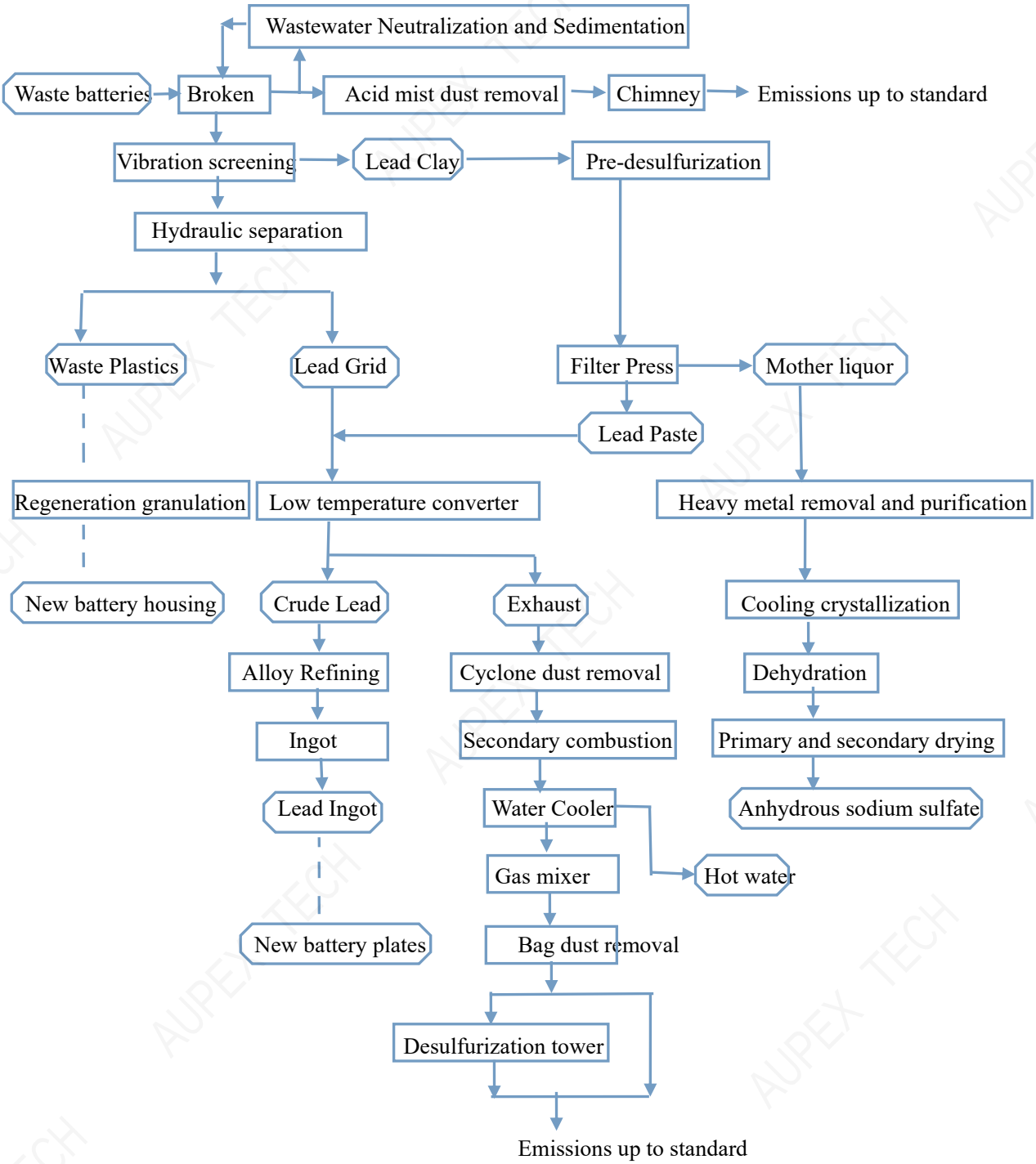
AUPEX TECH PTY LTD

System solution for processing 100,000 tons of waste lead-acid batteries per year

technical description

Waste storage battery regeneration and treatment process



Automatic lead-acid storage battery crushing and separation system

Aupex Tech PTY.LTD. Is established in 2014, the comprehensive recycling engineering equipment and technical services of Australia, is a collection of research and development, production, sales, as one of the professional development of metallurgical equipment, environmental protection equipment and non-ferrous metal purification technology enterprises, adhering to the professional service concept, the company has independent intellectual property products, set metallurgical industry design, production process and management, environmental protection, factory design, machinery manufacturing, automation, electrical engineering industry advantage talents, can independently solve in non-ferrous metal smelting, solid waste resources recycling, heavy metal harmless and high value process design consulting and product development.

The company provides the design and supply service of the fully automatic lead-acid battery crushing and separation system. The product introduction is as follows:

1. Equipment model: ZCPF100kt/a (crushing and sorting capacity of 10-15 tons per hour), the system can adapt to the lead acid battery, AGM / PVC / PE partition paper. The outer shape diagonal dimension is less than 800mm.

2. Details of the supplied equipment

Table 2-1 Supply schedule of fully automatic lead-acid battery crushing and separation system

code	device name	specifications and models	Provider	Quantity (table / set)	Main material
one	**Battery storage workshop**				
1.1	FRP liquid acid storage pool		The user to provide		
1.2	Bridge type driving	Q=10t	The user to provide	2	
1.3	Six flap grab	LSDYZ-3.0-3-B	The user to provide	2	Electric control + hydraulic

					pressure: 316L
1.4	vibrator feeder	ZG-13-65	AUPEX TECH	1	Lining the SS316L
	Weighing device	20t	AUPEX TECH	4	outsourcing
1.5	band conveyor	ZC PF16-00	AUPEX TECH	1	Stainless steel, fluorine and rubber
1.6	metal detector	RCDD-10	AUPEX TECH	1	
two	**Battery crushing and sorting workshop**				
2.01	Bridge type driving	Q=10t /5t	The user to provide	1	
2.02	Sound insulation cover for the crusher system		AUPEX TECH	1	assemble
2.03	crusher	ZC PF01-00	AUPEX TECH	1	SS 316L
	monkey		AUPEX TECH	20	022Cr23Ni
2.04	Hydraulic lubrication and cooling system of the crusher		AUPEX TECH	1	assemble
2.05	Level 1 vibration screening	ZC PF02-00	AUPEX TECH	1	SS 316L
	Lead cream cleaning device			1	SS 316L
2.06	Secondary vibration screening	ZC PF03-00	AUPEX TECH	1	SS 316L
	Lead cream cleaning device			1	SS 316L
2.06	hydroseparator	ZC PF04-00	AUPEX TECH	1	SS 316L
2.07	Primary lead gate screw conveyor	ZC PF05-00	AUPEX TECH	1	SS 316L
2.08	Secondary lead gate spiral conveyor	ZC PF06-00	AUPEX TECH	1	SS 316L
2.09	Plastic spiral conveyor (I)	ZC PF07-00	AUPEX TECH	1	SS 316L
2.10	Plastic spiral conveyor (II)	ZC PF08-00	AUPEX TECH	1	SS 316L
2.11	Heavy plastic screw conveyor	ZC PF09-00	AUPEX TECH	1	SS 316L

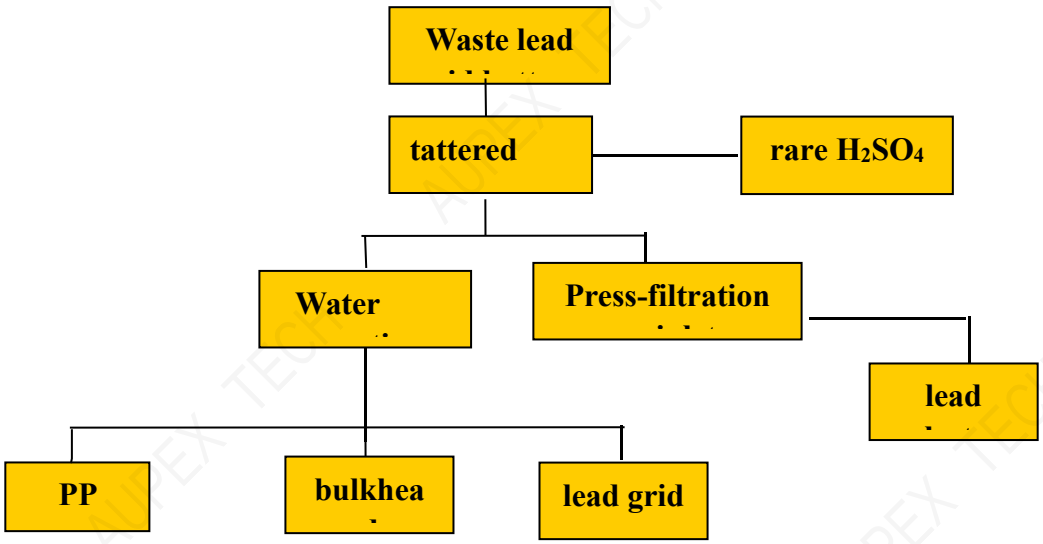
2.12	Lead mud settling machine (big ship)	ZC PF10-00	AUPEX TECH	1	SS 316L
	Scraper conveyor (in the big ship)		AUPEX TECH	1	SS 316L
2.13	Lead mud mixing tank	ZC PF11-00	AUPEX TECH	1	SS 316L
2.14	Acid storage tank	ZC PF12-00	AUPEX TECH	1	FRP
2.15	Lead liquid storage tank	ZC PF13-00	AUPEX TECH	1	FRP
2.16	Hydrodynamic separator	ZC PF14-00	AUPEX TECH	1	SS 316L
2.17	filter	ZC PF15-00	AUPEX TECH	1	SS 316L
2.18	Condenser adding machine	PY3-1000L	AUPEX TECH	1	outsourcing
	Add device		AUPEX TECH	1	SS 304L
	Measurement and pump		AUPEX TECH	1	SS 304L
three	**Acid fog dust removal part**		AUPEX TECH	1	
3.1	Strengthen the turbulent spherical acid fog purification tower	Φ 1800*8400	AUPEX TECH	1	PPR
3.2	induced draft fan	F4-72-10C Q=50000m^3/h	AUPEX TECH	1	assemble
3.3	acid-resistant pump	65YU-1A-60-20	AUPEX TECH	1	P PR
3.4	Emission smoke window	ZC PF14-01	AUPEX TECH	1	Q235
3.5	Automatic liquid-base addition system		AUPEX TECH	1	outsourcing
four	**All kinds of acid resistant pumps**				
4.1	Broken warehouse pump	125FY-260-9-30-4-1000	AUPEX TECH	1	stainless steel
4.2	Hydrodynamic separation pump	65SFYU-30-40-1000	AUPEX TECH	1	stainless steel
4.3	Launcher circulation pump	65FHU-ZK-30-55	AUPEX TECH	1	stainless steel
4.4	Hydrodynamic separation pump	125SFYU-260-9-1000	AUPEX TECH	1	stainless steel
4.5	acid pump	65FHU-AH-30-60	AUPEX TECH	1	stainless steel

4.6	Spray pump	100FHU-ZK-70-54	AUPEX TECH	1	stainless steel
4.7	Lead paste pump	T81-80H	AUPEX TECH	1	stainless steel
five	**Stairs, pipe platform**				
5.1	All kinds of connecting pipes		AUPEX TECH	1`	
	a. Acid liquid circulation pipeline				SS316L
	b. Acid fog pipe				PPR/PP
	c. Pneumatic pipeline				Surface anticorrosion treatment Q235-A
5.2	Platform, stairs, railings, and equipment support, steel frame		AUPEX TECH	1	Surface anticorrosion treatment Q235-A
six	**electric control system**				
6.1	The GCK control cabinet system		AUPEX TECH	8	assemble
6.2	The PLC control cabinet system	The S7-300 series	AUPEX TECH	1	assemble
6.3	Wire and cable		AUPEX TECH	1	copper core
	Tool joint			A batch of	
	cable bridge			A batch of	
6.4	Video surveillance and control system		AUPEX TECH	1	
	LED indicator	2 Admito 2 splice screen		4	
	Video monitoring system			1	
	desktop computer	samsung/Dell		2	

3. Functional description and main technical parameters

3.1 Automatic lead-acid battery crushing and separation system

3.1.1 Flow chart of automatic separation process



3.1.2. Explanation of the working principle of waste lead battery crushing and separation equipment

The working principle of the waste lead battery crushing separation system is through the crusher will store the battery broken, the broken fragments by the vibrating screen, wash away the lead mud, after cleaning the debris into the hydraulic separator, using different buoyancy in the water, the battery fragments from the hydraulic separator outlet through the spiral conveyor system.

The specific process is through the crusher hammer on the waste lead acid battery broken to 50~60mm fragments into the vibrating sieve, in the vibration sieve set up many water spray nozzle, under the dual action of hydraulic and vibration, the material is fully cleaned, the battery debris through the sieve plate mesh into lead mud sedimentation machine, through the appropriate proportion of coagulation, prompting lead mud mass, facilitate installation in the lead mud precipitation machine scraper conveyor to lead mud mixing tank, Then, the lead paste in the tank is transported to the filter press by the lead paste pump connected to the lead mud mixing tank to form the lead cream. At the same time, after vibration cleaning and separation, the light plastic and lead grid are sent to the hydraulic separator by the vibrating screen. Due to the different proportion of materials, the materials, the above three materials are sent from the upper, middle and lower exits after

separation by the hydraulic separator. In order to ensure that all kinds of materials cleaning separation thorough system for the material secondary cleaning separation, so as to ensure that all kinds of materials clean, clean separation thoroughly.

The system adopts full-screen monitoring, automatic control, high degree of automation, the main equipment adopts 316L stainless steel material, good corrosion resistance; the whole equipment internal acid forms an overall internal circulation system, so as to achieve zero emission and no pollution. In addition, the top of the main equipment is connected with the acid fog dust removal pipeline to pump the acid fog generated in the production process to the acid fog cleaning filter for cleaning and filtering standards and then discharged into the atmosphere, so as to prevent air pollution and meet the requirements of environmental protection.

3.2. Description of the processing process flow

Battery Discharge and Storage:

The battery is transported to the raw material workshop by heavy truck, and all kinds of batteries are weighted: first weigh the total weight, randomly select a certain number of batteries to weigh the small weight gross weight, and the residual water in the empty dry battery and then record the net weight after the small weight. Record the weighing result and classify the battery.

Electrolytes were collected and filtered

Waste lead-acid battery is broken in the process of unloading, in which the electrolyte returns to the raw material pit and is transported to the belt by the vibrating feeder, the electrolyte is returned to the electrolyte storage tank due to the appropriate Angle slope, and the filtrate enters the acid concentration workshop for processing.

Waste lead battery dismantling system

loading

Raw material pit of waste lead acid battery by six grab crane to the bin, the vibration of the bin below the feeder [by changing the frequency of the motor guarantee uniform feeding] on the battery to the belt, belt with metal detector

used to remove the magnetic metal in the process of battery delivery, to ensure the normal work of the crusher and extend the service life of the hammer.

tattered

The waste lead-acid battery falls into the hammer crusher through the belt for crushing. There are four groups of 20 hammer heads in the crusher to break, hammer and grind the battery. The battery fragments fall into the vibrating screen through the lower grate hole (size 8050mm) for cleaning and separation.

separation

Five groups of 18 sprinklers are used to wash the battery fragments. The lead mud (sieve material) enters the lead mud sedimentation chamber through the screen hole of 0.5mm width on the vibrscreen. Under the action of flocculant, the lead mud is clustered and is rapidly settled. The lead mud deposited to the bottom of the sedimentation chamber is transported to the lead mud mixing tank through the lead mud scraper for mixing. When the lead mud in the mixing tank reaches the appropriate specific gravity and liquid level, the lead mud paddle is transported to the pre-desulfurization device through the lead mud conveying pump, and then transported to the lead mud filter press for pressure filtration and dehydration to separate the lead paste. The sieve mainly includes polypropylene, heavy plastic and lead grid. After a vibrating cleaning, it enters a hydraulic separator. The polypropylene is light in specific weight (0.9-0.91g/cm3), floating on the water surface and moving out of the system through a separation flip plate. The material with a large proportion is deposited to the bottom of the primary hydraulic separator, and the separation is delivered to the middle separator; the heavy plastic and impurities is transferred to the middle separator, and the separation is separated by the lead gate spiral. The specific weight of the heavy plastic between the polypropylene and the lead gate flows to the secondary vibration sieve through the upper outlet of the primary hydraulic separator under the action of water flow and air flow. Material transported by two return pipe, the secondary vibrating screen (44mm) material into the lead mud chamber, heavy plastic (average 1.7) and a incomplete separation of polypropylene into the secondary separator,

polypropylene floating on the water through the secondary separation flip dial to polypropylene spiral to polypropylene spiral system, heavy plastic is deposited to the bottom of the heavy plastic spiral out of the system.

Pressure filtration and storage of lead paste

Lead mud mixing tank of lead paste by the mixer is suspended state, when the mixing tank lead paste quality, specific gravity, level reached certain conditions after the lead paste slurry delivery pump into the desulfurization desulfurization, desulfurization after the lead mud filter press filter, filtrate and lead paste, finally filter out lead paste filter cake, stored in the lead paste pit.

Acid mist collection with washing

The equipment that produces acid fog in the separation system (head of belt corridor, crusher room, primary separator, secondary separator, lead mud scraping spoon conveying tail, top of lead mud mixing tank, filter press room) is equipped with acid fog collection mouth to collect the acid fog generated in the production process. The acid fog enters the acid mist washer through the collection pipe. After washing and filtration, the gas is discharged into the atmosphere through a 20m chimney by the centrifugal induced draft fan. The emission index of acid fog is less than 0.7 mg/m3, and the Pb lead dust content is less than 0.2 mg/m3.

4.3. Water balance and material balance of the system

Water balance- -the raw material battery into a part of the acid, select the material and take out a part of the water, the relative loss of water in the system is relatively small, when the acid solution reaches 4% concentration, the alkali neutralization is added, or some water is added for dilution. Neutralizing or diluted water reuse system, crushing and sorting system water is fully recycled, without wastewater discharge.

Material balance- -the process of crushing and sorting is the process of wet physical treatment, and the whole material balance. Four kinds of materials are selected in the crushing process, and about 1% of the heavy plastics are mixed into the lead paste or lead grid. With the smelting of lead paste and lead grid melting and volatile.

3.4. Technical parameters

Table 3-1. Main technical parameters of the fully automatic crushing and separation system

order number	project	unit	numeric value
1	productivity	t/h	≥15
2	installed gross capacity	kw	About 750
3	operation staff	human being	3-5
4	Water content of lead paste	%	<11
5	Recovery of lead metal (grid and plate)	%	≥95
6	Plastic recovery rate	%	≥99
7	Plastic lead content	%	≦0.2
8	Total lead recovery rate	%	≥98
9	power consumption	linear measure /t	30 (broken battery)
10	Water consumption	m^3/t	0.05~0.1 (broken battery)
11	Compressed air consumption	m^3/t	15 (broken battery)
12	Flocker consumption	g/t	50-100 (broken battery)

Lead paste pre-desulfurization system

(I) System overview and technical indicators

1.1 Equipment Name: Lead paste pre-desulfurization system

1.2 Number of equipment: 1 set;

1.3 Equipment model: ZC YTS-7 wt / a.

1.4 Concentration requirement of lead paste slurry: 1.4~2.0 tons / cubic meter.

1.5 Processing capacity: 20 m 3 / h.

1.6 Sulfur content of lead paste after desulfurization: 0.5%

1.7 Water content of lead paste after pressure filtration: 13%

1.8 The lead paste slurry after desulfurization is sent to the pressure filter.

The filter cake can be sent to the smelting system, and the filtrate can enter the purification system.

1.9 System control: adopt centralized PLC automatic control.

(II) List of equipment specifications and models

order number	project	specifications	quantity	Main material	Provide manufacturers	remarks
1	retort	26 Cube	2	P P	AUPEX TECH	With a blender
2	Mandatory desulphurizer	DN100	2	316L	AUPEX TECH	
3	Reverse flushing system	Q=30 m 3, and H=40 m	1	groupware	AUPEX TECH	
4	Solid state base storage bucket	Full load of 5 tons	1	304	AUPEX TECH	Distribution: material discharge valve, weighing device
5	Online pH meter		2		AUPEX TECH	domestic
6	Forced desulfurization circulation pump	Q=100 m 3, and H=20 m	2	high polymer	AUPEX TECH	11KW, outsourced

7	Desulfurized lead paste delivery pump	Q=100 m 3, and H=60 m	A set	high polymer	AUPEX TECH	75KW, outsourced
8	Pipe and valve		A batch of	316L	AUPEX TECH	
9	Lead cream filter press	250 Square meters	1		AUPEX TECH	
10	Filter storage tank	29 cubic meters	1	glass fiber reinforced plastics	AUPEX TECH	With an online pH meter
11	Filter pump I	$10m^3/h$, 20m , 5.5kw	1		AUPEX TECH	outsourcing
12	Filter pump II	$30m^3/h$, 60m 18.5kw	1		AUPEX TECH	outsourcing
13	instruments and meters		A batch of		AUPEX TECH	
14	Copper core wire, cable and bridge		A batch of		AUPEX TECH	Bridge frame: hot-dip galvanized spray plastic
15	navar	Siemens PLC S7-200	1		AUPEX TECH	

(III) Description of the process system

Several key factors for pre-desulfurization of lead paste are: surface renewal, accurate material ratio and reaction temperature. Lead paste pre-desulfurization using soda ash (sodium carbonate) desulfurization process design, while leaving the corresponding auxiliary facilities,

4.1 Desulfurization reinforcement (surface renewal)

Two sets of desulfurization systems are built in parallel, and two sets of desulfurization systems share a set of backwashing device, in which the waste liquid pool is shared with the crushing system, and the flushing pump is opened and the valve opening of the outlet branch is connected with the circulating pump of the two reaction systems. When any circulating pump stops after operation, open the flushing pump, open the valve on the corresponding branch, and backwash. The washing setting time is tentatively set at 5 minutes and the time is adjustable. The desulfurization system is designed as intermittent reaction, each batch of reaction takes about 40 minutes (can be set), and each batch of processing capacity is 20 cubic meters of lead paste slurry.

4.2 Accurate deployment of materials

Accurate allocation of materials includes two aspects, one is the sulfur content of lead paste slurry should be relatively stable, the other is the amount of alkali added to be accurate.

(1) Ensure that the sulfur content of the lead paste slurry is relatively stable

① In the control system, the programming will chain the specific gravity of lead paste with the alkali amount.

② It is suggested that Party A configure a rapid measuring instrument (sulfur carbon analyzer) of lead paste to shorten the test time and improve the test accuracy.

(2) Accurate alkali addition

Solid alkali powder is used, manually put into the hopper in the pit, equipped with electronic weighing plate. After the alkali quantity reaches the requirements, the vehicle is adjusted to the top of the desulfurization cycle tank, and the alkali

solid powder is added to the desulfurization cycle tank through the upper hopper.

4.3 The filter system adopts a new filter press with flushing function.

After pressure filtration, the process of water flushing, resulting in the filter cake, this part of sodium sulfate into the decomposition furnace; ① the solid sulfur content of lead sulfate in solid; ② sodium sulfate in the decomposition furnace will increase energy consumption; ③ decomposition of sulfur dioxide discharged into the flue gas, increase the emission of sulfur dioxide, desulfurization, but also need to increase the cost of desulfurization; ④ sodium sulfate into the solid, reduce the concentration of sodium sulfate in the filtrate, reducing the recovery rate of sodium sulfate. We will improve the pressure filter system, after the filter with process water filter cake, leaching water does not enter the filtrate, and return to the production system as process water, which can recycle sodium sulfate to the solution, reduce the amount of filter cake with sodium sulfate, and will not appear the shower water dilution phenomenon of sodium sulfate mother liquor, will not increase the running cost of sodium sulfate subsequent crystallization evaporation.

4.4 Other

(1) All conveying pumps are anti-corrosion and wear-resistant pumps, and timely flushing system is configured. Ring ditch is opened around the pump and connected with the underground collecting pool to prevent the pump leakage from being scattered on the ground.

(2) lead paste slurry tank surrounding set WeiDang, and set around the gutter, connected with the underground pool, once the slurry run, can be collected in the gutter, and into the pool, by diving slurry pump back to the system, not run large area of slurry flow, greatly reduce the workload of collecting cleaning, improve the efficiency of collection.

Sodium sulfate solution purification system

(I) System overview and technical indicators

1.1 Equipment name: Sodium sulfate solution purification system

1.2 Number of equipment: 1 set

1.3 Equipment model: ZCJH-10m^3/h

1.4 Treat hourly sodium sulfate solution: 10m^3/h

1.5 Sodium sulfate concentration: 16%~28% (about 180~200g / l)

1.6 Total content of heavy metals in the treated solution: 5ppm

(2), sodium sulfate solution purification system supply schedule

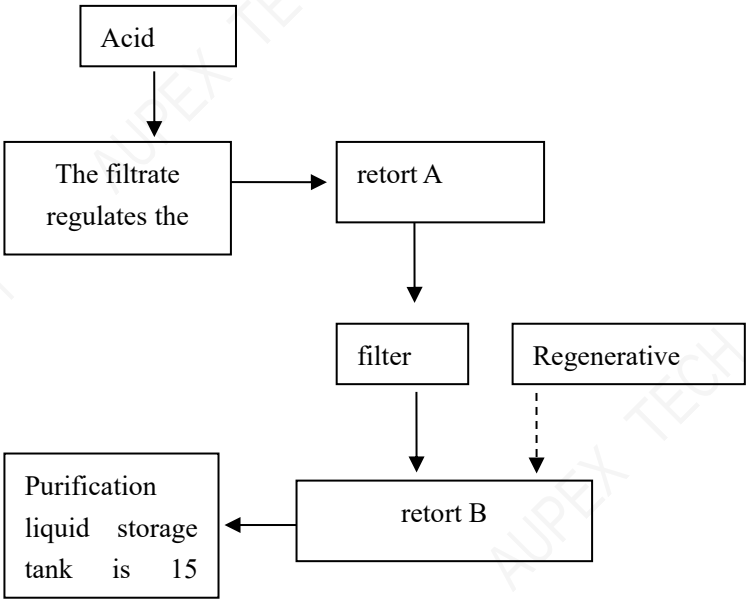
order number	project	specifications	quantity	Main material	Supply company	remarks
1	The filtrate regulates the tank	4 cubic meters	1	PVC	AUPEX TECH	With a PH value detector
2	retort A	H=2 m, D=1.6 m	1	PVC	AUPEX TECH	
3	retort B	H=2 m, D=1 m.6	2	PVC	AUPEX TECH	
4	Regenerative liquid storage tank	1 cubic meters	4	PVC	AUPEX TECH	Sulfuric acid, sodium sulfate, alkali, mixing tank
5	Purification liquid storage tank	29 cubic meters	1	PVC	AUPEX TECH	
6	Purification fluid conveying pump	Q=10 m 3, and H=40 m	1	high polymer	AUPEX TECH	outsourcing
7	Pipeline filter		1		AUPEX TECH	

8	Pipe and valve		A batch of		AUPEX TECH	Domestic well-known brand
9	Power and control system	Siemens PLC S7-200	A set		AUPEX TECH	
10	Steel structure platform		A batch of		AUPEX TECH	
11	instruments and meters		A batch of		AUPEX TECH	
12	Wire, cable and bridge frame		A batch of		AUPEX TECH	The cable bridge is hot galvanized
13	material (Resin, iron charcoal, etc.)		A batch of		AUPEX TECH	

(III) Description of the process system

The slurry enters the filter cake obtained by the filter press and enters the smelting system, the obtained filtrate enters the filtrate storage tank, the acid is added to adjust the pH value, and then continuously enters the processing reactor A, pipeline filter and reactor B, and the water enters the purification liquid storage tank, and then is transported from the pump to the crystallization link. Reactor A with special iron carbon catalytic water purification materials, remove organic matter in sodium sulfate solution and part of heavy metals, reactor B filled with special modified ion exchange resin, further efficient removal of heavy metals in the solution, resin saturated with acid, sodium sulfate solution, alkali solution in turn washing regeneration, regeneration of waste liquid into the company's waste water circulation system.

The flow is shown in the figure below:



Sodium sulfate solution crystallization system

I. System overview and technical indicators

1.1 Equipment name: sodium sulfate solution crystallization system

1.2 Number of equipment: 1 set

1.3 Processing capacity: 5m^3/ h (Sodium sulfate concentration 16% to 28%)

1.4 The proportion of sodium sulfate in total crystallisable: 99%

1.5 Equipment model: ZCJJ-5

2. List of equipment specifications and models

order number	project	specifications	quantity	Main material	Provide manufacturers	remarks
1	heat exchanger	Column type, heat transfer area 10m^2	1	304	AUPEX TECH	Cold water shell, Solution tube

2	Screw cold water machine	YB400WS, Refrigeration capacity is 541800 KCal / h (630KW), with an input power of 132KW	1		AUPEX TECH	With soft start
3	Thick thickness device	50 m^3	1		AUPEX TECH	Heat insulation, stirring, coil
4	centrifuge	0.5~9 t /h, 18.5Kw HR400	1		AUPEX TECH	
5	mother liquor tank	12m^3		PVC	AUPEX TECH	keep warm
6	Mother fluid pump	Q=10m^3,H=20m	1	high polymer	AUPEX TECH	
7	Ear nitro dehydrator	1 to 1.5 tons of water per hour	1		AUPEX TECH	Natural gas-containing combustion unit
8	fan	Q=1000m3/h,P=1000Pa	1	groupware	AUPEX TECH	
9	Product storage	Φ2m, H=2m（6m^3）	1		AUPEX TECH	
10	Pipe valve		A batch of		AUPEX TECH	
11	Stair, steel structure platform		A batch of		AUPEX TECH	
12	Wire and cable, bridge		A batch of		AUPEX TECH	The cable bridge is hot galvanized

	frame, and accessories					
13	navar	Siemens plc s7-200	1		AUPEX TECH	

III. Description of the process system

The solubility table and dissolution curve diagram of sodium sulfate show that the solubility of sodium sulfate varies greatly with temperature below 40℃, and changes very little after being higher than 40℃. This means that the effect of sodium sulfate from cooling crystals below 40℃ will be very obvious. If it drops from 30℃ to 10℃, 31.8 grams of sodium sulfate will precipitate from the saturated solution per 100 grams of water, with an precipitation rate of 78%. It can be seen that for sodium sulfate solution, cooling crystallization energy consumption is lower than evaporation crystallization, and the effect is better.

In view of this, the system cooled the sodium sulfate solution by 20℃ ~30℃ to crystallize the sodium sulfate. The specific process is described as follows:

The sodium sulfate solution in the solution storage tank passes through the heat exchanger, which is pre-cooled by the centrifuge, and the low temperature mother liquid is returned to the crusher sorting system as the system supplementary water. Sodium sulfate solution enters the thickening, which is equipped with scraper and cooling coil, external insulation layer, cooling coil circulation refrigerant, produced by the refrigeration unit. Sodium sulfate is cooled and crystallized in the thickener, the concentrated phase at the bottom enters the centrifuge for separation, the solid out of the centrifuge enters the dryer to remove the crystallization water, the mother liquor enters the mother liquor pool, and the mother liquor in the mother liquor pool is transported to the precooled sodium sulfate solution of the heat exchanger by the pump. The dryer uses the furnace hot flue gas as a heat source, so that the sodium sulfate crystal crystalline water to get anhydrous sodium sulfate, sodium sulfate into the storage warehouse, cooling into the packaging.

Process of smelting system of lead paste and lead gate in low temperature converter

1, lead paste automatic material preparation system

- Lead paste, lead grid and pole column, partition, float and flue ash, iron

dust, white powder coal, baking soda powder are stored in 7 storage hoppers.

- All storage hoppers and conveyors are equipped with an automatic weighing system, where operators can control the amount of each charge according to the formula, and the ratio of each charge can be preset in the central control room.

2. Automatic feeding system

- Automatic mixing and feeding truck can feed two lead smelting rotary ters respectively.
- The feeding system is equipped with automatic weighing system to control the feed amount, and all production data are recorded by computer in the central control room.

3. Rotary converter (2 sets)

- The mixing charge is added to the converter by the automatic feeder. The lead fluid volume of each converter is 10m^3, Equivalent to producing 30t of lead-containing materials (crude lead and lead slag) per furnace.
- The rotary converter has two different working cycles:

Cycle of smelting lead paste: when the furnace charge is lead paste, reducing agent and cosolvent mix, it takes about 6 hours, including feeding, smelting, lead out, slag out, etc., and the average smelting capacity is about 7 tons / hour (lead paste amount).

Melting lead grid cycle: when the charge is lead grid, a small amount of successive feeding, excluding slag removal, until the effective melting volume is filled, the average smelting capacity is about 14 tons / hour (lead grid volume).

Each furnace has 4 furnaces per day, 3 furnaces, processing lead paste, 1 furnace treatment lead gate column.

- Rotary furnace waste slag: quantity: <10% of lead production mass: lead content <5%

The maximum temperature of the rotary furnace can reach 1400 degrees, which can

meet the working condition of 1250 degrees.

Waste gas treatment system

(I) Flue gas parameters and treatment requirements

The 24-hour average soot emission of each set (two sets) is not more than 400 Kg / hour (peak emission of 600 Kg / hour in 30 minutes), and the 24-hour average soot emission of the whole system is not more than 800 Kg / hour.

The flue gas temperature of lead paste melting furnace is 1000℃, containing lead dust, dust, unburned plastic, plastic decomposition intermediates, dioxide, and so on.

Flue gas volume: 160,000 N m3/h (80,000 Nm 3 / h);

The emission concentration of lead smoke is 0.3mg / Nm 3;

Pb emission rate of 50g / h (daily or weekly average);

Daily dioxin mean <0,5 TEQ ng / m3;

SOX <200mg / Nm 3 (excluding flue gas scrubber); SOX <40mg / Nm 3 (including flue gas scrubber).

NOX < 50 mg/Nm3 ;

Particulate matter was <2.5 mg / Nm 3.

(2) Treatment process

Treatment process is: cyclone dust collector group secondary incinerator water cooler gas mixer bag dust collector desulfurization tower exhaust cylinder

1. Cyclone group

The cyclone dust collector group is composed of several high-efficiency cyclones in parallel, which is higher in efficiency, small in footprint, small in maintenance workload and simple in operation.

2. Secondary burner

The flue gas from the cyclone group enters two independent secondary combustion chambers, each secondary combustion chamber is installed with two burners, each burner is equipped with two combustion nozzle, using natural gas and oxygen.

3. Water cooler

The outlet flue gas of the incinerator enters the water cooler, and the tap water is used as the cooling medium, and the hot water obtained enters the hot water storage tank and serves as the bath water for the workers.

4. Mixed gas box

The air mixing box is set at the air outlet of the cooler, and the air bypass valve is set at the box body to monitor the temperature. If the flue gas temperature at the cooler outlet rises abnormally, the bypass valve is opened and the air is cooled. The bottom of the box is equipped with a cone bucket to collect dust and facilitate discharge. The cold air collected by the gas collecting hood of the secondary combustion chamber, the feed inlet of the rotary furnace and the working area shall be sent to the waste gas mixing box. After mixing with the flue gas, the waste gas will be cooled before entering the bag dust removal chamber,

5, the cloth bag dust collector

The flue gas from the outlet of the gas mixing box enters the cloth bag dust collector, and the pulse ash cleaning mode is adopted to ensure that the outlet dust is less than 30 mg / m 3. Prevent excessive flue gas and dust emissions, and the loss of lead dust.

6. Fender

The flue gas of the bag filter enters the induced draft fan, and the flue gas pipe of the induced draft fan is divided into two branches, one branch is discharged into the exhaust cylinder, and one branch enters the flue gas desulfurization device and then enters the exhaust cylinder.

7, desulfurization and dust removal tower

The desulfurization tower adopts power wave washing desulfurization system, which covers a small area, high efficiency and investment. The washing liquid system is equipped with two systems: process water and soda ash solution. When the washing tower is used as a dust collector, open the process water system; when the desulfurization tower is used, open the soda ash system. The desulfurization device is only used when the lead paste pre-desulfurization system is repaired or in abnormal production. Under normal working conditions, the desulfurization facility is the standby system.

Lead paste, lead grid smelting system and waste gas treatment system

equipment composition

order number	name	quantity	remarks
1	Sodium carbonate bin and screw conveyor	A set	AUPEX TECH
2	Partition storage bucket	A set	AUPEX TECH
3	Raw iron storage material bucket	A set	AUPEX TECH
4	Coal storage bucket	A set	AUPEX TECH
5	Lead gate storage bucket	A set	AUPEX TECH
6	Lead paste storage bucket	A set	AUPEX TECH
7	Floating residue storage material bucket	A set	AUPEX TECH
8	Partition conveyor	A set	AUPEX TECH
9	Raw iron conveyor	A set	AUPEX TECH
10	Coal conveyor	A set	AUPEX TECH
11	Lead gate conveyor	A set	AUPEX TECH
12	Lead cream conveyor	A set	AUPEX TECH
13	Floating slag conveyor	A set	AUPEX TECH
14	Feed equipment belt conveyor	A set	AUPEX TECH
15	crucible	30	AUPEX TECH
16	burner	Two sets	AUPEX TECH
17	Crucible transmission system	A set	AUPEX TECH
18	Rotary converter (10 m3)	Two sets	AUPEX TECH
19	Lt the rotary furnace accessories	Two sets	AUPEX TECH
20	automatic charging equipment	A set	AUPEX TECH
21	Burner cooling system	Two sets	AUPEX TECH
22	Secondary incineration system	Two sets	AUPEX TECH
23	Secondary incineration of the water cooling device	Two sets	AUPEX TECH
24	Mixed gas box	Two sets	AUPEX TECH
25	Cyclone dust collector group	A set	AUPEX TECH
26	gas mixer	A set	AUPEX TECH
27	bag-type dust collector	A set	AUPEX TECH
28	desulfurizer	A set	AUPEX TECH
29	exhaust funnel	A set	AUPEX TECH
30	Electrical control system	A set	AUPEX TECH
31	Steel structure platform	A set	AUPEX TECH

Lead alloy ingot casting machine

The ingot machine, the water cooling system, the upper part of the frame is equipped with steam dust cover, the middle of the collection tank, can be easily enough to access to the water cooling cycle, at the same time to ensure the environment of the production workshop, the rear is equipped with a release device, to the middle device, and finally to the conveyor of lead ingots to prepare stacking.

1. Capacity requirements: production capacity of 25 tons / hour.

2. The equipment is used for ingot casting of lead and lead alloy, and the liquid temperature is about 550~600℃.

3. The weight of each ingot is 24 ± 1kg, and the appearance of the lead ingot meets the GB21181-2007 standard.

4. The ingot casting frame is firm and stable, and the ingot casting mold is moved at a uniform speed under the transmission of the chain sprocket to ensure the appearance of the lead ingot. The total length of the ingot casting machine is about 20 meters (specifically to be detailed design).

5. About 290 monomer molds (to be designed in detail), the mold provided by the demander samples or drawings, the ingot mold for heat resistant cast iron precision casting, the ingot mold surface requirements smooth and easy to unmold, all edges and corners of the transition treatment, the ingot mold warranty period for one year.

6. The chain material is 40 Mn steel, and the sprocket material is 45 steel. The chain sprocket meets the steel performance requirements required by the product.

7. Lead ingot casting device: lead from the bottom of the lead pot through seamless steel pipe and double valve, quantitative flow to a lead buffer tank, lead in the buffer tank after the fine flow into the ingot casting machine star cast, star cast in ingot casting mold, the lead evenly distributed to each mold, mold shall not leak lead, lead, and to prevent lead ingot skin device, and equipped with preheating mold with gas gun four.

8. Lead ingot water cooling system: adopt the water sleeve adjustable structure, and then combine the water spray nozzle structure, meet different cooling

requirements, can meet the water mist cooling and soaking cooling, pipe and steam collection cover, in order to speed up the solidification speed, but not due to the fast cooling and affect the quality of lead ingot. The upper part of the rack is equipped with a steam dust cover and a collection sink in the middle, which can easily access to the cooling water circulation device to ensure the environment of the production workshop.

9. Lead ingot steel number beating device and the mold ingot support device: after the lead ingot is cooled, through can knock 8 steel number steel seal tapping mechanism, and then run to the tail wheel of the ingot machine, through the lead ingot unloading device, at the lead ingot unloading place, through the mechanical or pneumatic hammer mold, and there is a ingot support device.

10. After the lead ingot is released, it falls on the lead ingot transport belt. The lead ingot transport belt is welded by type steel, and the rack is equipped with a chain sprocket. Under the rotating action of the motor, the lead ingot falls on the chain and is transported to the working area of the automatic palletizing manipulator;

automatic piler:

Automatic palletizing manipulator installed on a cross lead ingot transport belt and lead pile conveyor, when the lead ingot transport belt will cool the lead ingot transport to the automatic pile manipulator work area, product full 6 pieces, automatic palletizing manipulator under the action of the cylinder and servo motor, do up and down and rotating 90 degrees, put the lead ingot layer by layer on the lead pile conveyor, code to the seventh layer, lead palletizing conveyor will code good a stack of lead ingot to a working interval. Automatic palletizing manipulator to do the next palletizing work cycle;

1. The frame is welded with groove steel, and the frame is equipped with chain, sprocket and lead stack transportation support plate

The conveyor chain is equipped with a chain plate, the surface is flat, and the good lead ingot is placed on the upper surface.

2. It is required to automatically code the lead ingot into 7 layers, 6 rows of

each layer, horizontal and horizontal crossing placement.

3. The double-chain conveyor belt of the lead stack conveyor is about 9m long, stable and reliable operation, and the shutdown is set at the end

warning device.

4. With a rotating 90° automatic palletizing manipulator to carry and stack lead ingots.

Electrical control:

Lead liquid from the lead pot bottom after the star casting device, ingot casting machine, paltizing mechanism into the finished lead stack process, can realize the automatic control through the electrical control system, and with emergency stop and other functions. Motor exceeding the power above 11 kW must be started by frequency conversion

Equipment composition:

order number	device name	specifications and models	material quality	quantity
1	Self-flow type adjustable thermal insulation star pouring device	Heating constant temperature pipe, electric heating maximum power 18KW	stainless steel	A set
2	mould		heat resisting cast iron	
3	Natural gas preheating device		customized	A set
4	Mold conveying chain		45	Article 2
5	rack section		Q235	A set
6	main drive	P=5.5KW	40Cr /45#	A set
7	coolant passage	Water consumption is 10-20 cubic meters per hour,	Q235	A set

8	Code-making device	Can hit 8 numbers	Q235	A set
9	Demolding vibration strike device		Q235	A set
1.10	Insect feeding device		Q235	A set
1.11	Lead ingot adjustment device		Q235	A set
1.12	Automatic stacking device	P=3KW	Q235	A set
1.13	Terrible conveyor	Delivery speed of V≈ 4.5m/min	Q235	A set
1.14	Steel structure platform		Q235	A set
1.15	Pneumatic and control system			A set
1.16	electric control system	PLC: Siemens S7-200 Touch screen: Vylon MT6100 IV5		A set