Progressive Cavity Pump

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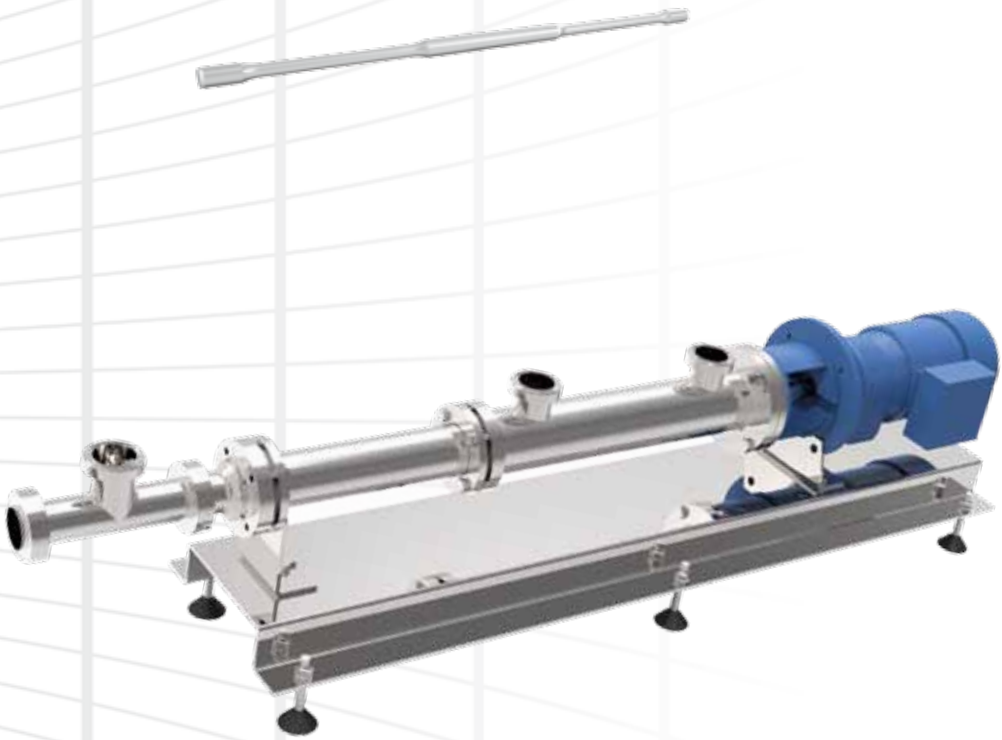
German Subtor Progressive Cavity Pump

subtor GmbH

Progressive Cavity Pump

Sanitary (Food Grade) PC Pump

Customized Pumping Solution Special for
Food, Pharmaceutical and Cosmetic Field



High Performance German
Downhole and Conveying Technology

We are SUBTOR

Company Profile

Weifang Subtor Rotating Precision Machinery Co.,Ltd., a joint venture between Germany Subtor GmbH in China, as a professional in research, design, production and sales the relative products based on moineau principle. Subtor with plants and technical centers in both Germany and China, sales offices and customer service centers in both Central America and Asia Pacific Region. In addition, we have working agents and sales representatives at your service in Russia, Kazakhstan, America, Kuwait, India, South America.

Key products: Progressive Cavity Pump, Grinder Macerator, Directional Drilling Mud Motor Power Section, Down Hole PC Pump, Stator Core and the relevant spare parts and services.

China Factory

Quality Inspection

Production Workshop

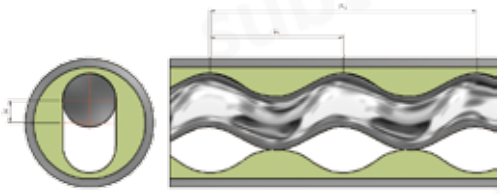
PS1000 Multifunctional Helicoidal CNC

Quality assurance

- ISO9001 Quality Management System Certification
- ISO14001 Environment Management System Certificate of Conformity
- OHSAS18001 Occupational Health & Safety Management System Certificate of Conformity

Well-equipped facilities and quality assurance control throughout all production processes ensuring total customer satisfaction.

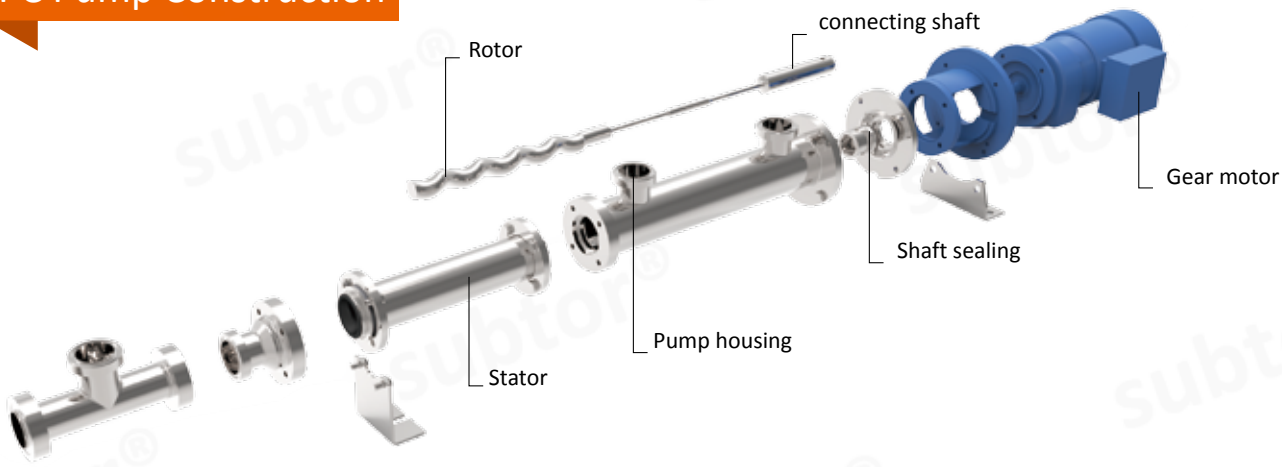
Working Principle of PC pump



The conveying process of PC pump depends on the sealed chambers which are formed by the interference fit between the eccentric rotation of rotor and the stationary stator. When the rotor is eccentric rotating within the stator， the internal sealed chambers of PC pump are moved along the axial direction from pump's entry to outlet, thus the fluid in the chambers can be conveyed from the entry to outlet continuously.

With the special structure and working principle, PC pump Characteristics is the most suitable pump for conveying all kinds of fluid with high solid content, high viscosity and fiberous products as well as corrosive, abrasive, shear sensitive fluids and at various temperature.

PC Pump Construction



PC Characteristics

•High efficiency; volume efficiency of more than 95%, mechanical efficiency up to 65 to 85%, and low energy consumption.

•No pulsation, no shear, no extrusion,no destroy to medium's physical property, low noise and vibration.

•Suitable for conveying medium of shear sensitivity or being susceptible to centrifugal force.

•Pump flow is directly proportional to rotational speed and continuous operation, which can be used for metering, measuring accuracy +/- 1%.

•Low noise and vibration during running, continuous conveying High solid content up to 65%.

•Wide temperature range from -20 ° C, to, +180 ° C.

•High solid content handling of up to 60%.

•Suitable for medium with viscosity up to 1,000,000 cp.

•Suitable for fluids containing fibrous, weeds materials and gas.

•Suitable for conveying of multiphase mixture of gas, solid and liquid.

•Excellent self-priming capacity, suction height 5-6 meter water coloumn.

•Simple construction, easy to maintain, no special tools required for maintenance.

Guideline for selection of Sanitary PC pump

Stator material

According to the special requirements of food and pharmaceutical industries, we developed food grade rubber material, such as nitrile rubber SU762, ethylene propylene rubber EPDM SU769, natural rubber SW041 SW042. Our stator can meet the highest medium temperature of 120℃ , at different working conditions. The synthetic rubber materials comply to the requirements of FDA and EC standards.

Rotor

Generally made up of stainless steel SS304, SS316, SS316L, under special circumstances with duplex stainless steel; Using special technique of high frequency impact extrusion polishing, rotor surface smoothness can reach to mirror-like grade; Special requirements on rotor surface; hardening, nitride or chrome plating, hardness up to HRC55-60° .

Other wetted pump parts

Usually SS304,SS316,SS316L or duplex stainless steel are available as options for pump wetted parts, with the excellent performance of both acid and alkali resistance.

They can meet various requirements of different working conditions. There are no hollow, no dead angle, no sharp angle and no welding gap either. Both suction chamber steel pipe and connection flange(coupling or threaded) are all chosen strictly complying with sanitary food grade requirements. The surface of rotor, coupling rod and coupling shaft are all treated by high frequency impact extrusion polishing, greatly improving fatigue strength and mirror-like grade, to avoid medium retention and agglomeration and easy to clean.

Universal joint and Coupling rod

• Titanium alloy flexible universal coupling rod In view of food and pharmaceutical industries, possibility of lubricating medium from contamination with product, Subtor self-developed titanium alloy flexible universal coupling rod, that requires no joint lubrication oil and do not contaminate the medium; it's characteristics are: having high elastic limit, deformation recovery ability, high temperature resistance and corrosion resistance, the finishing can reach mirror-like.

Flexible rod

Universal joint structure of pump with flexible rod

• Open universal joint If the media has good flow ability, an open joint form can be used with medium self-lubrication method, all the parts are designed with a smooth surface, no sharp angle and dead corners, the advantages are: simple structure, easy installation and maintenance, low cost and favored by end users.

Open Universal joint

Shaft sealing

• Single mechanical seal MG1 or M7N single end sealing type, silicon carbide Q2Q2VGG; for higher medium viscosity and solid content, cemented carbide alloy U2U2VGG, which has better characteristics of wear, corrosion resistance and less brittle; with medium viscosity and solid content particularly high, HJ977 type seal would be used, fully enclosed spring with no medium contact by an external shell, hence less likelihood of spring malfunction due to the bonding by viscous medium at seal face.All mechanical seals are produced in accordance with DIN24960.

MG1 M7N

HJ977

• Double mechanical seals M74D integral double seal, or two single mechanical seal with "back to back" arrangement, is suitable for higher solid content and viscous medium. "Back to back" arrangement double seal, requires the intermediate chamber to be added with flushing liquid with a certain pressure, usually the pressure is higher than pressure of pump suction housing about 1-2bar, so as to prevent the medium into the sealing cavity; flushing method will be chosen according to the medium characteristics.

M74D Integral double mechanical seal

• Balanced cartridge type mechanical seal Includes single or double type , its advantage is: main parts like dynamic ring and the static ring, spring, shaft sleeve, gland and auxiliary seals are combined into a whole assembly, hence the user only need to assemble it into the shaft. Manually adjustment of the spring tension is not required, it has the characteristics of convenient installation, high reliability and long life, which are widely used in recent years.

Sanitary container type mechanical seal has smooth contact surface, no holes, sharp angle and dead corners, it can be done with CIP cleaning, especially for the food and pharmaceutical industry; in accordance with FDA, EC1935/2004 and 3-A 00-2014 standard, flushing method can be chosen as the medium conditions.

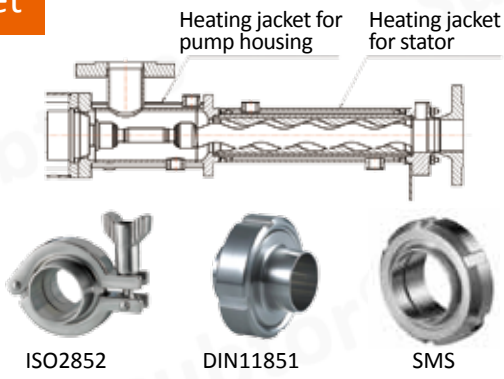
Single container

double container

Suction housing and stator insulation jacket

According to customer requirements, an insulation jacket can be added to the exterior of the suction housing and stator, before starting, during operation and stopping, hot water with 80 - 90℃ or steam can be add into the insulation jacket so as to maintain the medium at a certain temperature to prevent solidification and crystallization.

The inlet and outlet connection modes, can have flange, quick release clamp and round thread, with standard as: ISO2852, DIN11851 and SMS.



Direct coupled and bearing housing type

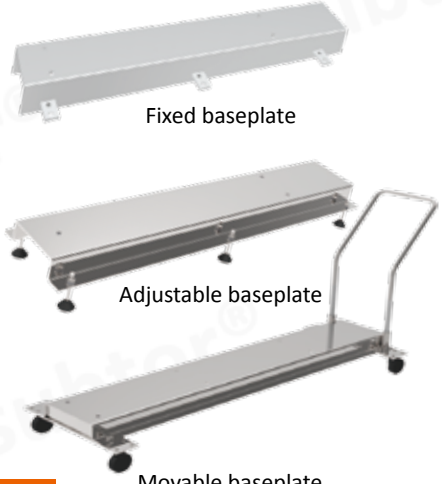
Under normal circumstances, for 18 bar and below conditions,direct coupled. Eg: 1 stage, 2 stages and 3 stages pump; For pressure exceeding 18 bar conditions, 4 stages and above,recommend with bearing housing, which is safer and more reliable.

Base plate and mounting

•Fixed baseplate, recommended to affixed with expansion bolts

•Adjustable baseplate, pressed and folded with stainless steel sheet, and can be adjusted with C-shaped base, the advantage is that is good for cleaning the medium left under the base so as to avoid deposition of any residue.

•Movable baseplate, coupled with wheels, can be moved to any place where needed and is easy for operation and maintenance.



Relation between rotor and stator, temperature

Under normal conditions, the relation between the rotor and stator with small amount of interference, so as to ensure the sealing performance and high transmission efficiency. When the medium temperature is high, the rubber will expand, the inner cavity of the stator wall will be reduced, hence frictional force between the stator and rotor will be increased, if the interference or torque is too big for the drive, the pump will ceased operation.

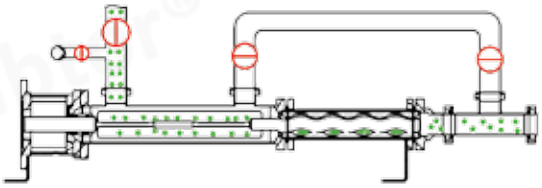
Therefore with the temperature rise, the rotor diameter should be reduced to compensate for the rubber thermal expansion caused by stator cavity reduction, at different temperature, corresponding rotor diameter size is different, the details are as follows:

Rotors temperature grade and medium temperature table						
Medium temperature	Normal temperature	31< to <50	51< to <70	71< to <90	91< to <110	111< to <130
The rotor corresponds to the temperature level	20℃	40℃	60℃	80℃	100℃	120℃

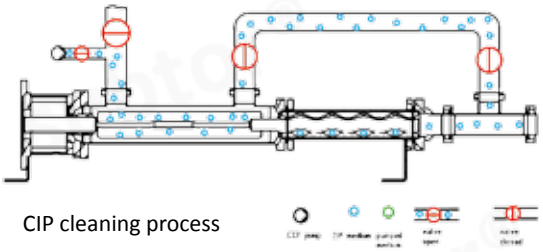
Its important for customer to provide us with actual product operating temperature in order for our application selection on the best stator and rotor execution for optimum performance and lifespan.

CIP on-line cleaning

The pump interior can be cleaned during, before starting or after stopping, so on-line cleaning is necessary, the flow rate of cleaning liquid should be maintained at 1.5~2.0m/s, and a manual cleaning is needed, ordinary one minute to start 2~3 times and each time 3–5 rotations, to ensure the pipeline and pump interior to be cleaned completely. In addition to the above cleaning, but also the pump should be open for inspection and maintenance regularly, if necessary the gaskets shall be replaced.



Normal Conveying process



CIP cleaning process

Gear reducer and motor

• In order to increase the reliability of the pump operation, high quality German brand SEW or Nord gear reducer are our standard drives, which has the advantages of stable operation, low noise, no vibration, safe and reliable operation.

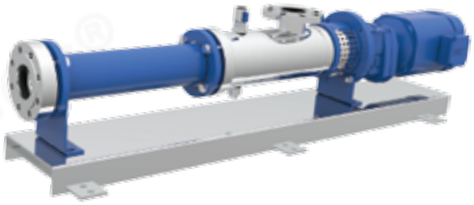
Designing reference standards

The designing, manufacturing and test accord with the standard of EHEDG, 3-A and FDA; the rubber material conforms to FDA (U.S. Food and Drug Administration) and EC(the European food grade test) standard requirements; mechanical sealing with DIN24960, FDA, EC1935/2004 and ANSI/3-A00-2014; the pump inlet & outlet connection implement relevant ISO2852, DIN11851, SMS standard.

SUBTOR Sanitary (Food Grade) PC Pump

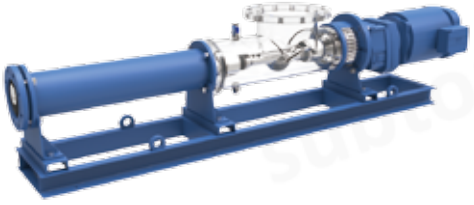
S class pump

Common design with flange directly coupled gear motor, with an advantage of compact structure, easy installation and maintenance, and low initial investment cost.



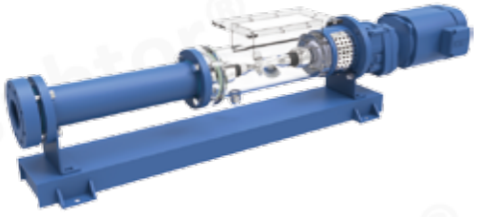
• M0 class pump

designed with round hopper and small feeding screw, suitable for viscous medium conveying.



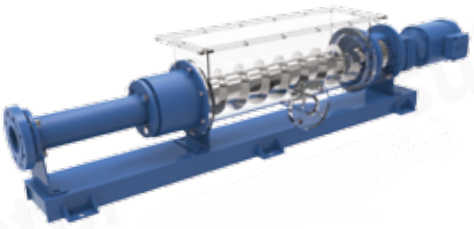
M1 class hopper pump

simple structure and is suitable for conveying medium with high viscosity and high solid content.



M2 class hopper pump

rectangular inlet hopper and coupling rod with propulsion unit by feeding screw, effectively feeding medium into the conveying elements and prevent accumulation at the entrance; this design is used for conveying high viscosity, high solid content up to 30%, and poor liquidity medium; the size of the hopper can be made according to the customer's site installation requirements.



•MM metering pump

compact structure, especially designed for dosing accuracy±1%, running stablility with no pulsation, modularization design with wide range of size and standard drive configuration with Nord Gear box and Burgmann mechanical seal.

• OU class pump

vertically mounted on the top of sump and tank with customized depth, the rotor and stator parts are inserted into the liquid and the gear reducer motor is located above the liquid level; The suction port of the pump is at the bottom of the pool and fixed by the foot support, so the pump operation is stable and reliable.

•BE class barrel pump

based on conveying characteristics of OU pump with vertical structure, with special design, it is suitable for dipping into different containers for extraction or drum emptying.

•SM and VM class pump

open mode hopper and easily movable designing, tailor-made for filling or quantitative supply of viscous fluids in different working conditions.

Application industries

Sanitary pump is mainly used in food, pharmaceutical and cosmetics industry, the products are as follows:

• Beverages, such as Fresh Juice, concentrated juice, fruit pulp and foam etc.

• Dairy products, such as yogurt, quark milk, cheese, Boudin, and butter condensed milk, etc.

• Sauce products, such as tomato sauce, mayonnaise, mustard sauce, bean paste, vegetable soup, gravy and condiments, etc.

• Dessert, such as chocolate, hard and soft candy, bean sauce, stuffing syrup, sucrose, strawberry pulp and second processing food, etc.

• Meat processing products, such as meat pieces, meat stuffing, meat paste, fish, fish oil, caviar, roe sauce and pet food etc.

• Sugar industry, like syrup, molasses, sugar juice, concentrated pond residue, suspension, flocculent additives, etc.

• Starch industry, like starch slurry, wheat gluten, dough, fermentation slurry, slag and other dregs department, etc.

• Other food industries, such as beer and wine, soy, vegetable protein, gelatin, monosodium glutamate, yeast, soy sauce plant, etc.

• Medicine industry, Chinese medicine extract and concentrated liquid, medicine juice, ointment, honey, various additives, sticky material and dregs of medicine, etc.

• Cosmetics, such as raw materials, creams, soaps and shampoos, various detergents, and viscous liquid for manufacturing processes;

Spare Parts

Common used wear parts are kept in stock; aimed to deliver to the client soonest when needed.

•Rotor, Stator

•Shaft, universal joint and coupling rod, flexible rod

•Universal joint outer and inner rubber seal sleeve,skeleton oil seal and mechanical seal

•Other spare parts, like round pin, spacer sleeve,long and short sleeve,clamp spring and so on

After-Sales-Service

Our professional service engineers are ready to serve you 24/7.

•On site training and guidance

•Help and guide customers to solve the problems as soon as possible

•Commissioning, maintenance and repair at site

•Technical consultation and spare parts purchase suggestion

•Reaching the site to offer service within 24 hours from notification.