

Case Study

Ames True Temper Ramps Up E-Coat Speed with KPAK™ Modules



Project Details

Location: Harrisburg, Pennsylvania

Application: Anodic Electrocoat Paint

Capacity: 80 GPM Peak Flow

Product: KPAK Ultrafiltration Modules

Overview

Over the past decade, production has grown rapidly at the Harrisburg, Pennsylvania manufacturing plant of Ames True Temper. Ames is the oldest and one of the largest producers of non-powered lawn and garden tools in North America.

Ames True Temper uses anodic acrylic electrocoat paint to provide corrosion and abrasion resistance to its products. The e-coat system was originally installed in 1977 with a 10 gpm ultrafiltration (UF) membrane system that employed ABCOR™ tubular membrane modules from Koch Membrane Systems (KMS). In 1996, UF capacity was doubled to 20 gpm.

By 2005, Ames needed to significantly increase its ultrafiltration capacity, but additional floor space was not available. Complicating matters was the need for all new UF equipment to quickly accommodate changes in paint color.

“We needed to increase the capacity of our electrocoat process,” said Wayne Wright, manufacturing manager at the Harrisburg plant. “Not only did we need to keep up with the higher production levels, but we were applying six different paint colors. We

currently change the paint color in our e-coat process two or three times each day during our two nine-hour shifts.”

The Challenge

To increase plant capacity and productivity without increasing footprint.

The Solution

After a thorough evaluation process, Ames chose KPAK ultrafiltration modules from KMS. “We selected the KPAK UF modules because they were lower in capital cost, more user friendly, and practically maintenance free,” said Wright.

Ames’ original specifications called for use of 8-inch diameter UF spiral modules. Fortunately, KMS had recently introduced the new 10-inch diameter KPAK module, with 462 square feet (42.9 square meters) of membrane. Using the larger-capacity modules, UF equipment occupying the same floor space can provide nearly twice the UF capacity. Because fewer modules are required, piping, hardware, and installation costs are reduced significantly.

The Harrisburg plant commissioned two KPAK systems in October 2005. Each system employs four 10-inch modules to provide a total UF permeate production rate of 80 gpm.

“The decision was not difficult, because no other membrane vendor offered a 10-inch solution,” said Wright. “The 10-inch membranes gave us the capacity we needed with far fewer membranes and much less equipment, compared to systems with 8-inch modules. Our two new KPAK™ systems now sit on the same footprint as the ones they replaced, and yet the new systems provide four times the UF capacity.”

“The KPAK system has far exceeded our expectations,” said Wright. “Some of our employees were initially skeptical about our being one of the first companies to utilize the new 10-inch diameter module. But now they say that we should have installed the KPAK spiral membranes long ago. The new systems have dramatically reduced our maintenance effort. Since installing the system eight months ago, the membranes have performed flawlessly and we have not had to clean them even once.”

The Membrane System

In order to change colors processed by the membrane unit, deionized water is cycled through the UF modules in a simple reverse flushing operation, a process that takes less than 1.5 hours.

“We now have a cleaner paint, which yields a better quality product,” said Wright. “We have been able to increase our production speed by over 10 percent, and are now painting at 17 feet per minute, up from 15 feet per minute.” Moreover, the higher capacity ultrafiltration system has significantly reduced the time for conversion from one color to another, as our post rinses can now be filled faster.”

When compared to other spiral

membranes, the virtually zero-bypass design of KPAK UF modules results in higher permeate output relative to paint feed. Maximum energy efficiency is achieved because practically all of the paint circulation flow passes over the membrane surface. The lower paint feed flow requirements means that smaller pumps can be employed to satisfy a given duty. In fact, the new system uses the same pumps as the original system. Since the UF capacity has quadrupled, energy efficiency has therefore improved by 300 percent.

“We took a bit of a risk as an early adopter of the 10-inch diameter module, but I had confidence in KMS because of our nearly 30-year relationship and because of their expertise and leadership in the electrocoat industry,” said Wright. “We have no regrets and no doubts that the high capacity module will become commonplace for large-scale e-coat operations.”

Product Overview

KPAK modules come in self-contained disposable plastic housing for fast installation and removal. The system uses smaller pumps, less piping and fewer filters and comes with easy-to-use connection hardware.

The 10-inch KPAK module achieves a higher permeate output relative to paint feed than other spiral membranes. The KPAK consumes less electrical power compared to conventional spiral designs but is interchangeable with other manufacturers' products.

Standard systems are available with 8" and 10" diameter KPAK spiral membranes, with either individual module CIP or full rack CIP. The family of systems offers options for 4, 6, 8, 12, 14 and 18 positions.



Applications:

- Automobiles
- Appliances
- Metal furniture
- Lawn and garden equipment

Benefits:

- Easily expandable
- Robust design, reduced downtime
- Energy efficient, zero bypass spirals
- Reverse flow cleaning for enhanced flux recovery
- Fast membrane module replacement
- Individual module CIP, no disruption in production
- Available as packaged systems or membrane racks
- Easy membrane preservation during plant shutdowns



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