



# NEMO<sup>®</sup> Magnetic Drive Progressing Cavity Pump

## Lithium-Ion Battery Electrode Coating Service Success

### The Problem: Improving Battery Production Processes

As transition to electric vehicles and mobile systems continue to grow, the demand for lithium-ion batteries multiplies. In parallel to the demand growth, battery designs and manufacturing methods are continuously evolving to pack more energy storage capacity into each cell requiring tighter tolerances, better production processes and stricter quality standards.

The critical battery manufacturing step, producing the cell's anode and cathode electrodes, is made by applying a very thin, even thickness of slurry on to a sheet of copper or aluminum foil. Slurry is pumped to the coating machine slot-die that applies the coating.

#### The Coating Challenge: Perfection or Scrap

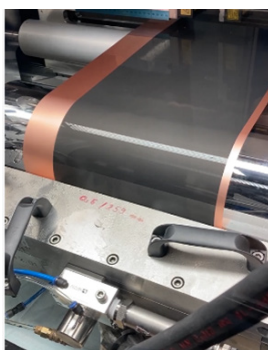
The standard pump technology used to convey this solids laden, abrasive, viscous slurry to the coating machine is progressing cavity pumps. This is due to progressing cavity pumps being precise, steady, pulsation-free, permitting extremely accurate, smooth, even coating layers.

In the highly competitive, cost conscious lithium-ion battery industry, manufacturers continuously look for more advanced pump technology that will allow them to produce greater

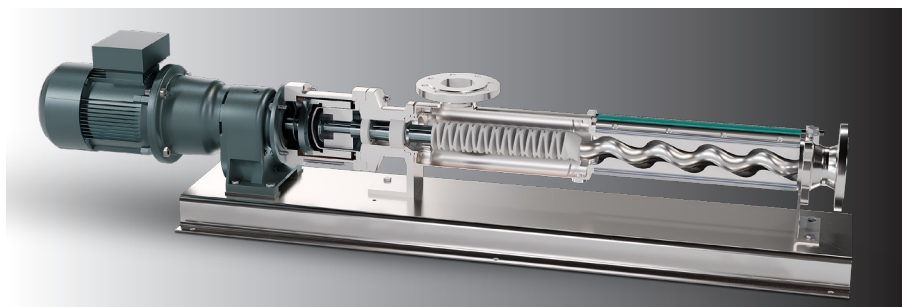
quantities of higher quality batteries at lower costs. Their primary coating pump needs include;

- Less maintenance labor
- Lower maintenance parts cost
- Decrease maintenance downtime
- Decrease coating defects
- Increase productivity

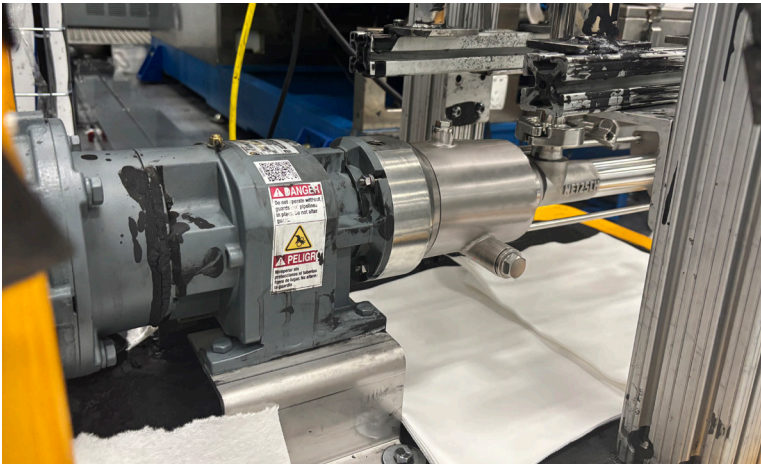
One US lithium-ion battery manufacturer was not satisfied with their typical progressing cavity pumps for their electrode coating services. They were experiencing high repair costs to replace leaking mechanical seals, which also required significant labor to repair. Their pumps also needed to be routinely fully



Coating Machine Slot-die Applying Anode Slurry



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disassembled between runs to ensure they were completely cleaned out of all residual slurry in confined spaces. Plus, the pumps let condensed gases get into the slurry feed system, which would form bubbles on the electrode surface creating small pits and voids, scraping portions of the electrode roll, lowering their productivity. They needed something better.

To address these critical coating issues, NETZSCH Pumps developed an advanced progressing cavity pump with a specially designed magnetic drive coupling to drive the pump shaft, eliminating the shaft seal, hermetically sealing the pump. This technology eliminates all fluid and vapor leaks, avoids formation of air bubbles, and stops time and cost to replace leaking mechanical seals. Additionally the pump has a clean-in-place (CIP) port, so the pump can be cleaned out after coating production runs simply by running a cleaning solution through the pump, without needing to disassemble it. The pump can also be supplied with all metal-free wetted wearing parts to stop worn metal particles entering the slurry.

The manufacturer tested a NEMO® magnetic drive progressing cavity pump on their coating system, installing one in early 2025. They ran extensive tests evaluating the electrode coating profile and quality, pump performance, and pump maintenance cost requirements during the trial. They were very pleased with all the results.

The manufacturer found the new magnetic drive pump showed significant quantitative and qualitative improvements, reducing their maintenance costs and defects while improving their productivity.

**The magnetic drive pump's annual operation and maintenance cost savings are in excess of \$23,254 per pump, per year.**

Concluding the NEMO® magnetic drive progressing cavity pump trial, and savings analysis, the manufacturer decided to convert all their current coating pumps to the magnetic drive NEMO® progressing cavity pump technology.

### Annual Operating Costs Battery Electrode Coating Pump Service

Costs	Typical PCP Design with Mechanical Seal	NETZSCH Advanced Design Magnetic Drive PCP
Replacement Parts Cost	\$6,437	\$3,500 (est.)
Rebuild/Clean Time Cost	\$8,574	\$2,143
Other Rebuild / Repairs Maintenance Cost	\$8,832	\$0
Downtime Cost for Leaking Mechanical Seal	\$5,054	\$0
<b>Total</b>	<b>\$28,897</b>	<b>\$5,643</b>
Ease of Cleaning	Partial Cleaning	Thorough cleaning
Productivity	Baseline	10% increase
Coating Defects	Baseline	40% decrease

### Battery Electrode Coating Pump Data

Pump type:	NEMO® NM011MY
Flow Rate:	up to 0.12 gpm / 455 mL/min
Pressure:	up to 25 psi / 1.7 bar
Medium:	Anode & Cathode Electrode Slurries

**NETZSCH®**

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