

# NETZSCH

Proven Excellence.



## Food & Pharmaceutical

Solutions for all your difficult processes from raw material receipt to product packaging

Pumps & Systems



# You've got the application,

## WE'VE GOT THE SOLUTION

Within the Business Unit Pumps & Systems, Food & Pharmaceutical holds a crucial position all over the world with regard to uncompromising hygiene and most demanding process requirements in all manufacturing areas.

### **We have our finger on the pulse**

Products should keep fresh for a longer period of time but still maintain their original quality standard. Our pumps as the "driving force" in your production process are a key ingredient of your product quality. We develop, manufacture and sell positive displacement pumps which ensure in all process stages a hygienic and smooth conveyance of high quality and shear-sensitive media.

### **Driving forces**

Two different types of pumps are available for various process requirements: NEMO® sanitary and aseptic progressing cavity pumps and TORNADO® sanitary rotary lobe pumps.

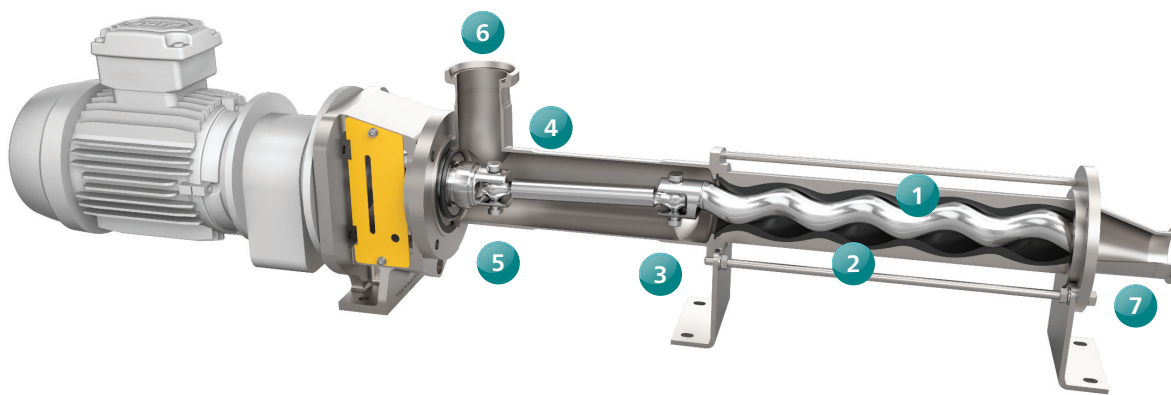
### **Engineering partnerships**

With our customers from all over the world we are able to incorporate the latest market trends and requirements into the development and improvement of our products. Therefore new possibilities for your manufacturing process continually arise.

# NEMO® for Hygienic Applications

## IN BLOCK CONSTRUCTION OR WITH BEARING HOUSING

### NEMO® BH Hygienic Sanitary Pump in standard version



#### 1 Rotor

Stainless steel polished to 32 Ra

#### 2 Stator with reduced wall thickness

For changing product temperatures and applications with a wide temperature range, a patented stator with reduced elastomer wall thickness is available. In addition, a thermal stator protector (STP-2 or STP-D) for overheating and dry running protection may be used.

#### 3.1 Standard joints (not shown)

Require food grade materials and lubrication.

#### 3.2 Hygienic joints

Patented, open, with no dead space, hygienic joints for optimal cleaning.

#### 3.3 No Joints (not shown)

For ultra hygienic or high risk product flexible rod negate the need for any joint.

#### 4 Drive train

Drive and connection shaft with coupling rod and two hygienic joints for drive transmission to the rotor.

#### 5 Sealing housing

Wide variety of hygienic mechanical seals chosen to meet specific application requirements.

#### 6 Tangential Suction

Creates more efficient flow (standard on all Sanitary Advanced and Sanitary Advanced Plus Pumps)

#### 7 Discharge Port

To be at lowest point, optimizing drainability (standard on all Sanitary Advanced and Advanced Plus Pumps)

# Food Contact Surfaces

## HYGIENIC DESIGN AND IN BETWEEN

### The difference between food contact surfaces, hygienic design and in between



FDA compliant materials are used in the construction of pumps and equipment which means that they are safe and acceptable for food contact. This equipment will not present a danger to human health nor change the food in an unacceptable way. The materials will hold up when used in the environment for which they are intended.

Hygienic design means pumps and equipment are manufactured using FDA compliant materials but

are also designed for cleanability with hygienic design in mind. This level of design includes the application of minimum radii, the elimination of nooks and crannies, and minimum standards on weld quality and surface finish among other criteria which all minimize or eliminate areas where pathogens can develop.



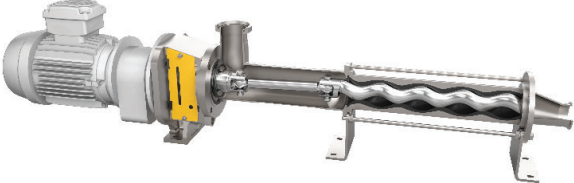









Is there an in-between? No. A design is either certified 3A or it is not but some anomalies occur. For example, a BO Sanitary Prime Hopper pump built with FDA compliant materials is acceptable for food contact. The

BH Sanitary Advanced Hopper Pump while also constructed of FDA compliant materials is based on a 3A certified Sanitary Advanced Pump and has all the hygienic design principles but because it is a hopper pump, the suction area is open and therefore the potential for cross contamination exists. As such, it cannot be classed as a hygienic design despite the internals being of hygienic design.



## NETZSCH's NEMO® Sanitary Pump Tiers

Pump Type	Certification Finish Compliance all wetted parts	Applications
<b>NEMO® BY Sanitary Prime Pump</b> 	 32 Ra .8 microns  External surfaces: Blasted	High acid. High sugar. High fats. Raw materials before being processed. Pet food.
<b>NEMO® BH Sanitary Advanced Pump</b> 	 32 Ra .8 microns  External surfaces: Polished	Meats, dairy products, sauces, cosmetics, personal care. Requiring gentle handling and/or high viscosity. Fully CIP-able.
<b>NEMO® SH Sanitary Advanced Plus Pump</b> 	 32 Ra .8 microns  External surfaces: Polished	Used when CIP time needs to be minimized. High risk product. Liquid eggs, white mass, cultures, low acid pasteurized or protein product.
<b>NEMO® BO Sanitary Prime Hopper Pump</b> 	 32 Ra .8 microns  External surfaces: Blasted	Integrated auger forces non-flowing product into the pumping area. Ideal for fruits, vegetables, meats. Can cope with "sticky" products.
<b>NEMO® BO Sanitary Advanced Hopper Pump</b> 	 32 Ra .8 microns  External surfaces: Polished	High cleanability force feed hopper pump for use in sanitary process. Can be CIP'ed. Hygienic joint.

# NEMO® Sanitary Pumps

## CHARACTERISTICS, FEATURES AND BENEFITS

### NEMO® BY Sanitary Prime Progressing Cavity Pump



Flow 880 gpm / 200 m<sup>3</sup>/h  
Pressure 360 psi / 24 bar  
Particles  $\frac{3}{4}$ " / 18 mm  
Ball Passage 3" / 76 mm

NEMO® BY Sanitary Prime Progressing Cavity Pumps can be used in any area of industry where a great variety of different substances must be pumped or very precisely metered. From low viscosity media to products barely capable of flowing, with or without solid content, shear-sensitive, sticky or abrasive – with the NEMO® BY, even difficult substances are conveyed gently and under low pulsation.

In block construction with a flanged drive, this NEMO® pump is particularly compact. The NEMO® BY is economical with low investment, operating and maintenance costs. Four rotor/stator geometries cover a wide range of products and applications.

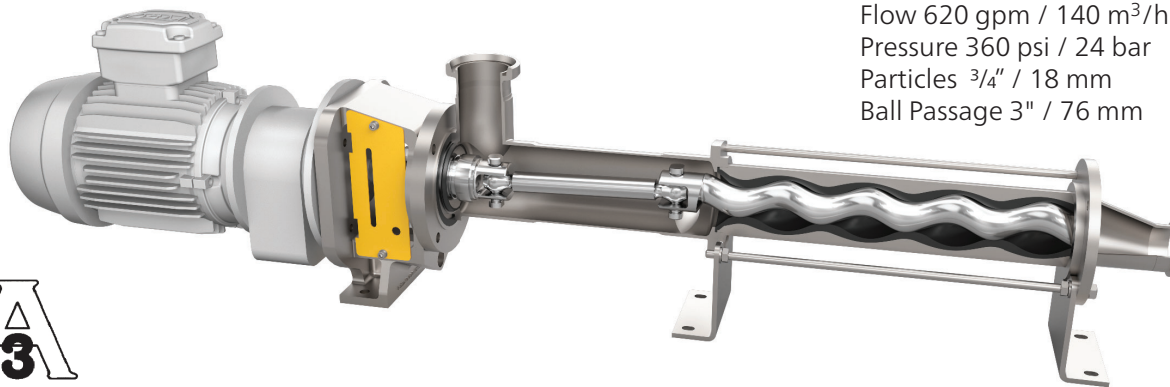
#### Features

- Continuous low-pulsation conveyance unaffected by fluctuations in pressure and viscosity.
- Product volume in proportion to rotation speed with high dosing precision over the entire rotational speed range.
- High pressure capability without valves.
- Mechanical seal located directly under the intake port in the pumping space makes external flushing of the seal unnecessary in many applications.
- Short drive shaft and pump lantern offer high stability for mechanical seal installation.
- Separate flange bearing and pump base make it easy to change the stator.
- Variable modular system.
- Robust and compact block construction.
- Standard: mechanical seal, other seals optional.
- Low noise, low vibration.
- High suction capability up to 27 ftwc/ 9 mwc.
- Bi-directional.
- Vertical or horizontal installation
- Temperatures from -40 °F to 392 °F  
-40 °C to 200 °C.

#### Your Benefits

- Gentle conveyance
- Easy to clean and service
- Low mean time between repairs
- Low noise, low vibration
- Economical operation and routine maintenance requirements only

## NEMO® BH Sanitary Advanced Progressing Cavity Pump



Flow 620 gpm / 140 m<sup>3</sup>/h  
Pressure 360 psi / 24 bar  
Particles  $\frac{3}{4}$ " / 18 mm  
Ball Passage 3" / 76 mm

NEMO® BH Sanitary Advanced Pumps provide superior quality and versatility for food, cosmetics, pharmaceutical and chemical/ biochemical industries. Our pumps are appropriate for clean-in-place processes when provided with optional flushing connections. They also meet 3A standard requirements and can be disassembled quickly for easy cleaning.

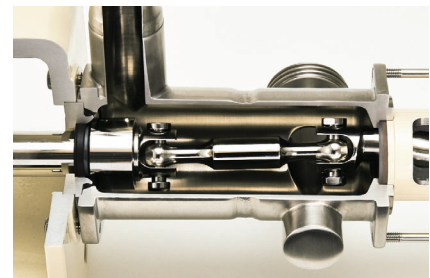
The exclusive NEMO® progressing cavity modular pump design, combined with food grade Nitrile, EPDM or Viton stators create a proven and reliable solution for all your sanitary pump applications.

### Features

- All wetted parts are in 316 stainless steel and are polished to 32 micro inch Ra.
- Crevice free and no dead spaces for optimal cleaning.
- Available with CIP ports (standard or tangential arrangement).
- Standard Tri-Clamp
- Single or double acting mechanical seal (multiple face materials available).
- Steady, non-pulsating metered flow.
- Perfect for shear sensitive products.
- Space saving block construction.

tested according to EHEDG and QHD regulations.

- Low mean time between repairs.
- Suitable for SIP and CIP applications.
- Economical operation and routine maintenance requirements only.



### Your Benefits

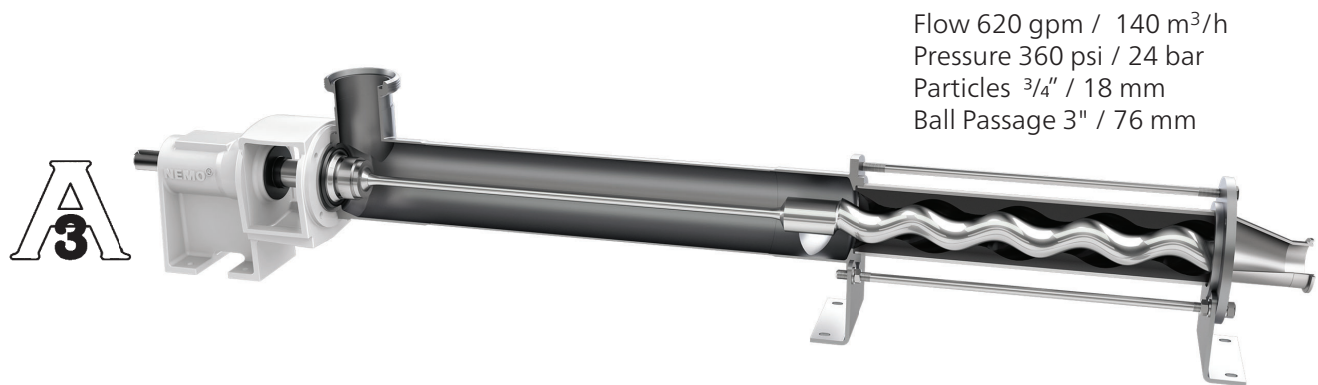
- Very smooth conveyance.
- Easy to clean and service.
- Complies with your 3A Sanitary Standard FDA certified materials and PL certified materials requirements Manufactured/

### Hygienic joint

The specially developed joints are continuously lubricated by the medium without the risk of medium being caught in any dead space.

## NEMO® SH Sanitary Advanced Plus Progressing Cavity Pump

for the strictest hygienic standards

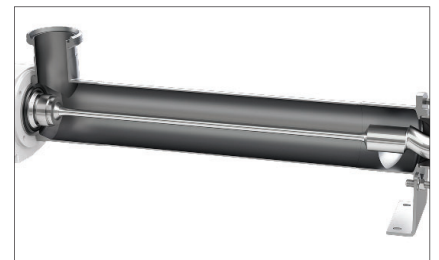


NEMO® SH Sanitary Advanced Plus Pumps provide superior quality and versatility for food, cosmetics, pharmaceutical industries. Our pumps are appropriate for clean-in-place processes when provided with optional flushing connections. They also meet 3A standard requirements and can be disassembled quickly for easy cleaning.

The exclusive NEMO® progressing cavity modular pump design, combined with food grade Nitrile, EPDM or Viton stators create a proven and reliable solution for all your sanitary pump applications.

- Joint free design.
- Crevice free and maintenance free flexible rod design.
- Stationary O-Rings designed to completely fill all spaces.
- Available with CIP ports (standard or tangential arrangement).
- Standard Tri-Clamp.
- Single- or double-acting mechanical seal (multiple face materials available).
- Steady, non-pulsating metered flow.
- Perfect for shear sensitive products.
- Space saving block construction.

- Easy to clean and service.
- Manufactured/tested according to EHEDG and QHD regulations.
- Low mean time between repairs.
- Suitable for SIP and CIP applications.
- Economical operation and routine maintenance requirements only.



### Features

- All wetted parts are in 316 stainless steel and are polished to 32 micro inch Ra.
- Crevice free and no dead spaces for optimal cleaning.
- No dynamic seals or lubrication required.

### Your Benefits

- For uncompromised sanitary applications.
- Certified by 3A Sanitary Standard, FDA certified materials and PL certified materials requirements.
- Very smooth conveyance.

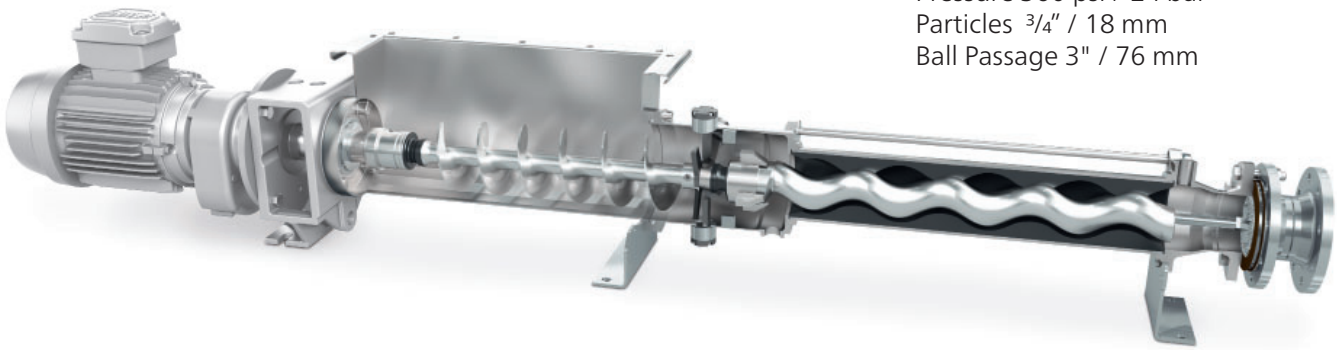
### Flexible Rod

The flexible rod is corrosion-proof and has no dead space. There are no components moving against each other.



## NEMO® BO Cutter Pump

Flow 620 gpm / 140 m<sup>3</sup>/h  
Pressure 360 psi / 24 bar  
Particles <sup>3</sup>/<sub>4</sub>" / 18 mm  
Ball Passage 3" / 76 mm



This NEMO® BO hopper pump with integrated cutting device has been designed for applications in the food industry to enable cutting and conveying in one process step. Large pieces of fruits or vegetables, for example, can be conveniently and quickly shredded and pumped for further processing.

The NEMO® BO progressing cavity pump with hopper and coupling rod with feeding screw and force-feed chamber is employed in almost all branches of industry to provide continuous, pressure-stable, gentle and low-pulsation conveyance.

Also available as BO Sanitary Prime with Cutter

### Features of the pump

- Hopper housing with rectangular inlet flange and feeding screw with force-feed chamber to provide optimal feed for slowly flowing and pasty media into the conveying elements.
- Continuous low-pulsation conveyance unaffected by fluctuations in pressure and viscosity.
- Conveyance volume in proportion to rotation speed with high dosing precision over a broad rotational-speed range.
- High pressure capability without valves.
- Also available with a bearing frame (SO).
- FDA approved materials.

### Features of the cutting unit

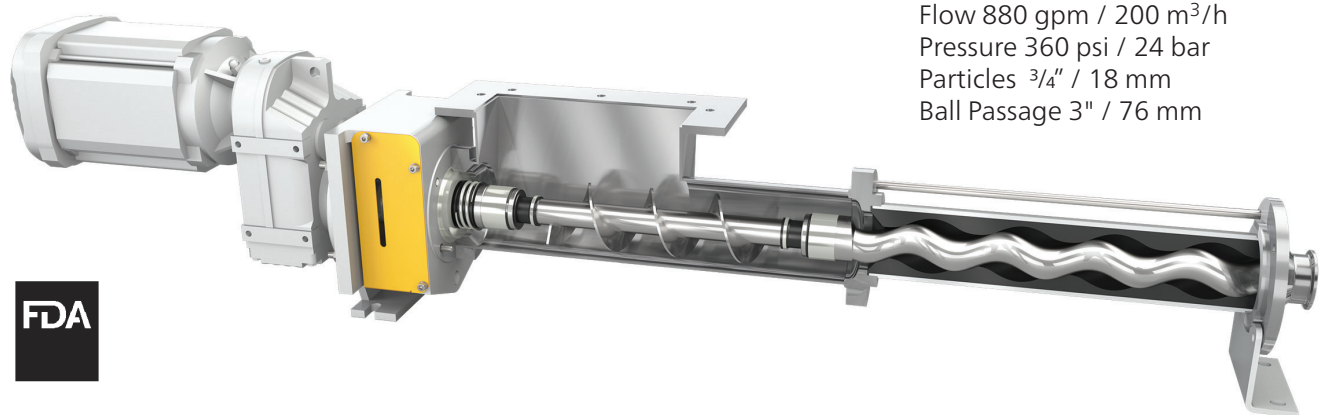
- Cutting unit inside the force feed chamber consisting of a rotating knife with three blades and a variable number of stationary knives adjustable to the size and consistency of the particles.
- Cutting unit at the discharge flange with perforated disc and rotating knife allows for additional fine definition of the particle size (various hole sizes available).

### Your Benefits

- Variable modular system for optimum conveyance and cutting
- Robust and compact construction
- Constant flow
- Ease of service
- Replacing additional machinery

## NEMO® BO Sanitary Prime Open Hopper Pump

Ideal for raw material handling, fruits, vegetables, and meat emulsions



Flow 880 gpm / 200 m<sup>3</sup>/h  
Pressure 360 psi / 24 bar  
Particles 3/4" / 18 mm  
Ball Passage 3" / 76 mm

NEMO® BO Sanitary Prime Hopper Pumps are designed to handle high-consistency products with a low degree of flowability. NEMO® BO pumps provide continuous, pressure-stable, gentle and low-pulsation conveyance with metering in proportion to rotational speed.

The pump housing is designed with a larger, rectangular hopper and force-feed chamber. The coupling rod is equipped with a conveyor auger that transports the product into the rotor/stator system. The auger is oversized and provides about 80% more flow to ensure improved pump efficiency. The conveyor auger is perfectly synchronized with the rotor/stator system and covers almost the entire hopper opening. The hopper opening can be customized to fit individual specifications.

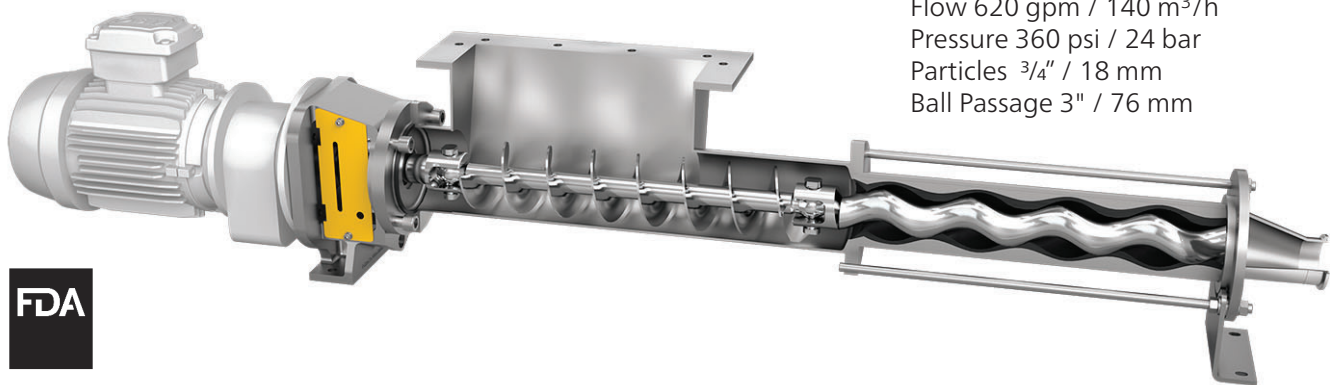
### Features

- FDA compliant materials
- Pump housing with enlarged rectangular hopper.
- Force-feed chamber.
- Integrated feeding screw in the hopper.
- Continuous low-pulsation conveyance unaffected by fluctuations in pressure and viscosity.
- Flow volume in direct proportion to rotational speed.
- High pressure capability without valves.
- Stator with funnel-shaped entrance for optimal filling of the conveying chamber.

### Your Benefits

- Gentle conveyance.
- Economical operation and routine maintenance requirements only.
- Close coupled, compact and economical.
- Low noise, low vibration.
- Easy to clean and service.
- Adaptable to meet your closed-system requirements.
- Can handle non-free-flowing products such as fruits, vegetables, and meat emulsions.

## NEMO® BH Sanitary Advanced Open Hopper Pump



NEMO® BH Sanitary Advanced Plus Open Hopper Pumps are designed to handle high-consistency products with a low degree of flowability. NEMO® BH pumps provide continuous, pressure-stable, gentle and low-pulsation conveyance with metering in proportion to rotational speed.

The pump housing is designed with a larger, rectangular hopper and force-feed chamber. The coupling rod is equipped with a conveyor auger that transports the product into the rotor/stator system. The auger is oversized and provides about 80% more flow to ensure improved pump efficiency. The conveyor auger is perfectly synchronized with the rotor/stator system and covers almost the entire hopper opening. The hopper opening can be customized to fit individual specifications.

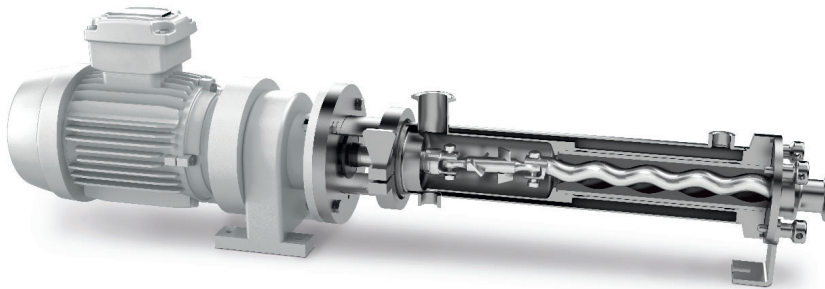
### Features

- Hygienic joint
- FDA compliant materials
- Pump housing with enlarged rectangular hopper.
- Force-feed chamber.
- Integrated feeding screw in the hopper.
- Continuous low-pulsation conveyance unaffected by fluctuations in pressure and viscosity.
- Flow volume in direct proportion to rotational speed.
- High pressure capability without valves.
- Stator with funnel-shaped entrance for optimal filling of the conveying chamber.

### Your Benefits

- Gentle conveyance.
- Economical operation and routine maintenance requirements only.
- Close coupled, compact and economical.
- Low noise, low vibration.
- Easy to clean and service.
- Adaptable to meet your closed-system requirements.
- Can handle non-free-flowing products such as fruits, vegetables, and meat emulsions.

## NEMO® BH Sanitary Advanced Pump with Heating Jacket



Flow 176 gpm / 40 m<sup>3</sup>/h  
Pressure 180 psi / 12 bar  
Particles 1/2" / 12.5 mm  
Ball Passage 2" / 50 mm



NEMO® BH Sanitary Advanced Pump with full heating jacket is suitable for all sanitary applications in the food, pharmaceutical, cosmetic, and biotechnology industries, especially for viscous product which have to be heated or cooled. This pump operates reliably and guarantees your process.

This pump is available with various rotor/stator geometries. It has open sanitary pin joints, exposed housing seals, mixing elements on the coupling rod, and a heating jacket over the entire length of the stator and pump housing. All surfaces that come in contact with the product are polished to prevent deposit formation and to facilitate cleaning.

### Features

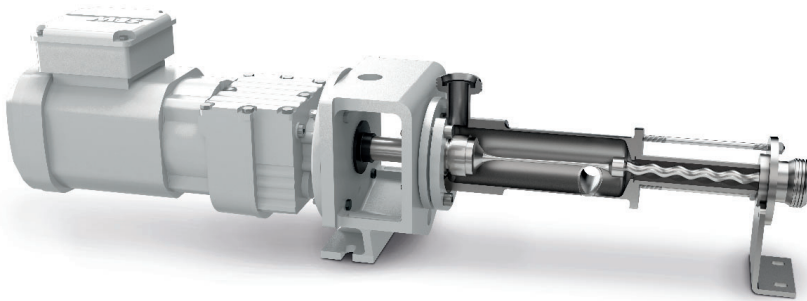
- Specially designed mechanical seals are arranged with no dead spaces
- Open, sanitary pin joints facilitate cleaning
- The housing and stator are heated or cooled
- All surfaces that contact the product are polished to prevent deposit formation
- Quick-fit connections for easy disassembly

### Your Benefits

- Gentle conveyance.
- Heating keeps viscous product flowing
- Pumping of product that requires cooling
- Easy to clean and service.



## NEMO® BH Sanitary Mini Advanced Plus



Flow 0.02 up to 130 gph /  
0.1 up to 500 l/h  
Pressure 520 psi / 36 bar.  
Particles  $\frac{1}{16}$ " / 1.5 mm  
Ball Passage  $\frac{1}{4}$ " / 6 mm



This NEMO® BH Sanitary Mini Advanced Plus pump with a flexible rod that has no dead space and is wear- and maintenance-free so that it can be used even with highly sensitive and with abrasive products. This pump has high metering accuracy (deviation of < 1%). The compact design with directly flanged drive delivers low investment, operating and maintenance costs.

### Features of the pump

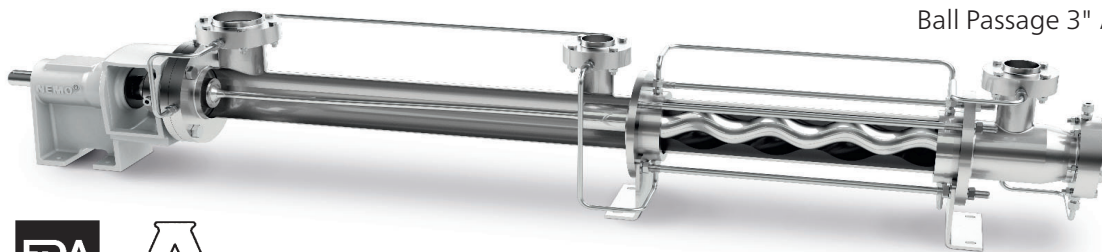
- No dead spaces
- No dynamic seals or lubrication required.
- Joint free design.
- Crevice free and maintenance free flexible rod design.
- High dosing accuracy
- Steady, non-pulsating metered flow.
- Compact design
- Low operating and maintenance cost

### Your Benefits

- Can be used with highly sensitive and with abrasive products.
- Certified by 3A Sanitary Standard, FDA certified materials and PL certified materials requirements.
- Economical operation and routine maintenance requirements only.

## NEMO® SA Aseptic Pump

Flow 620 gpm / 140 m<sup>3</sup>/h  
Pressure 360 psi / 24 bar  
Particles  $\frac{3}{4}$ " / 18 mm  
Ball Passage 3" / 76 mm



The NEMO® SA Aseptic Pump is used for aseptic and hygienic applications providing continuous, pressure-stable, gentle and low-pulsation conveyance and metering in proportion to speed. All hermetic areas can be sealed with steam or sterile condensate to avoid external contamination.

The hygienic design of the components and machines and the cleanability of the system parts (CIP and SIP capable) are defined in numerous regulations. NEMO® pumps are designed, manufactured and tested in accordance with QHD (Qualified Hygienic Design) guidelines. The materials are approved in accordance with FDA (Food and Drug Administration) and EU VO 1935/2004. NEMO® hygienic and aseptic progressing cavity pumps meet the requirements of the 3-A Sanitary Standard of the USA and are GOST-R certified (certificate of conformity for Russia).

### Features

- Perfectly crevice-free pumping space
- Optimized flow through the pump
- Continuous low-pulsation conveyance unaffected by fluctuations in pressure and viscosity
- Conveyance volume in proportion to rotation speed with high dosing precision over a broad rotational-speed range
- High suction and pressure capability without valves
- Reversible conveyance direction
- Stator with hopper-shaped entrance for optimal filling of the conveying chamber

### Your Benefits

- Conveyance under aseptic conditions
- Flexible rod design for uncompromising hygiene and long service life
- Gentle product conveyance
- Long production cycles with contamination-proof, sterile pump construction
- CIP and SIP capability
- Product admission under vacuum conditions up to almost an absolute vacuum
- Elastomers approved for food in accordance with FDA
- Horizontal and vertical installation
- Easy serviceability

# NETZSCH Emptying Technology

## AND BARREL/DRUM EMPTYING UNITS

### Product Range of Emptying Technology

NETZSCH Drum Emptying Units actually pump their way through your products reaching the bottom of the drum with less than 1% left in the container. The heart of the drum emptying unit is a NEMO® progressing cavity pump which creates positive displacement, low pulsation flow

to convey your product without damage. In fact, most products are only exposed to the friction loss through the discharge piping. The NETZSCH single slide rail system raises and lowers the follower plate safely while providing a simple and easy structure to clean.

Empties over 99% of drum  
Handles high viscosities

#### NETZSCH NBE 200 Features

- Continuous or intermittent emptying.
- No pressure or flow interruption.
- Emptying of conical pails.
- Low pressure conditions in the entire system.
- Continuously adjustable discharge capacity.
- Metering directly from the drum is possible.
- Flow in direct proportion to pump speed.
- Equipped with VSD for easy adjustment.
- Simple, single-rail design.
- Drum clamp holds drum in place.

#### Your Benefits

- Very smooth conveyance.
- Low pulsation.
- Significantly lower shear rate than any other pump technology.
- Products with entrained solids are conveyed without product damage.
- Flow is independent of temperature or viscosity.
- Nearly complete discharge, residues < 1 %.
- Maintenance friendly.
- Low life cycle costs.
- Stainless steel, easy-to-clean design.



# NEMO® Sanitary Pump Components

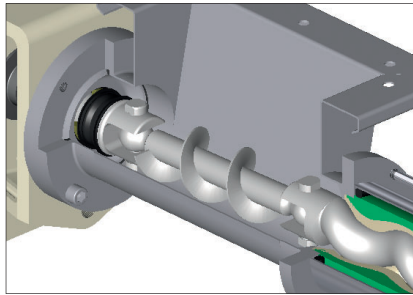
IN BLOCK DESIGN

## Characteristics and typical components



**Flexible rod**

The flexible rod for universal use in the NEMO® Hygienic Plus series is corrosion-proof, with no dead space, wear and maintenance free because there are no components moving against each other as in other joint types. Neither lubrication nor seals are required so that the lubricity of the fluid does not have to be taken into consideration. Ideal for pumping highly sensitive products with or without solids and for uncompromising hygienic applications. Also available as a 3-A flexible rod.



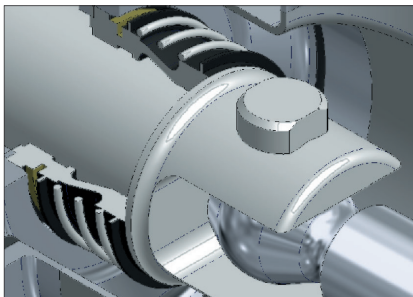
**Feeding screw hopper**

For highly viscous and pasty products, the pump is optionally equipped with a feeding screw and a hopper to allow for an optimal filling of the conveying chambers.



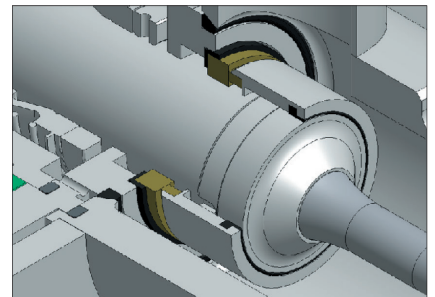
**Heating Rail and Thermal Jacket**

Optional version with pump housing and stator which can be heated or cooled.



**Mechanical seal with elastomer bellows (standard)**

Single seal, unbalanced, independent of direction of rotation, elastomer bellows with or without knife edge. Seals in SIC. On request elastomer in compliance with FDA standards.



**Mechanical seal with spring (optional)**

Single seal, balanced, independent of direction of rotation, with product protected spring. Smooth surface. Seals in SIC. Elastomer in compliance with FDA standards.

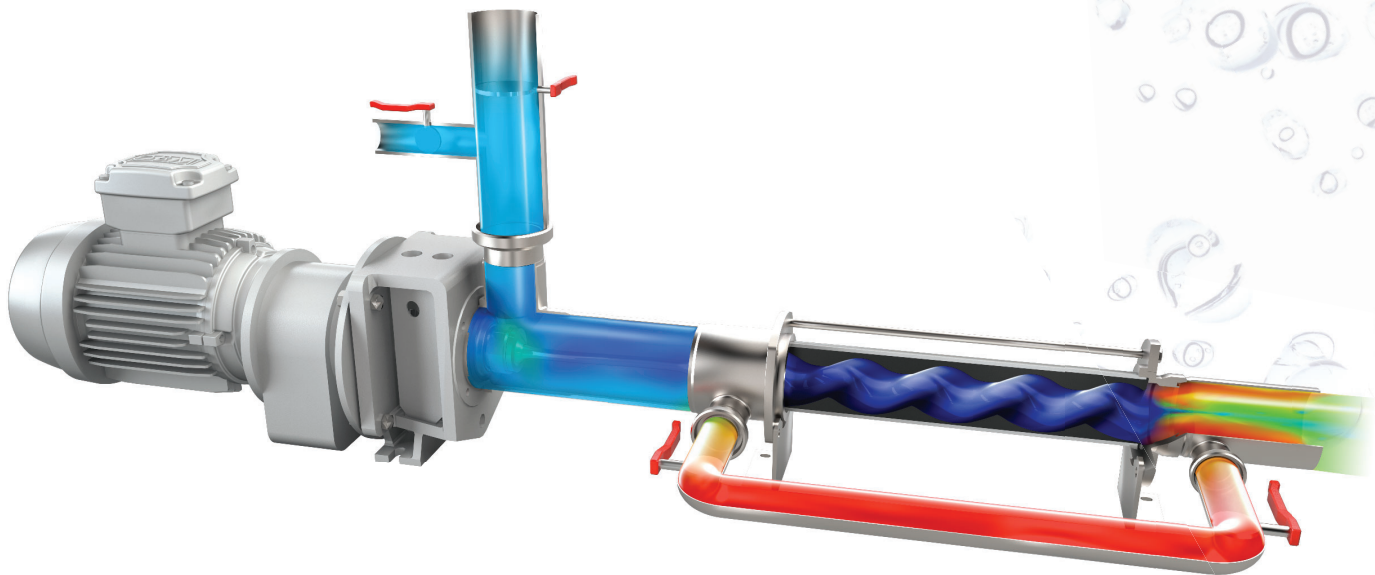
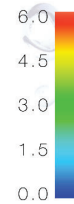


## CIP / SIP Process

For the CIP process, the entire system requires a cleaning fluid velocity of at least 4.9 f/s / 1.5 m/s. To facilitate this, NEMO® hygienic and aseptic progressing cavity pumps are equipped with additional cleaning ports. The position of these ports can be situated to suit the application, they require a bypass pipe.

A bypass is also required for the SIP process. In both the CIP and SIP processes NEMO® pumps are operated intermittently. The tangential cleaning ports guarantee complete emptying of the NEMO® progressing cavity pump. All of the pump materials used are suitable for CIP and SIP processes.

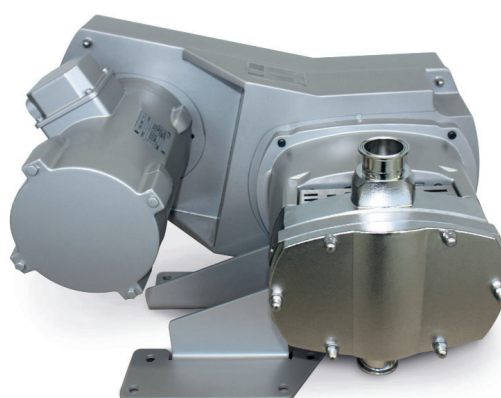
### VELOCITY



# TORNADO® Rotary Lobe Pumps

## POWERFUL, ROBUST AND COMPACT

The oil-free construction and lobe design makes the hygienic T.Sano® ideal for food and pharmaceutical media



NETZSCH TORNADO® self-priming, valveless, positive displacement pumps can be optimally customized to meet specific process and application requirements. They can be used for almost any media on intermittent, continuous or dosing applications.

### CIP-/SIP-Process

For the CIP process, the entire system requires a cleaning fluid velocity of at least 5 ft/s. / 1.5 m/s. As the pump reaches the required flow speed, it can also be used as a cleaning pump, i.e. the conveying and cleaning can be done by the same pump. All materials are in line with CIP and SIP processes.

### Wide range of capacities and pressures

- Flow rates up to 520 gpm / 120 m<sup>3</sup>/h
- Pressures up to 120 psi / 8 bar
- In 6 different sizes

### Wide range of applications

TORNADO® hygienic rotary lobe pumps are normally used for fluids having the following properties:

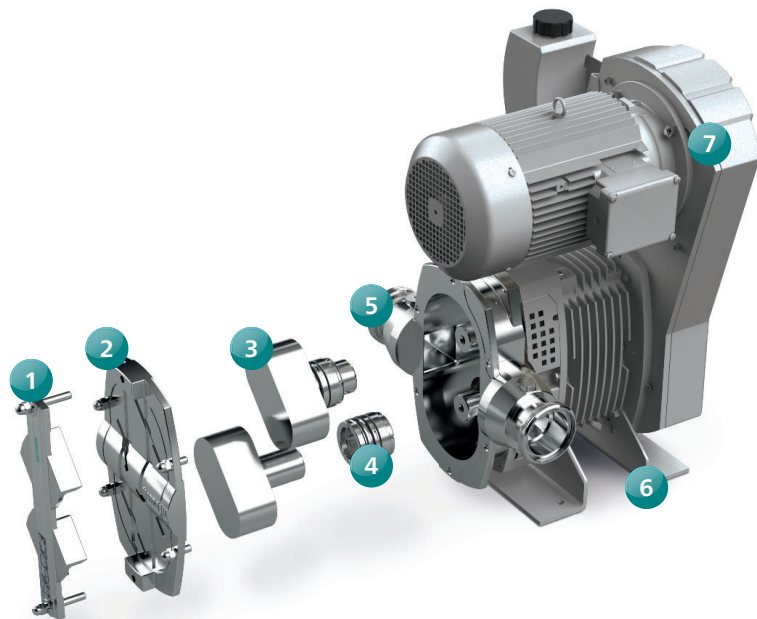
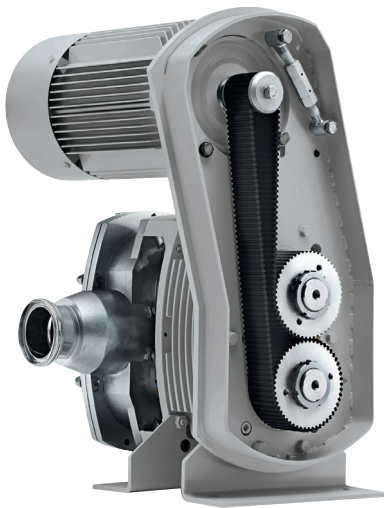
- Shear sensitive
- With or without solids
- Medium up to high viscosity (300 cps to 100.000 cps)
- Thixotropic and dilatant
- Lubricating and non lubricating
- Adhesive

### Advantages

- Compact design, high performance
- Suitable for a wide temperature range
- No dead spaces
- CIP and SIP capable
- Gentle product handling
- Reversible flow direction
- Flow rate in proportion to speed
- Low vibration, low noise emission
- Easy maintenance of the conveying elements and shaft seal without removing the pump from the pipeline

## Characteristics and typical components

## Full Service-in-Place



### 1 Rotor setting device

Using the setting device, the lobes are adjusted radially and axially.

### 2 Front cover

As an option, the pump cover can be heated.

### 3 Rotor

The stainless steel lobes are fixed externally. The surface of the lobes is perfectly smooth, and prevents any dead space.

### 4 Seal

The cartridge design is available in single and double acting versions. The seal is positioned specifically to avoid dead space, and the rotating seal faces are within the conveyed medium.

### 5 Rotor case


The suction housing is available with two options for connections: flanged or threaded. The interior of the housing has no dead space.

### 6 Bearing housing

The bearing housing is separate from the pump housing. The ball bearings are lubricated for life.

### 7 Tooth belt drive

Synchronization and drive via maintenance free tooth belt drive, which runs completely oil free.



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.

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