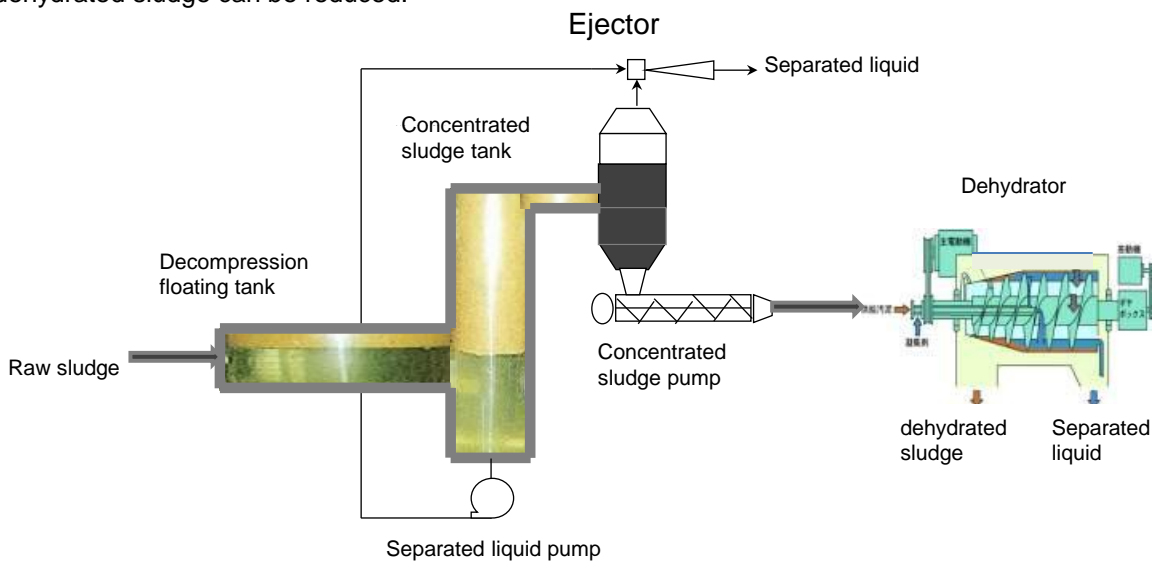


Sludge Vacuum Concentration and Volume Reduction System

• Dissolved gas is deaerated from sludge under a vacuum to float and concentrate the sludge and reduce the sludge volume.

Features

- Sludge can be concentrated from 0.5-1.0% to 3-4%, leading to a 5-10% reduction in the moisture content of the sludge after dehydration.
- In the process of dissolved gas deaeration, sludge flocculates. Thus, this treatment tank can also be used as the flocculation reaction tank of a dehydrator.
- In the process of dissolved gas deaeration, anaerobic gas and odor are deaerated. Thus, the odor of dehydrated sludge can be reduced.



*Case study of a vacuum concentration dehydration system using an ejector

Overview (Technical principles, actions, etc.)

Problem of conventional wastewater treatment sludge and dehydration technology

The volume reduction in activated sludge generated by the treatment of sewage and food factory drainage has been difficult, because the concentration of sludge has been 1% or less and dehydration of the sludge has also been difficult. Thus, as a pre-dehydration process, pressure floating concentration technology has been used: that is, air is dissolved in the sludge under increased pressure, and then the pressure is reduced to atmospheric pressure to deaerate the dissolved gas. In addition, a flocculation reaction tank, where coagulant is added to flocculate the sludge, has generally been installed to increase the drainability of the sludge. In this way, a large power source and facilities such as air compressors and stirrers are necessary for dehydration and volume reduction of the sludge by water treatment.

Overview of vacuum concentration dehydration system of our company

Our company has developed a technology to deaerate a small amount of gas dissolved in sludge under a vacuum to float and concentrate the sludge, and flocculate the sludge without using a coagulant at the same time. By using this technology, problems can be resolved as follows:

No need for a sludge concentration facility that requires a large power source and a large installation area

No need for a flocculation reaction tank that requires a stirring power source and a coagulant

Other than pumps for supernatant liquid and sludge, our company's facility does not have moving parts. It is a simple and inexpensive facility.

Performance of vacuum concentration facility and cost comparison

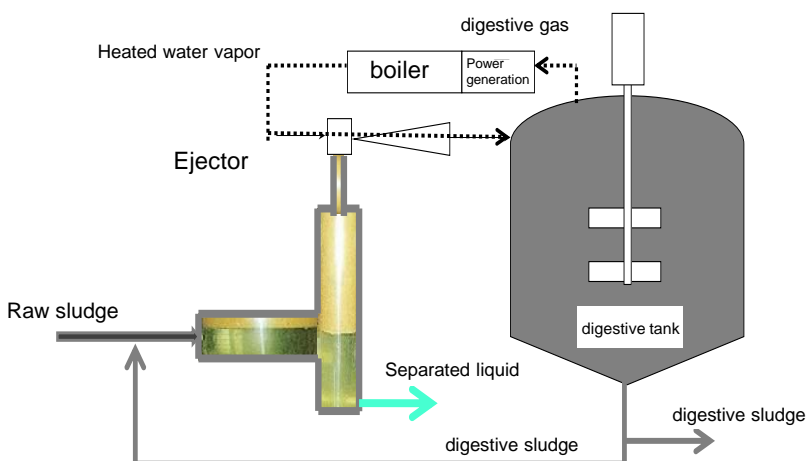
The vacuum concentration facility consists of fewer devices compared with conventional mechanical concentration facilities. In addition, our company's facility is compact, because the sludge retention time in our company's facility is significantly shorter than that of facilities using other floating concentration methods. Thus, the facility cost and its maintenance cost are much lower, compared with those of facilities using other methods.

The sludge concentration ratio and maximum concentration of our method are comparable to those of other methods. The solid recovery rate is ensured to be 90% or more.

Concentrating device	Centrifugal force	Pressurization and floating	Normal pressure flotation	Filter cloth filtration	Decompression floating
Component devices	Centrifugal concentration device, Pump etc.	Air compressor, Pressurized air dissolving tank, Floating concentration tank, Floating sludge scraper, Deaerator, Pump etc.	Air blower, Chemical tank, Flocculation reaction tank, Floating concentration tank, Floating sludge scraper, Deaerator, Pump etc.	Chemical tank, Flocculation reaction tank, Filtration concentration device, Filter cloth cleaning device, Pump etc.	Decompression floating concentration tank, Ejector, Pump etc.
Detention time	0.01 hour	2 hour	1 hour	0.5 hour	0.1 hour
Facility cost	100	100	100	50	20
Maintenance and operation cost	100	70	70	40	20
Maximum concentration	3~5%	3~4%	3~5%	3~4%	3~4%
Solid material recovery rate	Over 90%	Over 80%	Over 95%	Over 95%	Over 90%
Necessity in coagulant	unnecessary	unnecessary	necessary	necessary	unnecessary

Application to methane fermentation system

While the vacuum concentration dehydration system uses a water ejector as a vacuum device, there is a method for using heated steam as a high-speed fluid for the ejector. In this case, thermal reforming of concentrated sludge is possible due to steam condensation heat and cavitation effects. By thermal reforming, sludge dehydrability is enhanced and methane fermentation is facilitated. Vacuum treatment using a heated steam ejector has the following features:



1. Due to sludge concentration and thermal treatment effects, sludge is reformed and its dehydrability is enhanced.
2. Due to the heated steam concentration and cavitation effects, sludge is solubilized and methane fermentation is facilitated.
3. Since digestion fluid can be concentrated again to re-digest solid materials, sludge can be digested in the digestion tank using high concentration fluid.

Performance

By this sludge concentration systems, the sludge treatment and the water treatment cost can be reduced by the following features for sludge reduction.

1. By reducing the moisture content of dewatered sludge, sludge disposal costs can be reduced.
2. The methane fermentation system by this technology can significantly improve the digestibility and reduce sludge disposal costs.
3. The pretreatment system for wastewater including solids and oil by this technology can reduce the cost of water treatment.

TechnoPlan Co.,Ltd.

<http://www.technoplankobe.com>

E-mail info@technoplankobe.com

address: 〒658-0032 Kobe Fashion mart 4E-20, 6-9, Koyochonaka, Higashinada-ku, Kobe Hyogo

TEL 078-597-7877 FAX 078-597-7880