



**TECHNICAL
ARTICLE
SERIES**

Thermoplastics for Plants & Municipalities

ARTICLE # TL-171

INDUSTRY: Wastewater Industrial

ENTITY: Various

SOLUTION(S) PUMPED: Acids, Alkalies, Alum, Carbon slurries, Sodium hydroxide,

PUMP TYPE(S): CHEM-GARD Horizontal Centrifugal Pump, SUMP-GARD Thermoplastic Vertical Pump

Vanton Pump & Equipment Corp.
201 Sweetland Avenue
Hillside, NJ 07205 USA
Telephone: 908-688-4216
Fax: 908-686-9314
E-Mail: mkt@vanton.com
www.vanton.com

Vanton Pumps (Europe) Ltd
Unit 4, Royle Park
Royle Street
Congleton, Cheshire, UK CW12 1JJ
Telephone: 01260 277040
Fax: 01260 280605
www.vantonpump.com

Thermoplastics for Plants & Municipalities

Reprinted from POLLUTION ENGINEERING

Chemical plants and municipalities rely on thermoplastic pumps for odor control, corrosion resistance and reduced maintenance.



Figure 1: Close-up of magnetic-drive pump with casing opened to show solid thermoplastic casing, impeller and bearing housing.



Figure 2: View of 12,500-gallon tank with Vanton CGM magnetically-coupled polypropylene pump for handling sodium hydroxide at 55 gpm against a 0 foot TDH.

A recent study conducted by Pollution Engineering revealed that approximately 40% of the respondents use nonmetallic pumps at their facilities... even more significant, approximately 30% expected the number to increase over the next three years. The primary reasons for the current and anticipated use of plastic pumps were superior corrosion and abrasion resistance and ease of maintenance when compared with metals.

With the growing awareness of the significance of clean air and clean water, there has been an increased use of nonmetallic pumps in a variety of applications. These include scrubbing systems for odor control, chemical feeding for enhanced coagulation, water recovery projects, and neutralization of acidic or alkaline solutions as well as the treatment of a wide range of liquid wastes or toxic fumes to satisfy government regulations.

Consulting engineers and plant operating management play a major role in the specification of pump designs as well as materials of construction... more so than ever because thermoplastic pumps offer a broad choice of chemically-inert formulations for the safe handling of chemicals over the full pH range, and are now available for temperatures to 300°F. In addition, the relatively low initial cost of plastic pumps and their ready availability, in contrast to the rising cost and extended delivery time of metals, have made this choice more significant than ever. Added emphasis on environmentally-friendly and low-maintenance products has further accelerated the demand for sealless, magnetically-driven thermoplastic pumps. Here are two pertinent examples:

Harpeth Valley Water Treatment facility changed from a manual system, using granular hydrated lime, to an automated liquid caustic neutralization treatment system to reduce costs and achieve environmental benefits. According to their plant superintendent, a critical part of the new system involved two Vanton sealless magnetically-driven pumps to transfer the corrosive caustic (25% sodium hydroxide) from the 12,500 gallon storage tanks to a 500-gallon day tank.

One reason for specifying sealless mag-drive pumps was to eliminate any possibility for leakage. The engineers selected the Vanton pump design because it was sealless, eliminating the need for mechanical seals. The pump conformed with ANSI process pump specifications. Vanton designs assure no metal components be in contact with the fluid. The casing, casing cover and impeller were provided in injection-molded, homogeneous polypropylene, and the inner portion of the containment can of the mag-drive unit, the part in contact with



Figure 3



Figure 4



Figure 5

the fluid, was made of polytetrafluoroethylene (PTFE).

As a result of the change from powdered lime to liquid caustic, there has been noticeable improvement in environmental conditions, cleaner air and happier employees and neighbors.

Beckman Coulter, Inc. is a major producer of clinical chemistry agents. When they relocated their Puerto Rico plant to their plant in California, they were determined to upgrade the sulfuric acid chemical feed system to cope with changing environmental and workplace safety requirements, and simultaneously secure higher productivity and quality control. Their engineering department set these two pump specifications:

1. Eliminate any possibility of metallic contamination of the reagents; all fluid contact components were to be made of chemically inert polypropylene or one of the fluoropolymers.
2. Eliminate any possibility of fluid leakage through emissions or spillage; the transfer and circulating pumps were to be the latest sealless, magnetically-driven designs conforming to ANSI B73.1 process pump specifications.

In the Vanton CGM design, all fluid contact components are made of solid, injection-molded virgin, homogeneous polypropylene. This is not a lined pump. The inner magnet assembly is encapsulated in polypropylene, and the large diameter stainless steel shaft is isolated from the fluid by a PTFE Teflon assembly.

According to Jim Williams, Plant Engineering Manager, the Vanton design eliminates the possibility of metal contamination of their high quality product line, while reducing the chance of leakage so necessary to meet proper health and safety standards.

Figure 3: Overview of compact installation showing six Vanton Chem-Gard® Ansi end-suction polypropylene pumps recirculating acid and alkaline solutions for an odor scrubbing system at a Florida waste water treatment plant. The polypropylene material was perfectly suited to handle the liquids, which had varying pH levels of 3-12. Pumps were designed to deliver 650 GPM @ 38' TDH.

Figure 4: Two of eight Vanton PVC Sump-Gard® vertical pumps employed at a water treatment plant in Arizona. Pumps were chosen for their ability to handle different chemicals at varied concentrations such as sulfuric acid, sodium hydroxide, alum, polymers and carbon slurries. The average flow condition is 50 GPM @ 60' TDH.

Figure 5: Vanton Chem-Gard® magnetically-coupled sealless polypropylene end suction centrifugal pumps transfer liquid caustic from 12,500 gallon bulk storage tanks to 500 gallon day tanks at a water treatment facility in Tennessee. These pumps are tied into a state of the art computerized system, which eliminates manual labor, reduces operating and reporting time and provides more accurate data. Service conditions for these sealless mag-drive pumps are 55 GPM @ 30' TDH.