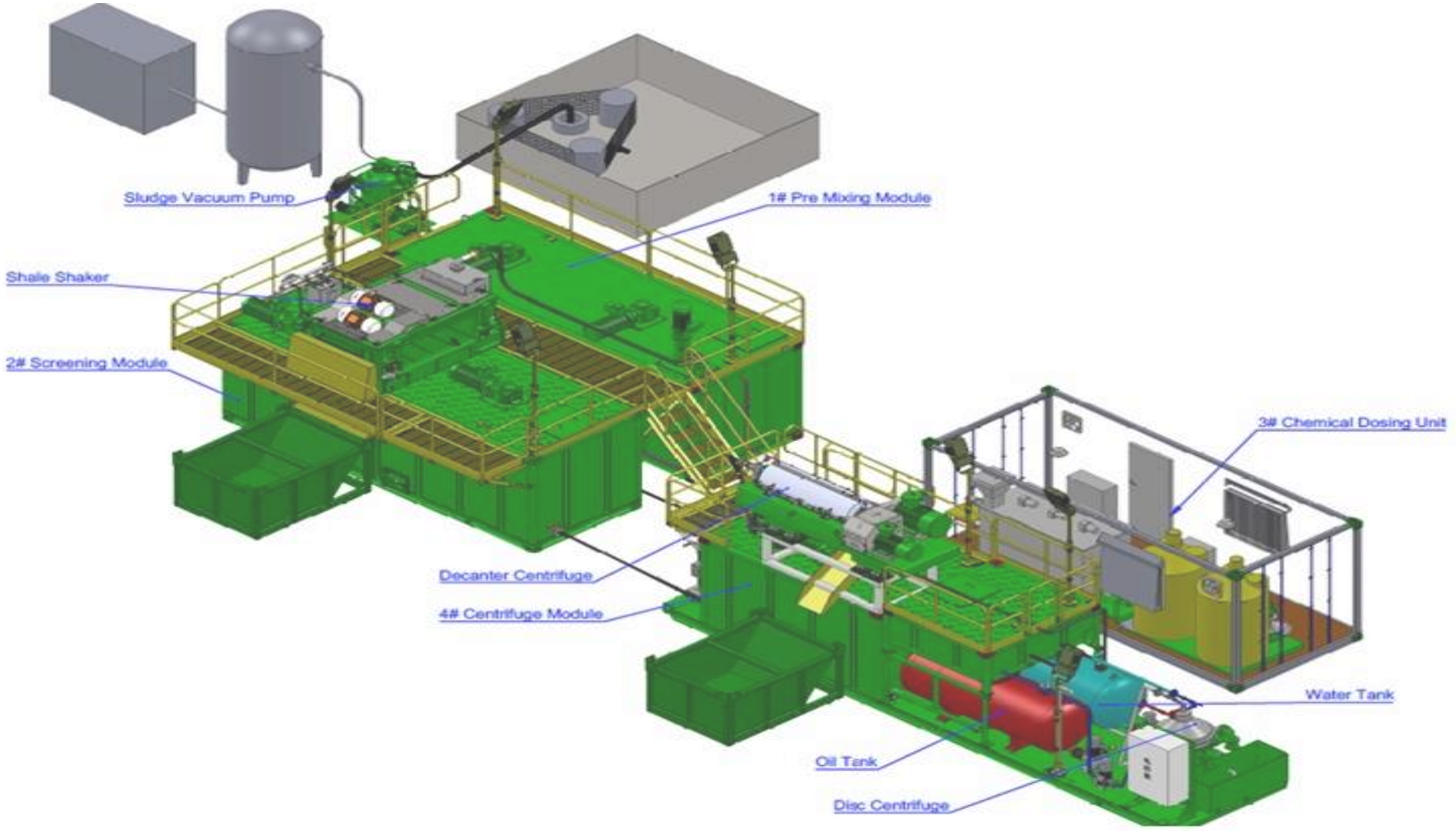
Oil Sludge Treatment



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Oil Sludge Treatment

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Introduction

Brief Introduction

Oil Sludge Treatment System is to use chemical to wash the oil sludge with heat to temperature of 60-70 C degree. After washing the slurry is pumped to separation equipment to separate into oil, water and solids. The recycled water can be reused in the washing process, and the oil is clean enough to sell to the refinery company, the solids contain less than 2% oil which can be sent to the stabilization system for final disposal if needed.

Oil Sludge From

1) Crude Oil tank cleaning sludge
2) Refinery plant waste oil sludge
3) Drilling waste oil sludge

Oil Sludge Test

Lab Test Equipment

Our company is capable to do Lab test for your material with our advanced lab equipment. This will help client to select the best performance treatment process and equipment..

Based on:

- **Special chemical recipes** self documented and prepared in our internal laboratory;
- **Different design of treatment plants in mobile or semi mobile construction** consisting of:
  - Three phase centrifuges with different capacities
  - Special Ex certified conditioning modules
  - Special pumping facilities
  - Automatic preparation and dosing of chemicals

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Test Unit (available)

The above unit is a test unit with capacity of 2m³/h, Dimension: 8000*2786*3257 mm
This unit is a compact designed unit for test or small capacity treatment.
Include: Pre-Mixing & Heating Module, Chemical Dosing Unit, Screening Module, Decanter Centrifuge, 3 Phase Centrifuge.

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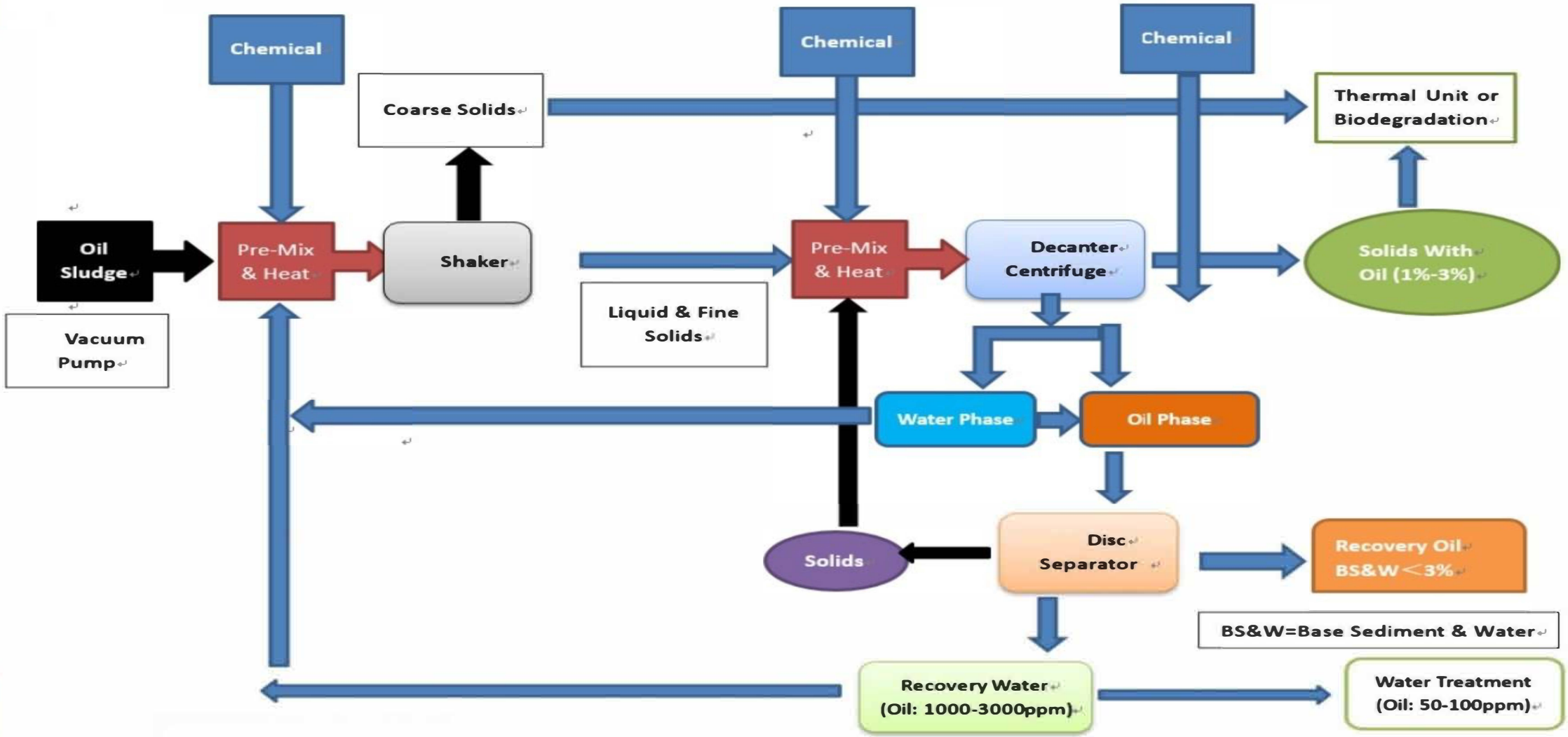
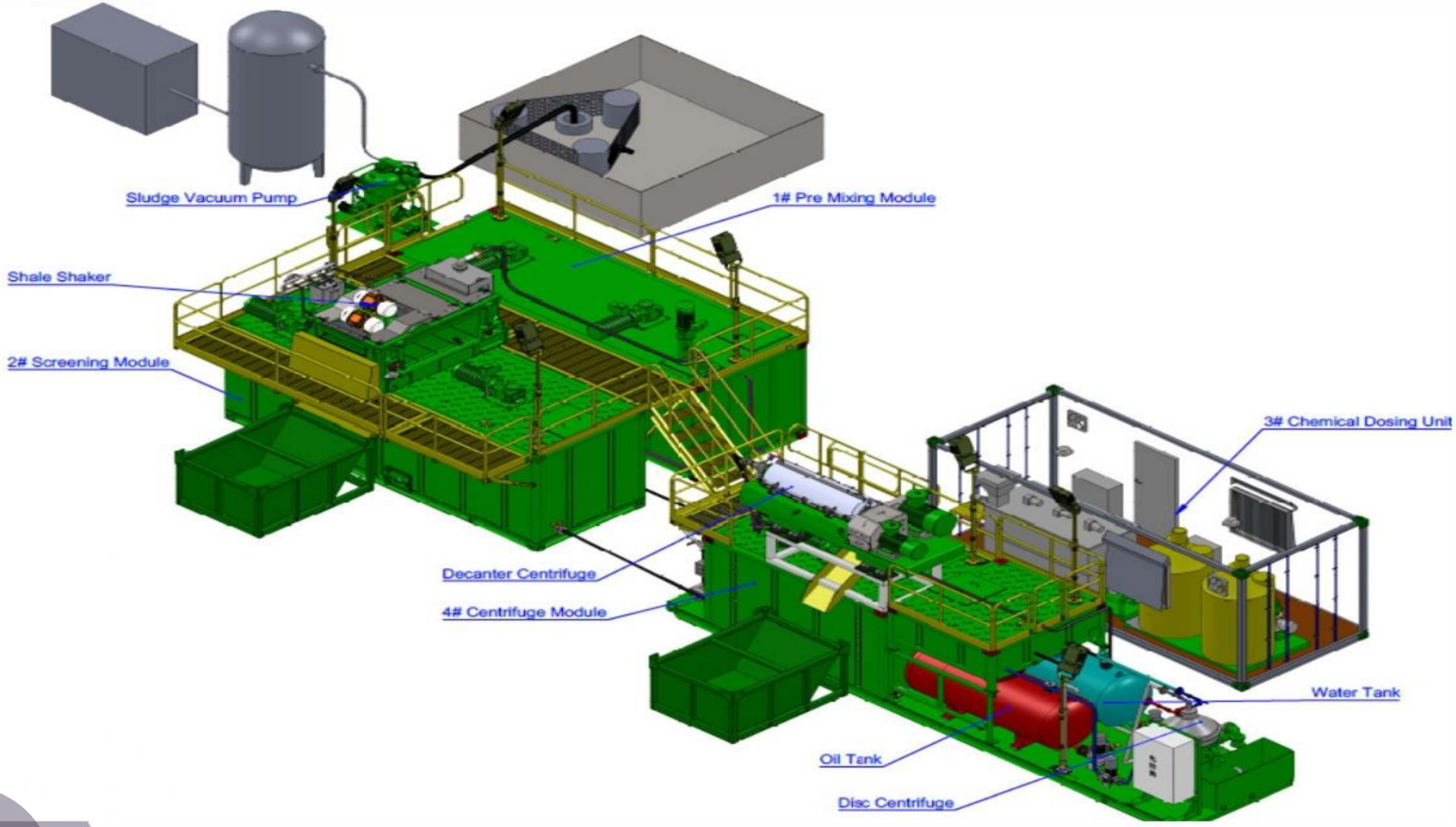
3 Phase Disc Separator Package Process



Oil Sludge Treatment

3 Phase Disc Separator Package Layout



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Material requirements

Equipment	Feed material requirement
Vacuum Pump Material	1. The material should be a little flowable, max size is less than 50mm. 2. Maximum water suction depth is 8m， max oil sludge suction is 3m. 3. Maximum lift head is 80m for water, is not capable for deposited and caked materials (otherwise excavator is required for such materials).
Material Before feed to pre-mixing tank	1. No garbage like plastic bag, gloves， the maximum size of the material after mixing should be less than 20mm (Otherwise, it needs to be pretreated by drum screen or crusher) 2. The density of the solids should be higher than the liquid.
Material before feed to shale shaker	1. Have certain liquidity. 2. Solid content less than 20% (Can be achieved by heating dilution by pre-mixing).
Material before feed to decanter centrifuge	1. Solid particles should be screened by ECO Shale Shaker correct size screen. 2. Solid content is less than 15%(Which can be achieved by heating and dilution pre-mixing stage). 3. By heating to 60-70C degree, demulsifying, flocculants and other chemical agents, hot washing and mixing, and put into a static test tube or separate by lab tube centrifuge , and from bottom to top, you can see 3 layers of: solid, water, oil.
Material before feed to 3 Phase Disc Separator	1. Solid content is less than 3% (usually after treatment by shale shaker and decanter centrifuge, this requirement can be achieved). 2. The maximum solid particle size is less than 200 microns (usually after treatment by shale shaker and decanter centrifuge, this requirement can be achieved). 3. By heating to 60-70C degree, demulsifying, flocculants and other chemical agents, hot washing and mixing, and put into a static test tube or separate by lab tube centrifuge , and from bottom to top, you can see 3 layers of: solid, water, oil.

Oil Sludge Treatment

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3 Phase Disc Separator Package Main Specification

System Model	02C-3	05B-3	15B-3
Capacity	2 m³/h	5 m³/h	15 m³/h
Shale Shaker	ECOS752	ECOS706	ECOS706
Decanter	ECOLW-224	ECOLWS-364	ECOLWS-554
3 Phase Centrifuge	ECOSD-40(440mm)	ECOSD-90(580mm)	ECOSD-125(620mm)
Oil on Solids	1-3%（Discharged from Decanter Centrifuge）		
Recovery Oil	BS&W=2-3%（BS&W=Base Sediment & Water in oil ）		
Recovery Water	1000-3000PPM（Oil Content in water, Recovery water from 3 phase centrifuge, can be reused for premixing tank）		
Water Treatment	50-100PPM（Oil Content, Water after treatment unit）		
Chemical Dosing	Our standard dosing system is designed for liquid type chemical.		
Remarks	The oil sludge should be heat and treated with correct chemical		
	The capacity is after pre-mixing before feed to shale shaker.		
	The capacity & result is for reference, it varies depends on sludge and the clients chemical.		

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Sludge Vacuum Pump

Model	ECOSP-10B	ECOSP-20B	ECOSP-40B
Max Water Capacity	10m3/h	20m³/h	40m³/h
Max Capacity for Oil Sludge	2m3/h	5m3/h	15m3/
Inlet & Outlet	3 inch	4 inch	4 inch
Max Solids	＜50mm	＜50mm	＜75mm
Air Required	4.3m3/min	8m3/min	17m3/min
Air Pressure	550-690Kpa		550-785Kpa
Vacuum Degree	85Kpa(25inch HG)		
Max Suction	50 Meters		
Max Discharge	500 Meters	1000 Meters	
Solids Content	80%（Max） or Powder		
Function	To suck slurry and feed the system		

Oil Sludge Treatment

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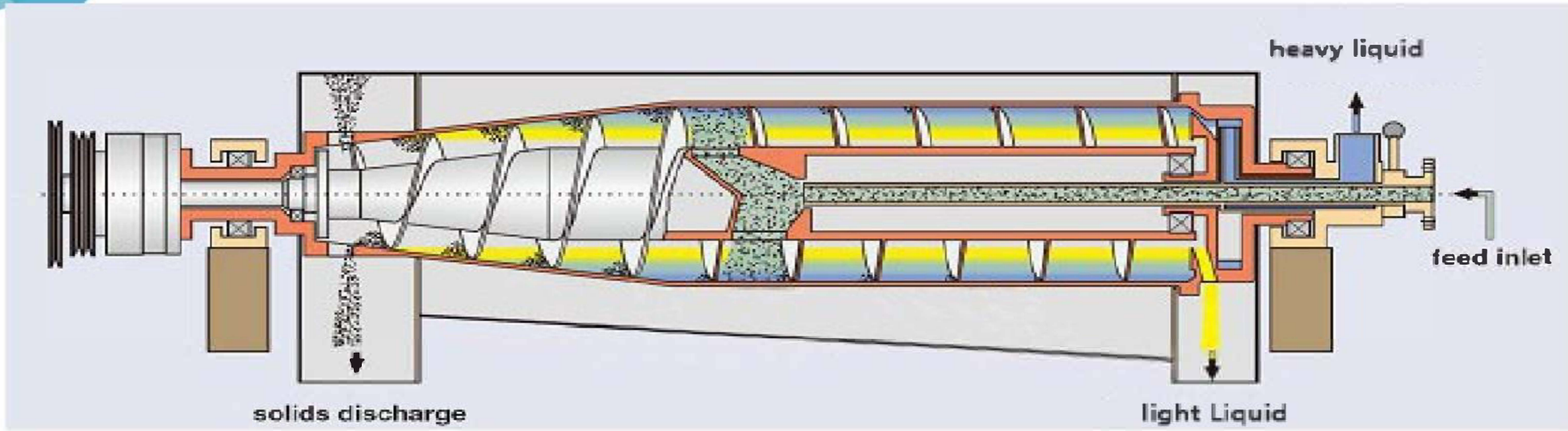
Shale Shaker

Model	ECOS752	ECOS703	ECOS706
Vibration	Linear Motion		
Motor	2x0.75Kw	2x1.72KW	2x1.94KW
Screen Qty	2 Pcs	3 Pcs	6 Pcs
Area	1.35m2	2.63m2	4.62m2
G Force	≤7.1G	≤7.5G	≤7.5G
Deck Angle	+2°	-1° -- 5°	
Amplitude	3.92-5.62mm	4.14-5.96mm	
Weight	900KG	1542KG	1589KG
Remarks	Optional to have spray system and cover		
	To screen coarse solids and protect the centrifuge from abrasion		

3 Phase Decanter

Working Principle-3 Phase



The three-phase decanter centrifuge operation is based on the principle of sedimentation, that is, solid particles with specific liquid weight precipitate in a predetermined time. This principle can also be applied to two immiscible liquids with different specific gravity. When the material enters the high-speed rotating drum, the material rotates synchronously with the drum. Because of the different specific gravity, the centrifugal force is different. The solid particles with the larger specific gravity are subjected to the greatest centrifugal force, followed by the heavy phase liquid (such as water) and the light phase liquid (such as oil). So the centrifugal force is becoming less from outside to inside according to the magnitude of centrifugal force. A concentric solid layer and two liquid layers are formed. Solids are pushed out by the screw conveyor, and liquids are removed from their respective nozzles. Therefore, the application of three-phase decanter centrifuge can not only separate the solid in the material, but also separate the two-phase liquid with different specific gravity in the material, that is, Solid-liquid-liquid separation can be achieved.

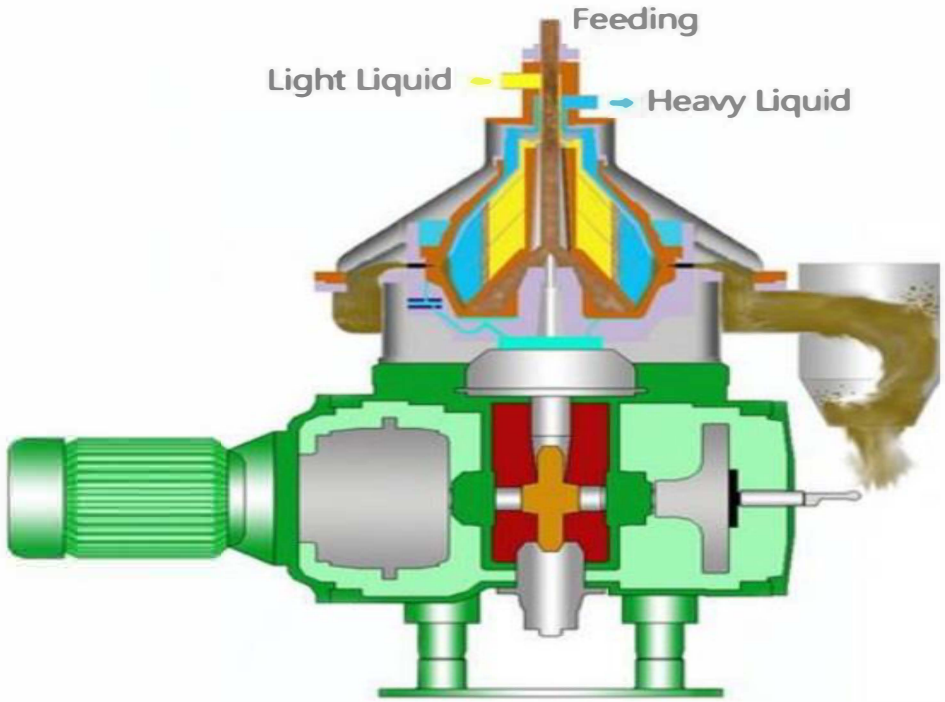
Specifications

3 Phase Decanter

Model	ECOLWS-364	ECOLWS-454	ECOLWS-554
Type	Solids Liquid Liquid Separation		
Bowl Dia	360mm	450mm	550mm
Bowl Length	1567mm	1947mm	2347mm
Capacity	5 m3/h	10 m3/h	15m3/h
Max Speed	4000 RPM	3600 RPM	3000 RPM
Max G Force	3225 G	3265 G	2772 G
Diff. Speed	0-30 RPM	0-30 RPM	0-30 RPM
Main Drive	30 KW/22KW	45KW/37 KW	75KW/55KW
Back Drive	7.5KW	15 KW/11KW	18.5KW/22KW
Lubrication	Grease type	Grease Type	Oil Lubrication
Oil Pump Size	N/A	N/A	0.37 KW
Feed Material	Solids Less 10% and Particle Size less than 2mm		

Disc Separator

3 Phase Separator



Working Principle

The separated material is feed into the heart part of the machine, which is inside the drum. Under the strong centrifugal force, the material passes through the separation interval of a group of disc bundles, with the neutral hole of the disc as the interface, the liquid with a large specific gravity moves along the wall of the disc to the outside of the neutral hole, wherein the heavy slag accumulates in the sediment area, and the heavy phase flows to the upward centripetal pump. The liquid with a smaller specific gravity moves along the disc wall toward the neutral hole and converges to the lower centripetal pump. At the same time, the light and heavy phases are respectively output by the lower centripetal pump and the upper centripetal pump, and the heavy slag is periodically discharged, so continuous production can be achieved.

It is especially suitable for three-phase, liquid-liquid & solids, separation, such as oil-water and sludge separation.

The solid phase material entering the three-phase disc separator usually shall be reduced the solid content to less than 3% and the solid particles to less than 400 micrometers by the decanter centrifuge, then the three-phase disc separator can achieve the best effect.

Oil Sludge Treatment

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3 Phase Disc Separator

Model	ECOSD-40	ECOSD-90	ECOSD-125
Type	3 Phase Disc Centrifuge		
Bowl Diameter	440mm	580mm	620mm
Sliding piston Dia	380mm	500mm	620mm
Max Bowl Speed	7100RPM	6150RPM	6000RPM
Max G Force	12409G	12273G	12488G
Capacity	1-2 m3/h	5-10 m3/h	10-15 m3/h
Main Motor	11KW	18.5KW	30KW
Feed Pressure	0-0.1Mpa		
Start Time	10-15 Min		
Feed Material	Solids≤3%		
Application	Oil & Water & Solids Separation		

3 Phase Separation

3 Phase Decanter + 3 Phase Disc Separator

Model	Description
Function	The 3 phase decanter centrifuge will separate solids ,oil and water, the oil phase or the water phase will be pumped to feed the 3 phase separator for further oil, water, and solids separation. The recovery oil BS&W is less than 3% which is saleable, and the recovery water with oil is 1000-3000ppm which can be reused for premixing, the solids discharged from decanter is with oil less than 2%
ECOST-05B 3 Phase Separation	3 Phase Decanter centrifuge ECOLWS-364,3 Phase separator ECOSD-90， include skid and centrifuge tank, and 5m³/h feed pump for 3 phase separator, flushing tank and flushing pump, and 3 phase separator solids discharge tank and pump system, level control for the centrifuge tank, and oil and water surge tank with 2 m3 volume and 5m3/h discharge pump and level control system.
ECOST-15B 3 Phase Separation	3 Phase Decanter centrifuge ECOLWS-554， 3 Phase separator ECOSD-125， include skid and centrifuge tank, and 15m³/h feed pump for 3 phase separator, flushing tank and flushing pump, level control for the centrifuge tank, and oil and water surge tank with 3 m3 volume and 20m3/h discharge pump and level c rol system.

Oil Sludge Treatment

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3 Phase Disc Separator VS 3 Phase Decanter Centrifuge

Items	3 Phase Disc Separator Package	3 Phase Decanter Centrifuge Package	Remarks
First Stage Equipment	Shale Shaker for Primary screening of coarse solids		Same
Oil water solids separation	3 phase decanter centrifuge + 3 phase disc separator for oil, water, solids separation.	Oil water, and solids separation by one equipment: 3 phase decanter centrifuge.	
Treatment Goal	More clean water and oil Output From Disc Separator • Oil on Solids: 1-3% • Water in Oil: 2-3% (BS&W) • Oil in water:1000-3000PPM	Less Clean water and oil Output from 3 phase Decanter • Oil on Solids: 1-3% • Water in Oil: 3-5% (BS&W) • Oil in Water:1%	Data For reference only
Max G force	12000+ G	3000+ G	
Operation	More frequently manual clean of the 3 phase disc separator More complicated Operation	Automatically Cleaning 3 phase decanter centrifuge More simple operation	
Investment	High	Low	
Application	High quality oil and water requirement conditions	Less quality oil and water requirement conditions	

Chemical Dosing System

Model	Description (Containerized Chemical Dosing System)
Polymer Dosing Unit	Automatic three-slot cabinet with 3 agitator, stainless steel, including dosing hopper, dry powder conveyor, flow meter, mixer, dosing pumps, valves, pipelines. For polymer mixing and supply to treatment equipment.
Demulsifier Dosing Unit	Dissolved Chemical Barrel, PE material covered with Metal Shell or Stainless Steel Shell, Including agitator, magnetic flap level gauge, dosing pump and pipelines. For demulsifier mixing and supply to treatment equipment .
Backup Dosing Unit	Dissolved Chemical Barrel, PE material covered with Metal Shell or Stainless Steel Shell, Including agitator, magnetic flap level gauge, dosing pump and pipelines. For other chemical mixing and supply to the treatment equipment.

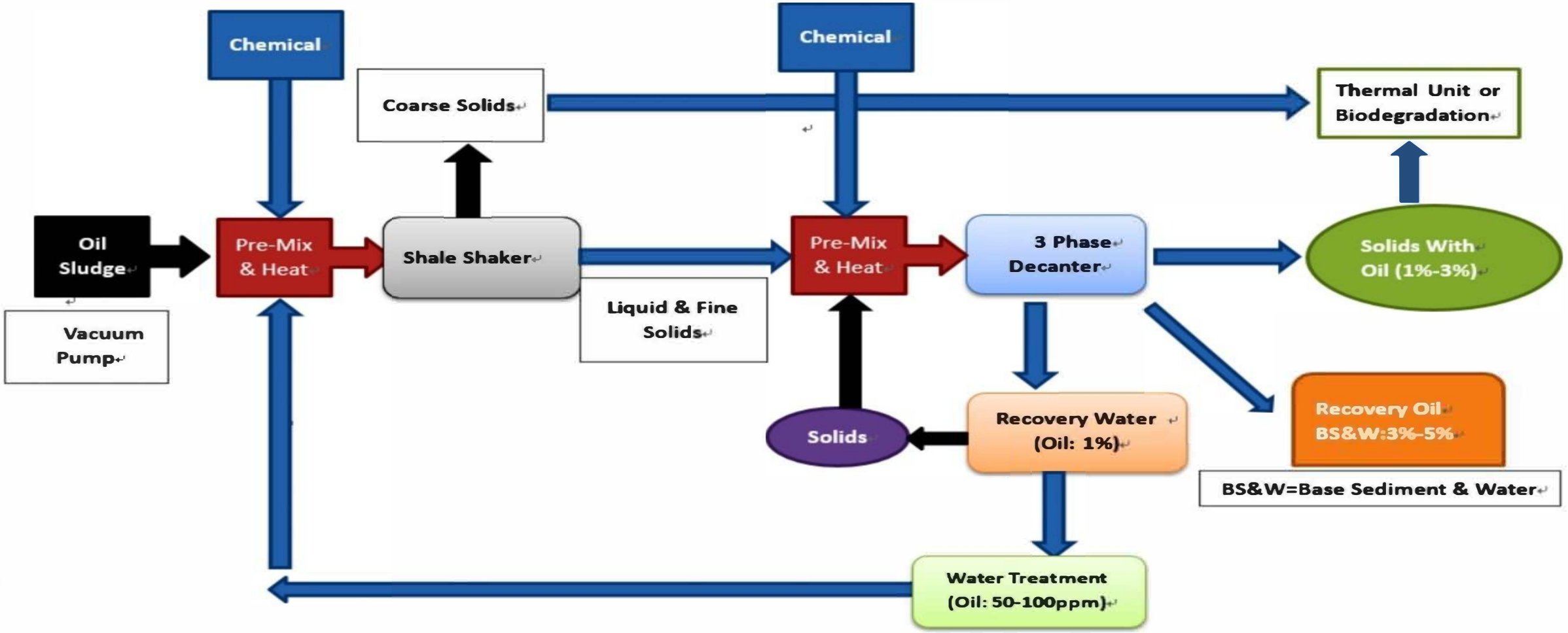
Oil Sludge Treatment

3 Phase Decanter Centrifuge Package

Model	ECOST-05C-2	ECOST-15C-2
Capacity	5 m³/h	15 m³/h
Shale Shaker	ECOS706	ECOS706
3 Phase Decanter	ECOLWS-364	ECOLWS-554
Oil on Solids	1%-3%（3 Phase Decanter Centrifuge Discharge Solids）	
Recovery Oil	BS&W=3-5%（BS&W=Base Sediment & Water in oil ）	
Recovery Water	1 % (Oil in recovery water from 3 phase decanter)	
Remarks	The oil sludge should be heat and treated with correct chemical	
	The capacity is after pre-mixing before feed to shale shaker.	
	The capacity & result is for reference, it varies depends on sludge and the clients chemical.	

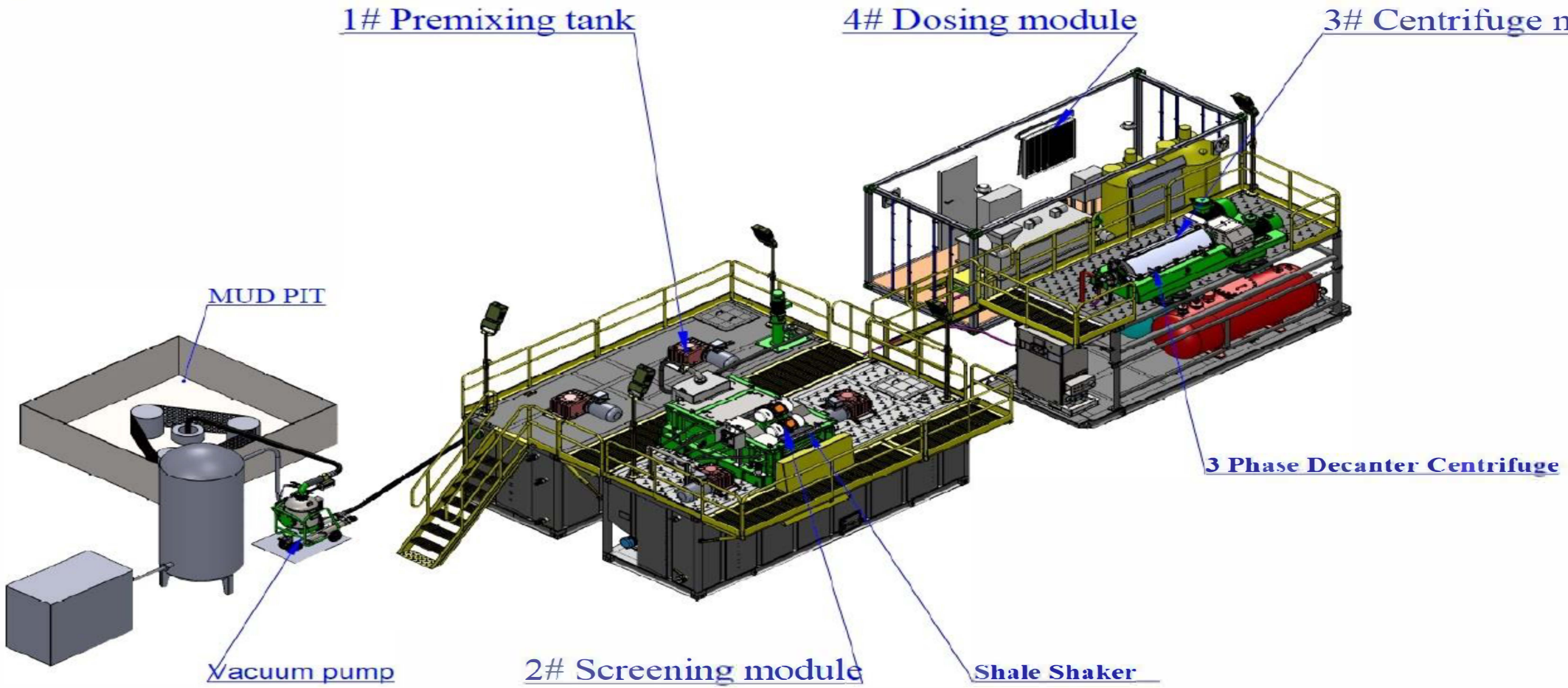
Oil Sludge Treatment

3 Phase Decanter Centrifuge Package Process



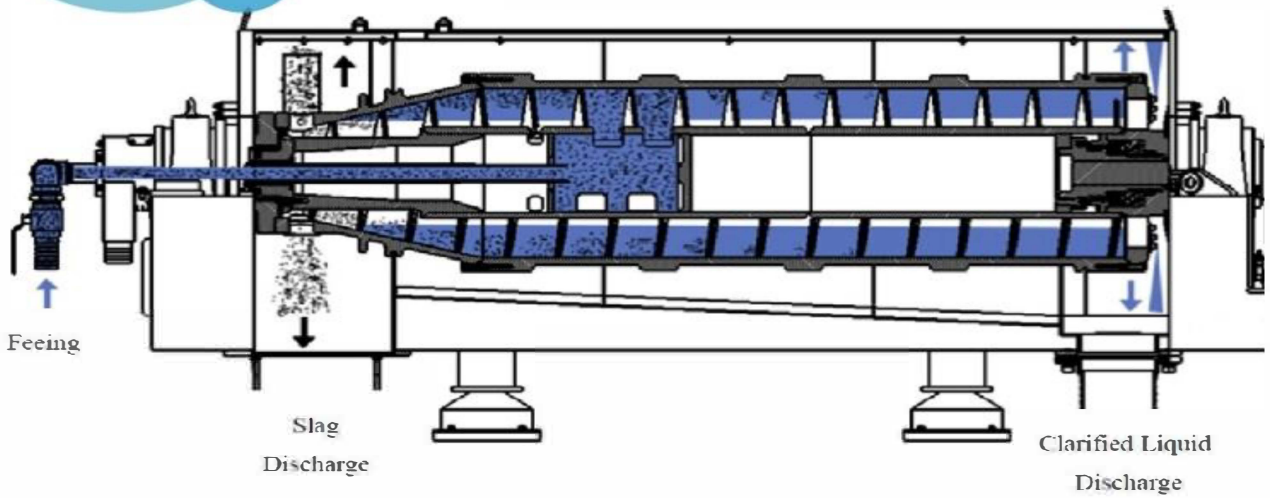
Oil Sludge Treatment

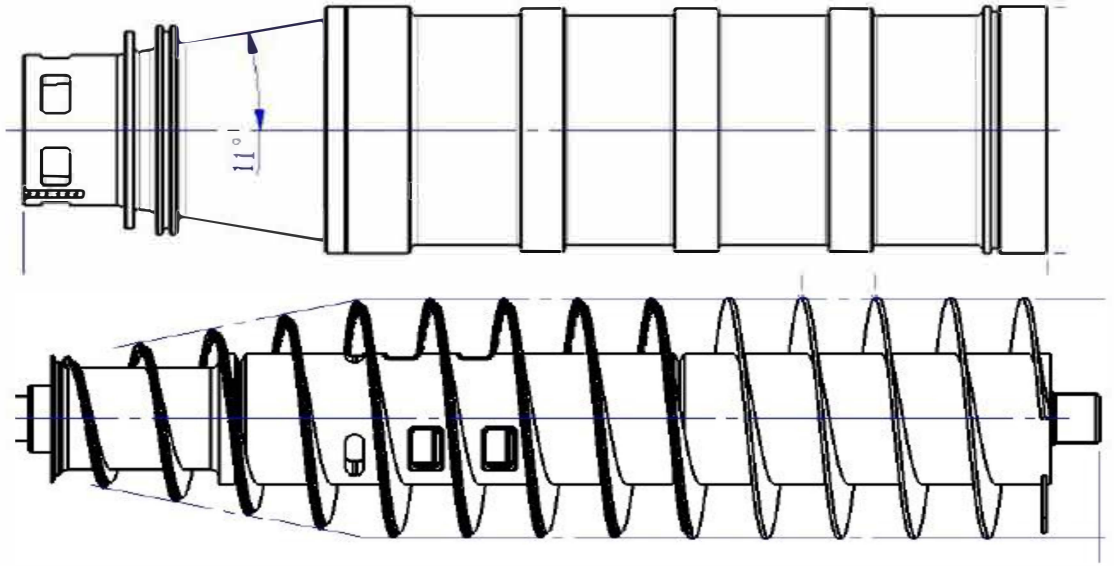
3 Phase Decanter Centrifuge Package Layout



Decanter Centrifuge

Working Principle - 2 Phase





Description of working principle

1. The bowl and screw of the decanter centrifuge rotate to the same direction with a certain differential speed. The material is continuously introduced into the screw shaft, and then flies to the bowl after its speed highly increased.
2. Under the action of centrifugal force field, heavy solid phase is deposited on the bowl wall to form sediment layer. The solid is continuously pushed to the cone section of the bowl and discharged through the slag outlet.
3. The light liquid phase forms an inner liquid ring, which is continuously overflow out of the bowl from the liquid outlets at the big end of the bowl
4. Straight section of the bowl is the clarification area, and the cone section is the extrusion drying area.

Dewatering Decanter Centrifuge Features

The beach angle of the dewatering decanter centrifuge is 11 Degree, which makes the decanter centrifuge cone section longer, that is, the drying and dewatering area of the decanter is longer, which is conductive to the dewatering performance of dewatering decanter centrifuge, and much drier solid cakes discharged. The beach angle of 11 degree will make the slag discharging more smooth so as to increase the amount of slag discharging.

Oil Sludge Treatment

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Decanter Centrifuge- 2 Phase

Model	ECOLW224	ECOLW363D	ECOLW553D
Type	Drive Oil Sludge Decanter Centrifuge		
Bowl Dia	220mm	360mm	550mm
Bowl Length	924mm	1271mm	1800mm
Bowl Speed	0-4500RPM	0-3200RPM	0-2500RPM
Dif. Speed	0-26RPM	0-45RPM	0-45RPM
Main Motor	11KW	37KW	90KW
Back Motor	5.5	11KW	37KW
Torque	1400N*M	3500N*M	12000N*M
Material	Duplex Stainless Steel Bowl		
Screw	Tungsten Carbide Tiles Protection		
Application	Fine solids removal from oil and water.		

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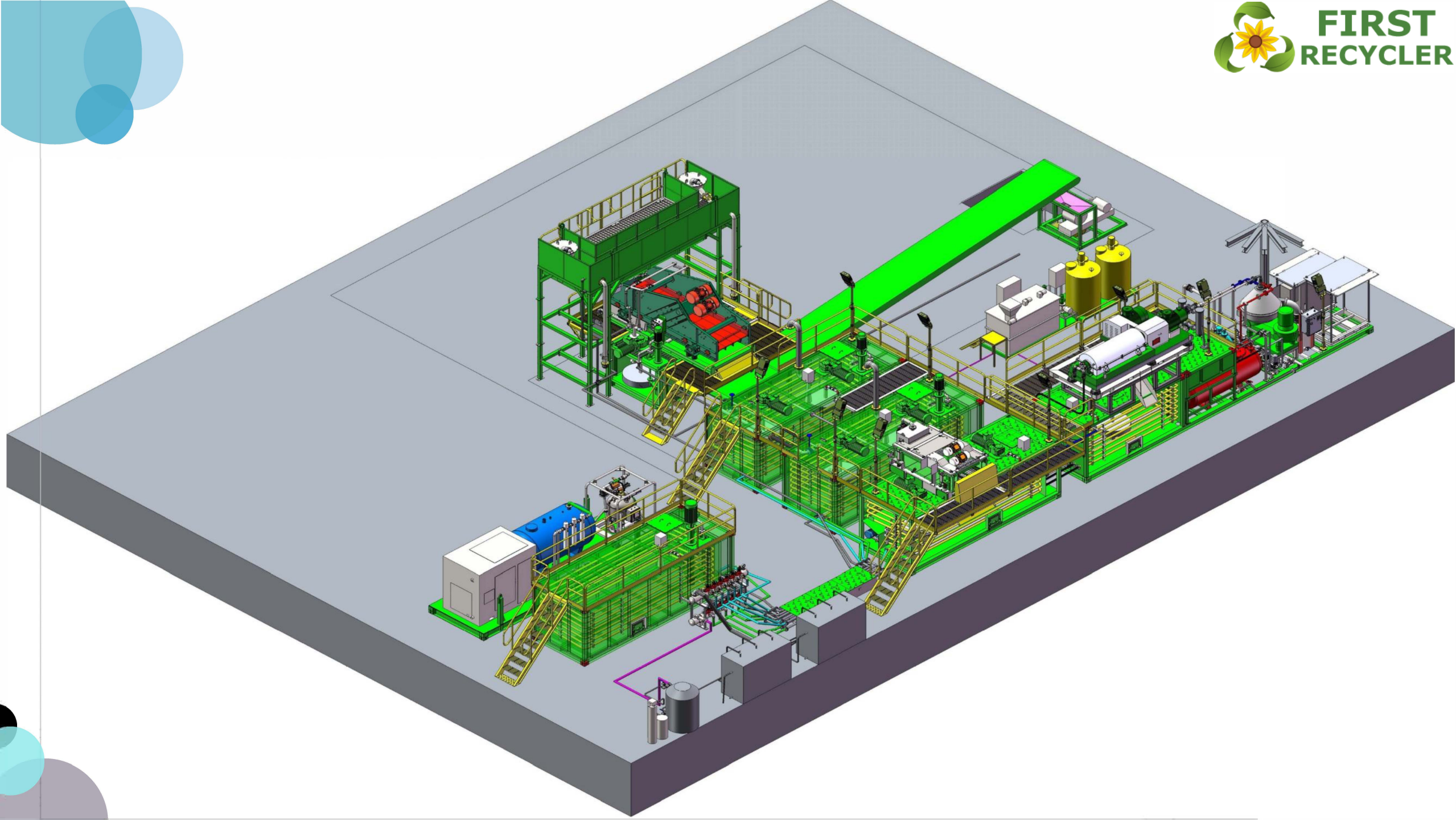

THANK YOU !

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