Screw Pump Parts

Product Overview

Screw pump components (stator + rotor) are the core functional elements that enable the pump to transport media—the stator and rotor form a pair of precisely meshed helical rotating elements, creating multiple sealed chambers within the pump housing that advance continuously along the axial direction, converting mechanical energy into the fluid's pressure energy to achieve smooth, continuous, and low-pulsation transport of the media.

The reason screw pumps are irreplaceable in industrial applications lies precisely in the unique advantages of this component pair:

Strong self-priming capability (vacuum level up to 0.85 or higher)

Ability to convey media containing solids and impurities (solid content up to 60%, particle diameter up to 30% of the pump's nominal diameter)

Stable flow and pressure output with low pulsation

Reversible bidirectional flow

The quality of the stator and rotor directly determines the extent to which these performance characteristics can be achieved.

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Technical Specifications

Screw Pump Stator		Screw Pump Rotor	
Main Material	Nitrile rubber (NBR), fluorocarbon rubber (FKM), ethylene propylene diene monomer (EPDM), chloroprene rubber (CR), food-grade rubber, specialty rubber	Main Material	304 stainless steel, 316L stainless steel, 2205 duplex stainless steel, 416 martensitic stainless steel, Hastelloy, titanium alloys
Frame Material	Carbon steel, 304/316L stainless steel, cast iron	Surface Treatment	Polishing (Ra ≤ 0.2 μm), hard chrome plating, nitriding, tungsten carbide spraying (HVOF), PVD coating
Nominal Pressure	0.6 MPa to 12 MPa (higher pressure specifications available upon request)	Nominal Pressure	0.6 MPa to 12 MPa (depending on the stator and pump housing)
Operating Temperature	-20°C to +200°C (depending on the rubber material)	Operating Temperature	-30°C to +350°C (depending on material and surface treatment)
Stator Inner Diameter	Φ15mm ~ Φ500mm (standard); larger sizes available upon request	Rotor Outer Diameter	Φ10 mm to Φ400 mm (standard); larger sizes available upon request
Pitch (Lead)	16 mm to 500 mm (standard sizes), customizable	Pitch (Lead)	16 mm to 500 mm (matching the stator pitch)
Rubber Layer Thickness	8 mm to 35 mm (depending on the pressure rating)	Eccentricity	2 mm to 50 mm (standard)
Rubber Hardness	60–85 Shore A (optional)	Surface Hardness	HRC 25–HRC 75 (depending on material and processing method)
Connection Methods	Flange connections, threaded connections, clamp connections	Straightness Tolerance	≤0.03 mm/m (Precision Grade) / ≤0.08 mm/m (Standard Grade)
		Connection Methods	Flange connection, spline connection, tapered shank connection, key connection

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Key Benefits and Features of the Product

Compatible replacement—equivalent to a new pump

The stator and rotor are a pair of precision-fit components whose geometric accuracy is interdependent.

Purchased as a set: After replacement, the meshing pair returns to its original design geometry, with performance equivalent to that of a new pump.

Purchased separately: Systematic deviations in the clearance between new and old components lead to accelerated wear of the new parts within the first 500 hours of operation, compromising the effectiveness of the repair.

Every stator and rotor set we ship undergoes a pairing and running-in test prior to shipment to ensure that meshing performance meets design specifications.

Comprehensive coverage of all materials and specifications, suitable for any operating conditions

Stator Rubber Material Series:

Material	Temperature Range	Core Strengths	Recommended Use Cases
Nitrile Rubber (NBR)	-20°C to +120°C	Optimal oil resistance and high cost-effectiveness	Crude Oil, Lubricating Oil, Mineral Oil
Fluorocarbon Rubber (FKM/Viton)	-10°C to +200°C	Resistant to high temperatures, strong acids and alkalis, and solvents	Building Materials, Chemicals, Pharmaceuticals, High-Temperature Steam
Ethylene Propylene Diene Monomer (EPDM)	-30°C to +150°C	Resistant to aging, ozone, and hot water	Pure Water, Food and Beverages, Hot Water
Chloroprene Rubber (CR)	-25°C to +130°C	Weather-Resistant and Flame-Retardant	Seawater Desalination, Environmental Protection Projects
Food-grade rubber	-20°C to +130°C	FDA-certified, odorless	Food, Pharmaceuticals, Cosmetics

Rotor Material Series:

Material	Temperature resistance	Core Strengths	Recommended Use Cases
304 Stainless Steel	Up to 870°C	Excellent value for money	Food and Beverage, Mortar and Concrete, Pure Water
316L Stainless Steel	Up to 925°C	Resistant to pitting corrosion and chloride ions	Seawater, Chemical Industry, Pharmaceuticals

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2205 Duplex Stainless Steel	Up to 300°C	High strength and resistance to stress corrosion	High-Pressure Oil and Gas, Offshore Platforms
416 Martensitic Stainless Steel	Up to 650°C	High hardness (HRC 28–32)	Sand-Containing Wastewater, Mineral Slurry
Hastelloy C-276	Up to 540°C	Resistant to virtually all acids, alkalis, and salts	Aqua Regia, Strong Oxidizing Acids
Titanium Alloy (TC4)	Up to 400°C	Lightweight, high-strength, and seawater-resistant	Offshore Engineering, Aviation

End-to-end quality control; every set of parts is traceable

Incoming Raw Material Inspection (Material Spectral Analysis)

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Compounding/Melting Process Records (Stator Rubber/Rotor Steel)

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Precision Molding/Machining (CNC Molding/CNC Turning and Milling)

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Heat Treatment and Surface Treatment (Nitriding/Chromium Plating/Coating)

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Precision Dimensional Inspection (Coordinate Measuring Machine (CMM) + Thread Measurement)

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Stator Air Tightness Test (Differential Pressure Method, Test Pressure: 1.5× Rated Pressure)

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Rotor Dynamic Balancing Test (G1.0 or G2.5 Grade, Optional)

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Pairing and Run-in Test (30-minute no-load run-in to verify smooth meshing)

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Final Factory Inspection + Issuance of Report

Applications

Oil and Gas Industry: Transportation of crude oil production fluids (water-containing crude oil), polymer displacement fluids, oil sludge treatment, steam injection for heavy oil thermal recovery, high-pressure water injection, acidizing and fracturing fluids, and natural gas condensate transportation.

Chemical and Fine Chemicals: Transport of acid and alkali solutions (sulfuric acid, hydrochloric acid, caustic soda); transport of solvents (toluene, acetone, DMF); transport of resins, coatings, adhesives, and crystalline media.

Food, Beverage, and Pharmaceuticals: Transport of milk, yogurt, jam, honey, syrup, and chocolate sauce; pumping of enzyme preparations, vaccine culture media, xanthan gum, and yeast.

Environmental Water Treatment and Municipal Engineering: Transfer of municipal sludge (activated sludge/dewatered sludge); transfer of concentrated sludge from membrane bioreactors (MBR); transfer of dredged slurry from rivers and lakes; transfer of oil-containing sludge from oil-water separation; dosing and metering of flocculants and coagulants.

Mining and Construction: Conveyance of ore slurry (copper/iron/gold ore); tailings thickening pumps; manufactured sand/quartz sand slurry; concrete admixtures; bentonite/foam conveyance for shield machines; high-pressure foundation grouting.

Marine and Offshore Engineering: Marine fuel oil (IFO/MDO/HFO) transfer; bilge water, oily wastewater, and ballast water treatment; seawater cooling pumps; and subsea pumps for offshore oil and gas production.

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Power and Energy Industry: Gas turbine fuel oil transfer; steam turbine lubricating oil circulation; boiler feedwater chemical dosing; conventional island cooling water pumps for nuclear power plants; and geothermal steam condensate.

Why Choose Us?

Expert Technical Team: Over 10 years of experience in R&D of mixing equipment, providing customized solutions

Quality Assurance: Rigorous quality control system; ISO 9001-certified company

After-Sales Service: Global service network, 24-hour response, and lifetime technical support

Success Stories: Serving over 500 companies across more than 20 countries and regions

FAQ

1.

Q: What is the minimum order quantity for your products?

A: For larger equipment such as mixers, our minimum order quantity is one unit; for smaller products such as valves and fittings, the minimum order quantity ranges from 50 to 100 pieces. Please contact our sales representatives to confirm the specific minimum order quantity.

2.

Q: From which port do you ship?

A: Since our company is located in Qingdao, most of our shipments depart from the Port of Qingdao.

3.

Q: Are you a factory or a trading company?

A: We are a manufacturing company with our own factory; all our equipment is produced in our factory's production lines.

4.

Q: What is the relationship between the stator and rotor in a screw pump? Do they have to be purchased as a set?

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A: The stator and rotor of a screw pump are the only mating components that form the pumping chamber.

Working Principle: The rotor performs a planetary eccentric rotation inside the stator. The rubber lining inside the stator cavity and the metal surface of the rotor form multiple sealing chambers that advance axially, driving the fluid from the suction end to the discharge end.

Actual Benefits of Purchasing as a Set:

Restores performance to that of a new pump (best-case scenario)

Total savings of 10%–15% compared to purchasing separately (best price)

Avoids secondary downtime (when one part is replaced and another fails shortly afterward)

5.

Q: What is the typical service life of screw pump components (stator + rotor)?

A: The service life of screw pump components depends on three variables: the characteristics of the medium, operating parameters, and material selection. Typically, the service life of the stator ranges from 1,500 to 15,000 hours, while that of the rotor ranges from 5,000 to 30,000 hours.

6.

Q: How is the meshing clearance between the stator and rotor of a screw pump adjusted? What are the consequences of incorrect clearance?

A: Meshing clearance is one of the most critical geometric parameters of a screw pump, directly determining the pump's sealing performance, efficiency, and service life.

Basic concepts of clearance:

Radial clearance (δr): The minimum distance between the outer circumference of the rotor and the inner cavity of the stator.

Typical range: 0.05 mm to 0.30 mm (exact values vary by pump model; refer to the manufacturer's manual).

Guideline: For new pumps, set the clearance to the midpoint of this range; it will automatically adjust to the optimal range during the running-in period.

Key Adjustment Points:

Adjust strictly according to the clearance values specified on the pump nameplate or provided by the manufacturer.

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Use a feeler gauge (thin gauge) for measurement; do not rely on visual inspection.

Check the actual clearance after 500 hours of operation following installation (rubber components require a break-in period).

If you are unsure of the clearance value, contact us with the pump brand and model, and we will provide a recommended value.

7.

Q: What is the correct installation sequence for the stator and rotor of a screw pump? What precautions should be taken?

A: Following the correct installation sequence and method can extend the service life of components by 20% to 40%. The standard operating procedure is as follows:

Pre-installation Preparation:

Verify component specifications → Clean the pump chamber → Inspect the appearance of components → Prepare lubricant → Prepare tools

Standard Installation Sequence:

Step 1: Apply lubricant evenly to the rotor mating surface (the helical section that contacts the stator)

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Step 2: Slowly push the rotor horizontally along the axial direction into the pump chamber (Do not strike the rotor's helical section!)

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Step 3: Install the connection between the rotor and the pump shaft (key connection/spline connection), applying torque as specified in the manual

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Step 4: Use a dial indicator to check the concentricity of the rotor shaft with the pump housing axis (deviation ≤0.03 mm)

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Step 5: Apply lubricant evenly to the interior of the stator

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Step 6: Align the stator horizontally with the pump housing flange, and gradually tighten the bolts diagonally in three stages to the specified torque

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Step 7: Manually rotate the pump 2–3 revolutions to confirm smooth rotation without binding

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Step 8: Run the pump idle at low speed for 5–10 minutes, observing temperature rise, vibration, and noise

8.

Q: How can we reduce the operating costs of screw pump parts?

A: Screw pump parts represent a significant spare parts expense for companies. Below are cost-saving strategies that have been validated by numerous customers:

Strategy 1: Establish a scientific spare parts inventory strategy

Follow the “1+1” principle when stocking core equipment (1 in use, 1 on standby) to avoid high markups associated with emergency purchases.

Strategy 2: Optimize Operating Conditions to Reduce Wear (Extend Service Life)

Install a Y-strainer or magnetic separator at the pump inlet to intercept large solid particles → This can extend stator life by 20%–40%;

Maintain operating temperature 20°C below the rated range → High temperatures accelerate rubber wear; for every 20°C reduction, service life is extended by approximately 30%;

Avoid frequent start-stops → The pressure differential shock from each start-stop is equivalent to approximately 50–200 hours of normal wear.

Strategy 3: Correct Sizing to Avoid “Over-Specification”

Not all operating conditions require high-pressure-rated stators → Select specifications that match the actual pressure to save 15%–25% on procurement costs;

Operating conditions with low solids content (<3%) → There is no need to select a high-abrasion-resistant compound; standard NBR specifications are sufficient, saving 30% in costs;

Clean media → No tungsten carbide coating is required; 316L stainless steel with polishing is sufficient, saving 50%–80% in surface treatment costs.

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Strategy 4: Purchase as a Set—Repair It Right the First Time

Replace the stator and rotor as a set → Saves 50%+ of total repair time compared to replacing one part at a time, reducing downtime losses;

Purchasing as a set is 10%–15% cheaper overall than buying parts separately, while also eliminating the risk of a second shutdown.