

SLUDGE CAKE TO LIQUID IN MINUTES

APPLICATION DETAILS

- Conveying capacity: 150 m³/h
- Pressure: up to 10 bar
- Back mixing to process imported dewatered sludge cake into liquid sludge
- Conveyed product: 30 % DS sludge cake to 6% DS sludge

KEY SPECIFICATIONS

- Consistent 6 % DS homogenous mix for digester feed
- Truck loads processed in under an hour
- Rotor Joint Access for ease of maintenance
- Pumps can handle 30 % DS sludge cake even without dilution liquid

BACKGROUND

Yorkshire Water Knostrop is a large Wastewater Treatment Works (WwTW) servicing a growing population of 800,000 people. The decision was taken to rebuild the works with standard digestion and a Combined Heat and Power (CHP) plant. The contract was given to build a facility to process indigenous sludge and imported dewatered sludge cake.

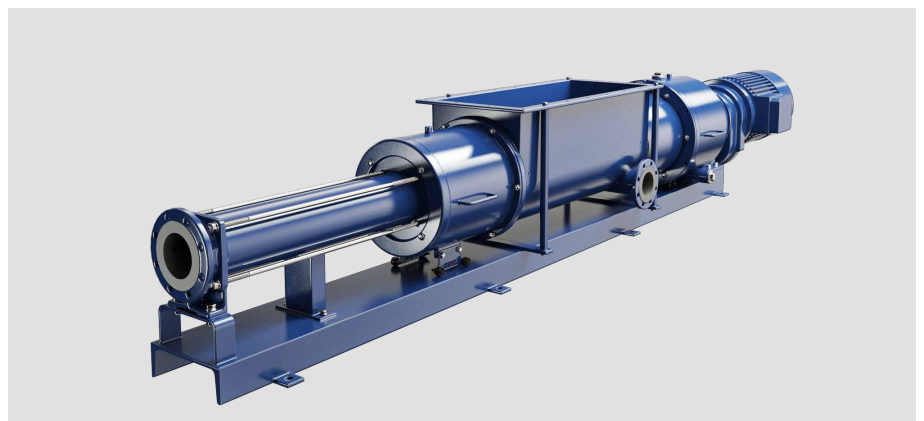
SEEPEx had previously installed twelve large progressive cavity pumps on site, conveying sludges to an incinerator, which had come to the end of its asset life. Over many years these pumps had proven to be reliable, and SEEPEx had built a well-established relationship with both the end user and their logistics hub.

TASK AND TARGET

Knostrop is a sludge treatment center that not only produces indigenous sludge but also receives five daily loads of dewatered sludge by truck five days a week from satellite sites in West and North Yorkshire. Each load had to be processed in under an hour to prevent vehicle backup.

The application required a pump to receive imported dewatered sludge from a large reception belt facility and process 28 tonnes of 30% DS sludge cake with high grit and rag content into a 6% DS homogenous mixture.

The resultant total volume after mixing was 150m³/h which was then fed to the digesters. The pump had to run up to eight hours a day and achieve a constant dry solids content and operate reliably under these extreme conditions.



The BTVE open hopper pump with an auger feed can handle 30% DS sludge cake with ease.

SMOOTH, MINIMAL PULSATION

COST SAVINGS

MORE COST-EFFECTIVE COMPARED TO TRADITIONAL MULTI-STEP BACK MIXING

LESS DOWNTIMES DUE TO EASY ROTOR JOINT ACCESS (RJA)

LOW TCO AS PUMP PERFORMS COHERENT TO KPIS WITHOUT ANY INTERRUPTION

SEEPLEX PRODUCTS

- 2x BTVE open hopper pump

SOLUTION

SEEPLEX calculated the total conveyed volume of sludge cake plus dilution liquid, using a combination of application experience, pump selection software and algorithms. Choosing the correct amount of dilution/side stream liquid to thin the cake is important to achieve the 6% DS required to optimise digestion. Two large BTVE open hopper pumps with an auger feed screw were selected, these were fed from the imported sludge reception facility. Each pump was designed to handle a capacity of 150m³/h of back mixed sludge and pump 30% DS dewatered sludge cake without dilution liquid.

A homogenous mix was achieved within the pump hopper by the auger feed screw and appropriately positioned dilution connections. A reliable 6% DS mixture was delivered by monitoring the pump's speed and discharge pressure by controlling the amount of dilution liquid being added to the pump hopper. To assist with maintenance, the pump was fitted with rotor joint access (RJA) enabling the pump's sliding casing part to be moved over the stator. This allows access to the rotor universal joint and gives the ability to remove debris without involving extensive maintenance work, e.g. removing pipework and the pump's stator.

RESULTS

Since their installation in June 2018, the pumps have performed as per the predicted KPIs related to parameters such as flow, pressure, speed, kW and amps. The processed sludge is pumped without interruption. And there has been no reported failure or performance drop. The sliding casing part significantly reduces downtime as blockages caused by large debris can be removed and the pump put back in operation within hours without dismantling the pump and extensive downtime.

The solution delivered by SEEPLEX is a more cost-effective alternative to the traditional multi-step back mixing approach which would involve further tank storage, additional pumps and blending.

BENEFITS

- Improved digestion from homogenous consistent dry solids mix
- No reported failure or performance drop since installation
- Blockages can be removed within a few hours without dismantling the pump
- Reliable operation with good service life