Garlock

Case Study: Garlock ONE-UP® Diaphragm Doubles Service Life in Battery Slurry Pumps

INDUSTRY

Battery Manufacturing – Coating Process Systems

BACKGROUND

A global manufacturer of batteries and electronic materials required a durable diaphragm solution for its lithium battery coating operation. The facility produces batteries for electric vehicles, energy storage systems, and IT devices, where coating uniformity directly affects product quality and efficiency. Their Air-Operated Double Diaphragm (AODD) pumps transfer viscous, abrasive slurry containing lithium hydroxide and high nickel content to the coating machines. The customer's existing two-piece OEM diaphragms, composed of Santoprene and PTFE layers, were failing after only two to four weeks of service, causing costly downtime and reduced throughput. The company needed a diaphragm with longer service life and superior resistance to aggressive media.

CHALLENGES FACED

The customer's pump system operated in a demanding environment with a high-viscosity, abrasive slurry at elevated temperatures up to 176°F/80°C. As the customer increased the nickel concentration in the slurry, diaphragm degradation accelerated, leading to frequent replacements, inconsistent flow rates, and unplanned shutdowns. The failure of these diaphragms disrupted coating uniformity and caused production losses. The customer needed a single-piece diaphragm design capable of withstanding abrasive wear and chemical attack while maintaining precise flow control to ensure consistent coating quality.

OPERATING CONDITIONS

Size: Custom sizing for AODD pumps

Temperature: 176°F/80°C

Application: Slurry transfer in lithium battery coating lines

Media: High-viscosity slurry containing lithium hydroxide and nickel compounds

SOLUTION AND BENEFITS

Garlock recommended the ONE-UP® Diaphragm, engineered with a PTFE diaphragm layer bonded to an elastomer backing in a single, seamless construction. The ONE-UP®'s design eliminates potential leak paths between layers while offering superior chemical resistance, flex life, and mechanical durability compared to traditional two-piece diaphragms. After a successful trial, the ONE-UP® diaphragm demonstrated more than twice the service life of the previously used competitor diaphragm. Based on this performance, the plant transitioned its entire fleet of AODD pumps to the ONE-UP® diaphragm, which has remained in continuous operation since installation.

For more information, please visit:
http://www.garlock.com

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