

Project Report

M/s. STARUN SOHAR (FZC) LLC.

SOHAR FREEZONE/SOHAR/NORTH

AL BATINAH GOVERNORATE

P.O BOX: 0, Postal Code: 322, OMAN

Project Summary

1	Name of The Company	M/s. STARSUN SOHAR (FZC) LLC, OMAN
2	Proposed Product	Recycling Plant of Old Lead Acid Batteries (VRLA) & Automotive Batteries.
3	Location	Oman
4	Name of the project	Recycling Plant of Old Lead Acid Batteries
5	Total land area of the plot	7000 Sq Mtrs
6	Reservation or optional land	2000 Sq Mtrs
7	Major raw material	Used and Old Lead Batteries
8	Water	5 KLD
9	Power	100 KW
10	Proposed manpower	50 No's
11	Waste water quantity (estimate and disposal pathway)	Sewage 4.5 KLD Effluent 0.5 KLD (Zero Liquid Discharge System)
12	Air emissions	Enclosed annexure
13	Solid Waste	Enclosed annexure
14	Project cost estimate	Rs. 32 crores

2. Introduction of the Project

2.1 Identification of Project and Project

Proponent: This is our New Project in Oman and we are run from last twenty three years in India.

2.2 Brief Description of Nature of the Project:

The industry has proposed the production capacity of value regulated lead Acid batteries 1000 MT per month.

The details of the resource requirements like land, raw materials, power, water and manpower for the proposed project is described in this section.

2.3 Need for the project and its importance to the country and or region:

The increasing demand for power storage solutions due to electric vehicles, battery Driven vehicles, solar parks, telecom sector in addition to conventional automotive Batteries, industrial batteries necessitated the expansion proposal.

2.4 Demands-Supply Gap:

The project is envisaged to meet the demand supply gap in both domestic markets And export market due to government focus on solar energy utilization and battery-operated Vehicles (Pollution free transport).

2.5 Imports vs. Indigenous Production:

Production enhance the foreign exchange reserves in view of the proposed exports of Few types.

2.6 Export Possibility:

There is increase in demand globally for Lead Acid Batteries due to the growing Concern to reduce Air Pollution by promoting green transport.

2.7 Domestic/export Markets:

The products shall cater to both domestic and export markets.

2.8 Employment Generation (Direct and Indirect) due to the project:

It is expected to generate employment for nearly 100 Persons.

3 Project Description

3.2 Type of Project including interlinked and interdependent projects, if any:

This project is Lead recycling Plant. The major plant facilities Proposed for the project total production capacity of Lead 1000 MT/Month

3.3 Size or magnitude of operation:
The Manufacturing Capacity is as under:-

Table A-1 Manufacturing Capacity –

Products	Planning
Lead Recycling	1000 MT/ Month
By products	-NIL-
Intermediate Products	-NIL-



Process of Recycling Lead:--

- Step 1) Place Battery on Conveyor of Battery Cutting Machine
- Step 2) Extract Poles on Pole Extracting Machine
- Step 3) Break Connection joints by Connection Breaker
- Step 4) manually take out the Battery material

This machine has an automatic conveyor. Battery is placed on the conveyor. Width of Battery, need not to be set. It can accommodate Battery up to Max. Width of 305mm. Most of Batteries are below this. This machine has two Blades for Cutting. Cutting heights of both the blades can be set at independent height by turning Rotary wheel. This wheel is visible in picture of machine. Scale is provided to set the height of cutting from bottom. Conveyor takes the Battery into machine for cutting. First cutting is set normally at sealing line of lid and Second cutting is set below strap. During Cutting of Battery dust is confined inside of covers because cutter is enclosed. Max. Of Automotive Batteries have approximately same height, say +/-10 mm. Cut Lid ejected out of first window and Strap portion of battery ejects out form second window. Remaining Battery will come out of machine on Conveyor. Machine can be provided with wheels so machine is used to unload battery at the same time cutting is performed.

This saves exposure of workman from Lead Dust; increases efficiency of organization reduces lead time as well as increases liquidity of Funds. Plastic Containers can be sent for immediate disposal/recycling facility. Lead Dust is confined inside enclosure at the same time water jets are provided by pre-fitted Pump. Water is collected in the bottom tank. This helps to separate Plastic Dust from Lead dust. Plastic dust floats and lead dust is precipitated at the bottom. Hence it becomes environmentally Sound Method to cut the Battery for further separation. Remember this Cut Battery can directly go to another attachment; we call it Acid Draining Attachment. Details of this attachment are mentioned below.

Equipment for Smelting Process As Under:--

Lead to be manufactured from Rotary Furnace can be obtained directly from scrapped batteries or as slag from Mini Blast Furnaces. In case of former batteries are cut open or broken to segregate lead scrap, plastic and other materials from them lead scrap in the form of lead powder/ plates etc. is charged in the furnace along with a proportionate charge of additives. In The case of latter, slag produced from Mini Blast Furnaces is charged into the Rotary Furnace, again with proportionate additives.

This process is a batch type process. After filling the required quantity of raw material (either manually or mechanically), the lid of the furnace at the front is closed. The burner attached to the moving door is then fired.

The Rotary Melting Furnace is very flexible and universal equipment used for recycling many non-ferrous metals. It is the major lead production technology used in India and many other countries for Secondary Lead Production. A lead production system based on this technology has certain distinct characteristics such as

- Equipment scalable for installing higher capacities
- Recovers all lead in one production cycle
- Plates & powder from scrap battery as well as sludge from Mini Blast Furnace can be used as raw material
- Requires addition of certain consumables
- Can be fired with various fuels
- Generates high Pollution both as Flue Gases & Fugitive Emissions





Apart from plates and paste of lead oxide from scrap batteries, sludge from Mini Blast Furnace is charged in the Rotary Furnace.

In addition to these, certain compounds of sulphur are also present in the batteries. When this material is heated in the Presence of carbon, lead oxide is converted to lead. This conversion along with burning of fuel generates flue gases and fumes containing dust, dirt, oxides of lead, lead particles and such other impurities etc.

Hence, to meet various goals of maintaining employees' health and factory environments as well as regulatory requirements, it becomes imperative to get high end Air Pollution Control Systems to be installed with the Rotary Furnaces.

DETAILS OF ALLOW WITH FUNCTIONS EQUIPMENT'S

Rotary Chamber receives very hot gases from Rotary Furnace while cold gases from atmosphere are induced into chamber via specially designed profile. Thus chamber works as an equalizing chamber to reduce the temperature of gases and also where sedimentation of dust particulate matter takes place.

Rotary Chamber Advantages

- Recovers 100% lead in the first operation.
- Sludge produced is lead free.
- Equipment can be scaled up for higher production capacities.
- Many chemicals are required for operation.
- High power consumption.

DISCHARGE CHARACTERSTICS REQUIRED AS PER NORMS

Tapping of Rotary Furnace also lead to generation of Fugitive Emissions which need to be captured at source and treated to maintain ambient air standards at workplace. Air Pollution Control Device for Rotary Furnace

- Dust : Less than 50 mg / Nm
- Lead (Pb) : Less than 10 mg / Nm
- Temperature : 60-90 C
- Gases : Traces of NO_x and SO₂

AIR POLLUTION CONTROL SYSTEMS, GAS NEUTRALISING SYSTEM & GAS STACKING UNIT

Based on the parameters and the standards mentioned, the following technology is adopted for Air Pollution Control System in Rotary Furnace:

- Rotary Chamber
- Gravity Chamber
- Involutes Cyclone
- Cooling Loops
- Spark Arrester
- Pulse Jet based Bag House Filtration System
- Stack & Wet Scrubber



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FUGITIVE EMISSIONS CONTROL DEVICE

Smelting of lead in furnaces involve stages or parts where though pollution is generated, it is not handled by the main Air Pollution Control System, like charging of Rotary Furnace when it is red hot or tapping of lead from Rotary Furnace which lead to generation of fumes.

Systems put in place to capture and treat these fugitive emissions as and when they arise are called Fugitive Emission Control System. Fugitive Emissions generally lead to pollution of work atmosphere and jeopardize the maintenance of ambient air standards at the workplace. Hence, to safeguard employee health, these systems are becoming mandatory world over.

Norms of Ambient Air which the Fugitive Emissions Control System helps to meet are Parameter Approved Range Time Period

- PM (size < 2.5 micron) < 40 micro gm/ Nm³ Annual Basis
- PM (size < 10 micron) < 60 micro gm/ Nm³ Annual Basis
- Lead < 0.5 micro gm/ Nm³ Annual Basis
- SO₂ < 50 micro gm/ Nm³ Annual Basis
- NO₂ < 40 micro gm/ Nm³ Annual Basis

- Allows large size particles to settle down
- Cools down temperature of flue gases
- Used as spark arrestor to entrap live or red hot particles.

GRAVITY CHAMBER

Cyclone is used to remove medium size particles from flue gases stream. The treated flue gases are discharged from top and dust is collected at bottom.



INVOLUTE CYCLONE AND COOLING LOOP

It is used for final filtration of flue gases to remove fine dust particulate matter using Pulse Jet Technology. Treated gases from all the bags are collected at top of bag house and passed through ID Fan to exhaust the same through chimney. The dust is collected at bottom of hopper and is discharged.



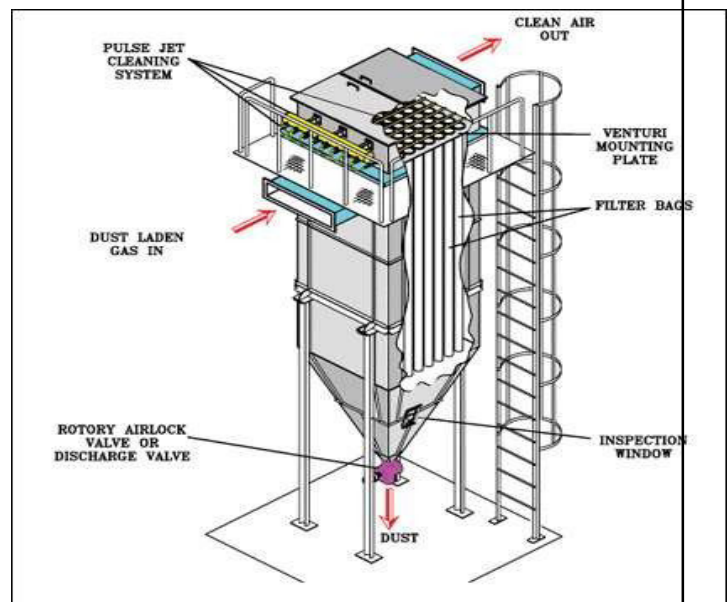
DUCT PIPE LINE AND BENDS

All bends and reducers are aerodynamically designed and have provision of manhole cleaning mechanism.



BAG FILTRATION SYSTEM

Ducts and Bends are required to convey flue gases from point of suction to final top of the chimney and connect with various pollution control equipment like gravity chamber, cyclone, bag house, ID Fan and chimney.



GAS NEUTRALIZING SYSTEM FOR AIR POLLUTION CONTROL **DEVICE: WET SCRUBBER**

A Wet Scrubber in the Air Pollution Control System is mandatory in India and many

parts of the world. Wet Scrubber uses water to scrub clean the flue gases of any pollutant gases or particles that may remain after Bag Filtration System.

The Scrubber therefore requires a pump, pipeline and a retention tank.

The size of the Scrubber depends upon the capacity of the system being installed. Flue gases are introduced in the body of the Scrubber from side and as they move up towards the top of the Scrubber which has the outlet, they pass through a spray of fine water droplets provided by a spray shower provided in the body. This fine spray leads to scrubbing of any pollutant in the flue gases. Cleaned gases escape through the top opening after passing through a mist eliminator whereas water with pollutants moves to the bottom of the Scrubber from where it is passed into the tank. One or more chambers of the tank allow for settling of pollutants which are then periodically cleaned and fresh water is added to make up any loss in quantity of water. It is then recalculated to the Scrubber.



JUMBO INGOT MOULD

Jumbo Ingot Molds are collection trolleys used for collecting molten lead from Rotary Furnaces. They can be of varying capacities, ranging from 300 Kg. to 800 Kg. The most prevalent of the same is 500 Kg. Ingot Mold. Due to higher weight of the cast, it is called a Jumbo. These molds have trolley type structure with two unidirectional wheels at the back and one free spin wheel at the front. It is provided with a handle to pull it.

- They are moved manually or on rails electro-mechanically, varying from unit to unit.
- They are smoothened on the inside and do not have any sharp folds or edges. They are usually constructed in SG cast iron for longer life and increased strength.

STACK (CHIMNEY)

The generated gases are passed into atmosphere after treatment through chimney of suitable height and diameter.



IN FUTURE PLANING REFINING PROCESS UNIT

ABOUT LEAD REFINING

We will initially do the work of making lead and after 2 years in future we can also do the refining process Lead recycled from used lead acid batteries or other sources (SecondarySmelting) via the Mini Blast Furnace or Rotary Furnace route, contains lot of contamination and undesired components. On the other hand, Lead required for battery manufacturing is either soft Lead with 99.97% purity or hard Lead of varying Antimony compositions.

In order to make quality of lead suitable for its different uses, differentvariations of pot melting processes are employed.

These includes

- "Re-Melting" for removal of **Sludge**,
- "Refining" for attaining required purity levels and
- "Alloying" for producing various alloys of lead.
- The equipment used is the same, the consumables and the processes, however, differ.

PRODUCTION PROCESS

Melting Processes have been grouped as

- Re-Melting Process
- Refining Process
- Alloying Process

Re-Melting Process

This process is undertaken for value addition to the recycled lead from furnaces. Lead is melted in the pot and major impurities are skimmed from it to make it saleable in the market.

In Future planing Refining Process

We will initially do the work of making lead and after 2 years in future we can also do the refining process. Lead is melted in the pot, additives such as Sulphur, Wooden Powder and Coke Breeze are added and mixed gently followed by dross removal. Thereafter, Tin is added to remove Copper and temperature is increased to 550-600°C. Further, additives such as Sodium Nitrate & Caustic Soda are added to remove Antimony. This process is repeated to get the desired purity of lead.

In Future Planing Alloying Process

We will initially do the work of making lead and after 2 years in future we can also do the Alloying process. Lead is melted in the pot; additives such as Sulphur, Wooden Powder & Coke Breeze are added

MELTING PROCESS LEAD TO GENERATION OF AIR POLLUTION AT THE FOLLOWING STAGES

- Initial heating and melting generates fumes
- Drossing with sulphur, wooden powder and coke breeze generates lot of smoke and dust particles
- Further heating for Refining and Alloying with different chemicals generates fumes and dust particles.
- Hence, to meet various goals of maintaining employees' health, factory environments as well as regulatory requirements, it becomes imperative to get high end Air Pollution Control Systems to be installed with the Melting Pots.

CHARACTERISTICS OF AIR POLLUTION GENERATED IN MELTING POT

- Dust : 500-600 mg/Nm³
- Temperature : 60-80° C
- Gases: Fumes and Dust

DISCHARGE CHARACTERISTICS REQUIRED AS PER NORMS

- Dust : Less than 50 mg/Nm³
- Lead (Pb) : Less than 10 mg/Nm³
- Temperature : 50-60° C
- Gases : Not Detectable

SELECTION & DETAILSON TECHNOLOGY FOR AIR POLLUTION CONTROL

Based on the Parameters and the Standards mentioned, the following technology is adopted for Air Pollution Control System n Melting Pot is Pulse Jet based Bag House Filtration System

SUCTION HOOD: -

Aerodynamically designed suction hoods are provided to capture flue gases generated at source itself.

DUCTS & BENDS: -

Ducts and bends are required to convey flue gases from point of suction to final top of the chimney and connect various equipment's like suction hood, bag house, ID fan and chimney. All bends and reducers are aerodynamically designed and have provision of manhole cleaning mechanism.

BAG FILTRATION SYSTEM: -

It is used for final filtration of flue gases to remove fine dust particulate matter using Pulse Jet Technology. Treated gases from all the bags are collected at top of bag house and passed through ID Fan to exhaust the same to chimney. The dust is collected at bottom of hopper and is discharged through Rotary Air Lock Valve.

ID FAN: -

ID Fan provides necessary driving force to convey flue gases from top of furnace to top of the chimney. The volume sucked overcomes the total resistance offered by equipment and duct with the help of fluid horse power provided by ID Fan driven by suitable motor.

STACK (CHIMNEY): -

The generated gases are passed into atmosphere after treatment through chimney of suitable height and diameter.

PROCESS OF RECYCLING LEAD

When Lead Acid Batteries are replaced, they contain spent acid with some lead dissolved in it. These used batteries are sold in the open market to lead recyclers where they are drained before being put into the process of recycling. Further in many units, plastic containers of the batteries, after cutting and opening, are washed to remove any lead in them. The drained acid along with any washing effluent of the plastic scrap comprises of the effluent that needs treatment at the Effluent Treatment Plant (ETP). This ETP is also commonly called Acid Neutralization System. If unchecked, these untreated effluent will seep in to land and would lead to soil contamination, pollution in ground water level and their runoff may also lead to pollution of nearby water sources. Hence, their proper treatment before disposal is necessary

ABOUT EFFLUENT TREATMENT PLANT

Effluent from such used batteries mainly consists of sulphates and sulphides of lead, small quantity of lead and diluted sulphuric acid. Further effluent from container washing which mainly contains small quantity of lead is also fed to the ETP.

This effluent has low pH values. pH balancing agent (caustic or lime in this case) is added to adjust the pH and also for coagulation. The effluent is then mixed for Flocculation. The flocks so formed are settled and dewatered on a Sludge Bed (or through Filter Press). Treated effluent after this is further polished using filters. While treated water may be disposed or used as permitted by law, sludge is recharged into furnaces for recycling and reclamation of lead*

DESCRIPTION OF PROCESS

An Effluent Treatment Plant for lead recycling units can be designed as a Batch Type unit or as a Continuous Unit. This mainly depends on the quantity of effluent to be handled. While smaller quantities can be treated in batches, quantities above 10kl/day are to be treated in Continuous

Operating Units

- Batch Type Unit
- Continuous Treatment Unit

BATCH TYPE UNIT

Effluent from used batteries and from container washing is stored in a receiving tank. It is then lifted with the help of an acid proof pump and fed to a Clari-flocculator. Required dosing of alkaline additive is mixed in fresh water in a separate dosing tank and also fed to this Clari-flocculator. The Clair- Flocculator is a PVC lined cylindrical tank in mild steel construction. It has an electro-mechanized stirrer for mixing of the effluent with dosing chemical. It has conical bottom with drain valve. Effluent is fed from the top and after requisite dosing, is agitated and mixed. This leads to neutralization, coagulation and there after flocculation. Once mixing is stopped and flocks are formed they are allowed to settle at the bottom of the conical tank.

After Characteristics of Effluent before and after Treatment (*However, where only spent acid is fed into the ETP, sludge generated is in the form of sodium sulphate or calcium sulphate with lesser quantities of lead will be dewatered and stored as hazardous waste instead)

PARAMETER BEFORE TREATMENT APPROVED RANGE

- pH 3.0 - 4.0 6.5 - 8.5
- Suspended Solids 600 - 800 mg/l < 50 mg/l
- Lead 30 - 40 mg/l < 0.1 mg/l

Sometime, treated effluent is drained from the side of the tank. Sludge is disposed through the bottom of the tank for de watering to either Sludge Beds or to Filter Press. Treated effluent is passed through a series of Polishing Filters (a set of Pressure Sand Filter & Activated Carbon Filter) before disposal. This improves upon the characteristics of the treated effluent. This is called a Batch type unit as the Clari-flocculator is designed to process effluent of a particular capacity in one operation cycle and no more. After it is completely treated and drained, a second batch of effluent can be treated.

In a Continuous type unit, effluent is consistently fed into the system and is treated continually. Hence, it is suggested for treatment where higher capacities of effluent is involved. Effluent from used batteries and from container washing is stored in a receiving tank. It is then lifted with the help of an acid proof pump and fed to a Flocculator. Required dosing of

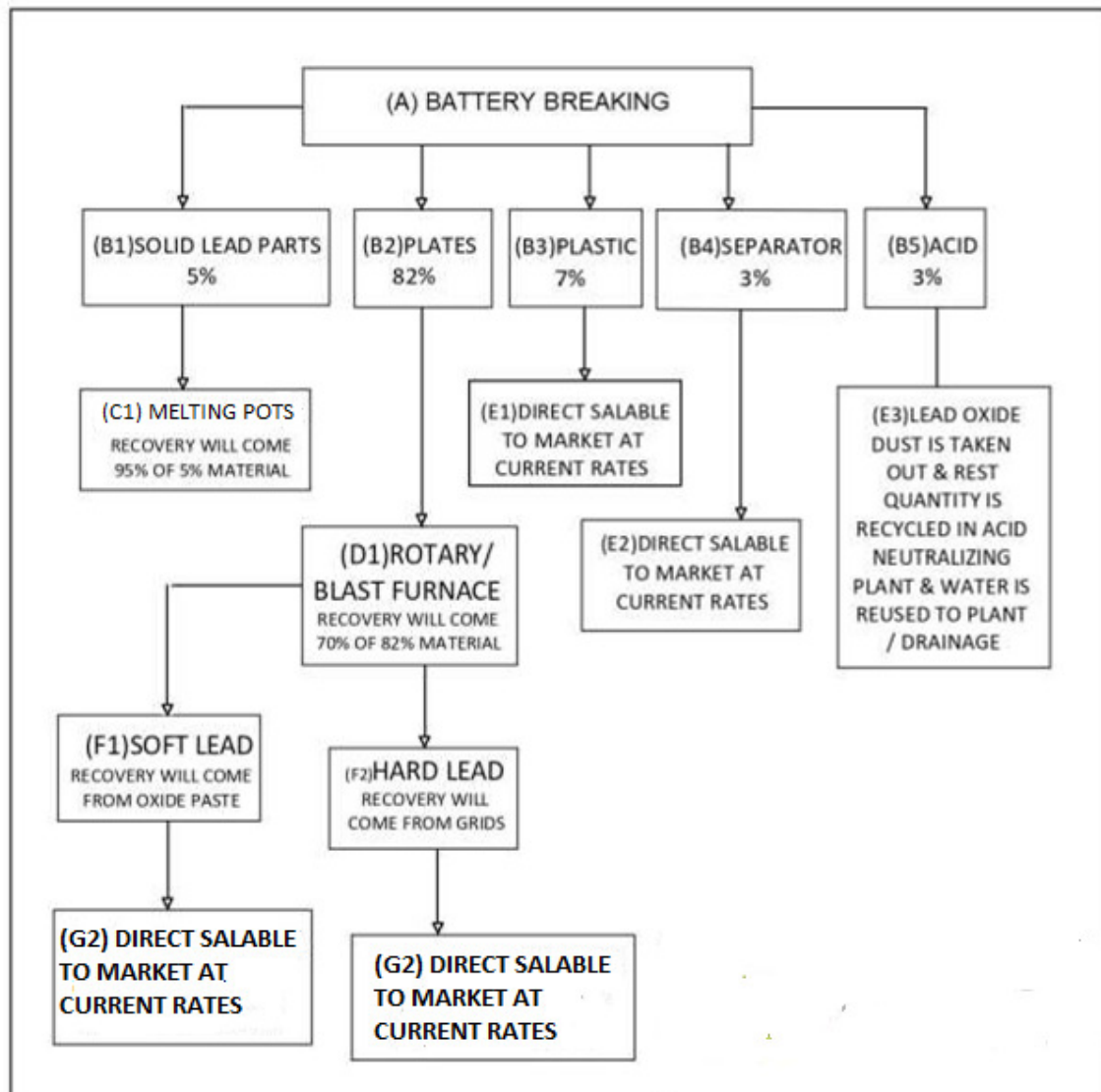
alkaline additive is mixed in fresh water in a separate dosing tank and also fed to this Flocculator. The Flocculator is a PVC lined tank in mild steel construction. It has an electro-mechanized stirrer for mixing of the effluent with dosing chemical. It has conical bottom with drain valve. Effluent is fed from the top and after requisite dosing, is agitated and mixed. This leads to neutralization, coagulation and thereafter flocculation. Effluent with flocks is passed to a Tube Settler. It is a PVC lined tank in mild steel construction. Hexagonal PVC settling media is fitted in this tank. Effluent is allowed to settle here and as a result, the flocks settle on the PVC media provided and are passed to the conical bottom of the settler. Sludge is disposed through the bottom of the tank for dewatering to either Sludge

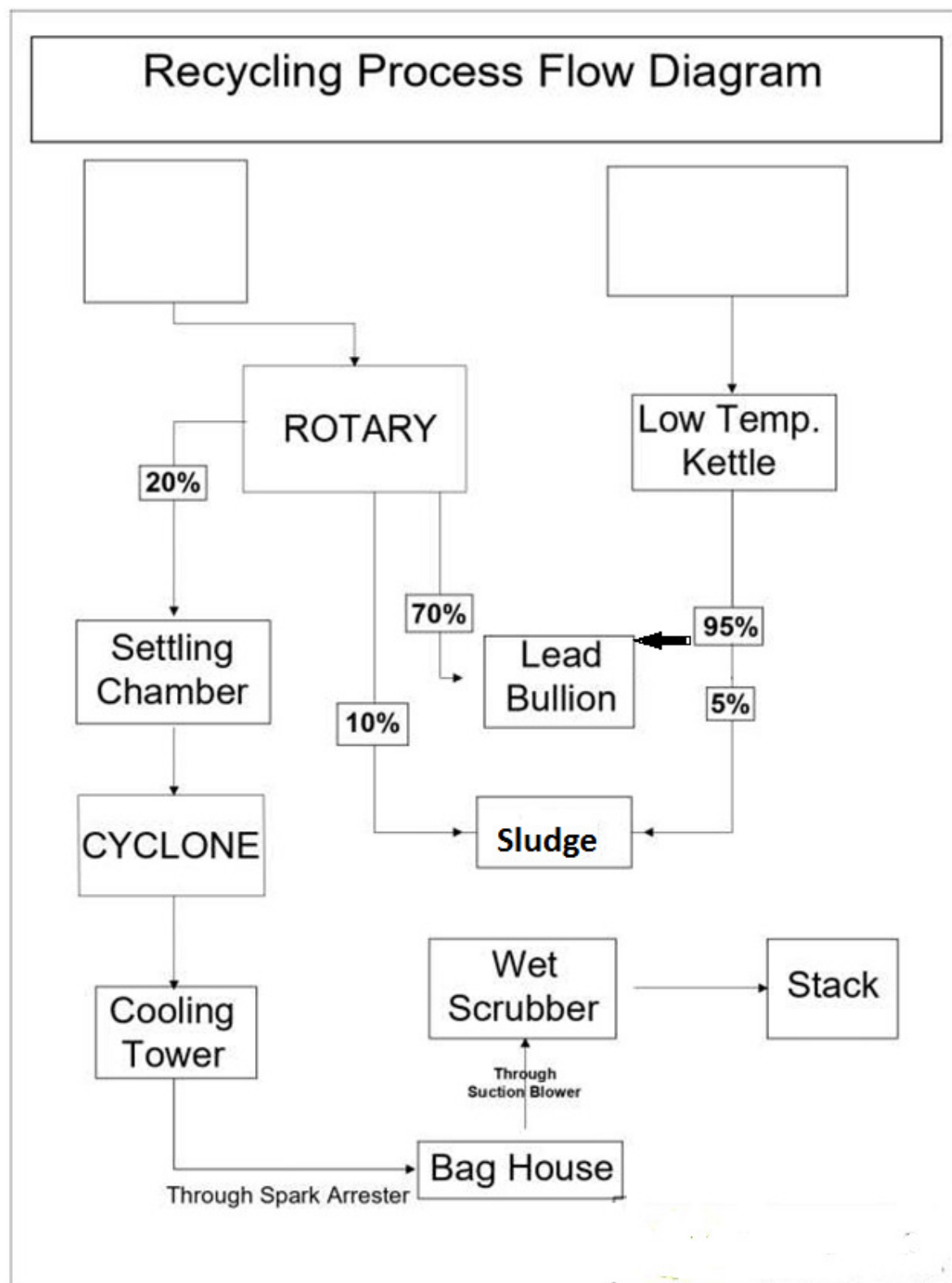
IN FUTURE REFINING POT DETAILS

The Refining Pot (or Refining Kettle or Alloying Pot, as it is variously called), is a mechanical mixing device with a pot and a heating arrangement. The inner pot is made of heavy MS plate with dish end bottom. It is placed within a jacket of refractory bricks, which in turn, are protected by an outer cover of MS plate with reinforcements. The pot is covered at the top with opening for feeding lead ingots and is provided with an electro-mechanical mixer. At the bottom, a heating source, usually an oil fired/ Diesel burner& sometimes by Wood burning is provided to heat the pot and to melt the lead. Once lead melts, impurities are skimmed and removed and any consumables required are added. Lead is then drained from the pot through an outlet pipe and valve.

Capacity of such pots depends upon the requirements of particular units. Standard pot capacities made are from 3.0 Tons per Batch to 20.0 Tons per Batch. Higher capacity pots are also manufactured as required by any particular establishment.

Melting pots are installed both with and without accessories which may include Ingot Casting Machine, Ball Making Machine (where Ball Mills are installed down the line), Air Pollution Control Systems, and Jib Cranes etc.





BEDS OR TO FILTER PRESS

Treated effluent is passed through a series of Polishing Filters (a set of Pressure Sand Filter & Activated Carbon Filter) before disposal. This improves upon the characteristics of the treated effluent.

CONTINUOUS TREATMENT UNITS

Note: Due to continuous up-gradation in technology, specified & projected values may differ in actual products

Raw materials Requirement

S.NO.	Material	Quantity ton /month
1	Old battery	1000
2	Re molted lead	260
3	Scrape Powder	20
4	Barium sulphate	40
5	Vanespersc	6
6	Carbon Black	9

3. Availability of water its source, energy/power requirement and source should be given Water is required for process, wet scrubbers, washing, cooling tower makeup and Domestic purposes. The required water shall be drawn from ground water sources and rain water harvesting in addition to reuse of treated wastewater.

Water and drainage board as agreed to provide 30 KLD water from This will reduce the ground water abstraction. The total water Requirement is 10 KLD consisting of 10 KLD fresh water and the Remaining 9.5 KLD of recycled water. Total water balance is presented in Table Below.

Total Water Balance -

Purpose	INPUT (KLD)		OUTPUT (KLD)			
	Fresh water	Recycled water	Gets Evaporated	Goes with Product	Sewage	Effluent
Process	5	4.5		.5		4.5
Scrubber	1					1
Cooling, Curing, Ventilation	3.25		1.25			3.25
Gross Total	10	4.5				
Total	10		10			

* From 10 Kl effluent, 9.5 Kl recycling through ZLD & .5 Kl goes to Evaporation

Electricity:-

The required energy shall be drawn from as per rules of Govt
Set of 2 x 250 KVA are proposed DG set.

Fuel Requirement:

Name of fuel	Point of use	Quantity (ltr/Day)
Diesel	Diesel Generator	2000
Diesel	Lead melting	2500

Quantity of wastes generated (liquid and solid) and Scheme for their Management/disposal:

Sewage Treatment & Disposal:

Advanced Sequential Batch Reactor (SBR) Technology which consists of both aerobic?

& an oxidation Phases. The process of BOD removal, nitrification, phosphorous removal and sludge separation are achieved continuously in a single SBR tank. The

Process operates on the continuous in flow & batch out flow principle.

The process of Aeration, settling and decanting occur sequentially and are controlled by PLC. The Treated water is filtered through a pressure sand filter and disinfected using sodium Hypochlorite. The waste sludge is being used as manure after dewatering using Sludge drying beds.

Entire sewage transfer from source of generation to treatment

Plant is by gravity hence pumping of raw sewage is eliminated. Sewage from Security office & administrative building is being treated in septic tank based on Anaerobic method., the sewage generation will be 30 KLD, the Generated sewage 1 and sewage 2 are 30 KLD and .5 KLD respectively. The sewage 1 is treated using aerobic process same as that of existing (Sequential batch Reaction) whereas sewage 2 by anaerobic process using septic tank. Treated water will be used For Green belt development & maintenance.

Effluent Treatment & Disposal:

Effluent generation in battery manufacturing industry is mainly due to the floor and Machine cleaning and also from electro forming operation.

Another source is the Regeneration of water treatment plant. Schematic diagram of source of generation is enclosed. Effluent after filtration is neutralized using hydrated lime. Neutralized Effluent is fed into clarifier. Sludge from the clarifier is vacuum dried and disposed for co processing cement manufacturing. Clarified water is treated in RO.

RO Permeate is used in back in process and cooling whereas reject is evaporated in multiple effect evaporator.

Quantity of Effluent Generated and Mode of Treatment

Description	Quantity as per consent KLD	Mode of Treatment in ETP
Process, Machine Washing, Cooling Tower	8	Effluent is neutralized using hydrated lime & Filtered. Filtrate is passed through RO. RO permeate is used in process & Reject is Evaporated. Solid waste from ETP (Gypsum) is sent for Co processing in Cement
Scrubber Bleed off Effluent	2	
DM Plant Regeneration	3	
Total	13	

Total Solid Waste Generated and Mode of Disposal

S.no	Nature of Solid waste	Quantity(Tons/Month)	Mode of disposal
1	Wooden pellets	1	Sold to scrap vendor
2	Waste paper and carton	.25	Sold to scrap vendor
3	Metal straps	.5	Sold to scrap vendor
4	Lead sludge/bearing residue		Be'ah / Municipality of Oman
5	Lead ash/particulate from flue gas		Recycle
6	Chemical sludge from waste water treatment		Be'ah / Municipality of Oman

4. Project Estimation

The estimated cost of the project is approximately Rs. 32 crores

Project Cost		
		Rs. In Crores
Plant& machinery		7.19
Civil buildings		3.15
ETP, STP and Air Pollution Control		0.45
Other Assets		21.21
Total		32
Project Cost		32

THANKS

*For:-
STARSUN SOHAR (FZC) LLC.
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