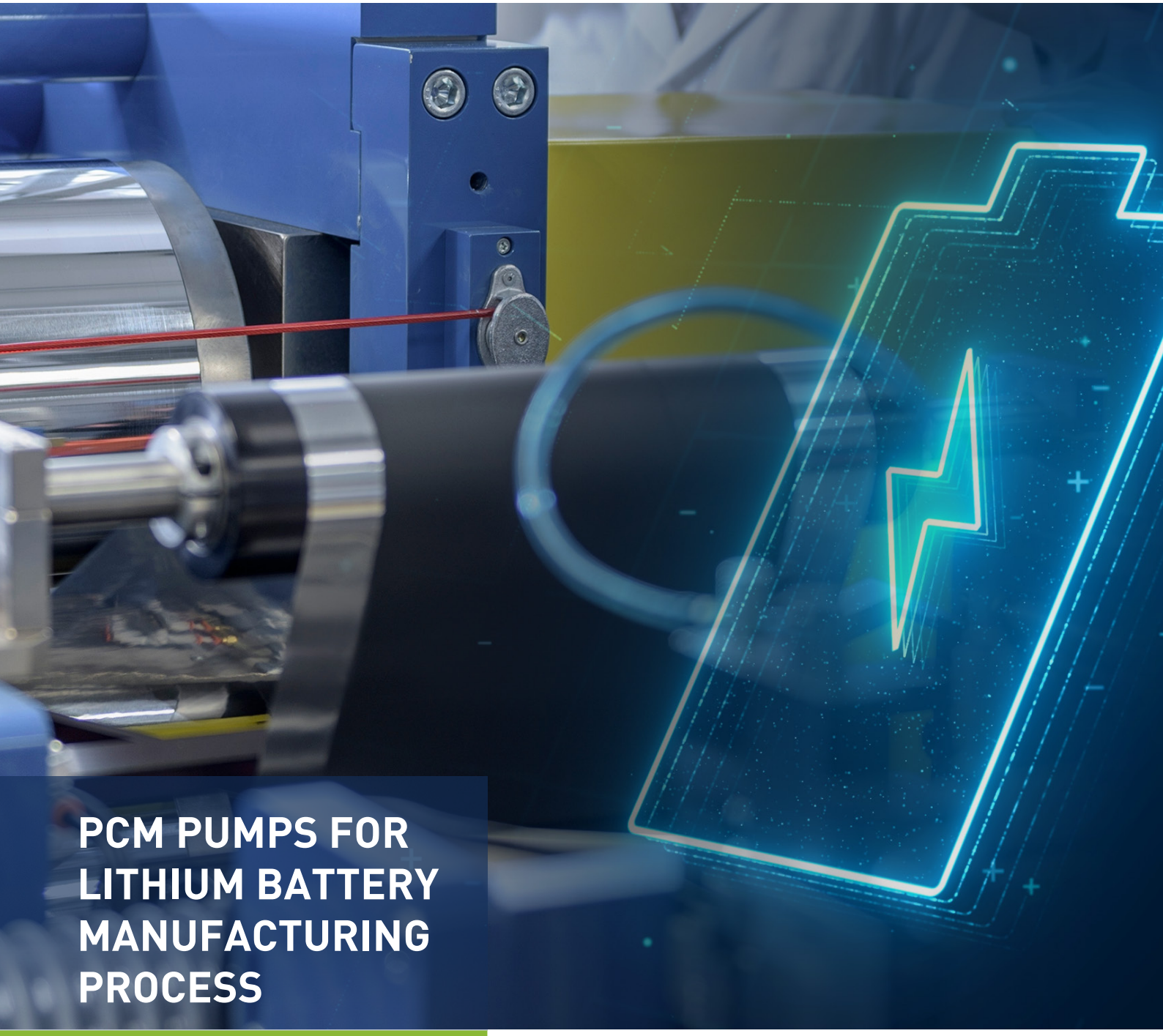
INDUSTRY



PCM PUMPS FOR LITHIUM BATTERY MANUFACTURING PROCESS

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PCM | keep it moving

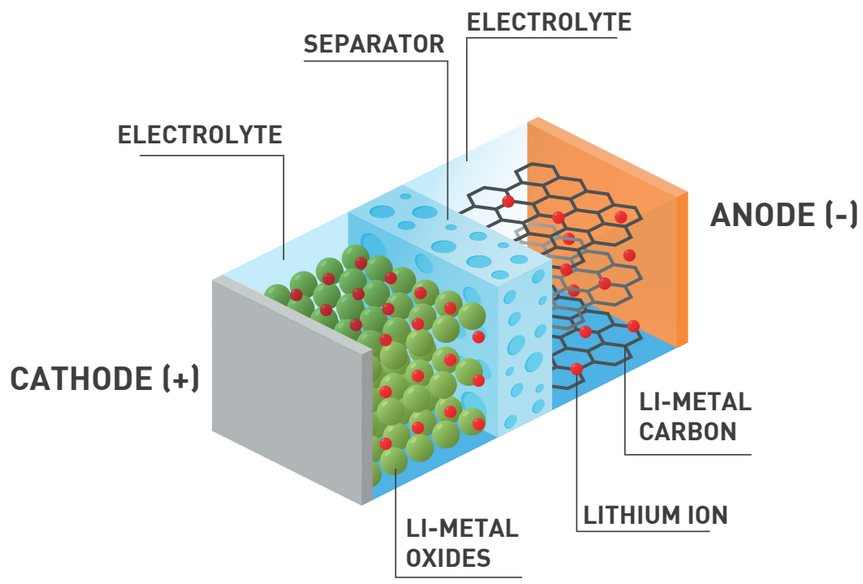
Lithium global demand is constantly increasing for few years and this increase should be even stronger in the coming years. Main part of lithium consumption is linked to manufacture battery used in the portable equipment sector (phone, laptop, tools...), in renewable energies storage and electric transports (bikes, cars, scooters).

Despite their high costs (compared to other battery technologies), Lithium-ion batteries are used for their performances and their long life. They are composed of :

- **Electrode (anode or cathode) :** these are collectors on which lithium inks are coated.
- **Separators :** microporous polyolefin films (polymers) positioned between cathode and anode of the batteries.
- **Electrolyte :** non-aqueous or aprotic solutions (which cannot contain or donate electrons). Most of time, they are lithium salts dissolved in dimethyl, ethylene, or diethyl carbonate (organic solvents)

The quality and purity of the materials used combined with an optimal chemical composition will give the lithium battery the best possible range and performance.

PCM pumps are therefore perfectly suited **to transfer viscous and fragile fluid, and they totally respect quality and characteristics of fluids. Our pumps produce very low shear and operate without pulsation.** They are suitable for a **wide range of processes,** particularly those requiring **consistency and precision, such as the dosing and coting of lithium solutions.**



PCM AT THE HEART OF THE BATTERY
MANUFACTURING PROCESS

1

Raw materials are transported and stocked in different tanks.

2

Then, they are transfered in a mixing tank in order to be mix together. Anode or cathode paste is mixed with a solvent (NMP) to facilitate the coating process. This paste is also mixed with a binder (black carbone) in order to improve the efficiency of batteries.

3

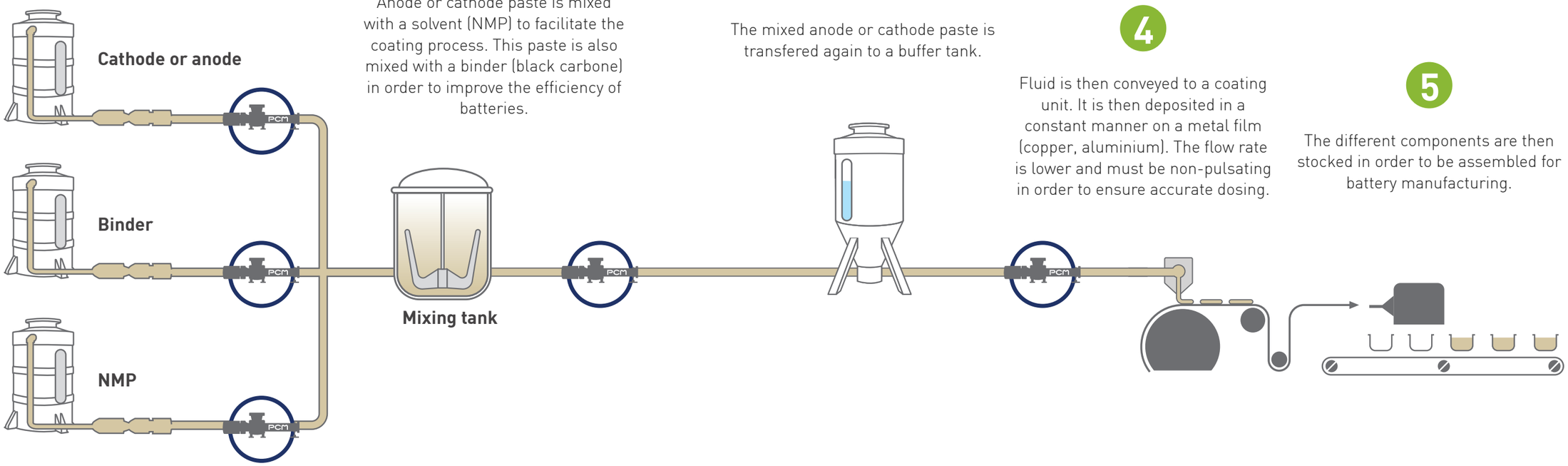
The mixed anode or cathode paste is transfered again to a buffer tank.

4

Fluid is then conveyed to a coating unit. It is then deposited in a constant manner on a metal film (copper, aluminium). The flow rate is lower and must be non-pulsating in order to ensure accurate dosing.

5

The different components are then stocked in order to be assembled for battery manufacturing.



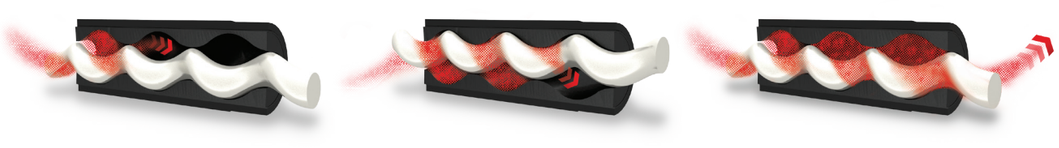
PCM TECHNOLOGIES

PCM provides a wide range of positive displacement pumps, designed to meet your needs whatever industry you are working in.

PRINCIPLE OF THE TECHNOLOGY MOINEAU™

A Moineau™ pump consists of a helical rotor turning into a helical stator. When the rotor turns inside the stator, the honeycomb progresses spirally along the axis of the pump without changing either shape or volume. This action transfers the product from the pump suction to the pump discharge without degrading the product.

This basic principle of Moineau™ pumps allows a high accuracy of flow and pressure, making these pumps extremely efficient for transferring and dosing the most complex fluids.



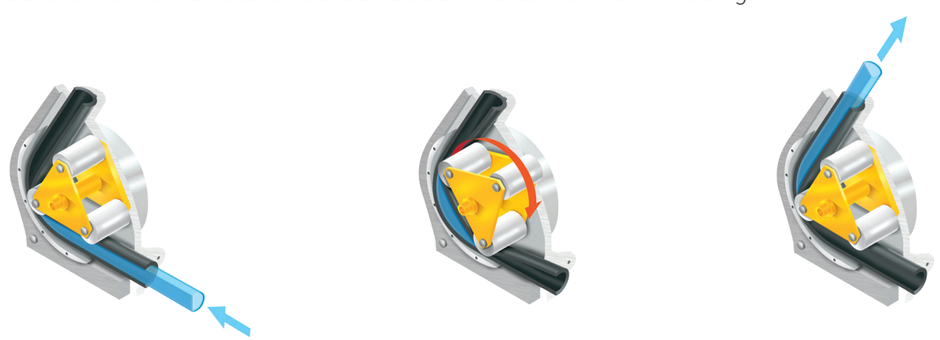
PCM Moineau™ pumps are configurable to perfectly fit to the multiple applications proposed by their users. From the choice of the elastomers of their stator, to the coating of their rotor, through the choice of the types of dynamic seals of their drive, but also many other options, each PCM Moineau™ pump is modular and thus meets all constraints.

BENEFITS

- Preserves the texture of fragile fluids (no shearing compared with lobe or centrifugal technologies)
- Handles fluids with solids
- High suction capability
- Self-priming
- Constant non-pulsating flow
- Reversible

PRINCIPLE OF TECHNOLOGY PCM DELASCO™

The peristaltic pumping principle is based on the capacity of a soft elastomer hose to accept a deformation and subsequently recover its initial shape. Peristaltic pumps are provided with either high- or low-pressure hoses, covering a wide range of applications which need versatility and flexibility. PCM Delasco™ pumps are robust, allowing them to transfer very abrasive and corrosive products while being accurate for the measurement of various binders and additives as well as for dosing.



For applications requiring the handling acidic components, only the hose is in contact with the fluid. No metallic parts (copper, zinc, nickel) are exposed with the pumped product. In order to increase the protection of the pump, the body contains a lubricant which reduce reduces friction to ensure performance and minimize maintenance.

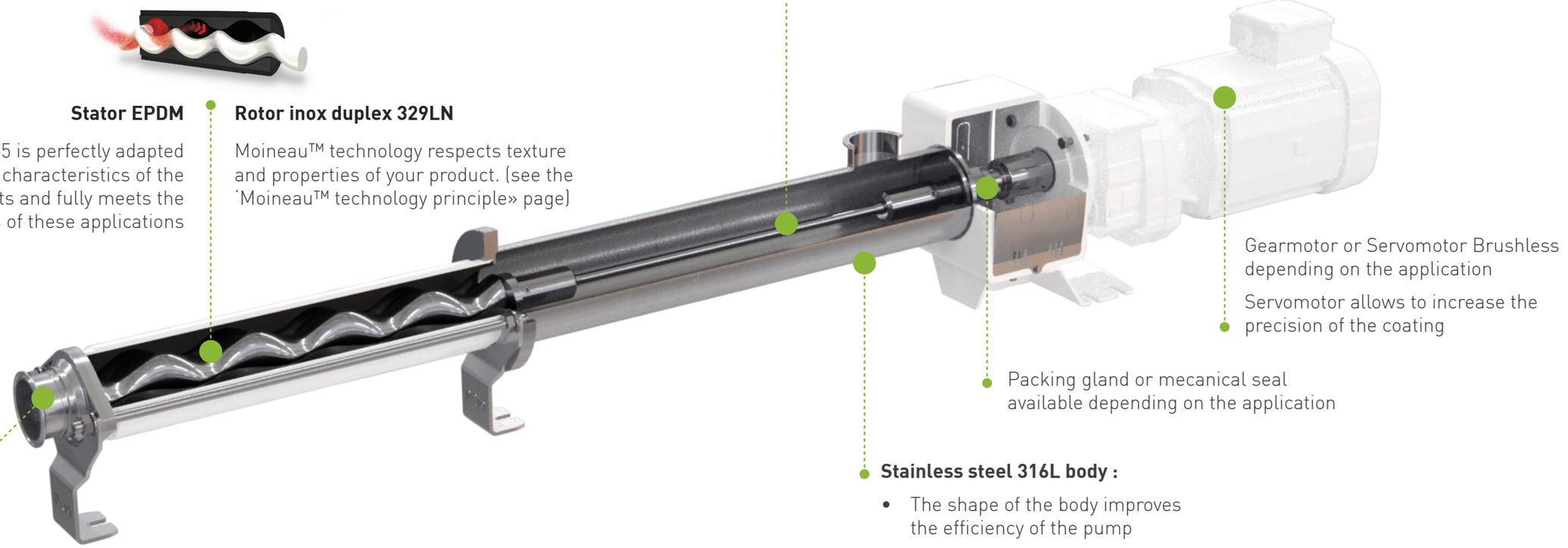
BENEFITS

- Media purity (only one wearing part: the hose)
- Gentle pumping action
- No metallic parts (copper, zinc, nickel) in contact with the fluid
- Self-priming
- Low life cycle costs
- No mechanical seals, valves or gaskets

PCM ECOMOINEAU™ LX

Pump construction

Its revolutionary design combines the legendary performance and reliability of PCM Progressing Cavity Pump technology with a highly modular, eco-friendly design. The EcoMoineau™ LX pump requires less space for installation which reduces costs and makes it easy to integrate into your system (or process). The EcoMoineau™ LX pump is shorter and uses 10% less power than most progressing cavity pumps on the market. The energy used to manufacture, transport and operate the EcoMoineau™ LX pump is therefore optimized. This PCP is made with fewer parts compared to competitors models. This new stainless-steel pump has many design features that makes installation, operation and servicing easier than ever before.



Stator EPDM

PCM EPDM 185 is perfectly adapted to the chemical characteristics of the pumped products and fully meets the requirements of these applications

Rotor inox duplex 329LN

Moineau™ technology respects texture and properties of your product. (see the 'Moineau™ technology principle» page)

Available connections :

- SMS
- CLAMP
- DIN 11851
- ISO flanges

Duraflex flexible shaft :

- **Titanium** : high quality and reliability
- 3 years warranty
- Small footprint due to flexible shaft

Designed in one piece, it has no possible **retention zones, which limits material loss.** The total absence of wear parts prevents **any risk of metal particles** being dropped into the product. **No sheaths, grease, or oil** in the pump, and therefore **no risk of contaminating the product**

Gearmotor or Servomotor Brushless depending on the application

Servomotor allows to increase the precision of the coating

Packing gland or mecanical seal available depending on the application

Stainless steel 316L body :

- The shape of the body improves the efficiency of the pump

ECO-DESIGN PUMP

• 10% less power consumption compared to most Progressing Cavity Pump's on the market
• Less raw materials

EASY AND QUICK DISMANTLING

• The seal can be changed by simply disconnecting the drive
• Removal of the shaft line (rotor, connecting rod, drive shaft) without dismantling the piping

LITHIUM SOLUTION / BLACK CARBONE
TRANSFER

TECHNICAL INFORMATION :

- Monobloc mounting
- 329LN Duplex stainless steel rotor
- EPDM stator
- Titanium Duraflex flexible shaft
- Packing gland PTFE
- CLAMP ISO 2852 Connections
- Gearmotor

ANODE / CATHODE PASTE 4-10 BAR

POSITION	RANGE	TYPE	Q MINI (m3/h)	Q NOM (m3/h)	Q MAX (m3/h)	RPM Q MINI (tr/mn)	RPM Q NOM (tr/mn)	RPM Q MAX (tr/mn)	F Q MINI (hz)	F Q NOM (hz)	F Q MAX (hz)	MOTOR POWER (kw)	NORD WITH CTP	RPM NOM (tr/mn)	WEIGHT (kg)	PRICE
1	LX	6LX12	0,22	0,31	0,40	58	85	105	41	61	75	0,37	SK172	47	36	
2	LX	13LX12	0,36	0,66	0,96	78	115	145	40	59	70	0,75	SK372	116	47	
3	LX	18LX12	1,02	1,51	3	85	110	190	35	46	80	1,5	SK372	110	104	
4	LX	25LX12	3	3,9	4,8	125	160	190	38	49	58	3	SK572	160	120	
5	LX	40LX12	4,8	6,9	9	110	150	190	44	60	77	5,5	SK772	151	264	

NMP, SOLVENTS
TRANSFER

TECHNICAL INFORMATION :

- Monobloc mounting
- 329LN Duplex stainless steel rotor
- EPDM stator
- Titanium Duraflex flexible shaft
- Mechanical seal SIC / SIC / EPDM
- CLAMP ISO 2852 connections
- Gearmotor

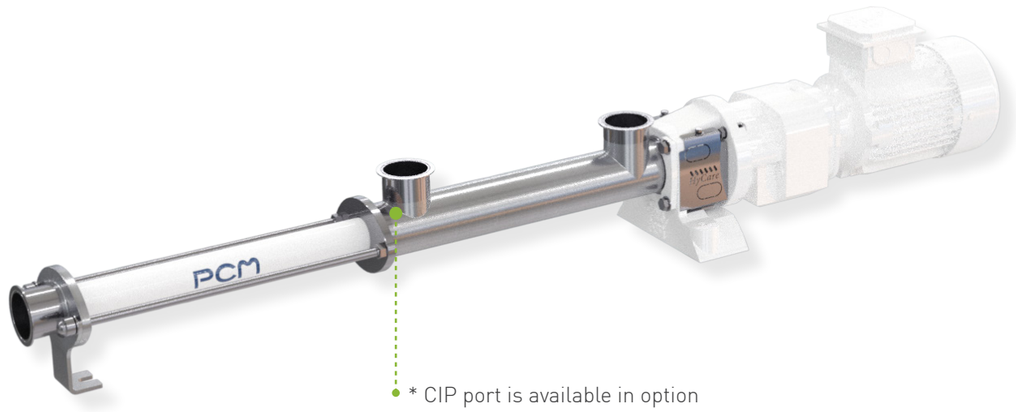
NMP, SOLVENTS 4-10 BAR

POSITION	RANGE	TYPE	Q MINI (m3/h)	Q NOM (m3/h)	Q MAX (m3/h)	RPM Q MINI (tr/mn)	RPM Q NOM (tr/mn)	RPM Q MAX (tr/mn)	F Q MINI (hz)	F Q NOM (hz)	F Q MAX (hz)	MOTOR POWER (kw)	NORD WITH CTP	RPM NOM (tr/mn)	WEIGHT (kg)	PRICE
6	LX	6LX12	0,22	0,31	0,40	58	85	105	41	61	75	0,37	SK172	47	36	
7	LX	13LX12	0,36	0,66	0,96	78	115	145	40	59	70	0,75	SK372	116	47	
8	LX	18LX12	1,02	1,51	3	85	110	190	35	46	80	1,5	SK372	110	104	
9	LX	25LX12	3	3,9	4,8	125	160	190	38	49	58	3	SK572	160	120	
10	LX	40LX12	4,8	6,9	9	110	150	190	44	60	77	5,5	SK772	151	264	

LITHIUM COATING
DOSING

TECHNICAL INFORMATION :

- Monobloc mounting
- 329LN Duplex stainless steel rotor
- EPDM stator
- Titanium Duraflex flexible shaft
- PAcking gland / Mechanical seal SIC / SIC / EPDM
- CLAMP ISO 2852 connections
- Servomotor / Gearmotor



LITHIUM COATING 4-10 BAR

POSITION	RANGE	TYPE	Q MINI (m3/h)	Q NOM (m3/h)	Q MAX (m3/h)	RPM Q MINI (tr/mn)	RPM Q NOM (tr/mn)	RPM Q MAX (tr/mn)	F Q MINI* (hz)	F Q NOM* (hz)	F Q MAX* (hz)	MOTOR POWER (kw)	NORD WITH CTP	RPM NOM (tr/mn)	WEIGHT (kg)	PRICE
11	LX	05LX24	6	30	50	62	165	250	20	53	80	0,37	SK072	170	27	
12	LX	1LX24	50	80	120	85	125	175	39	56	80	0,37	SK072	135	27	
13	LX	3LX24	120	195	270	90	135	175	43	62	80	0,55	SK572	160	36	

* calculation made for a gearmotor, these datas are not correct if the pump is equipped with a servomotor

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