

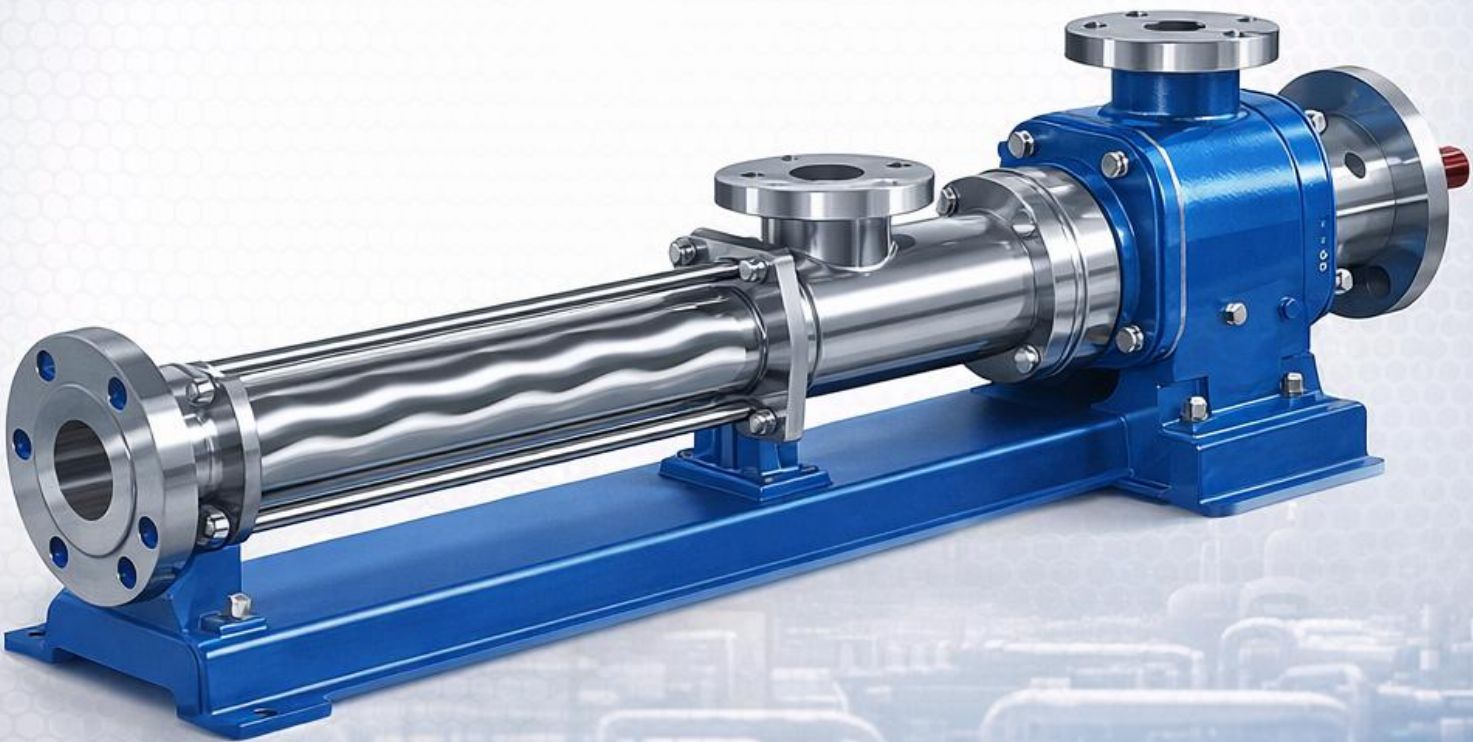


SPEW

POSITIVE DISPLACEMENT PUMPS

PROGRESSIVE CAVITY PUMP

MODEL: SSG



TECHNICAL KNOWLEDGE BASE

PROGRESSIVE CAVITY PUMP

MODEL: SSG

Technical Knowledge Base Document

Version 1.0 — For Engineering, Sales, Service & System Integration Teams

1. INTRODUCTION, OVERVIEW & FEATURES.

INTRODUCTION:

The **SPEW Single Screw Pump (SSG Series)**, also known as a **Progressive Cavity Pump**, is a **positive displacement rotary pump** specifically engineered for the **smooth, continuous, and pulsation-free transfer of viscous, abrasive, shear-sensitive, and solids-laden fluids**.

The SSG pump operates on the proven **rotor–stator principle**, where a precision-machined **single helical rotor** rotates eccentrically inside a **double-helical elastomer stator**, forming sealed cavities that progress axially from suction to discharge. This unique mechanism ensures **constant flow irrespective of pressure variations**, making the SSG pump exceptionally reliable in demanding industrial applications.

Designed for **low-speed, high-torque operation**, the SSG pump delivers **high volumetric efficiency**, gentle product handling, and excellent suction performance, even under challenging inlet conditions.

OVERVIEW

The SSG Series is developed with a focus on:

- **Operational reliability**
- **Ease of maintenance**
- **Wide application flexibility**
- **Long service life**

Unlike centrifugal pumps, the SSG pump maintains **stable flow across wide viscosity ranges** and can handle **fluids from thin liquids to extremely high viscosities** without loss of performance. Its modular construction allows easy customization of **materials, sealing systems, drive options, and mounting configurations** to suit specific process requirements.

FEATURES

Progressive Cavity Pumping Principle

- Continuous, non-pulsating flow
- Flow directly proportional to speed
- Minimal shear on the pumped medium
- High accuracy for metering and dosing applications

Wide Fluid Handling Capability

- Low to extremely high viscosity fluids
- Fluids containing solids, fibers, or entrained gas
- Shear-sensitive and fragile products
- Abrasive and corrosive media (with suitable materials)

Robust Mechanical Design

- Heavy-duty bearing housing
- Precision-ground rotor
- Replaceable elastomer stator
- Industrial-grade mechanical sealing systems

RELIABILITY & SERVICEABILITY

The SSG pump is engineered for **easy maintenance and reduced downtime**. The stator—the primary wear component—can be replaced quickly without disturbing pipework, while the rotor offers long operational life when matched correctly to the application.

Routine servicing requires minimal tools and can be performed on-site, making the SSG pump a **cost-effective lifecycle solution** for continuous-duty industrial operations.

2. Working Principle

2.1 Cavity Formation Mechanism

The PCP uses:

- **Rotor:** single helical metallic screw
- **Stator:** molded elastomer double-helix cavity
- **Motion:** eccentric rotation creates progressive cavities

Flow Equation:

$$[Q = V_c \times \text{RPM}]$$

Where:

$$Q = \text{Flow (m}^3/\text{hr)}$$

$$V_c = \text{Volume per cavity per revolution}$$

2.2 Flow Control Logic

- Increase RPM → Increase flow proportionally
- Decrease RPM → Dosing/metering precision
- Pressure load does **not** change flow drastically unless slippage occurs

2.3 System Behaviour

Condition	Result
Higher discharge pressure	Increased torque requirement
Increased viscosity	Improved volumetric efficiency
Excessive temperature	Elastomer expansion; potential stator wear

3. Pump Construction & Variants

3.1 Component Anatomy

Component	Function	Materials
Rotor	Positive displacement element	SS304/316, Duplex, Hastelloy, Chrome plated
Stator	Sealing cavity formation	NBR, FKM, EPDM, PTFE, HNBR
Suction Housing	Fluid entry, NPSH zone	CI, Carbon Steel, Stainless Steel
Drive Assembly	Transmits torque	Gearbox, Motor, Coupling, Universal Joints
Sealing System	Prevent leakage	Packing, Mechanical Seal, Double Seal
Base Frame	Alignment & installation	Carbon steel fabricated skid

3.2 Build Configurations

Configuration	Use Case
Horizontal Bare Shaft	Export pump for integration
Base-Mounted Gearmotor	Standard industrial service
Hopper Feed with Auger	Paste-like or high-viscosity
Sanitary Tri-Clamp	Food & pharma
Vertical Inline	Limited space or retrofit

4. Material Selection Matrix

4.1 Rotor Materials

Media Type	Recommended Material
General Industrial Fluids	SS316
Abrasive Slurry	Hardened Tool Steel (Chrome Coated)
High Chlorides	Duplex / Super Duplex
Chemically Aggressive	Hastelloy / Titanium
Food & Hygienic	SS316L Polished

4.2 Stator Elastomers

Fluid Category	Elastomer
Hydrocarbons / Fuels	FKM (Viton)
Water-Based / Neutral	NBR / EPDM
High Temperature (150 °C)	FKM / PTFE
Sludge / Waste	HNBR
Food / Edible	EPDM Food Grade

5. System Design Considerations

5.1 Suction Piping

- Keep suction line **short & direct**
- Avoid elbows near suction nozzle
- Use oversized suction piping for viscous media
- Recommended **2–3× ID** of pump inlet

5.2 Discharge System

- Install pressure relief valve
- Provide bypass recirculation if deadheading possible
- Use **pressure transmitter + shutdown interlock**

6. Installation & Commissioning Checklist

6.1 Before Startup

- ✓ Check alignment of motor–coupling–pump
- ✓ Verify direction of rotation
- ✓ Prime pump if media not self-lubricating
- ✓ Confirm mechanical seal lubrication
- ✓ Inspect tightening torque of flange bolts

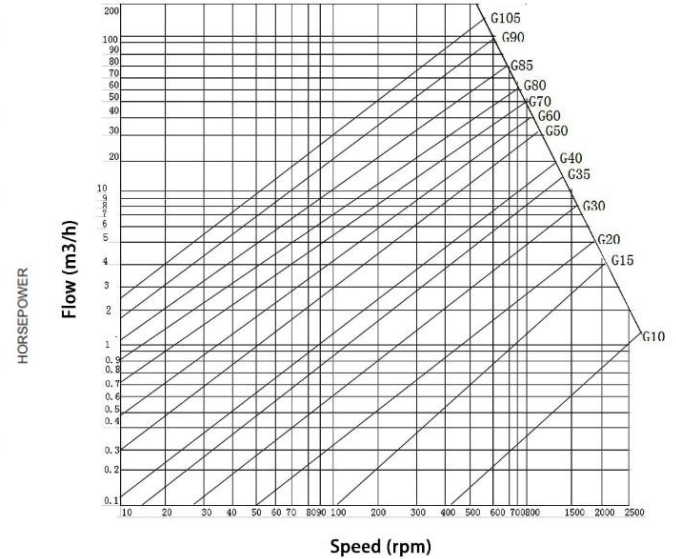
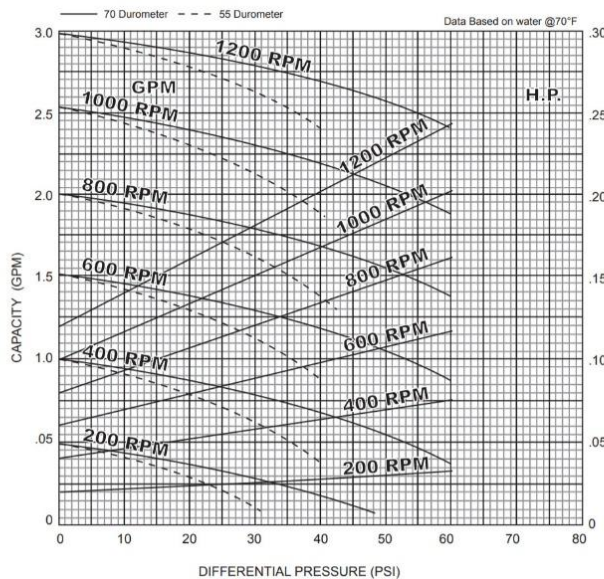
6.2 During Startup

- 🕒 Ramp speed slowly via VFD
- 📊 Monitor temperature rise
- 📊 Record baseline pressure & flow

6.3 After Startup

- 📁 Save performance trend as baseline reference
- ⚙️ Set torque and overload limits

7. PERFORMANCE CHARACTERISTICS (SSG Series)



7.1 Flow Behaviour

- Near-linear flow proportional to rotational speed
- Flow remains stable across wide pressure ranges
- Minimal pulsation (<2%) even at low speeds

7.2 Pressure Capability

- Differential pressure up to **24 bar per stage**
- Multi-stage stator options available for higher discharge pressure

7.3 Efficiency

- Volumetric efficiency: **85–95%** (depends on viscosity & slip)
- Mechanical efficiency remains high at low RPM

7.4 Speed Range

- Typical operating speed: **50–400 RPM**
- Optimized for **low-speed, high-torque** operation

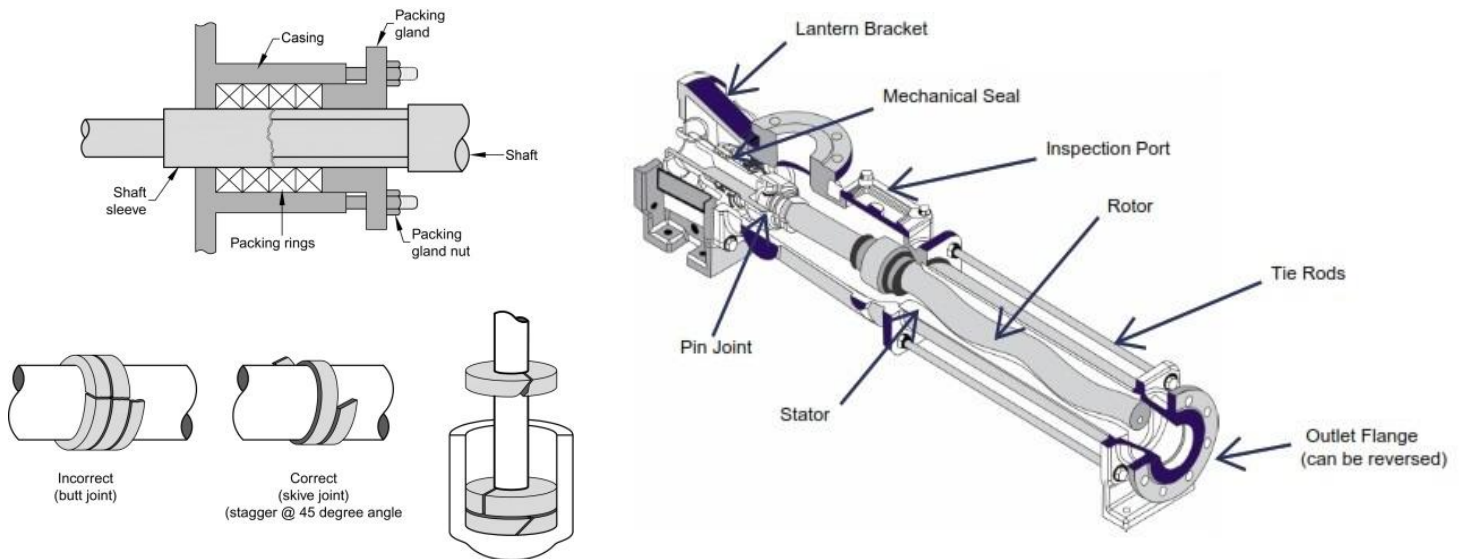
8. MATERIALS OF CONSTRUCTION

Component	Standard Material	Optional Materials
Rotor	SS 410 / EN 1.4021	SS 316, Duplex, Hard-coated
Stator	NBR Elastomer	EPDM, FKM (Viton), HNBR
Pump Casing	Cast Iron	SS 304 / SS 316
Drive Shaft	Alloy Steel	SS 316
Mechanical Seal	Carbon / Ceramic	SiC/SiC, TC/TC
Gaskets	NBR	PTFE, Viton

Elastomer Selection Guide

- **NBR** – Oils, fuels, hydrocarbons
- **EPDM** – Water, food, mild chemicals
- **FKM (Viton)** – High temperature & aggressive chemicals

9. SEALING ARRANGEMENTS



9.1 Available Options

- Single Mechanical Seal
- Double Mechanical Seal (Back-to-back / Tandem)
- Stuffing Box with Gland Packing

9.2 Seal Standards

- Designed as per **DIN / ISO seal dimensions**
- API seal plans available on request

9.3 Special Options

- Quench / flush connections
- Pressurized seal chamber
- Cartridge seal compatibility

10. DRIVE & TRANSMISSION SYSTEM (ILLUSTRATED)



10.1 Drive Configurations

- Electric Motor + Helical Gearbox
- VFD compatible for flow control
- Servo or hydraulic drive (special duty)

10.2 Power Transmission

- Flexible pin-bush or jaw coupling
- Fully guarded coupling (safety compliant)

10.3 Mounting

- Foot-mounted baseplate
- Skid-mounted systems
- Vertical inline option (special design)

11. INSTALLATION GUIDELINES

11.1 Suction Conditions

- Flooded suction recommended
- Suction line velocity ≤ 1 m/s
- Avoid sharp bends & restrictions

11.2 Discharge Line

- Install pressure relief valve
- NRV recommended for vertical installations

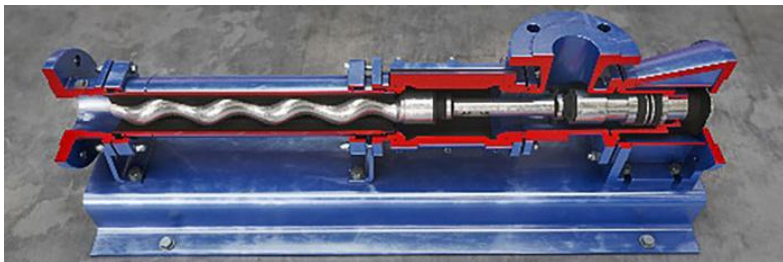
11.3 Alignment

- Laser alignment preferred
- Re-check after commissioning

11.4 Foundation

- Rigid, vibration-free concrete base
- Use anti-vibration pads if required

12. COMMISSIONING & START-UP PROCEDURE



12.1 Pre-Start Checks

- Pump primed with liquid
- Correct rotation direction
- Mechanical seal flushed (if applicable)

12.2 Start-Up

1. Start pump at minimum speed
2. Gradually increase RPM
3. Monitor pressure, noise & temperature

12.3 Never Operate

- ✗ Dry running
- ✗ Closed discharge valve
- ✗ Excessive speed beyond rating

13. OPERATION & CONTROL

13.1 Flow Control Methods

- Speed control via VFD (preferred)
- Bypass line (secondary option)

13.2 Instrumentation Integration

- Pressure transmitter
- Flow meter
- Temperature sensor
- Dry-run protection switch

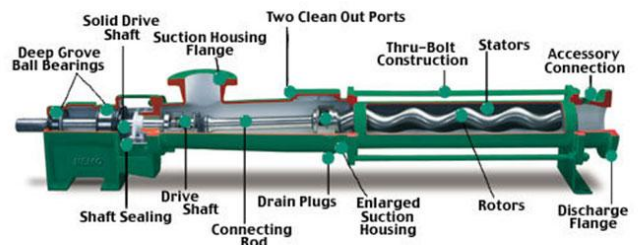
13.3 Automation Ready

- PLC / SCADA compatible
- Remote monitoring possible

14. MAINTENANCE & SERVICEABILITY

14.1 Routine Maintenance

- Lubricate bearings as per schedule
- Inspect seals periodically
- Monitor vibration & noise



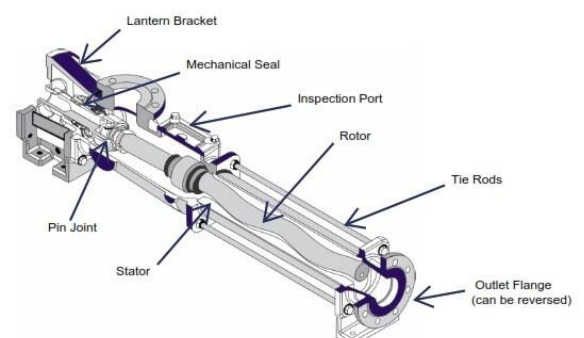
14.2 Wear Part

- Stator (primary wear component)
- Rotor (long life with proper lubrication)
- Mechanical seal



14.3 Service Advantage

- Stator replacement without dismantling piping
- Simple rotor-stator removal
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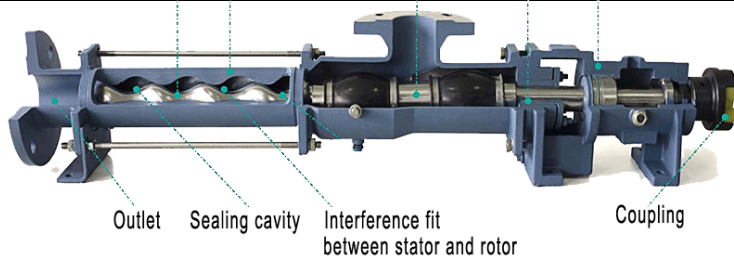


Preventive Intervals

Component	Frequency
Greasing	2000–3000 hours
Coupling Alignment Check	Every shutdown
Stator Inspection	Semi-annually
Seal/packing replacement	Annual (avg.)

15. TROUBLESHOOTING GUIDE (SUMMARY)

Symptom	Cause	Solution
Drop in flow	Rotor/stator wear	Replace stator or rotor
Overheating	Dry running	Install dry-run protection
Vibration	Misalignment	Adjust coupling & alignment
Seal failure	Wrong elastomer	Recheck selection chart
Pressure loss	Slippage Rotor Stator Coupling rod Shaft seal Bearing pedestal	Increase viscosity / speed or rotor clearance



16. APPLICATIONS

The SSG Pump is widely used across multiple industries due to its versatility:

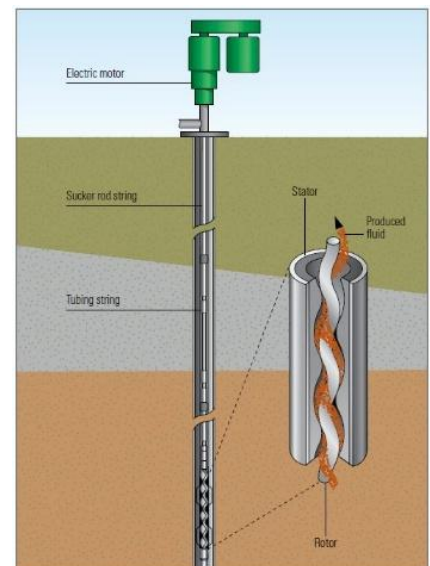
- Oil & Gas (crude oil, sludge, oily water)
- Lubricant blending & additive transfer
- Chemical & petrochemical processing
- Food & beverage (with food-grade elastomers)
- Wastewater, sludge & dewatering systems
- Paints, inks, resins & polymers
- Pulp & paper
- Pharmaceuticals & cosmetics (special execution)

Industries

- Oil & Gas
- Lubricant blending plants
- Chemical & petrochemical
- Food & beverage
- Water & wastewater
- Paints, inks & resins

Typical Fluids

- High-viscosity oils
- Sludge & slurry
- Polymers
- Emulsions
- Shear-sensitive fluids



17. OPTIONAL ACCESSORIES

- Hopper with feed screw
- Heating jacket (steam / electric)
- Pressure relief valve
- Base frame with drip tray
- Acoustic enclosure

18. STANDARDS & COMPLIANCE

- ISO 9001 Manufacturing
- CE compliant design
- ATEX option available
- Food-grade (FDA elastomer on request)

19. DOCUMENTATION PROVIDED

- GA drawing (Plan & Elevation)
- Cross-sectional drawing
- Performance curves
- Installation & O&M manual
- Spare parts list

Contact Us

Business Hours

 Weekdays: 8.30AM to 5.30PM
Weekends: Closed

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