Contaminated Soil Washing Equipment







Contaminated Soil Washing Equipment

Introduction



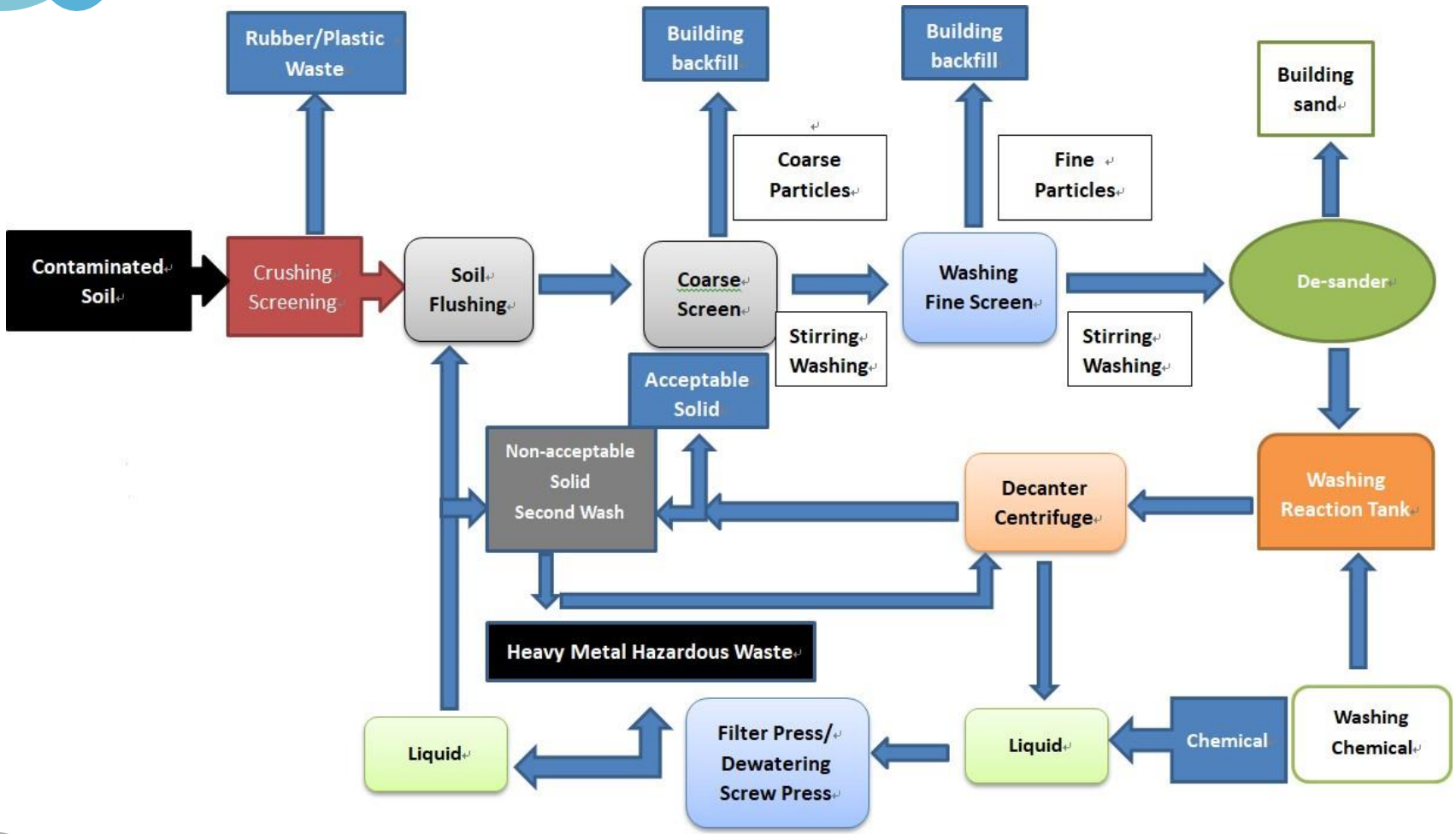
Contaminated Soil washing equipment and technology can realize the reduction of contaminated soil, reclamation of clean soil, reduction of the contaminated soil amount and the cost of contaminated soil treatment. It is suitable for heavy metals and semi-volatile and non-volatile organic pollutant soils. It can choose to build a centralized station or skid-mounted design, and is suitable for different working places such as rivers, factories, lakes, etc.

Soil Flushing/Washing System is a method that uses physical and chemical methods to separate heavy metals from the soil. It is divided into two types of operations, physical and chemical. The physical method is generally to concentrate pollutants on a small amount of fine particles in the soil, and to separate the large particles in the soil by hydraulic or gravity methods; the chemical method is to use reagents to act with heavy metals in the solid phase and form soluble heavy metal ions or metal complexes, thereby transferring pollutants from the soil to the liquid.

The soil washing process mainly includes soil pretreatment, rotary drum screening, vibration screening, hydrocyclone screening, washing reaction, mud-water separation, water treatment, sludge dewatering and other process.

Contaminated Soil Washing Equipment

Heavy Metal Soil Treatment Process



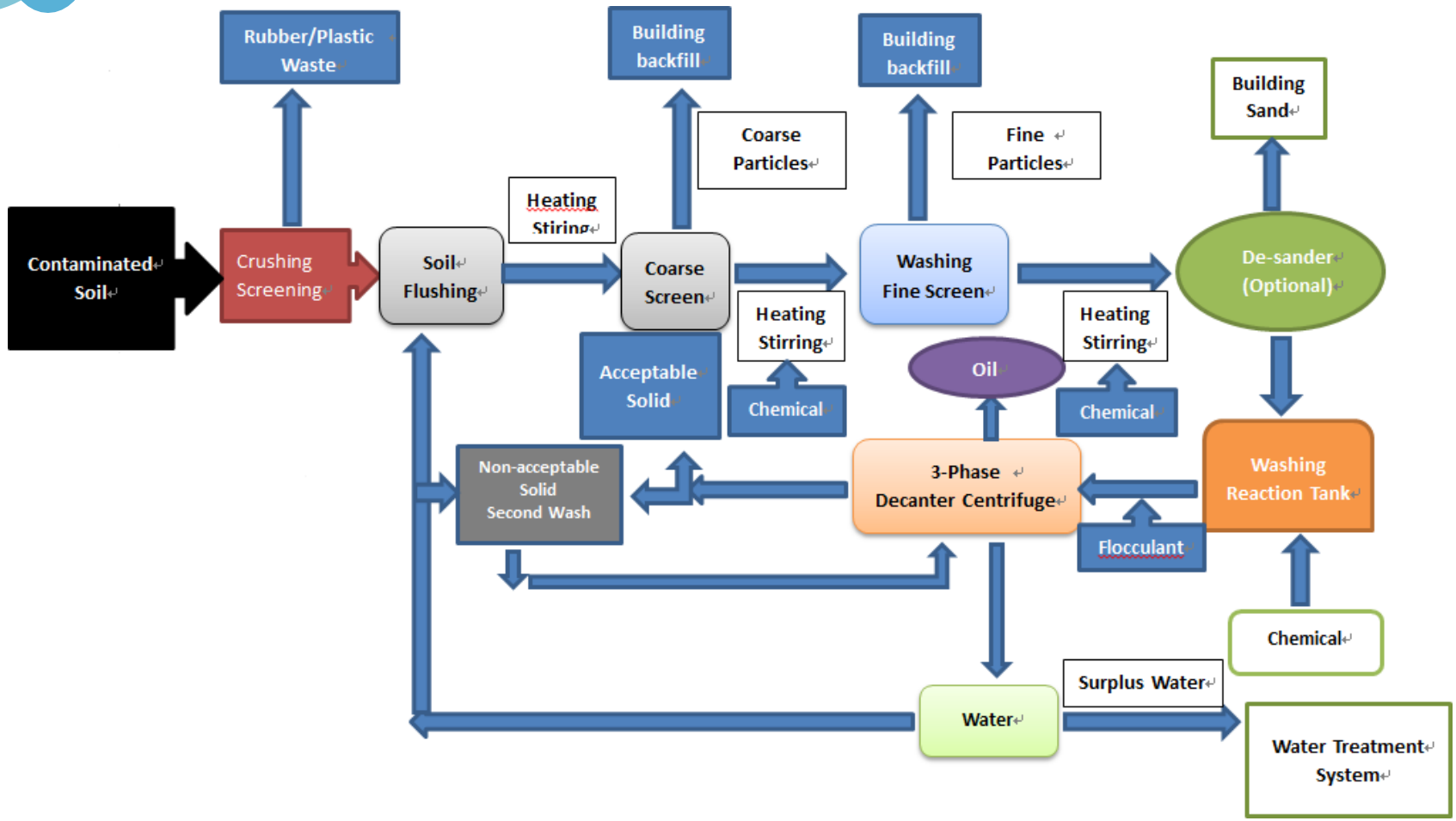
Contaminated Soil Washing Equipment

Heavy Metal Soil Treatment Process

S/N	Procedure	Process description
1	**Crush & Screening**	Crush the soil by a crushing bucket or a crusher. If there is rubber and plastic waste, it needs to be sorted out through a rotary drum screen.
2	**Soil washing**	The crushed soil is transported to the soil washing machine through the hopper and belt conveyor for water washing to form a solid-liquid mixture.
3	**Coarse screening**	The washed materials are sent to coarse screen for coarse solid separation, and the separated coarse particles can usually be used as construction waste for backfill.
4	**Washing and fine screening**	The slurry separated by the coarse screen is transported to the washing fine screen, washing and screening at the same time. The separated solid materials can usually be used as construction waste for backfill.
5	**Cyclone desanding**	After the fine screening, 50-500 micron fine sand is sent to the desanding machine to separate. The fine sand is usually used as a building material. Depending on the sand content of the soil, this step can be omitted and directly enter the next level of treatment.
7	**Washing reaction**	The liquid after desanding treatment enters the washing reaction tank, adding washing agent and agitating for washing reaction, adding a certain proportion of washing agent to make the heavy metals contained in the soil slurry react with the washing agent in the washing tank. The heavy metal pollutants can be ionized after staying in the washing reaction tank for a certain period of time, and separate from the soil particles and enter the aqueous solution to achieve the effect of washing separation. Then it is pumped to the mud-water separation equipment for treatment.
8	**Mud water separation/ Mud water oil separation**	After the washing reaction, the slurry can be separated by high-speed VFD decanter centrifuge for solid and liquid separation. The separated mud will be tested. If it meets the standard, it can be used as building material. If it doesn't meet the standard, it can be agitated, flushed and tempered for a second time for mud-water separation treatment again. The separated water enters the next level of chemical dosing treatment.
9	**Chemical dosing**	The aqueous solution enters the water treatment system, adding heavy metal traps and other agents to form heavy metal ions into a non-ionic state, and adding flocculants to trap and form flocs.
10	**Dewatering machine processing**	The aqueous solution after chemical dosing and flocculation is processed by the filter press or screw press to realize the separation and drying of heavy metal pollutants. The separated heavy metal pollutants are treated as hazardous waste, and the water enters the circulating pool for recycling.

Contaminated Soil Washing Equipment

Oily Soil Treatment Process



Contaminated Soil Washing Equipment

Oily Soil Treatment Process

S/N	Procedure	Process description
1	**Crush & Screening**	Crush the soil by a crushing bucket or a crusher. If there is rubber and plastic waste, it needs to be sorted out through a drum screen.
2	**Soil washing**	The crushed soil is transported to the soil washing machine through the hopper and belt conveyor for water washing to form a solid-liquid mixture slurry.
3	**Coarse screening**	After heated, cleaned and stirred, the flushed materials can also be added with oil sludge cleaning agents . After washing, be pumped to coarse screen for coarse particle solid material separation. The separated coarse particles can usually be used as construction waste for backfill.
4	**Washing fine screening**	The slurry separated by the coarse screen can also be added with sludge cleaning agent after heating and washing. Then it is transported to the washing fine screen, washing and screening in the same time, the separated fine solid materials can usually be used as construction garbage for backfill.
5	**Cyclone desanding**	After fine screening, and heating, washing and agitating, oil sludge cleaning agent can also be added, after cleaning, sent to desanding machine to separate 50-500 micron solid fine sand. Fine sand is usually used as a building material, depending on the different sand content of the soil, this step can be omitted and go directly to the next level of processing. If the oil content of the sand exceeds the standard, the material can also be crushed, after sand removal then enter the next stage of washing reaction.
6	**Washing reaction**	After desanding, the solution enters the heating, washing and agitating reaction tank to separate the oil from the mud and demulsify it, so that the subsequent 3-phase decanter centrifuge can separate the mud, water and oil.
7	**Mud water oil separation**	After reaction, the slurry is usually added with flocculating agent before entering the 3-phase decanter centrifuge to realize the 3-phase separation of mud, water and oil in the 3-phase decanter centrifuge. After testing and meeting the washing requirements, the separated mud can be subjected to post-processing such as biodegradation.
8	**Secondary agitating and washing**	If the oil content of the sludge separated by the 3-phase decanter centrifuge cannot meet the standard, it can be treated for the secondary heating, agitating and washing , and then enter the 3-phase decanter centrifuge for separation.
9	**Recovered oil and water**	The recovered oil can be sold to refineries as appropriate, the recovered water can be used for recycling and washing, and the surplus water is sent to the subsequent water treatment system.

Soil Washing Package Equipment

System Model Selection （Mobile Modular System）

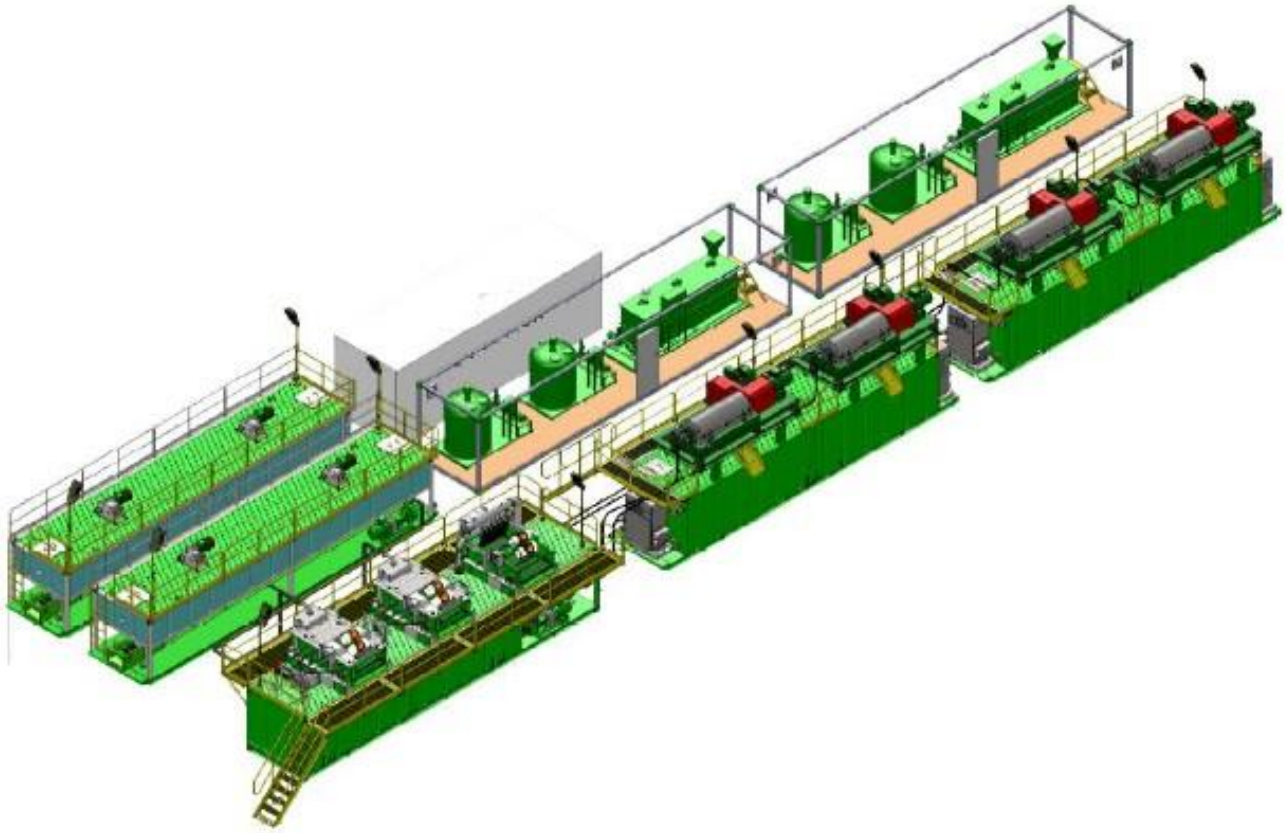
Model	SW-30T	SW-60T	SW-90T
Max Capacity	30T/H	60T/H	90T/H
Estimated Mud Volume	120m3/h	240m3/h	360m3/h
Vibrating Coarse screen	1xZS1230	1xZS1236	2xZS1236
Vibrating Fine Screen	1*ZS703	2*ZS706	3*ZS706
De-sander	1*ZS703F-1S	1*ZS703F-2S	1*ZS703F-3S
Decanter Centrifuge	2*LW553	4*LW553	3*LW764
Dewatering Screw Press	3*DL404	6*DL404	9*DL404
Filter Press	2*60m3/H	4*60m3/h	3*120m3/h
Chemical Dosing System	2*2000L/H	4*2000L/H	3*4000L/H

Can provide customized solutions according to client different working conditions and provide the best solutions. The cooperation process is as follows

1. Questionnaire and technical negotiation
2. Laboratory material analysis
3. Pilot system material testing
4. Contract signing
5. Field service instruction

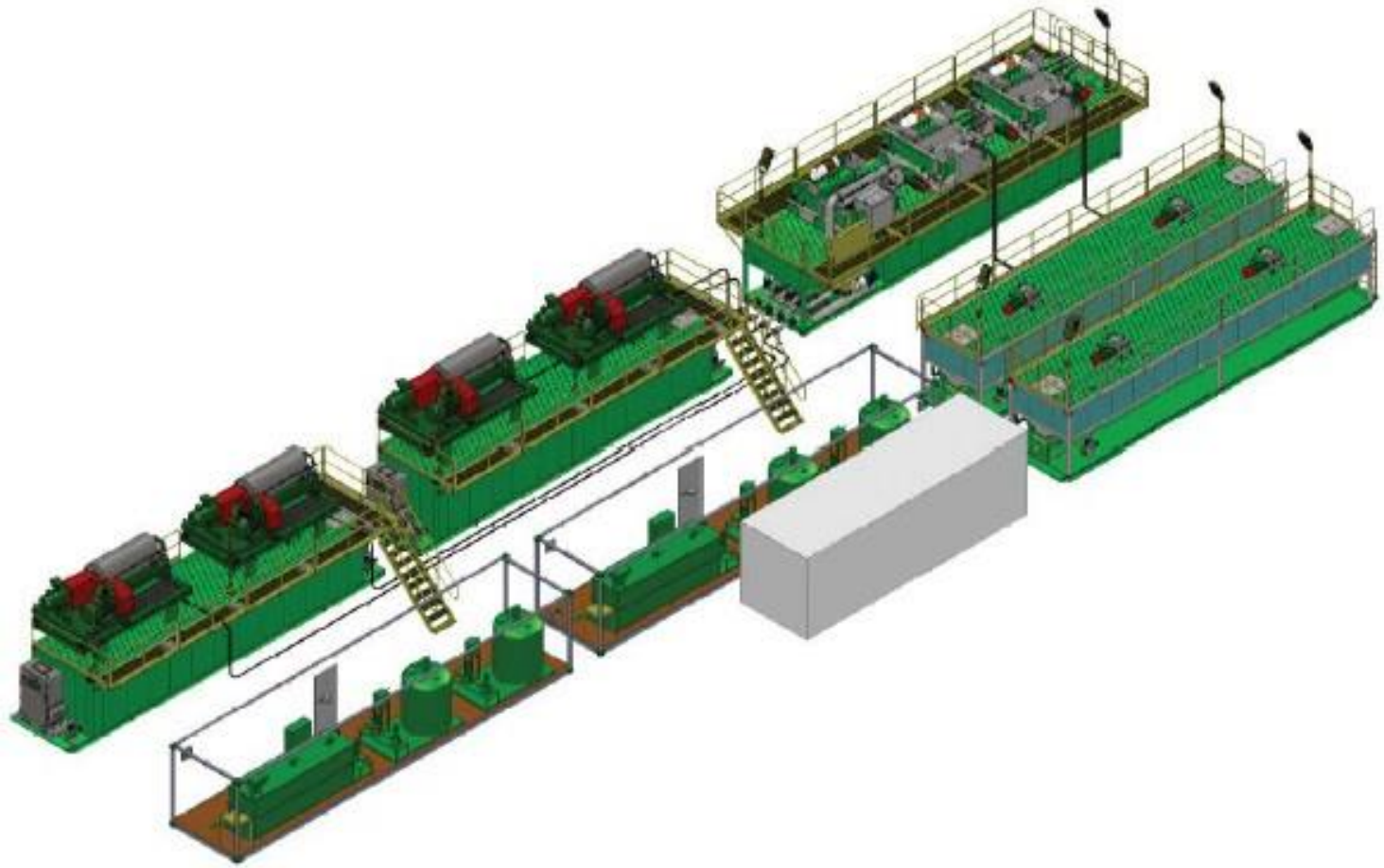
Contaminated Soil Washing Equipment

Equipment Arrangement



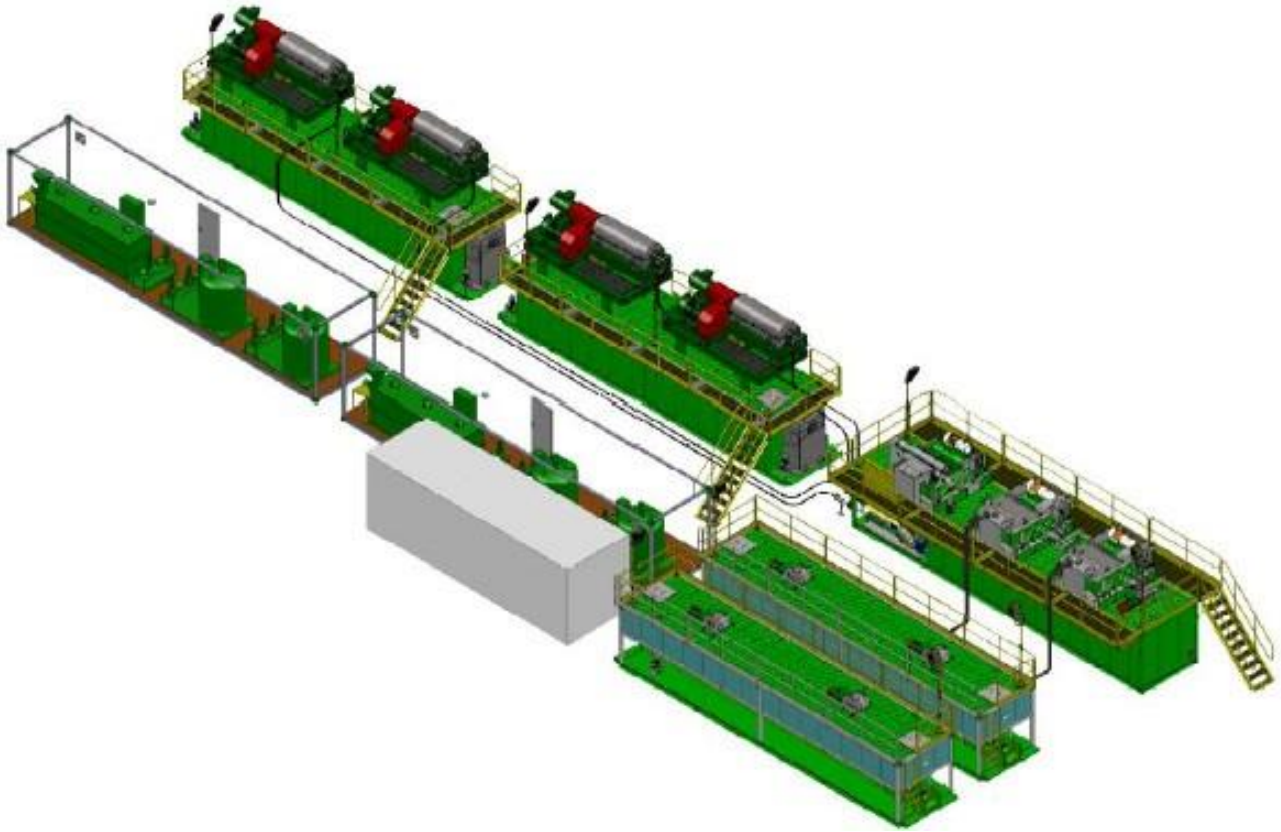
Contaminated Soil Washing Equipment

Equipment Arrangement



Contaminated Soil Washing Equipment

Equipment Arrangement



Contaminated Soil Washing Equipment

Soil Pretreatment Equipment

Screening Crushing Bucket



The core feature of the hydraulic screening crushing bucket is a unique grid device designed on the upper part of the rotating blade board. The blade board continuously carding the materials in the gaps between the grids, and the materials fall through the gaps between the grids. The strip spacing determines the size of the final materials screened out. Screening, crushing, mixing, aeration and other functions can be completed by the driver's one-step operation in the cab. The top grid screening structure makes the screening work smoother. Set to handle wet materials, the screening crushing bucket is the first choice for screening surface soil, mud, coal and landscaping materials.

Soil Pretreatment Crusher



The soil pretreatment crusher is mainly composed of frame, transmission device, crushing tooth roller, adjustment device and spring safety device. The soil pretreatment crusher adopts double tooth roller, and the shape of the roller surface can divide into coarse or fine tooth rollers, which can be adjusted for production according to the material size.

The motor drives the gear to make the rollers rotate, and the two rollers rotate toward each other. The soil enters between the two rollers and is crushed due to friction. The crushed materials are discharged from the gap between the two tooth rollers under the gravity action.

Roller Screening Machine



The working principle of Roller Screening Machine is that the motor and the drum device are connected together through a coupling, and the drum device is driven to rotate around its axis. When the material enters the drum device, due to the inclination and rotation of the drum device, the material on the screen surface is turned and rolled. Through the relative movement of the bulk material and the screen surface, some particles pass through the screen holes to separate the garbage, large rocks, and sundries. A combined screen is usually used. This soil screening machine is widely used for screening various solid materials with a particle size less than 300mm.

Contaminated Soil Washing Equipment

Roller Soil Washing Machine



In the process of cleaning the material by the roller soil washing machine, the friction of the materials has a self-grinding effect. The addition of a high-elastic liner increases the surface scrubbing times of the material, so that the mud and sand are separated very thoroughly, and the effect is significant. It is an ideal equipment for high cleanliness of sand and mud mass materials.

The roller soil washing machine is supported by four tugs, and the drum is driven by motor and reducer to rotate the large and small gears at low speed. The sludge/soil containing mud and stone powder and sand are fed from the feeding port through the feeding device, and the sludge/soil entering the rotating drum are continuously carried, tossed, agitated and scrubbed by the agitating device and rods installed in the drum. In the process of moving from the feeding end to the discharging end, it is continuously washed by the high-pressure water jet in the forward or reverse direction during multiple cycles. The cleaned sludge/soil is dehydrated by the dewatering device at the discharge end and then is discharged and sent to the finished product pile. Sewage and fine sand containing sludge flow out through the discharge end, enter the next step to screen out the fine sand, and pure slurry enters the sewage treatment process.

Contaminated Soil Washing Equipment

Vibrating Screen

Model	ZS1230	ZS1236	ZS706
Vibration Mode	Linear Motion		
Vibration Motor	2x3.0 Kw	2x3.7KW	2x1.94KW
Screen Qty	10 pc	12 pc	6 pc Double-deck
Screen Area	3.6m2	4.3m2	4.6m2
Double Amplitude	8mm	8mm	≤7.5G
Deck Angle	+2°	-1°-- 5°	
Type	Large amplitude coarse screen		High frequency fine screen
Optional	Optional to have spray system and cover		
Remarks	Choose screens with different openings according to different working conditions		





Contaminated Soil Washing Equipment

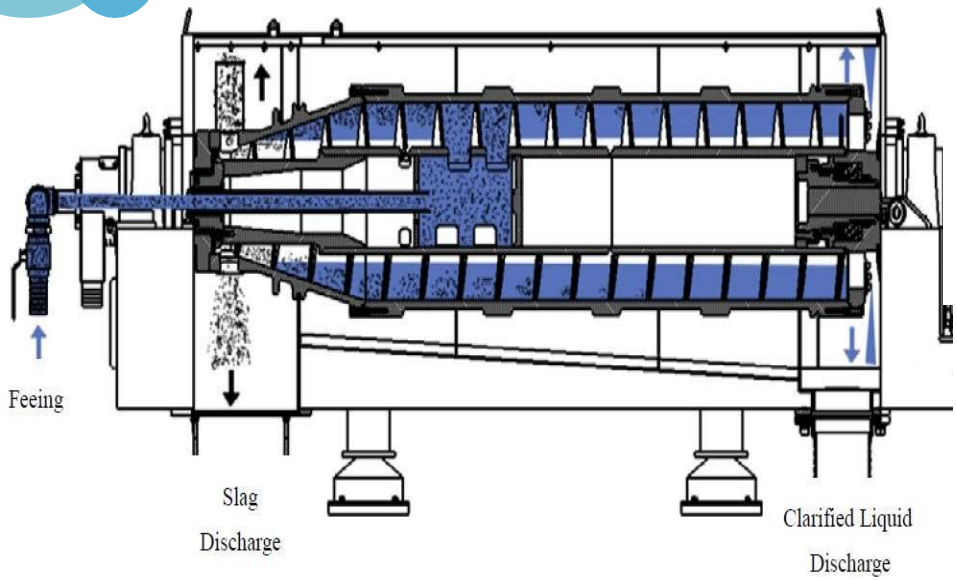
De-sander

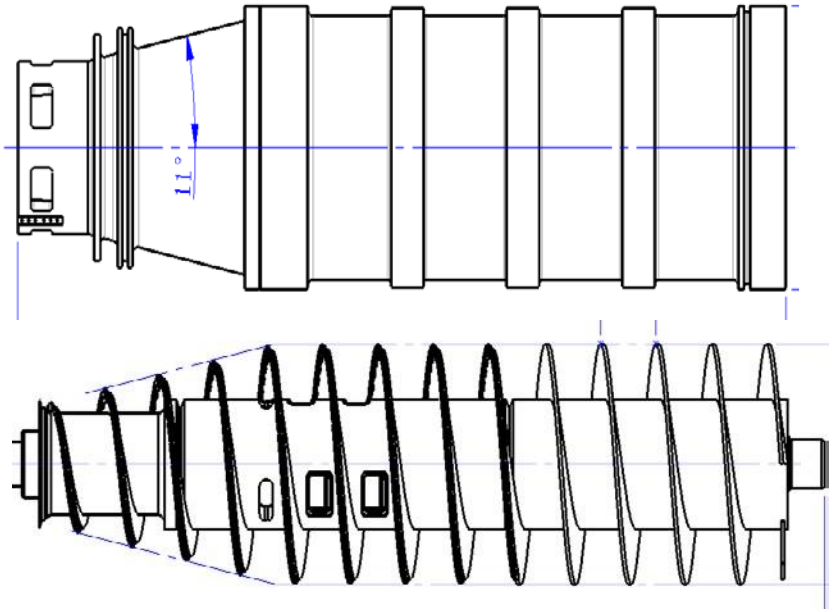
Model	ZJ703F-1S	ZJ703F-2S
Cyclone Size	10 inch	10 inch
Cyclone Qty	1 Set	2 Sets
Work Pressure	0.25-0.4 Mpa	
Vibrating Screen Model	ZS703F	ZS703F
Vibrating Motor	2x1.72Kw	
Screen Qty	4 Pcs	
Screen area	2.6 m2	
G force	≤7.5G	
Deck Angle range	-1 to 5 degree	
Application	Separation of solids >50 microns	



Decanter Centrifuge

2 Phase Solid Liquid Separation Principle





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.

P Series Decanter Centrifuge Features

The beach angle of the P Series 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 P series 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.

Mud Separator

2 Phase Decanter Centrifuge Parameters

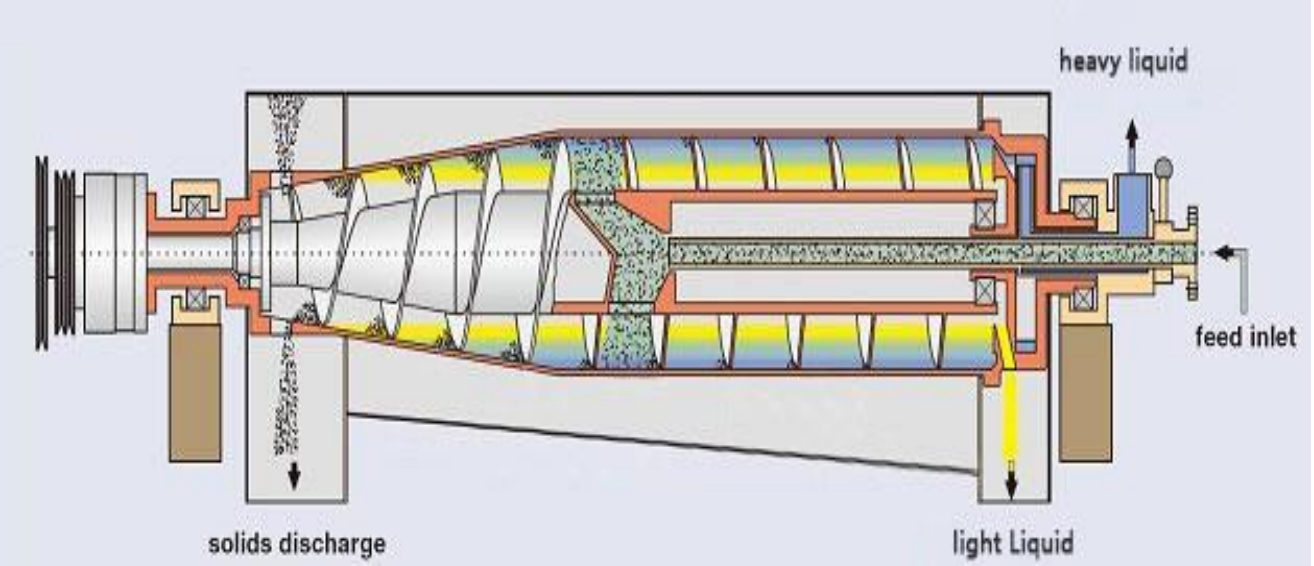
Model	LW553C-VFD	LW764A-VFD
Drive Type	VFD Adjustable Speed	
Bowl Diameter	550mm	760mm
Bowl Length	2310mm	3328mm
Bowl Speed	0-2500RPM	0~2200 RPM
Cut Point (No Chemical)	2-5 μm	2-5 μm
Cut Point (With Chemical)	≤2 μm	≤2 μm
Differential Speed	0-45RPM	5~28RPM
Main Motor	90 KW	160 KW
Back Motor	45 KW	90 KW
Torque	12000N*M	25000N*M
Bowl Material	Duplex Stainless Steel Centrifugal Casting	
Screw Protection	Tungsten Carbide	
Application	Fine Particles Separation from Mud	





Solids Water Oil Separator

3 Phase Decanter Centrifuge Working Principle



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.

Solids Water Oil Separator

3 Phase Decanter Centrifuge Parameters

Model	SX-350	SX-450	SX-520
Type	Continues Oil / Water / Solids Separation		
Bowl Dia	350mm	450mm	520mm
Bowl Length	1540mm	1800mm	2132mm
Capacity	5 m3/h	10 m3/h	15m3/h
Max Speed	4000 RPM	3600 RPM	3000 RPM
Max G Force	3136 G	3260 G	2620 G
Diff. Speed	2-25 RPM	5-25 RPM	5-25 RPM
Main Drive	22 KW	37 KW	55KW
Back Drive	5.5 KW	15 KW	15KW
Lubrication	Grease/Oil	Thin Oil Pump	
Oil Pump Size	N/A or 0.37KW	0.37 KW	0.37 KW
Feed Material	Solids Less 10% and Particle Size less than 2mm		





Contaminated Soil Washing Equipment

Mud Separation Decanter Centrifuge

Dewatering Decanter + Flocculants Dosing Unit

According to the material particles，the sludge can be mechanically separated, also can be separated by dewatering decanter equipped with chemical flocculation dosing unit for fine particles.



Sludge Cake Discharged from Decanter Centrifuge



Sludge Dewatering Machine

Advantage/Weakness Comparison

Type	Screw Press	Filter Press	Decanter Centrifuge
Energy Consumption	Low	Moderate	High
Labor Intensity	Low	High	Low
Footprint	Low	High	Low
Automation Degree	High	Low	High
Investment	Low	High	High
Sludge Moisture Content	High	Low	Moderate
Operating Cost	Low	Moderate	Moderate
Capacity	Low	High	High
Capability for Oily Sludge treatment	Moderate	Low	High



Screw Press



Filter Press



Decanter Centrifuge

Contaminated Soil Washing Equipment

Chemical Dosing Unit

PAM Power Automatic Dosing Unit



For dry powder chemicals, the flocculants can be automatically dispensed and dosed through three-tank automatic dosing unit. The chemicals is fed quantitatively by tube screw, and the flow rate of clean water is controlled by flowmeter. After stirring and maturing in three-tanks, the dosing amount is controlled by the metering pump.

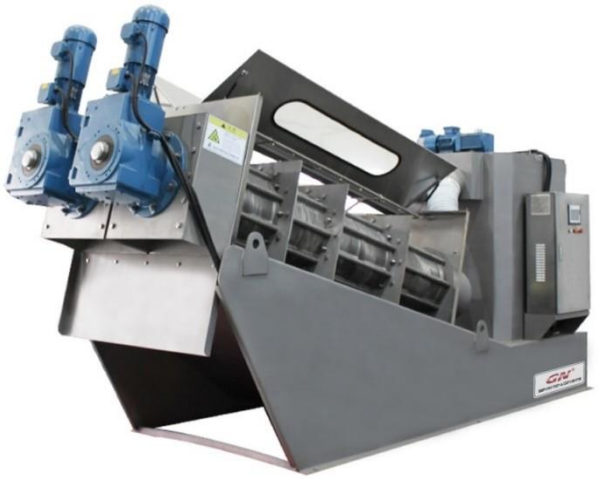
Single Barrel Dosing Unit



Liquid or solid chemicals can also be prepared by in mixing barrels according to a quantitative and predetermined concentration, and then conveyed by a metering pump to a solution tank or processing equipment that needs chemical treatment. The mixing barrel dosing unit mainly includes corrosion-resistant mixing barrel/tank, agitator, metering dosing pump and liquid level control system.

Screw Press

Sludge Dewatering Machine





Brief Introduction

Screw press sludge dewatering machine is a kind of economic and environmental friendly sludge dewatering equipment. It is a new type of sludge extrusion dewatering equipment by using the principle of screw extrusion, through the strong squeezing force generated by the change of screw diameter and screw pitch, and the tiny gap between the floating ring and the fixed ring, to realize solid-liquid separation.

Dewatering screw press is composed of fully automatic control cabinet, flocculation modulation box, sludge thickening and dewatering device, and liquid collecting tank. Dewatering screw press is with automatic control technology, which can realize the flocculation fully automatic operation, and continuously complete the sludge thickening and squeezing, finally return or discharge the collected filtrate liquid.

Screw press dewatering machine is widely used in sewage treatment projects of municipal, aquaculture, food, starch, oil, pharmaceutical, chemical, paper, leather and other industries

Advantages of Screw Press Sludge Dewatering Machine

•1. Suitable for wide range sludge dewatering and can be used for oily sludge treatment.

•2. Operating continuously and automatically, not easy to block.

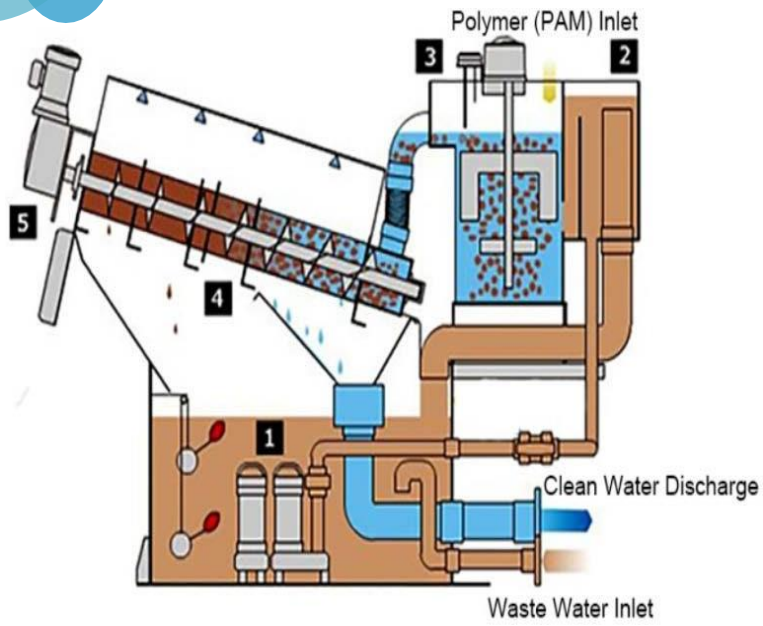
•3. Low investment and operation cost, no secondary pollution.

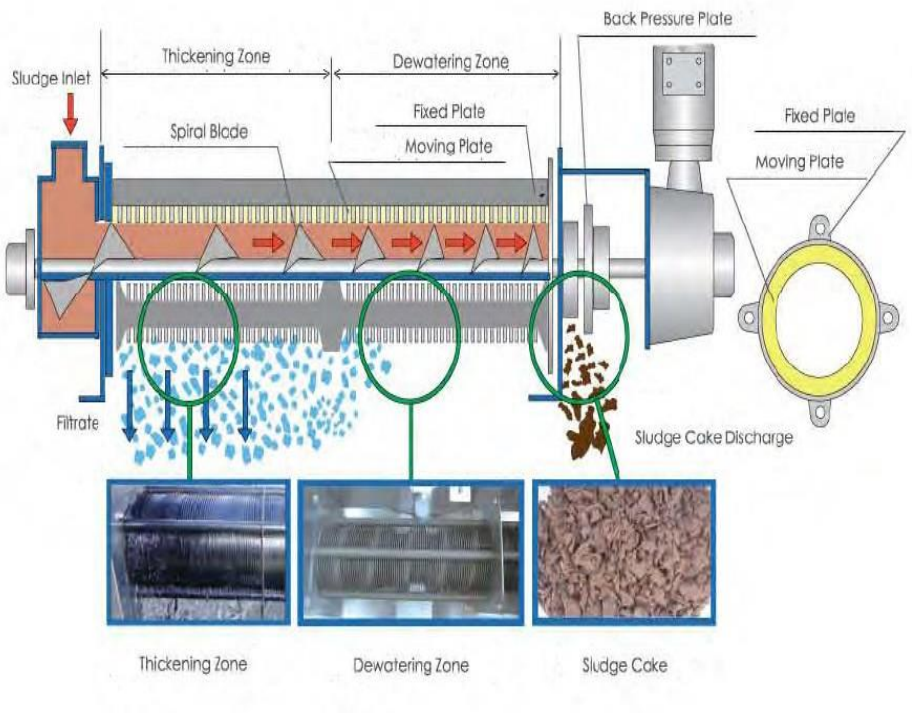
•4. Energy saving and environmental friendly, compact design with small footprint.

•5. Sludge can be dewatered under aerobic conditions to avoid phosphorus release from anaerobic sludge dewatering.

Screw Press

Working Principle





Process description

1.The sludge is delivered to the metering tank through the sludge pump, and then the sludge flows into the flocculation mixing tank. The excess sludge flows back to the sludge tank from the overflow pipe.

2.Inject polymer flocculants into the flocculation mixing tank, alum floc formed after stirring, and then enters into the dewatering section of the screw press after gravity concentration section.

3.Along the direction of the mud cake discharge outlet, the screw pitch of the screw gradually becomes smaller and compressed by the pressing plate, so that the internal pressure in the main body becomes larger. After the purpose of dewatering is achieved, the mud cake is discharged.

4.Self cleaning: the rotation of the screw shaft drives the continuous rotation of the floating ring. The equipment relies on the movement between the fixed ring and the floating ring to realize the continuous self-cleaning process, so as to ingeniously avoid the blocking problems commonly existing in the traditional dewatering equipment.

5. The clean filtrate after treatment by dewatering screw press is discharged from the filtrate port.

Sludge Vacuum Pump

Super Pneumatic





Introduction

Sludge/solid vacuum pump is a kind of vacuum suction loading, pneumatic positive pressure delivery pump. Sludge/solid vacuum pump is fully powered by compressed air, which can transport solid particles, powder materials, mud, high concentration sludge, oily sludge, pulp and other bulk materials.

Sludge/solid vacuum pump is a compact, solid and efficient pump, which can generate a vacuum degree of 25 inch mercury (85kpa), has strong suction capacity and can transport more than 500 meters. Vacuum pump can choose 10 m3 / h, 20 m3 / h and 40 m3 / h models for single machine, and can design and provide integrated vacuum sludge pump group. In mining and river dredging industry, vacuum pump is often used as pneumatic dredging pump. In the tank cleaning industry, it is also used as a self-priming pneumatic tank cleaning pump.

The maximum allowable particle size is 75 micron or 50 micron depending on the size of the pump.

Soil Remediation Equipment

Sludge Solidification Unit





Introduction

1） Sludge collection hopper collects all the sludge, which is transported to the mixing chamber by the underneath screw conveyor at pre-set capacity.

2)Lime storage box is keeping limes powder, through the tubular screw conveyor, powders are sent to the mixer at pre-set capacity.

3)In the same way, curing agent kept in a box, then sent to the mixer by tubular screw conveyor at pre-set capacity.

4There are 2 liquid inlets, for water, acid, alkali and other liquid chemicals feeding, located beside the mixer inlet.

5The high-shear mixer mixes all the material, and push forward at the same time. When the sludge arrive the discharge port, it is already mixed sufficiently, and then discharged.

Sludge is solidified by innovative blending technology and can be processed continually on-site. The dosing rates of the curing agent and the sludge, limes powder can be adjusted accordingly for man power saving with high efficiency.

Contaminated Soil Washing Equipment





Contaminated Soil Washing Equipment





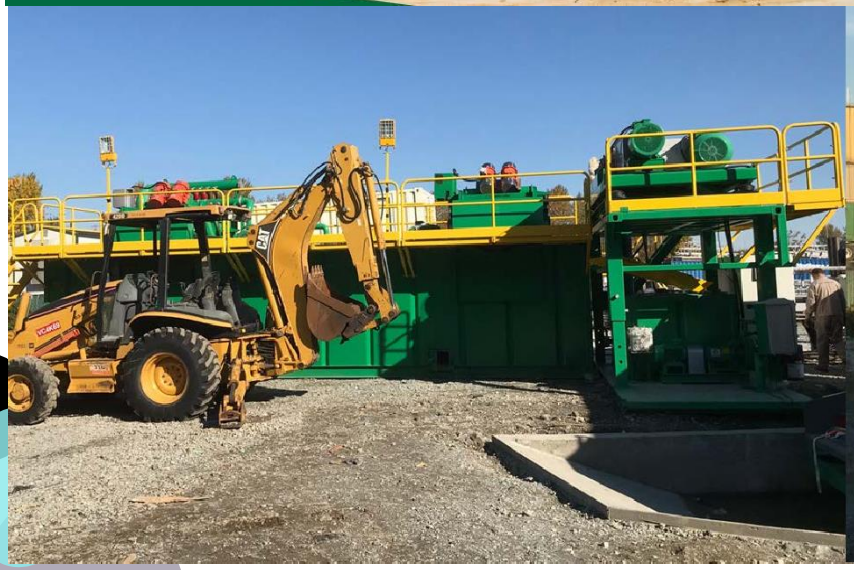


FIRST RECYCLER

Contaminated Soil Washing Equipment







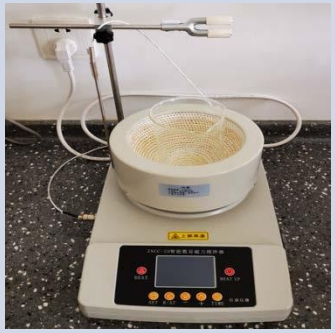


Sludge Test

Lab Test Equipment



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..

Premixing & Heating (Automatic)	Vibration Sieve (German Fritsch)	Lab Tube Centrifuge (G Force up to 10000G)	Retort Kit (TDU) (US Fann Brand)	Solids Content Test (UK Partech Brand)
				

Contaminated Soil Washing Equipment

Pilot Unit





The above unit is a Pilot unit with capacity of 1-2m³/h, Dimension: 6058*2438*3182mm

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.