



Thickened Sludge Leads to Tankering Requirement Reduction

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 sludge 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



Solution

Atlantic Pumps identified the LSM peristaltic pump as being the best option for United Utilities waste sludge movements. Being able to pump thicker sludge would make better use of the dewatering screens, optimise the existing site facilities at source, and reduce the amount of water that is trucked off-site.

LSM peristaltic hose pumps allow United Utilities' treatment plants to dewater sludge to 12% dry matter and still pump it, with less downtime and interventions than previously.

The trial site has demonstrated good potential for reduction in road tankering requirements. Furthermore, on the occasion that the site does reach capacity, the tankers can now transport sludge at 4 times the solids content – an overall reduction in road miles and vehicle movements.

United Utilities have trialed the LSM pump in a number of other sludge applications and found it to be very versatile. Its proven successful at drawing sludge off PST (primary settlement tanks) and pumping it 150m, plus clearing out AD digesters and grit traps that normally require a vac truck.

Other advantages that LSM pumps delivered were longer lasting wear parts, and the ability to run dry without damage – an important factor in many sludge transfer applications as the viscosity can result in air gaps. Not only is the frequency of intervention less, but the wear parts cost less to change, as this can often be done by existing site staff.

Pump utilised: LSM150
 Rated power: 18kW
 Hose/passage diameter: 150mm (6")
 Suction lift (unaided): 4m (8m is possible with vacuum addition)
 Nominal flow: Up to 125m³/hr (controllable by VFD)
 Nominal pressure: 4.5 bar
 Max pressure: 10 bar

Results

LSM key benefits:

- Operation - Minimal operational maintenance, no daily greasing required. Periodic checks on the gearbox but minimal manpower to operate.
- Pump Maintenance - Can be maintained in situ using in house maintenance.
- Spares - from stock
- Solids Passage. Has the ability to handle odd rag parts and sizes, can run dry if needs be and can be run in reverse if there is a blockage.



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Get In Touch...

T: +44(0)1246 284 420 E: hello@atlantic-pumps.com W: atlanticpumps.co.uk

Atlantic Pumps Ltd is registered in England company number: 09400148. VAT Number: 249459267.
 Registered Office: Atlantic Pumps, Carrwood Road, Chesterfield, Derbyshire, United Kingdom, S41 9QB.