

Options for sludge pumping

Rag and Grit



ATLANTIC
PUMPS

Large Industrial Peristaltic Pump - LSM

- Energy efficient
- Lower cost of ownership (compared to PCP)
- To 12% DS sludge
- Passes Rag & Grit
- No rotating parts in the sludge
- Simple maintenance – Upskill Ops
- Fast turnaround times on spares
- Case studies



Key Applications

Large Industrial

- PST De-Sludge
- PFT De-Sludge
- Lamella De-Sludge
- General Sludge Transfer (High Rag, Grit)
- Digester Feed
- Pasteurized Sludges

Small Industrial

- Polymer Transfer
- Chemical dosing
- Lime Milk



Temporary

- **Digester Clearance**

We have had experience in assisting water authorities and contractors removing heavy, raggy and gritty sludge from digestors on periodical cleaning routines.

In instances where sites have previously been using DISAB/supersuckers, we have used the LSM range for tank emptying.

This is a self priming positive suction pump bringing material from the tanks and feeding it at constant rate onto processing rigs or any other treatment methodologies.

The benefit of this solution is that you have one wearing part (the hose), very low cost of ownership and the pumps can be run in forward or reverse, meaning that you can eliminate blockages in the suction or discharge line.



Advantage

- **Rag/Grit/Debris Handling**

With no rotating parts immersed within the sludge, Large Peristaltic pumps pass large solids and amassed fibrous material.

Here we see the results of using an LSM 150 used to empty a choked Digester. 12% DS sludge settled out with grit and masses of rag.



Case Studies



Case Study



Overview

Being able to pump thickener sludge at a higher dry-matter concentration brings many improvements and efficiencies to wastewater treatment works. Replacing max 3% solids capability lobe pumps with LSM allows 12%+ sludge transfer.

Background

Like many sewage and wastewater companies, United Utilities take residual sludge from their satellite treatment sites to regional large-scale treatment plants. Here, further dewatering and thickening processes take place, resulting in clean, clarified water and solid filter-press cake consisting of clay, sand, and grit.

The smaller local wastewater treatment plants are limited in how much they can dewater sludge due to space, equipment and site parameters.

The current constraint of many WwTWs (wastewater treatment works) is often set by the limitations of their pumps, with anything more than 2 or 3% solids content proving un-pumpable with clean water pumps. Even the positive displacement lobe pumps struggled with high wear rates and frequent blockages.

Having to keep the wastewater at a high dilution reduces plant efficiency and capacity. It gets to a point where the amount of fluid recirculating around the plant means wastewater has to be taken away to other treatment plants.

This often results in tankers having to transport very watery slurries (97% water) to larger sludge processing sites. In such cases, the water is basically acting as a 'carrier' for the sludge solids, increasing the volume and weight of road tankering.



Switching from lobe pumps to LSM enabled sludge movement at four times more dry-matter content than previously possible



Case Study



Sludge Treatment Centre

Overview

The pumps at this sludge treatment site struggled with the wide diversity of DM (dry matter) content and variable solids in their sludges. Atlantic Pumps found the ideal pump for handling the wide range of sludge properties processed, enabling anything up to 12% TS. At the same time, operating costs have improved. The client's bio-resources lead is keen to replicate this success across more sites.

Problem

The sludge pump at the treatment plant wasn't living up to it's promises.

This lobe pump was initially chosen for its compact design, stated efficiency (as new), low initial purchase price, and apparent effectiveness in moving sludge.

However, operating and asset maintenance costs proved vastly more expensive than predicted. Furthermore, it could not cope with the wide variety of slurry viscosities and bio-solids being imported into this site.

The wear rate of the incumbent pump required a lobe change every five or six weeks, and the higher viscosity sludges would either trip the system or cause sudden damage that brought the process to a halt, requiring emergency repair.

Furthermore, it was found that the quoted energy consumption was only true at first use, and the VFD inverter had to be sped up progressively to compensate for lobe wear.



By working with Atlantic Pumps, the plant achieved reduced energy usage, reduced spares requirements and reduced maintenance costs, plus saw an increase in sludge density range.



Case Study



Overview

A major UK WASC needed a more efficient solution for managing grit and rag accumulation in their anaerobic digesters. The Bio-resources team plays a key role in renewable energy and biosolids recovery, but digester fouling was impacting throughput and driving up maintenance costs.

Challenge

Routine de-gritting required vacuum tanker support — a slow, resource-heavy process involving batch transfer of sludge to an onsite wash plant. Despite the vac loader's impressive suction capacity (200kWh, >90% vacuum efficiency), its batch-mode operation created a mismatch with the continuous flow requirement of the washplant's dewatering screen, causing idle time and bottlenecks. Blockages in the vac line were also time-consuming to resolve manually.

Solution

Atlantic Pumps proposed the LSM-150 peristaltic pump — well-suited to thick, gritty, rag-laden sludge. A trial system was installed to continuously transfer sludge from digester to wash plant at controlled rates. The final setup included:

- LSM-150 with quick-connect Bauer fittings
- VFD inverter drive for adjustable flow
- Mobility features for use across multiple tanks

This eliminated reliance on vac trucks and enabled on-demand, consistent feed to the wash plant.



Throughput increased from the previous rate of 50m³/h to 130m³/h — fully utilising the wash plant capacity

Results

- Throughput increased from the previous rate of 50m³/h to 130m³/h — fully utilising the wash plant capacity
- Single operator can manage the process; less than half the time needed per clean-out
- Faster tank turnover, improving AD uptime
- Handles solids up to 100mm, minimising blockages
- No spinning parts for rag and fibre to wrap around
- Blockage-resistant pump, and simple overload recovery via reverse function

The LSM-150's 18kW motor delivers 130m³/h at up to 10 bar, and optional vacuum assist supports suction lifts up to 8m. Low maintenance, high uptime, and energy efficiency make it an attractive asset addition for multiple duties, including digester clean-outs.

Following successful trials at some of the company's other STWs, they are partnering with Atlantic Pumps in AMPB to integrate similar solutions in their resilience and efficiency upgrades across the network.

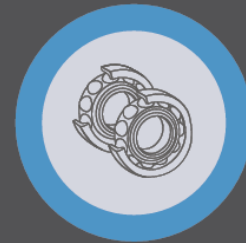
Toro Progressive Cavity Pumps (PC Pumps)

Meet 'Toro' our own line of robust, heavy duty PC pumps. Built to last, to be used where conventional PC pumps are overwhelmed by challenging applications.

T-LINE HOPPER

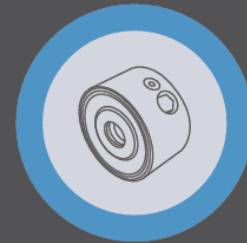


T-LINE SUCTION



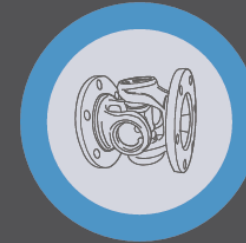
2RS DOUBLE BALL BEARINGS SUPPORT

Sturdy ball bearings support which absorbs axial and radial loads produced by the rotation of the rotor.



MECHANICAL SEAL LUBRICATED IN OIL

Cartridge mechanical seal, springs free, not in contact with the fluid.



CARDAN TRANSMISSION

Cardan transmission with needle bearings lubricated in grease, totally maintenance free.

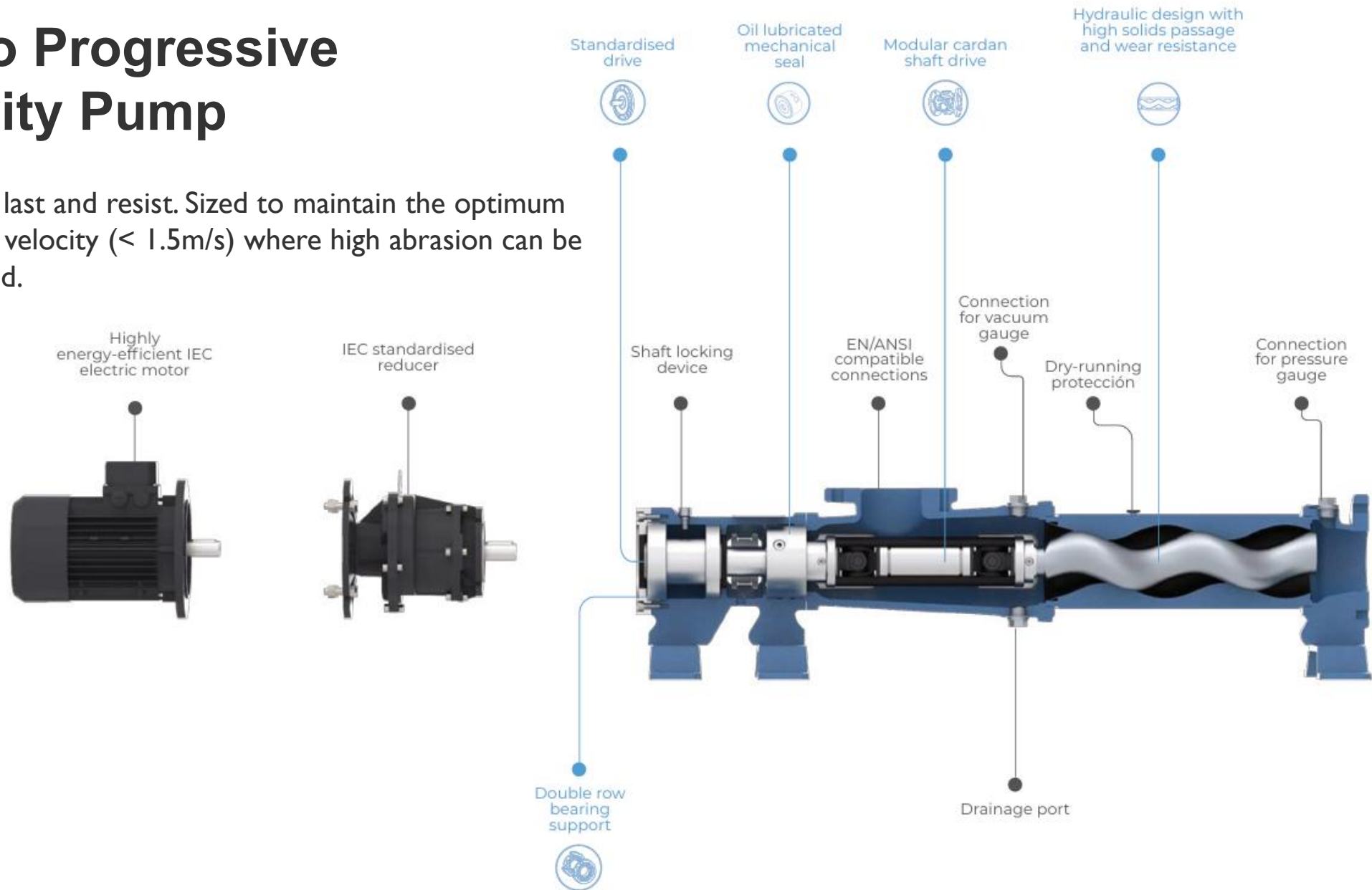


EDS: EASY DISASSEMBLY SYSTEM

Fast and easy disassembling system to facilitate maintenance tasks.

Toro Progressive Cavity Pump

Built to last and resist. Sized to maintain the optimum rubbing velocity ($< 1.5\text{m/s}$) where high abrasion can be expected.



WIMES guidance – Pump speed at the Rotor for Progressive Cavity Pumps

Clause 5.2.3

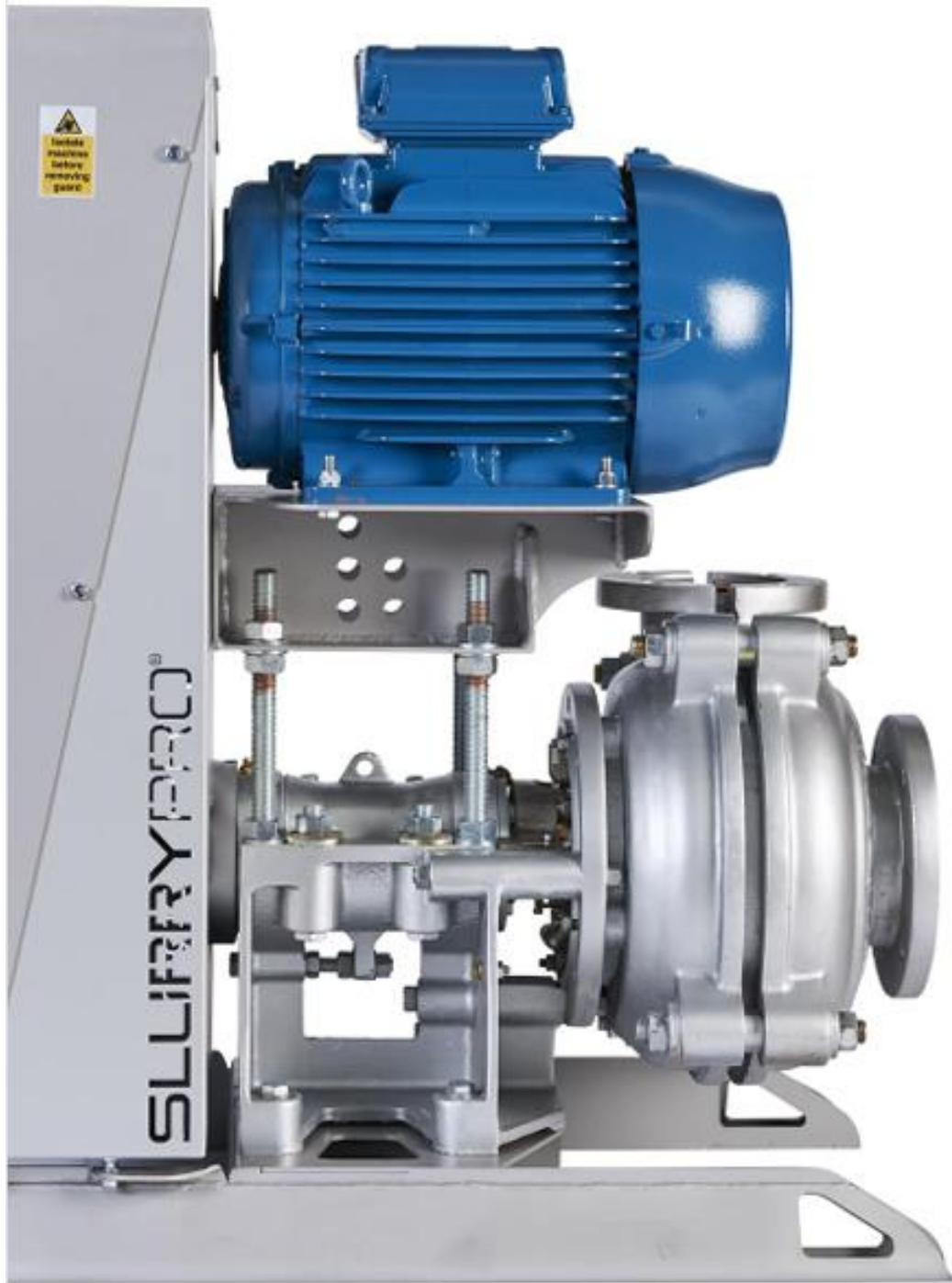
The maximum rotational speed of the pump rotor and pressure per pump stage should be limited to the values detailed in the following table:

Pumped Medium	Maximum Rotor Speed (rpm)	Maximum pressure per stage (bar)
Polymer	1000	5
Wash water	400	5
Final effluent	400	5
Macerated raw sewage	350	4
SAS/RAS/humus sludge	350	4
Digested sludge (max 2.5 % DS)	250	4
Blended sludge (max 8 % DS)	150	4
Primary sludge	200	3
Thickened sludge	150	3
Raw/imported sludge	175	3
Blended sludge (max 5 % DS)	200	3
Picket fence thickener sludge (max 5 % DS)	200	3
Imported/Indigenous sludge cake (18 – 30 % DS)	100	3
THP feed sludge (16 % DS)	100	3

WATER INDUSTRY MECHANICAL AND ELECTRICAL SPECIFICATION 1.04

PROGRESSING CAVITY PUMP UNITS

WIMES 1.04
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Slurry pro

- Designed for the toughest environments
- Lined Casings and Impellers – High Chrome or Rubber
- Simple Maintenance

Application

- Digester Recirculation
- High volume – liquid with high grit content



Audex

- Designed for the toughest environment
- Automation / failure protection





**ATLANTIC
PUMPS**

Keeping abrasive fluids moving