow rates for the most efficient recovery.

Enhancing distillation efficiency

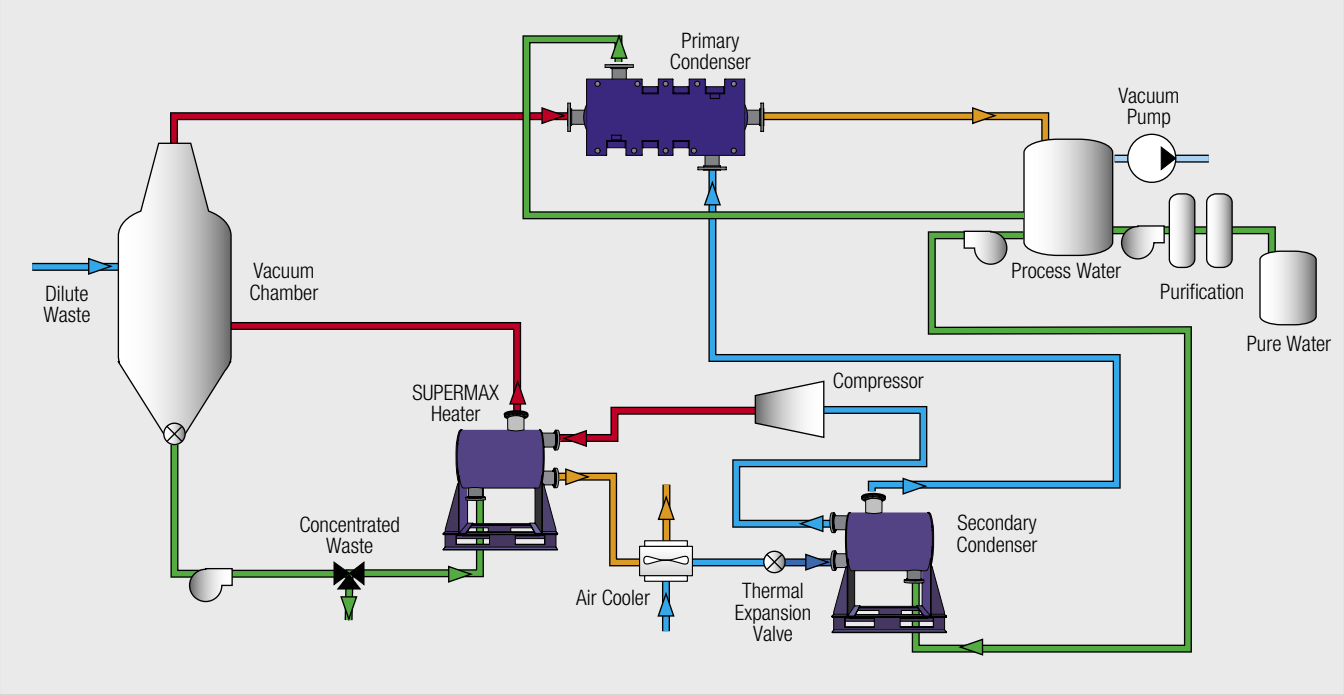
The basic components of a vacuum distillation process line are: a vacuum vessel; a condenser; a water collection tank; a vacuum pump; and a chiller that uses collected water as a chilling medium and whose hot stream goes to heat the incoming effluent through a heat exchanger. Tranter SUPERMAX® and ULTRAMAX® welded plate heat exchangers are particularly suited for large-capacity distillation process lines. Placing these units in the system optimizes thermal efficiency and water recovery while minimizing maintenance overhead.

The high heat transfer rate of the welded plate primary condenser removes heat from the water vapor at high flow rates for excellent recovery. By reducing the boiling temperature to below 38°C (100°F), the process reduces corrosive attack on heat transfer surfaces. The low hold-up volume of the welded plate chiller and condenser conserves refrigerant costs and improves systems responsiveness. The close approach applies more heat to the vacuum chamber and improves throughput, with less susceptibility to upset. This reduces operational costs and improves thermal efficiency.

Both the ULTRAMAX and SUPERMAX offer compact designs with reduced weight and structural complexity. The Removable Core SUPERMAX makes maintenance comparatively easier than with shell & tube heat exchangers. There is also no tube scaling, a major issue with atmospheric evaporators, and an increase of material recovery, up to 95%.

Delivering superior results

ULTRAMAX and SUPERMAX advantages make vacuum distillation an attractive water processing strategy for manufacturing industries. The benefits are improved recovery, lower energy consumption and reduced burden on effluent treatment plants.



ULTRAMAX® and SUPERMAX® advantages make vacuum distillation an attractive strategy for various processes in manufacturing where atmospheric boiling is not possible. Both types can function as heaters and condensers.

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