

DEHYDRATOR MULTI-DISC SCREW PRESS

ADVANCED DEWATERING SOLUTION

- ◆ Low noise level
 - ◆ Simple process
 - ◆ High sludge recovery performance
 - ◆ Power and water savings
 - ◆ Low investment and maintenance
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ASHIDA YOICHI

- CEO of SLUDEN -

“With the policy of considering quality as top priority, always respecting and listening to the comments of customers, warranty and maintenance in accordance to international standards, **SLUDEN INTERNATIONAL INCORPORATION** commits to become reliable partner and companion for all customers.”

Multi-disc screw press dehydrator began to be researched and developed by Japanese experts in the early 90s of the last century. In the early 2000s, the multi screw press dehydrator was applied widely in Japan and in fact it was considered as a revolution in the field of treating waste sludge from wastewater treatment plants because of its excellent advantages compared to conventional methods. After that, the multi-disc screw press dehydrator was accepted widely in the markets in North America (USA, Canada), and nowadays the multi-disc screw press dehydrator has become common all over the world, especially in the developed industrial countries.

In Vietnam, the multi-disc screw press dehydrator has been begun to be applied to factories, enterprises in the recent years, however the scope of application has not been common yet because the product is still strange to customers in Vietnam.

To produce and trade the goods to customers with the best quality as well as reasonable investment cost, the multi-disc screw press dehydrator is designed by Japanese engineers and fabricated in Vietnam with the trademark as SLUDEN.

SLUDEN INTERNATIONAL INCORPORATION

Director

(As signed)

SLUDEN multi-disc screw press dehydrator has enough advantages which overcome the conventional sludge dewatering equipment, including in the following:

- ◆ 100% material is made of 304 grade stainless steel, the blade is reinforced by anti-abrasion alloy coating with the hardness up to 1100HV, thus the life span of the device expands longer.
- ◆ Being produced in Vietnam – thus the spare parts are available.
- ◆ Bad odor and noise reduced at most.
- ◆ Very extremely low clean water consumption: as 1/50 times less than belt press.
- ◆ Low power consumption: as 1/20 times less than centrifugal decanter.
- ◆ High dry solid content of dewatered sludge, sludge recovery performance achieving up to 85-90%, reducing at most the volume of sludge returning to the plant following to rinse-water.
- ◆ Low operation cost.
- ◆ Small installation footprint.
- ◆ Easy operation and maintenance.
- ◆ Highly automated, may be connected to SCADA – May be operated by touch screen HMI.
- ◆ Capable to well-handle oily and fat waste sludge - Suitable for processing factories such as meat, cooking oil, food, cosmetics, cattle & poultry slaughtering, and aqua-sea products (catfish, pangasius), etc.
- ◆ Models are designed and fabricated with the capacity of 6-705 kg DS/h, corresponding to the flowrate of 0.2-87 m³/h in accordance to each type of sludge, SLUDEN multi-disc screw press dehydrator can satisfy all the needs of customers.

TYPES OF SLUDGE DEHYDRATOR

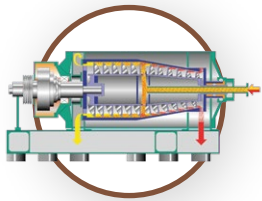
Disadvantages

Conventional solutions of sludge dehydration such as screw press, centrifugal decanter, belt press, filter press used to be common methods for dewatering waste sludge from sewage treatment plants and water treatment plants.

However, they need continuous operator attention and more power consumption as well great deal of frequent maintenance.

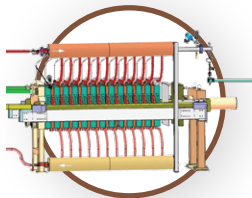
CENTRIFUGAL DECANTER

High speed operation.
Extremely high energy input
High noise level
Excessive maintenance
Incapability of inorganic sludge dewatering



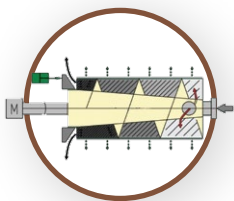
FILTER PRESS

Permanent filter clogging
High pressure pump requirement
Incapability of continuous operation without inspection
Incapability of organic sludge dehydration



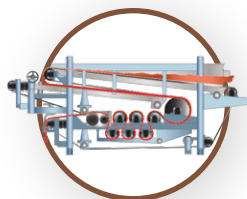
SCREW PRESS

Screen as filtering material, so frequent blinding.
Difficult continuous operation.
Incapability of inorganic sludge dewatering.



BELT PRESS

High and continuous operator attention requirement because of its difficult alignment of moving parts.
Continuous filtering cloth wash-downs, maintenance and replacement due to clogging and damage.
High water & power consumption
Incapability of dewatering sludge with high oil and fat.



MULTI-DISC SCREW PRESS DEHYDRATOR

Advanced Dewatering Solution

Simple Process

Reduced Noise As Much As Possible

High Dewatering Efficiency

Water And Power Savings

Low Investment And Maintenance

SLUDEN multi-disc screw press dehydrator is the product of sludge dehydration applying the most advanced technology in waste sludge treating field nowadays. They are being used more and more widely in industrial as well domestic wastewater treatment plants for dewatering liquid sludge and reducing the volume of waste sludge up to as much as possible.

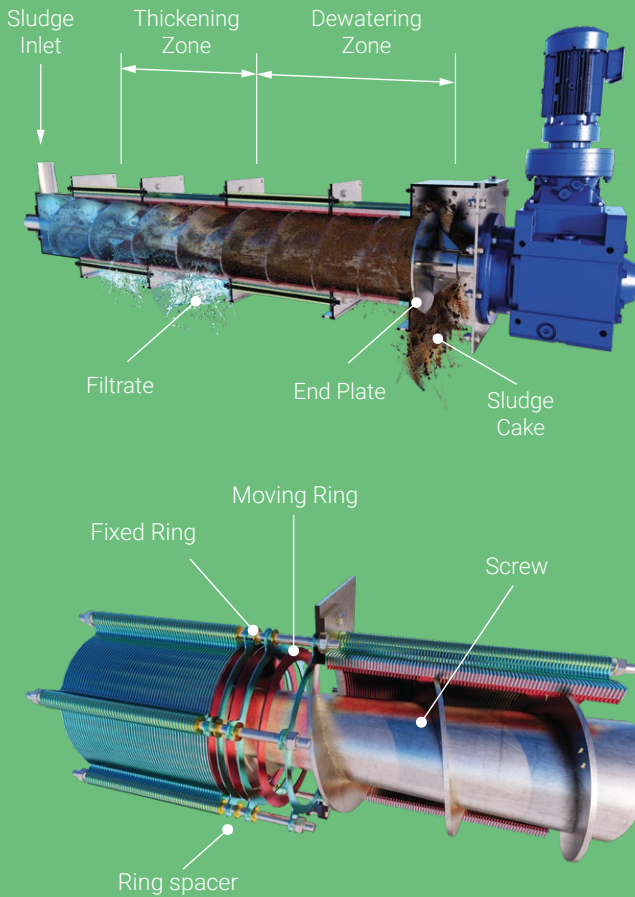
SLUDEN multi-disc screw press dehydrator is born to help shooting the problem of conventional sludge dehydration methods. Unique structure and simple working principle make it excel the conventional sludge dewatering equipment which is limited to its feature and function.

A dewatering cylinder combined with flocculation tank allows it to do high sludge recovery performance. It owns fixed rings and moving rings replacing instead of screen or filtering cloth, which are stacked and intertwined forming a tube assembly. The inside rotating screw forces the moving rings to slip freely between the fixed rings, enabling it to do self-cleaning continuously and automatically. The gaps between the discs and the screw pitch/size are designed to get gradually narrower from thickening zone to dewatering zone towards the adjustable end plate at discharge side, creating multi-dimension compression effect.

This special structure makes it to dewater the sludge more efficiently and easily, independence to wash-water pressure which prevents clogging. The filtrate escapes continuously and constantly with high cleanness and quality. The dewatered sludge has high dry solid content and low loss. It can be applied to low sludge content from 2,000mg/l up to 50,000mg/l, diversified types of sludge, and higher capacity outcome.

Usage of minimal horsepower and low speed motors helps reducing energy consumption cost and eliminating noise level. Unique self-cleaning effect keeps it from clogging and rising wash-water demand. The machine can operate continuously for 24/24h per day, so as to release labor of operators and managers. It is skid-mounted and prewired, making easy transportation and installation. It has in-place shielding chassis and guarding lid for eliminating bad odor emission.

A different advantage compared with the conventional sludge dehydrators is that it can dewater the sludge directly from clarifier and biological aeration basin without sludge storage tank and thickener, thus this cuts down initial investment cost for WWTPs. High sludge removal performance eliminates phosphorus to release into the influent. Its robustness and small footprint help to save installation space, infrastructure investment and equipment procurement.



In principle, a multi-disc screw press dehydrator consists of three main components: Screw, fixed rings and moving rings.

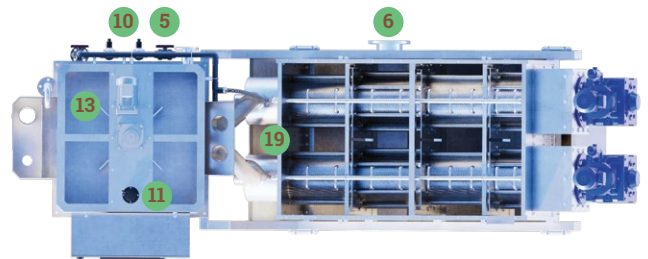
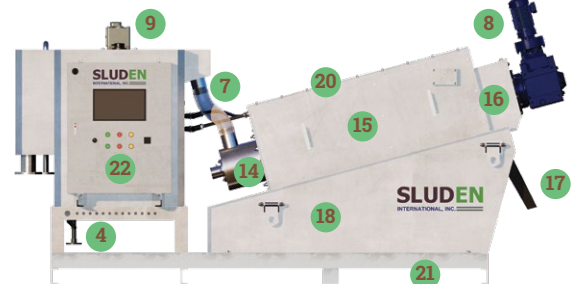
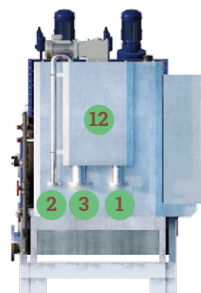
The fixed rings and moving rings are arranged alternately in succession and the gaps between the discs are fixed by ring spacers. The thickness of the moving rings is less than the washers between two successive fixed rings, so as to help the moving rings to slip freely in the gaps between two fixed rings. This unique structure enables the water in the liquid-sludge mixture to discharge outside continuously without clogging the gaps, and then clean water is not necessary to use to spray them to avoid blocking.

The moving rings can slide by force which is applied by the blade of screw. Normally a multi-disc screw press dehydrator is divided into main zones: Lower thickening zone and upper dewatering zone.

In the thickening zone, the water in liquid-sludge mixture is removed with fast speed and so as to rise the concentration of solid in the mixture. In the dewatering zone, the thickened sludge is compressed in high pressure due to the rotation of the screw to squeeze thoroughly the remaining water in the liquid-sludge mixture for increasing the content of dry solid up to as much as possible in the dewatered sludge. Commonly, to increase the ability of splitting water as well to rise the concentration of solid in the dewatered sludge, the assembly of the cylindrical tube (including fixed rings and moving rings) and the screw is inclined at a certain angle horizontally.

COMPONENTS

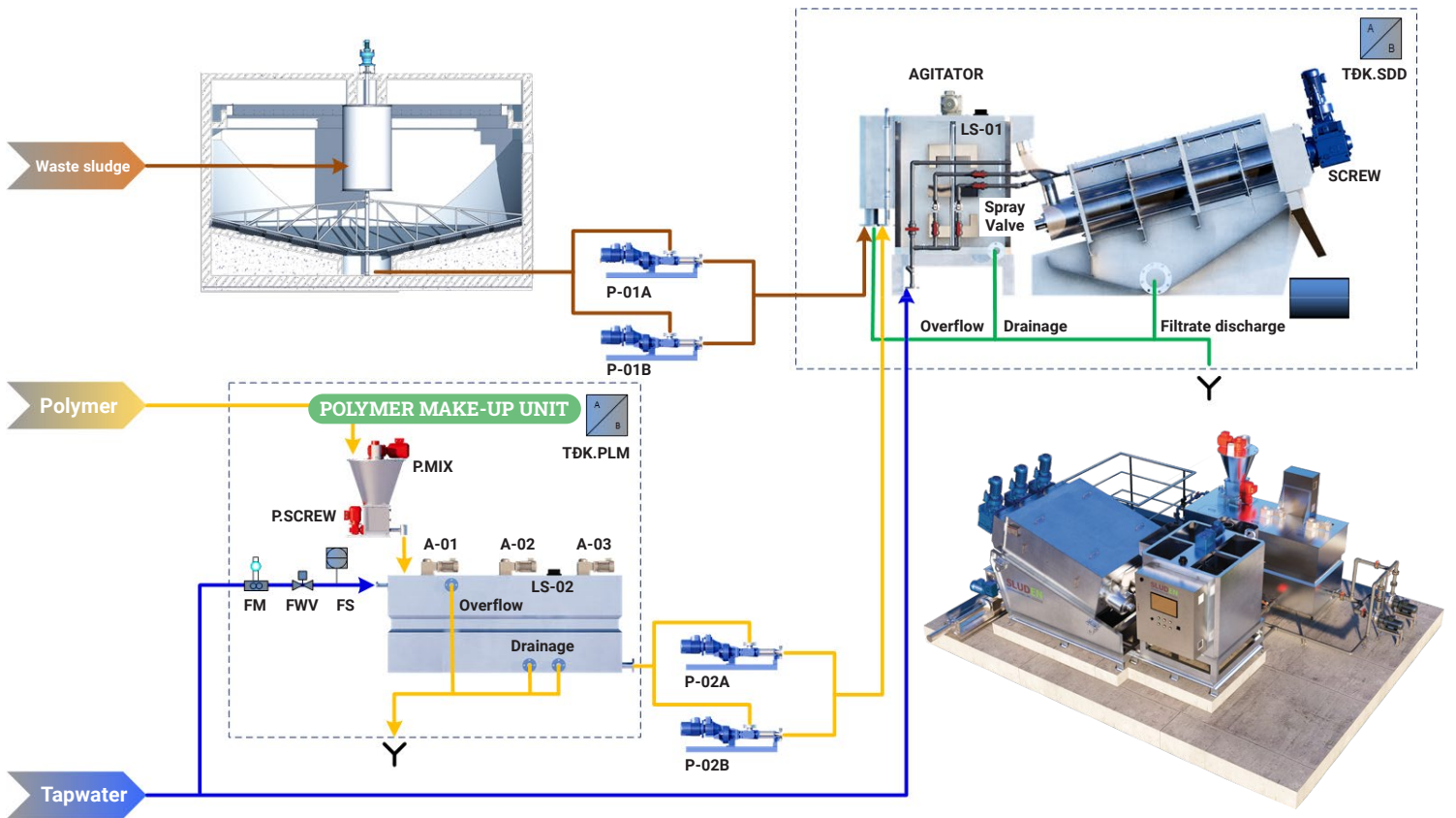
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|---------------------|----------------------------|
| 1 Sludge inlet | 12 Inlet sludge chamber |
| 2 Polymer inlet | 13 Flocculation tank |
| 3 Overflow outlet | 14 Inlet sludge zone |
| 4 Wash-water inlet | 15 Dewatering cylinder |
| 5 Drainage outlet | 16 Outlet sludge zone |
| 6 Filtrate outlet | 17 Discharge chute |
| 7 Inlet sludge pipe | 18 Filtrate discharge zone |
| 8 Screw motor | 19 Shielding chassis |
| 9 Mixing motor | 20 Guarding lid |
| 10 Spray valve | 21 Mounted skid |
| 11 Electrode sensor | 22 Control panel |



All of components such as screw, fixed ring, moving ring, chassis, lid, skid, bolt & nut, pipe... are made of 304 grade stainless steel, helping the equipment having chemically and physically corrosion and abrasion resistance reliability, so as to eliminate maintenance and repair up to as much as possible.

SLUDGE THICKENER

MULTI-DISC SCREW PRESS DEHYDRATOR



DESCRIPTION OF PROCESS

- 1 Waste sludge from thickener is pumped into the inlet sludge chamber of the multi-disc screw press dehydrator. Here, inlet flowrate is regulated with the overflow weir. Excess volume returns to the sludge storage tank through the overflow pipe.
- 2 Polymer solution is injected into the flocculation tank from the automatic polymer making tank and mixed with the sludge by the agitator, forming suitable floc.
- 3 After forming floc, the sludge flows down to the dewatering cylinder. Through the rotation of screws and moving rings, the sludge is thickened and dehydrated. The dewatered sludge comes out at the sludge discharge trough.
- 4 Filtrate goes out into the filtrate collecting zone behind and exit outside at the discharge outlet.
- 5 During its operation, tap-water is supplied into the equipment to clean the assembly through the high pressure sprayers installed above the screws.
- 6 All the machine's operation are controlled by control panel.

TYPES OF APPLICATION

SLUDEN multi-disc screw press dehydrator is suitable for treating almost types of organic and inorganic sludge. In general, SLUDEN multi-disc screw dehydrator is applicable for all kinds of sludge treatable by sludge dewatering devices such as belt press, filter press, centrifuges...

SLUDEN multi-disc screw dehydrator is applicable for dehydrating waste sludge from WWTPs of the fields such as:

- ◆ Food processing: alcohol, beer, beverage, sugar, milk, cake, candy, meat...
- ◆ Livestock waste and slaughter (cattle & poultry).
- ◆ Vegetables and aqua-sea food processing.
- ◆ Garment, textile and dyeing factories.
- ◆ Mining industry and metallurgical plants.
- ◆ Chemicals, printing ink, pulp & paper, packaging, rubber, cassava...industries
- ◆ Sewage treatment process for municipal & industrial zones.
- ◆ Deposited sludge from rivers, ponds, lakes.
- ◆ Water supply for commercial & domestic purpose

Below table of technical specifications is only for reference – Capacity is different in accordance with each type of sludge. For more detailed information please contact the sale-men of SLUDEN to be advised.

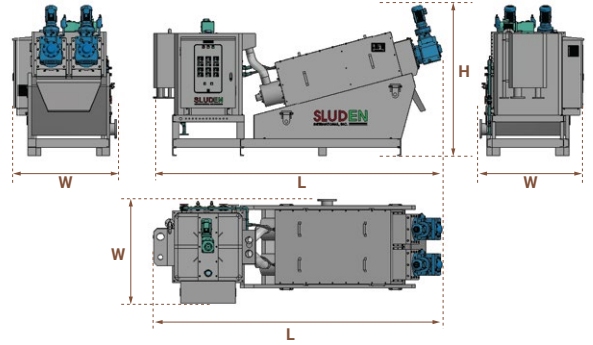
The capacity is estimated being based on the humidity of dewatered sludge cake as 85%.

No limited value to the inlet sludge content, however the capacity of dewatering sludge need to be considered.

The value of column "Flotation sludge" is given being based on the types of sludge with oil and fat such as sludge from food processing factories, cosmetics, aqua-sea products, etc...

Thickened sludge mixture is understood as the mixture including physiochemical sludge, anaerobic & aerobic biological sludge after being stabilized in the sludge thickener.

Beside of standard models below, SLUDEN International Incorporation also provides design & fabrication on customers' demands.



Model	Capacity (kg DS/h) as dry solids		Sludge flow rate followed by contents						Diameter x Q'ty	Power consumption (kW/h)	Water consumption (L/h)	Installation dimensions			Weight	
	Low content	High content	Sludge contents									Length (L) (m)	Width (W) (m)	Height (H) (m)	Dry (kg)	Wet (kg)
			0.5%	1.0%	1.5%	2.0%	3.0%	5.0%								
SDD-111	6	10	1.2	0.6	0.66	0.5	0.33	0.2	D110x1	0.4	20	2.26	0.86	1.54	275	455
SDD-112	12	20	2.4	1.2	1.33	1	0.66	0.4	D110x2	0.65	40	2.41	1.09	1.54	385	654.5
SDD-113	18	30	3.6	1.8	2	1.5	1	0.6	D110x3	1	60	2.56	1.25	1.54	495	866
SDD-151	12	20	2.4	1.2	1.33	1	0.66	0.4	D150x1	0.65	30	2.78	0.96	1.54	525	840
SDD-152	24	40	4.8	2.4	2.66	2	1.33	0.8	D150x2	1.2	60	2.93	1.22	1.54	840	1,386
SDD-153	36	60	7.2	3.6	4	3	2	1.2	D150x3	1.75	90	3.15	1.44	1.54	1,175	1,998
SDD-201	30	50	6	3	3.33	2.5	1.66	1	D200x1	0.95	40	3.27	1.03	1.8	775	1,279
SDD-202	60	100	12	6	6.66	5	3.33	2	D200x2	1.65	80	3.60	1.28	1.8	1,385	2,355
SDD-203	90	150	18	9	10	7.5	5	3	D200x3	2.4	120	3.80	1.58	1.8	1,825	3,194
SDD-251	60	100	12	6	6.66	5	3.33	2	D250x1	1.3	55	3.6	1.08	1.93	1,200	1,980
SDD-252	120	200	24	12	13.33	10	6.66	4	D250x2	2.25	110	3.81	1.33	1.93	2,050	3,485
SDD-253	180	300	36	18	20	15	10	6	D250x3	3.35	165	3.9	1.66	1.93	2,950	5,163
SDD-301	100	160	20	10	10.66	8	5.33	3.2	D300x1	2.25	90	4.14	1.28	2.17	2,150	3,655
SDD-302	200	320	40	20	21.33	16	10.66	6.4	D300x2	4.1	180	4.34	1.50	2.17	4,025	7,044
SDD-303	300	480	60	30	32	24	16	9.6	D300x3	6	270	4.54	1.86	2.17	5,500	9,900
SDD-351	145	235	29	14.5	15.66	11.75	7.83	4.7	D350x1	3.3	100	4.23	1.36	2.32	3,025	5,143
SDD-352	290	470	58	29	31.33	23.5	15.66	9.4	D350x2	5.9	200	4.63	1.7	2.32	5,150	9,013
SDD-353	435	705	87	43.5	47	35.25	23.5	14.1	D350x3	8.8	300	4.94	2.09	2.32	7,260	13,068



Standard version

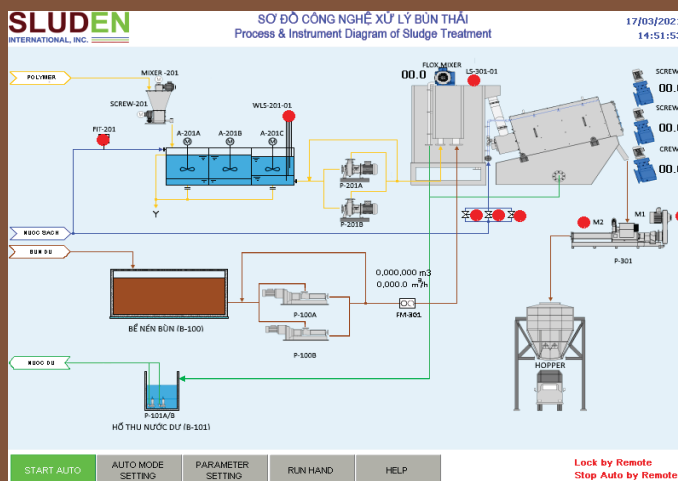
Optional version

For standard version, the operation of SLUDEN multi-disc screw press dehydrator is controlled by programmable logic controller (PLC). Screw and polymer mixing motors is operated by inverters. Thus, the operators can adjust the speed of mixing and movement of sludge following to the capacity and dry solid content of the dewatered sludge. The control panel is installed with a touch screen (HMI – Human Machine Interface), so as for the operators to set-up, start up, adjust and monitor the operation of the motors easily. For optional version without HMI display screen, the operators can start/stop the motors by turning on/off the switches on the panel door, and the operation status of the motors is shown by lamp indicators.

Control Panel

The control panel is equipped with electrical control circuit to connect to the external devices such as automatic polymer making tank, polymer pumps, sludge pumps. Thus, the sludge dewatering system can operate independently on other items of the WWTP. Moreover, the control panel also has available terminals for linking to MCC / SCADA of the WWTP if required.

In case of connection to more devices out of scope of the standard version, the control panel can be changed and designed in accordance with reality.



HMI Touch Screen

ADDITIONAL EQUIPMENT



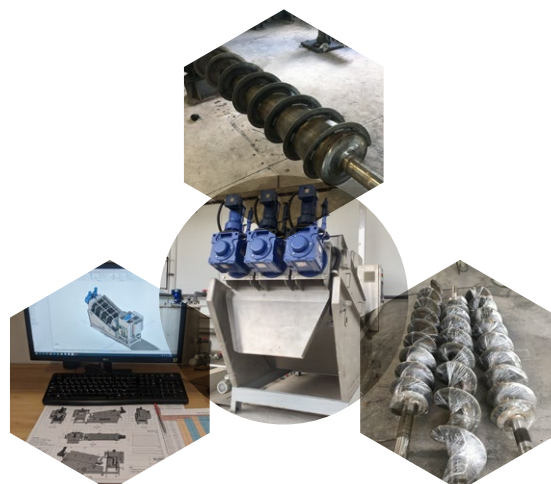
Beside of producing & trading multi-disc screw press dehydrator, our SLUDEN company also provides a package of complementary equipment for a complete sludge treat system, including:

- ◆ Automatic polymer make-up unit.
- ◆ Screw conveyor or pump for transferring dewatered sludge.
- ◆ Sludge cake hopper with hydraulically actuated valve to discharge to the waste sludge carrying truck.

DESIGN and MANUFACTURE

SLUDEN multi-disc screw press dehydrator is designed and manufactured precisely including the smallest machine details by highly skillful, experienced and dedicated engineers, as well as technical workers. The complex mechanical parts are fabricated by tool machines with high precision. This ensures good looking of device as well as stable performance and long-term efficiency, reducing the maintenance and repair cost up to as less as possible.

All phases such as: design, fabrication, assembly and finishing are supervised and managed strictly, so as to delivery the products with the best quality to customers.





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