Vacuum Application

Extruder Barrel Evacuation

Busch EXT Vacuum System Improves Plastic Product Quality and Lowers Costs

Application

A major plastics manufacturer in the United States produces approximately 5000 plastic chair mats a day. By using Busch EXT vacuum systems instead of liquid ring vacuum pumps, the company lowered production cost, improved product quality, and eliminated the water contamination and cleanup problems associated with liquid ring pumps.

The Process

A powder mixture from a hopper goes into a heated extruder barrel (Cincinnati Milacron Model CM-80HP) where it is melted and pushed through the barrel by a screw.

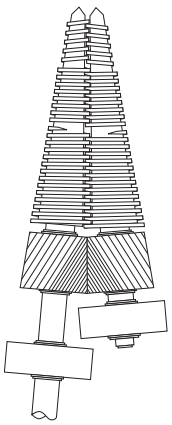
Vacuum is applied to the extruder barrel to eliminate moisture, solvents, and/or air which, if not removed, produces porosity in the final product. From the screw, the extruded PVC plastic passes through a die and then two rollers, which results in a plastic sheet which is then cut to size for the final product – a plastic chair mat.

Problem

The plastics manufacturer was originally using liquid ring pumps which required approximately 6,000,000 gallons of water per year. However, the liquid ring pumps presented several problems. They were messy, they leaked, and still worse, they contaminated the chilled water system.

Four liquid ring vacuum pumps ran 365 days a year, 24 hours a day, 7 days a week which produced 120,960 gallons a week of contaminated water. This volume of water became expensive to chill and treat.

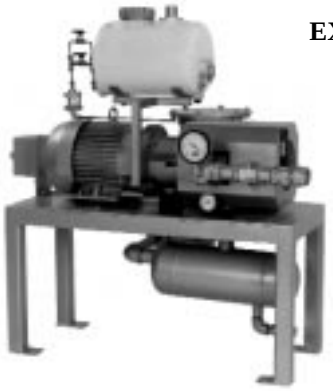
An additional problem was that the liquid ring pumps did not produce a deep enough vacuum, resulting in large amounts of excess scrap.



Conical Twin Screw Extruder

Solution

In September 1992, the four liquid ring pumps were replaced with four Busch Model EXT063 vacuum pumping systems. These systems incorporate direct driven, air cooled, single stage, once-through-sealing vacuum pumps and are especially designed for plastic extruder barrel evacuation. Nominal pumping speed is 38 ACFM with a guaranteed end vacuum of 50 torr.



EXT Vacuum System

The standard package includes a TEFC motor, sealant mist eliminator, 3 gallon sealant reservoir, discharge separator tank, discharge temperature gauge, inlet vacuum gauge, and inlet isolation valve. An optional combination knockout pot/inlet filter was added as an extra precaution to prevent any solid or liquid carryover into the vacuum pump. Busch engineering also suggested mixing the sealant with kerosene to reduce any buildup inside the pump.

The Busch EXT vacuum systems run at a vacuum level of 28"Hg and require only routine maintenance, which includes topping off the 3 gallon sealant reservoir on a regular basis, draining off the discharge separator tank twice a day and changing the combination knockout pot/inlet filter element as needed.

By switching to Busch EXT vacuum pumping systems, the plastics manufacturer eliminated the water contamination problem and as well as water treatment costs.

They are able to produce a better product due to deeper vacuum in the extruder. Now the plastic chair mats are now much clearer in appearance, resulting in 8-9% less scrap.

Busch, Inc.
516 Viking Drive
Virginia Beach, VA 23452
(757) 463-7800
www.buschpump.com