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PRESENTATION of DAB

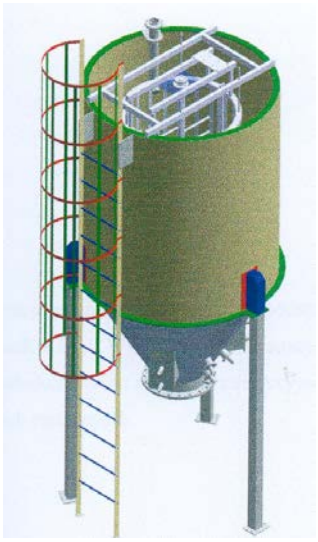
Sludge thickening and dewatering technology

Introduction

The DAB System can be applied everywhere sludge or slurry should be dewatered or thickened. No matter if sludge or slurry is organic or inorganic. Construction of DAB equipment can be different since quality of sludge or slurry very in a wide range and since dewatering or thickening demands are different.

DAB System is being used in a variety of applications such as:

Sewage treatment	Fish process
Paper	Septic tanks
Chemical	Food waste
Diary	Meat process



In order to cover the very wide spectrum of applications there are four types of construction within the DAB System:

- DAB Dewaterer (shown on the drawing to the right)
- DAB Thickener
- DAB Continuous
- DAB Drainer

Most common are DAB Dewaterer and DAB Thickener. DAB continuous is being developed. This version will be ready soon.

The DAB System operating principles are simple but effective. After filling the DAB silo with polyelectrolyte prepared sludge, the sludge is allowed to thicken or dewater within the DAB silo. The free water released by the flocculation process is allowed to drain through the patented double-walled cylinder until the required product is achieved. The thickened solids or dewatered cake can then be discharged via the bottom outlet valve.

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Available in standard sizes, the DAB system provides an economic means of thickening and/or dewatering sludge from small and medium sizes municipal and industrial sludge treatment plants. Construction is simple and robust, requiring minimum servicing and the system can be supplied to operate automatically. The two photos above show DAB's effectiveness - how well dewatered is sludge in municipal sewage treatment plant and how clean is the discharge water.

With its simple silo design and small footprints, the DAB System is ideal for outdoor installation (if the climate is favourable) and can be applied to scenarios where sludge thickening and dewatering would have previously been uneconomic.
The DAB system was developed to meet specific needs to give high performance 24 hours per day. DAB has simple construction and contains patented filtration cylinder, which gives various advantages.

Features and benefits

The DAB System has proven itself in a wide variety of applications giving:

Small footprints
Dual purpose – thickening or dewatering
High filtrate quality
Low polymer consumption
Low whole-life costs
Automatic operation
Minimal maintenance
Sludge volume reduction
Very low energy consumption

Construction of DAB

All designs of DAB units are constructed to the same high quality, meet all current standards, and incorporate the following minimum essential components:

Silo (or other container) with support and ladder
Spray system
Reject pipe with valve
Filtration cylinder
Inlet pipe
Bottom valve

The filtration cylinder usually has a form of a double wall cylinder and consists of a framework of stainless material covered with draining screen. When the filtration cylinder is immersed in the sludge to be treated, the reject water flows through the screen walls into the hollow spaces between the walls. Water then runs off by gravity from the bottom of the cylinder.

Dewatered sludge is fed out from the bottom of the silo with a conveying screw, a pump or drops down into a container under the silo. Thickened sludge is removed by pumping. A silo set-up can be supplied in the standard sizes of 2, 6, 10, 20 and 25 m3, or designed specifically for users needs.

The filtration cylinder can be placed directly into a sludge store or sludge basin for thickening. A filtration cylinder placed in a container with piping and valves constitutes a complete thickening system.

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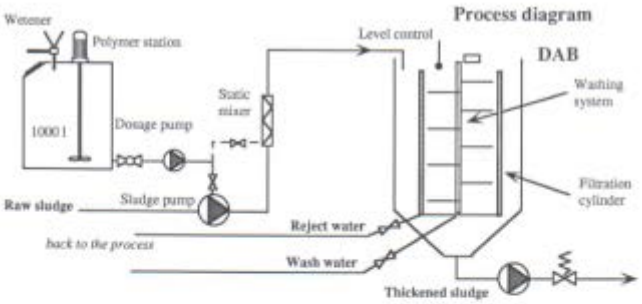
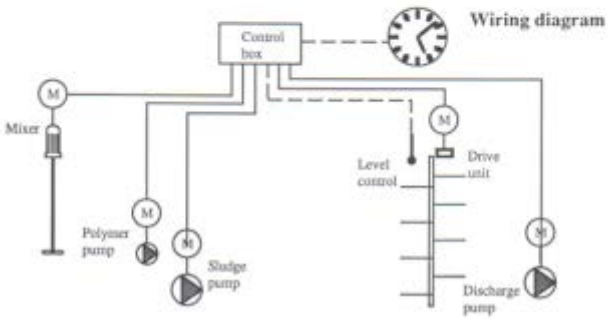
System description

The most common systems are DAB Thickener and DAB Dewaterer. In order to meet customers' wishes, details can differ but principle of the system is always the same. The drawing below shows the thickening system.
The DAB system consists of a polymer station (for emulsion or powder polymer), a sludge pump, a static mixer and a DAB unit equipped with a filtration cylinder, a washing system, a level control (to avoid over-filling) and a bottom valve or a discharge pump.

Before thickening can take place a suitable polymer solution is to be prepared. The polymer pump and the sludge pump work simultaneously. The polymer solution can be added to the sludge stream before or after the sludge pump. In order to achieve good contact between the polymer and sludge particles the stream passes a static mixer on the way to DAB. While filling, level of sludge is rising. When the sludge reaches the lower part of the cylinder, the thickening process starts i.e. water goes through the walls and out from the DAB. Usually the outlet is open while filling. In spite of water removing the level of sludge rises. DAB is equipped with a level control which stops both the sludge and the polymer pump when a risk for over-filling appears. In some applications a low level sensor is used too.
The sludge used to be left for a while to let more water to flow out (thickening proceeds). When the right thickening level has been achieved the bottom valve is opened or the discharge pump is started.
Usually some sludge particles are left on the walls so the washing system is started in order to guarantee full function for the next cycle. After washing the bottom valve is closed or the discharge pump stopped.



DAB Thickener



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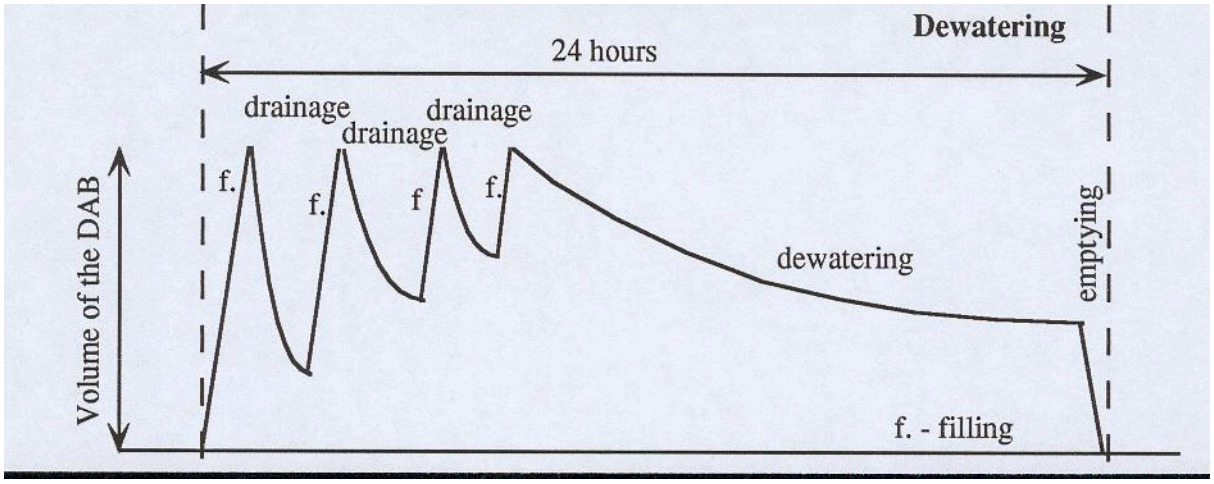
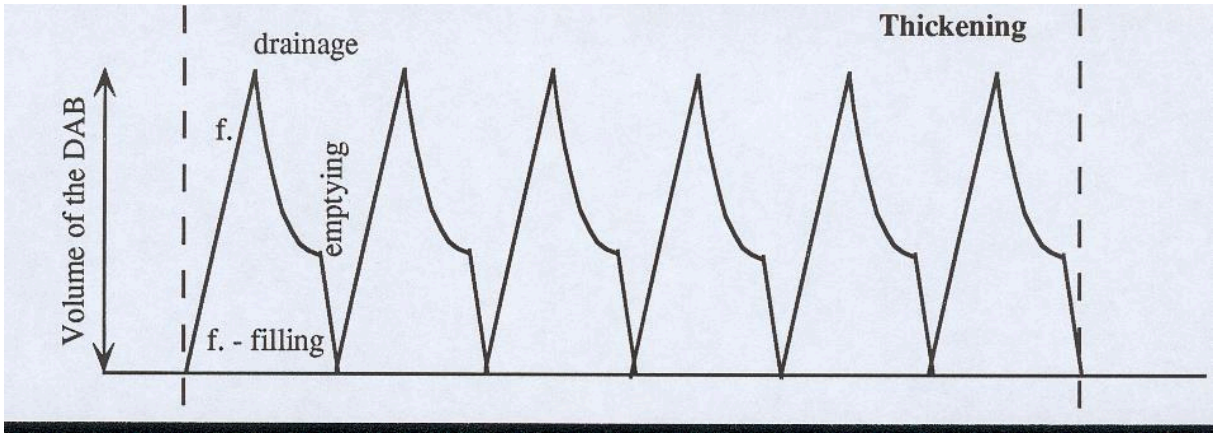
Dewatering and thickening cycle (see two sketches below and Process description)

Sludge (mixed with polymer) is pumped into DAB. Usually the reject valve is open and liquid is removed during pumping. This means that about double volume is pumped before the container is filled, e.g. into DAB 20 about 40 m3 is pumped (for inlet d.s. of 1-2%) After about 2 hours the thickened sludge takes up a volume of about 6 m3. New portion of sludge of about 30 m3 is pumped and after further 2 hours the thickened sludge takes up a volume of 10 m3. The third portion of sludge about 20 m3 and the fourth of about 15 m3 are added. Then the sludge is left for the night. During that time more water is removed. Sludge volume decreases to less than 15 m3.
In the morning the bottom valve is opened and the dewatered sludge falls on a band conveyor, into a screw conveyor or into a container. For the municipal sludge the d.s. can be 10-16%.
If necessary the draining screen is washed and a new dewatering cycle is started.
All together one cycle takes 24 hours.



Thickening i.e. achieving d.s. 5-8% is much quicker. One cycle takes 4-6 hours and the capacity of the unit is 2-4 times higher.



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Specifications

Silo volume /m3/	2	6	10	16	25
Overall diameter /m/	1,2	1,8	2,3	2,6	3,0
Height /m/ (can differ)	4,1	4,8	5,3	6,0	6,0
Weight /kg/ (unloaded)	750	1000	2000	2700	3000
Weight /kg/ (loaded))	2750	7000	12000	23000	28000

Typical performance

Sludge type	Feed solids	Thickened sludge	Dewatered sludge
	/% d.s./	/% d.s./	/% d.s./
Biological	0,5-1,5	4-7	8-12
Co-settled	1,5-3	4-7	14-18
Primary	2-4	6-8	16-22
Digested	1,5-3	6-8	12-16
Water works	0,3-1,5	4-6	6-25

Typical capacity (for sewage sludge)

Silo volume /m3/	Thickening /m3/day/	Dewatering /m3/day/
2	25-40	4-10
6	90-150	10-30
10	150-230	20-60
16	300-450	40-120
25	400-600	50-150

Special industrial applications

In many industries different slurry is produced, e.g. fish or chicken rests in food industry, thickened sludge in paper or paint industry, sediment in steel industry etc.
For further thickening of slurry a special type of equipment DAB Drainer is used. This DAB is in form of a container with two rectangular drainage cassettes. Between 5 and 20% of liquid can be removed from the slurry that make the consistence more solid and/or transport costs are decreased.
DAB Drainer can be used in farming e.g. for manure thickening.