

Containerised HUBER S-DISC Sludge Thickener

a cost-effective, low risk approach to sludge thickening

by David Thompson BEng MBA

During AMP8, increasing amounts of sludge will be generated as a result of new wastewater treatment processes that will be required in order to comply with the Water Industry National Environment Programme (WINEP) and to provide the necessary enhanced protection of the UK's water courses. The additional sludge generated at small rural treatment works will add to the existing logistical and transportation challenges that water companies face, i.e. having to ensure that biosolids are moved in the most cost-effective manner between rural satellite treatment works and sludge dewatering hubs and sludge treatment centres.



*Render of the containerised HUBER S-DISC sludge thickener
Courtesy of Huber Technology*

Containerised HUBER S-DISC

The Containerised HUBER S-DISC re-packages proven technology for small scale sludge thickening to provide water companies with a cost-effective solution that will help address their biosolids logistics challenge.

At the heart of the Containerised S-DISC is the HUBER Disc Thickener (S-DISC); it is well proven sludge thickening technology with more than 90 references in the UK and 1071 worldwide.

The S-DISC thickens flocculated sludge using a principle similar to that of a gravity belt thickener (GBT). However, whereas a GBT uses a continuous fabric filter belt driven between two rollers, the S-DISC uses an inclined rotary filter disc with a filter media of woven stainless steel mesh. Sludge ploughs are used to assist the drainage of filtrate and a scraper blade is used to remove sludge from the disc surface, very similar to their use on a GBT. However, the stainless steel mesh is much more robust than the GBT's fabric belt and overall the machine is very compact and easily accessible for maintenance.

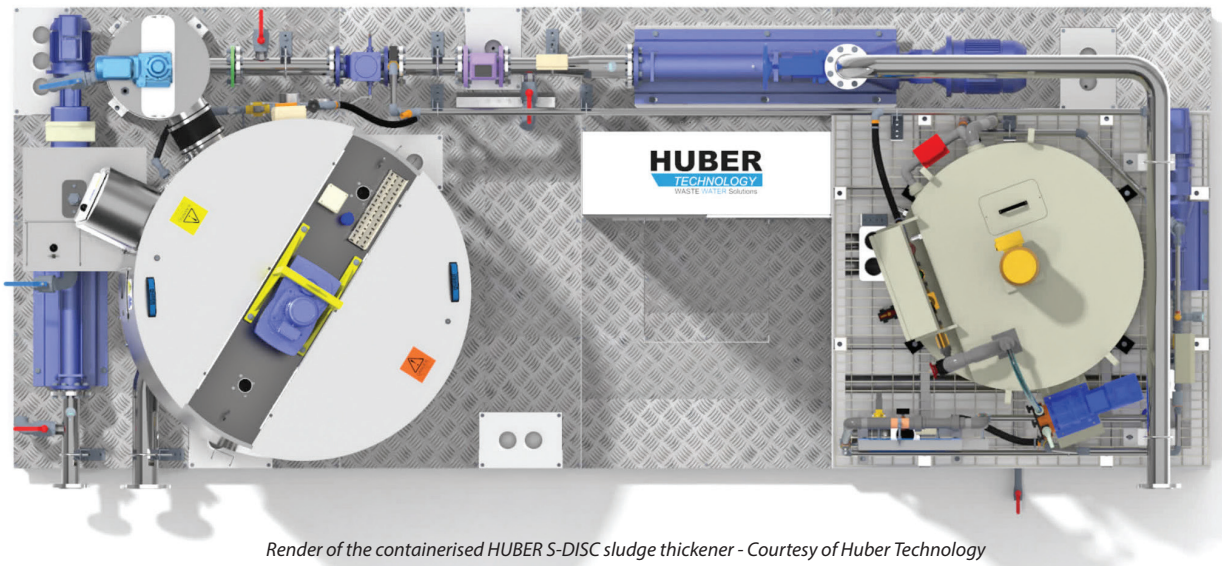
The S-DISC can thicken up to 38m³/hr (Size 2) of secondary sludge to >6% dry solids content with solids capture of >97%.

Design for Manufacture and Assembly (DfMA)

The design of the Containerised HUBER S-DISC adopted a Design for Manufacture and Assembly (DfMA) approach with the focus on:

- Reduced project lead time.
- Reduced production costs.
- Reduced site assembly time and associated H&S risk.
- Standardisation around a plant layout optimised for operation & maintenance.
- Full compliance with Water Industry M&E Specifications (WIMES).

The S-DISC and ancillary equipment are mounted on a galvanised steel skid which has integral cable ducts for effective cable management and for reducing potential trip hazards associated with surface mounted cable management. The skid also includes an integral sump under the poly dosing equipment to act as a bund



Render of the containerised HUBER S-DISC sludge thickener - Courtesy of Huber Technology

to capture any spillages. Level control in the bund indicates if there is liquid spilling into the bund and shuts the plant down to prevent further spillage of polymer. The bund has enough space to locate a day tank of concentrated liquid poly or polymer can be fed from an external IBC with a level control interface and IBC heating jacket power supply being provided from the container.

The skid is incorporated into a purpose built shipping container with bi-fold doors along one side and double doors at each end in order to provide unrestricted maintenance access to the plant. The plant can also be supplied as a skid mounted assembly where there is already an existing building to re-use.

An operation and maintenance risk assessment was undertaken during the design phase and then validated on the first production unit. The design brief was to ensure that this packaged solution eliminated any compromises in relation to maintenance activities.

Clear customer advantages

An integrated packaged solution which includes:

- Sludge feed and discharge pumps.
- A bunded polymer preparation unit and dosing pump.
- Heating, lighting and ventilation.
- A WIMES 3.04 compliant control system.
- A reduction in the number of both supplier interfaces and control interfaces that would otherwise be needed for a third party control system. This dramatically reduces project lead times and helps to de-risk the customer's project.

Case study: Welsh Water - St Davids STW

Welsh Water required a sludge thickener to reduce the number of tanker movements from this site. This was motivated not simply by the need for more efficient sludge transportation but also due to the narrow access in and out of the area and a recent local hotel

development. The treatment works has a population equivalent of 2,300 which increases threefold in the summer due to tourism.

The sludge thickening plan was required to thicken 16m³/hr of surplus activated sludge from 0.5% dry solids content to >5%. Having recently successfully installed an S-DISC thickener at Fishguard STW, it was deemed to be appropriate technology to use at St Davids STW. However, there was a need at St Davids to provide a building or enclosure for the sludge thickening plant as none existed on this isolated site.

A Containerised HUBER S-DISC size 1 was identified as the ideal solution. The container was based on a 20' high cube ISO shipping container which included heating, lighting and ventilation. By offering a package solution, the need for on-site construction and M&E installation was minimised. All assembly work was undertaken at Huber's Chippenham works and the completely assembly was fully tested prior to dispatch. The control system was design and manufactured in-house by Huber ensuring compliance with Welsh Water's electrical specifications including the use of Mitsubishi PLC automation.

The unit was delivered in late 2022 and installed on a pre-prepared plinth. It was then commissioned in March 2023. The S-DISC thickened sludge to 5.5% dry solid content with a polymer consumption of <2 kg/tds. Filtrate quality was <200 mg/l SS demonstrating a 98% solids capture rate.

The success of this project has subsequently led to ten more units being delivered to Anglian Water, Scottish Water, Severn Trent and Thames Water.

The editor and publishers would like to thank David Thompson, former Engineering & Operations Director with Huber Technology, for providing the above article for publication.



Containerised HUBER S-DISC sludge thickener at St Davids STW
Courtesy of Huber Technology



Render of the Containerised Huber S-DISC
sludge thickener - Courtesy of Huber Technology