

# NETZSCH

Proven Excellence.



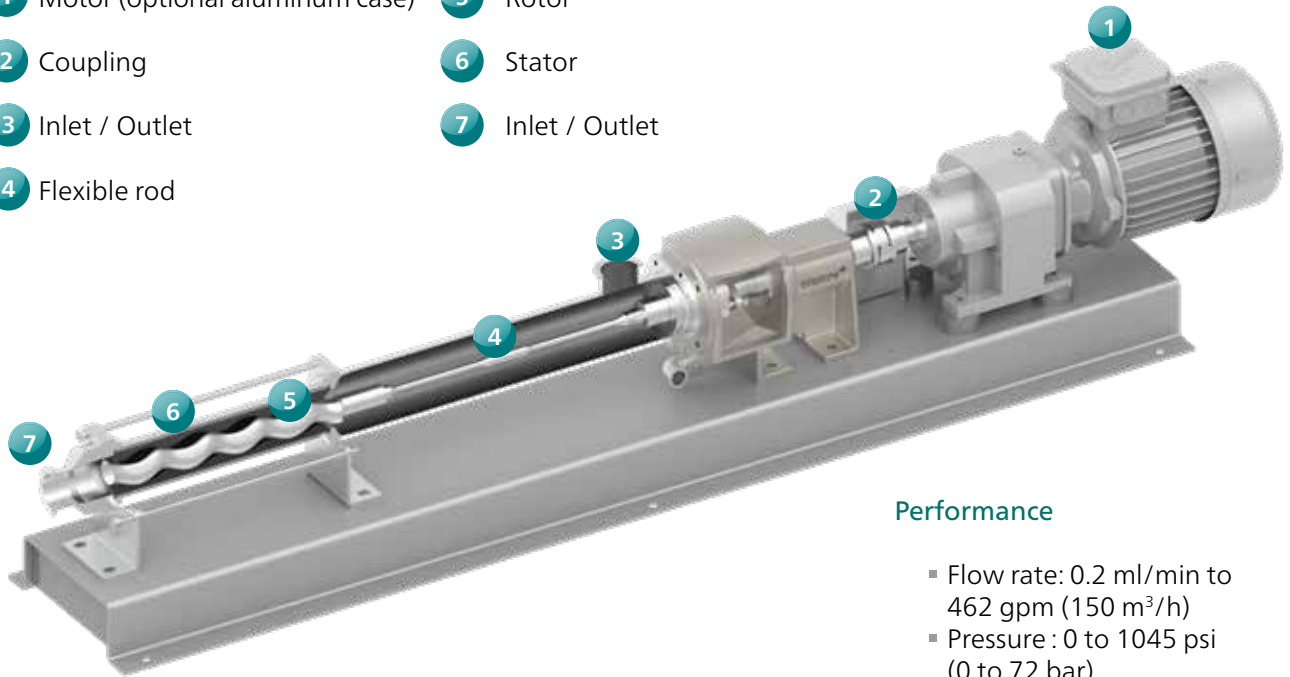
## Application of NETZSCH Products in Lithium Battery Manufacturing Industry

Pulsation-free, high precision metering, corrosion resistance

Pumps & Systems

# NEMO® Progressing Cavity Pumps

- 1 Motor (optional aluminum case)
- 2 Coupling
- 3 Inlet / Outlet
- 4 Flexible rod
- 5 Rotor
- 6 Stator
- 7 Inlet / Outlet

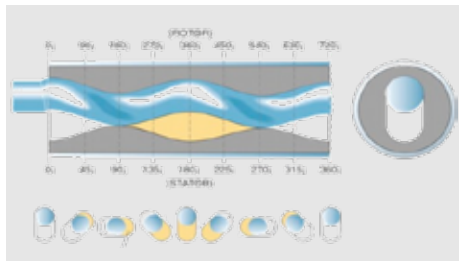


## Performance

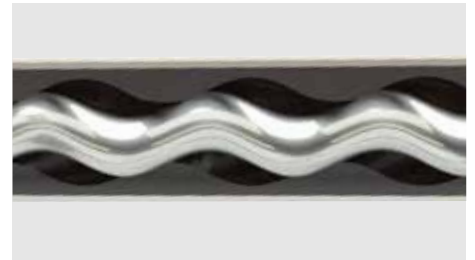
- Flow rate: 0.2 ml/min to 462 gpm (150 m<sup>3</sup>/h)
- Pressure: 0 to 1045 psi (0 to 72 bar)
- Viscosity: 0 to 3,000,000 cp max.

## Features of NEMO® Progressing Cavity Pumps

- Flow rate is proportional to speed



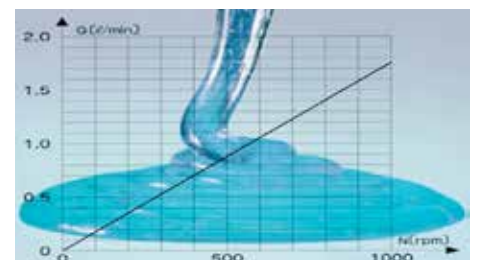
- Stable conveying, no shearing to medium



- High accuracy up to  $\pm 1\%$



- Suitable for conveying medium and high viscosity materials



# Lithium Battery Application

## of Progressing Cavity Pumps

### Features

- No metal contact between wet components, so that no metal abrasive particles enter the medium.
- Rubber material has good chemical resistance.
- The pump can run in reverse under negative pressure to remove bubbles in the medium (vacuuming).
- There are a variety of metal materials to process wetted parts.

### Medium characteristics

- Can transport electrode slurries, electrolyte conductive material, adhesive, UV resin, coating paste and other functional materials.
- In the production of pole pieces, various types of positive and negative electrode slurries, including solvent-based / water-based media.
- Can transport various materials such as NMP, CNT, DIW, SBR, etc.

### Reasons for choosing NEMO® pumps for lithium battery manufacturing

- Accurate fluid measurement and metering.
- Capable of pumping highly viscous material.
- No metal abrasive particles.
- No lubricants or oil in the pump that could contaminate the process fluid.
- Can be evacuated.
- Suitable materials (battery-resistant stator, duplex stainless steel rotor and wet parts).



Application in stirring tank workshop



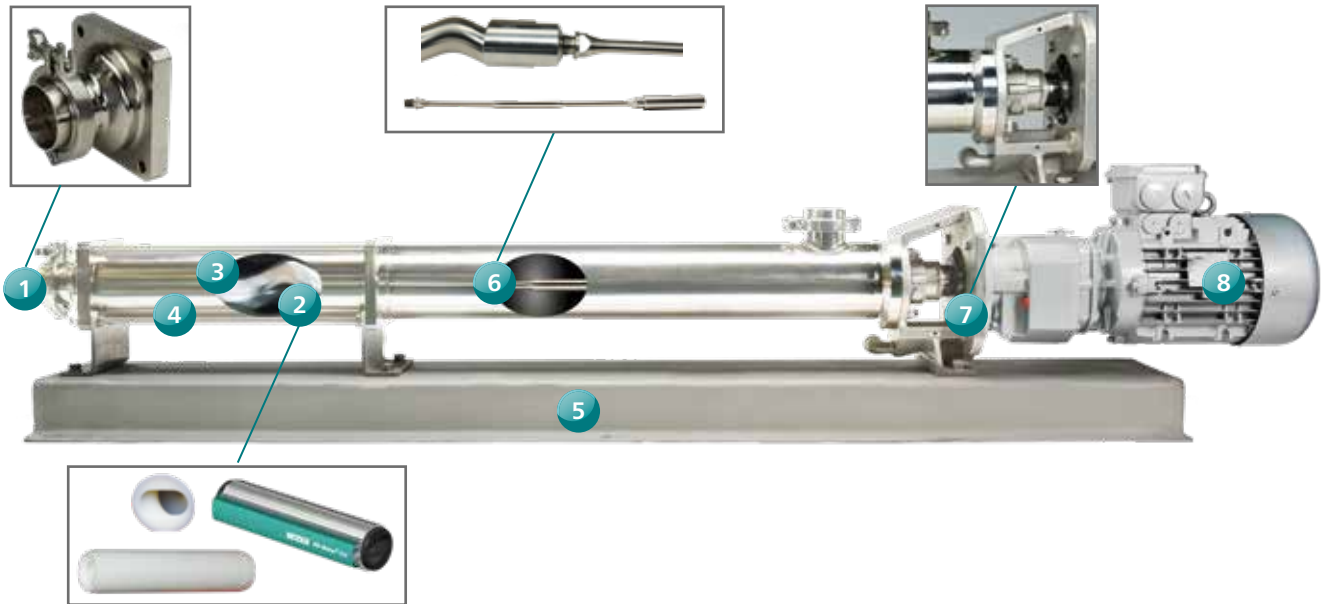
Application in storage reservoir discharge workshop



Application in coating process



# Design Characteristics



## 1 Connector

Hygienic quick-connections are used for inlet and outlet, which is convenient for replacement disassembling and cleaning the pump.

## 2 Stator

Stator materials available for abrasion resistance and chemical attack. PTFE and other rubber materials are resistant to corrosion by lithium slurry. Optional iFD-Stator® has an aluminum shell and allows for replacement of only the rubber portion, saving cost and maintenance time.

## 3 Rotor and wet parts

The rotor and wet parts are made of duplex stainless steel, which has good corrosion resistance. In special cases, the ceramic rotor can be used.

## 4 Thru bolt

Thru bolts are constructed with a quick-change design and are manufactured out of stainless steel.

## 5 Base plate

The base plate can be made of stainless steel to prevent corrosion from falling medium, prevent rust, and ensure the production site is clean.

## 6 Flexible rod

A flexible rod is used so there is no joint lubricant required thus preventing the rupture of protective joint sleeves causing lubricant to leak into the medium.

If joints are used they can also lead to the internal metal parts of the joint grinding during wear and which can get into the battery medium when the joint fails thereby affecting battery quality. The flexible rod with threaded connection is also convenient for disassembly, easy to replace the rotor head, and convenient for maintenance.

## 7 Shaft Seal

A packing gland seal is used to prevent oil from entering the contaminated medium. No lubricant is required. When the medium is suitable, a mechanical seal can also be used.

## 8 Motor reducer

The motor case can be made of aluminum to prevent spilled or falling medium from corroding the motor and it is easy to clean. The motor can be an ordinary motor or an explosion-proof motor according to user requirements. The Mini-pump can use planetary gear reducer+ servo motor.

### According to customer requirements

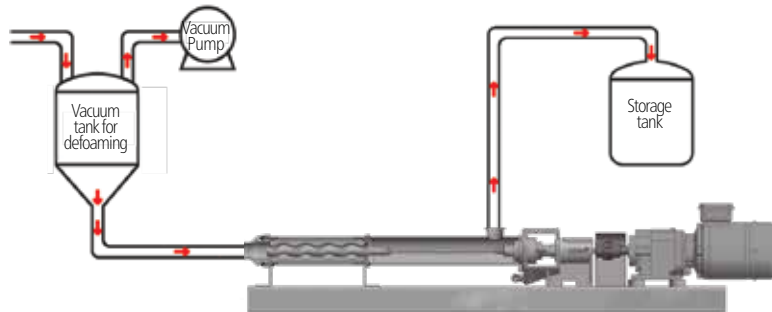
- Can be a directly connected structure or with bearing housing structure.
- Pump housing is polished stainless steel.

# NEMO® Progressing Cavity Pumps

## Application in Lithium Battery Manufacturing Industry

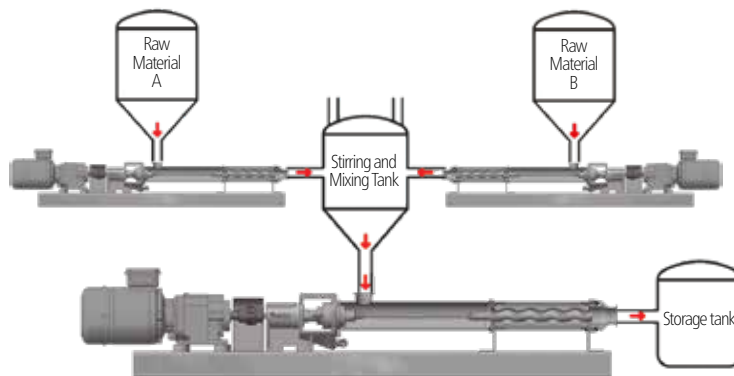
### Vacuum defoaming process

Slurries can be strongly suctioned even under high vacuum conditions.



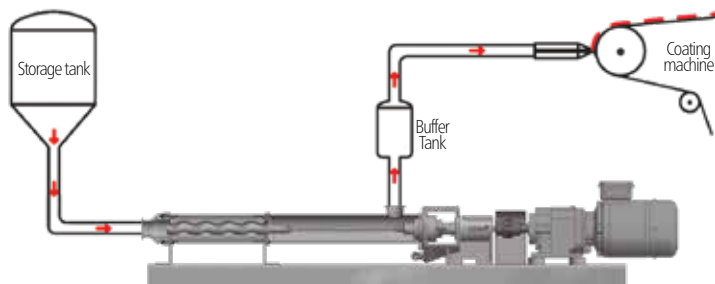
### Stirring process

One or more NEMO® pumps can transport a variety of primary raw materials to the stirring tank. After being stirred at a high speed by the stirring tank, the NEMO® pump will transport the media to the storage tank.



### Coating process

High viscosity and high-concentration slurries can be steadily supplied without pulsation to a coater, providing a thin and even film thickness.



# NEMO® Mini Pumps & Dispensers

## NEMO® Mini Pump

The pump body and housing will have duplex stainless steel construction with stainless steel lantern. The pump is capable of being equipped with a servo motor and frequency converter.



### Performance

- Flow rate: 0.05 gpm to 132 gpm / 0.2 l/h to 500 l/h
- Pressure : 0 to 174 psi / 0 to 12 bar

### Advantages

- Small and compact
- Precise control with control system
- With sanitary quick change coupling
- For coating feed

## NEMO® Mini Pump

NEMO dispensers provide very accurate metering and extremely high repeatability and accuracy. These dispensers are widely used in the coating process in battery manufacturing.

### Performance

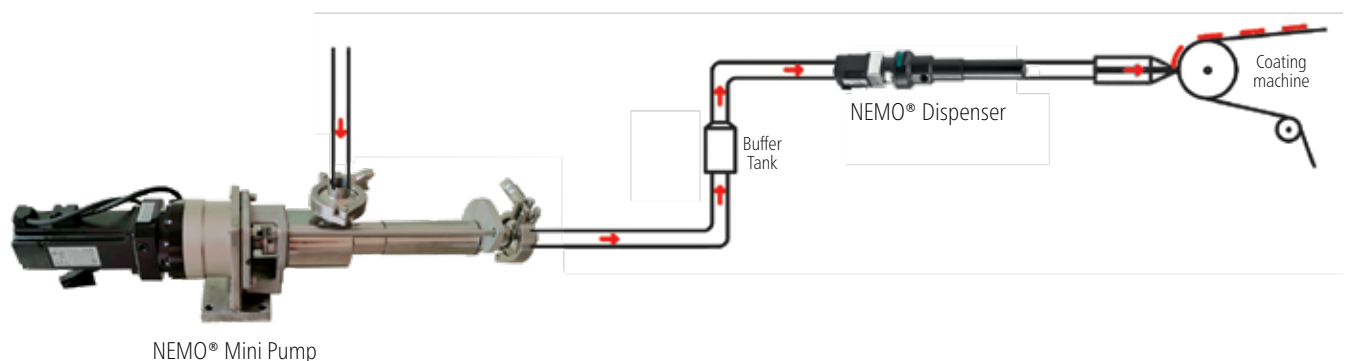
- Flow rate: 0.05 ml/h to 9 ml/h
- Pressure : 0 to 174 psi / 0 to 12 bar



### Advantages

- Uniform coating
- No accumulation, dripping or breakpoints
- Driven by servo motor for high precision and automated control

Through centralized control of multiple pumps, manual / single adjustment or simultaneous control of all pump flow changes can be achieved, specially developed for battery film coating, the most demanding accuracy and automation conditions during process.



# Various Customized Designs



Mini pump with Servo Motor



Battery pump with white motor and stainless steel bearing housing structure



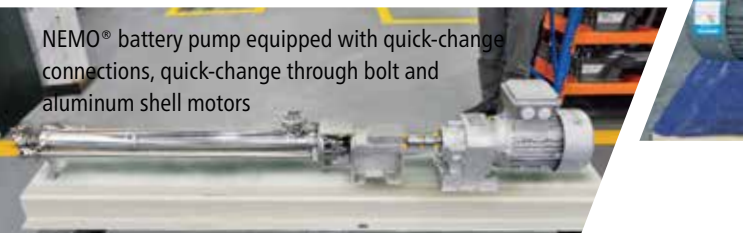
Battery pump equipped with the servo motor to be equipped with quick change connectors



Battery pump with white motor customized according to customer requirements




NEMO® battery pump with servo motor



NEMO® battery pump equipped with quick-change connections, quick-change through bolt and aluminum shell motors



Stainless steel battery pump equipped with ordinary motor



The NETZSCH Group is an owner-managed, international technology company with headquarters in Germany. The Business Units Analyzing & Testing, Grinding & Dispersing and Pumps & Systems represent customized solutions at the highest level. More than 4,000 employees in 36 countries and a worldwide sales and service network ensure customer proximity and competent service.

Our performance standards are high. We promise our customers Proven Excellence – exceptional performance in everything we do, proven time and again since 1873.

The NETZSCH Business Unit Pumps & Systems offers NEMO® progressing cavity pumps, TORNADO® rotary lobe pumps, NOTOS® screw pumps, PERIPRO™ peristaltic pumps, macerators/grinders, metering technology and equipment custom built for challenging solutions for different applications globally.

## Proven Excellence.

NETZSCH Pumps USA  
119 Pickering Way  
EXTON, PA 19341  
Tel.: 610 363-8010  
Fax: 610 363-0971  
[npa@netzsch.com](mailto:npa@netzsch.com)

NETZSCH Pumps USA  
1511 FM 1960 Road  
Houston, TX 77073  
Tel.: 346 445-2400  
[npa@netzsch.com](mailto:npa@netzsch.com)

NETZSCH Canada, Incorporated  
500 Welham Road  
Barrie, ON L4N 8Z7  
Canada  
Tel.: 705 797-8426  
Fax: 705 797-8427  
[ntc@netzsch.com](mailto:ntc@netzsch.com)



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[pumps-systems.netzsch.com](http://pumps-systems.netzsch.com)