ecowair lead paste desulphurization

ECO DESULPHURIZATION PLANT

The content of Sulphuric acid in the paste is considered a matter of pollution in itself and become more dangerous while the paste is put in the furnace to produce pure lead.
During this phase the furnace release gases that are mainly constituted by SOx. Some countries rules require that the peak point never exceed the 200 mg/Nm3. Some others out of Europe, require that the daily average never exceed this data. So, a desulphurization system is required.
This plant, using some reagents, special reactors and a crystallization units, neutralize the content of H2SO4 avoiding all environmental problems. In the other hand, the result from the neutralization plant is sodium sulphate Na2SO4 that is in detergent degree purity, that can be used in detergents or in glass production.

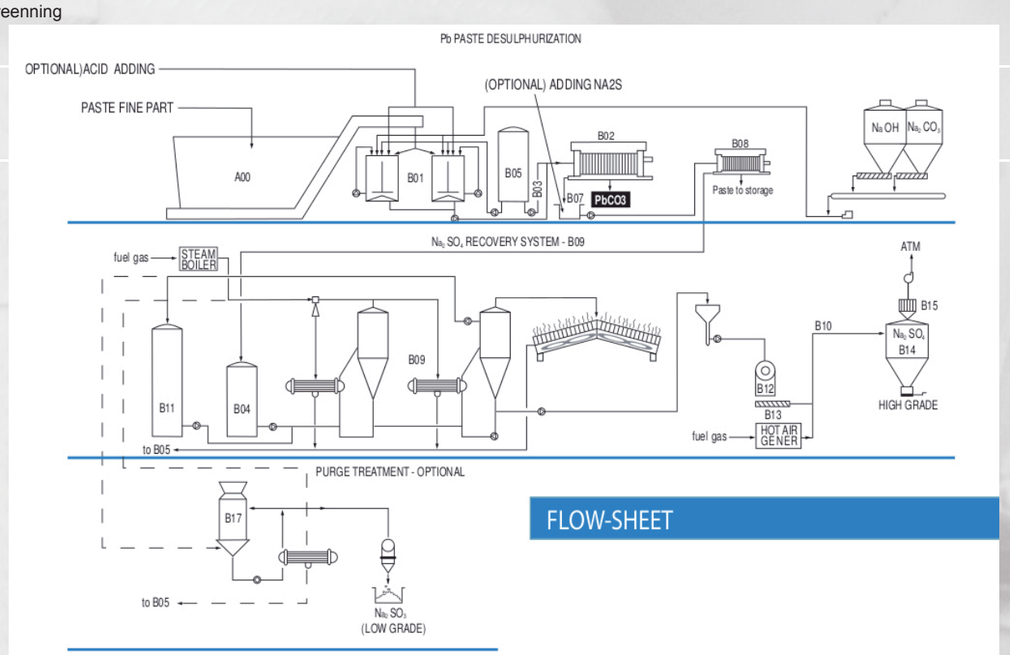
PROCESS DESCRIPTION

From the exhaust battery crushing and components separation process two fractions are obtained containing:
- grids and poles
- Pb paste (PbO, PbO2 and PbSO4), where PbSO4 is 50% (S = 6%).

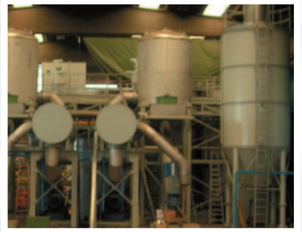
The desulphurization of the Pb-paste is made in water with adding sodium carbonate and traces of caustic soda in the B01 reactions tanks, obtaining the transformation from PbSO4 to PbCO3 according to the following reaction:
PbSO4 + Na2CO3 > PbCO3 + NaSO4
During this treatment the sulphuric acid (H2SO4) present or eventually added is neutralized with caustic soda, according to the following reaction:
• H2SO4 + 2NaOH > Na2SO4 + H2O.
• The machines composing the plant are:
- paste desulphurized section and sulphuric acid neutralization section (B01)
- desulphurised paste de-watering (filter press B02) section with washing and drying to -eliminate as well as the sodium sulphate.
- crystallization anhydrous sodium sulphate (Na2SO4) section (B09).
- Anhydrous sodium sulphate drying section (B10).
The process is shown on the FLOW SHHET picture.
-Environmental pollution for the gaseous emission of SO2/SO3 in the atmosphere.
With the present desulphurisation process, the PbSO4 turn to PbCO3 and the melting in the same furnace of the PbCO3 involves advantages in the process as follows:
-Minimum or no necessity of reagents added, it is expected about 5% of reagents on the charge instead of previus 23%.
More exploitation of the furnace capacity for the inprovments of lead (95%) in the charge, instead of about 78% with sulphur paste.
Therefore it is foreseen a productivity increase of the rotating furnace of about + 20%.
-Less time cycle (about 20%), and less fuel energy consumption (16%) due to the less chemical reactions and lower furnace temperature in the furnace during melting (Carbonate specifi c heat - 356 cal/Kg, Sulphate - 535 cal/Kg).
-Of course less production of slags (27% less) due to the lack of sulphur and iron compounds that produce slags.

EFFICIENCY OF RECOVERY

Desulphurized paste
Metallic yield (as Pb oxides and carbonate): 87% about
Residual sulphur content (as PbSO4): 0,13% maximum, on d.w.
Residual sulphur content (as Na2SO4): 0,2% depends on the effi ciency condition of the fi lter
Moisture: 10% maximum, on d.w.
Filter press Pb Paste screenning



FLOW-SHEET



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ecowair

lead recycling plants

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Ecologic Battery Breaker and separation

The most advanced system to break batteries, separate and recover the components

Presentation:

coming out from the Italian long time experience on the field,
we are presenting, our recycling plant for the lead batteries.

The environment safeguard and the materials recycle now is an obligation and a business opportunity.

This thought is a must for all leaving people that want to preserve the nature, increase the life' quality' and -why not- save and earn money from waste.

All battery producers and cars disposal have this opportunity. A lot of them, may be also you, are already doing that, and every day more people is asking to enter in this market. Also Governments are pushing and financing the recycling of materials.

If we consider the reduction of mines, the sharply increasing cost for row materials, and the taxation for waste that goes up every day too, we can confirm: recycle is convenient!!!
And we can help on this with our experience, know how and machinery.

It is a simple concept: recycle the most part of the lead, the light plastic and the oxide past of the spent batteries.

This multiple unit is studied to be able to process the batteries in this way:

- empty the electrolyte, filter it and eventually concentrate it
- crush the batteries in small pieces
- separate the main components:
  - grids and poles
  - lead paste
  - polypropylene
  - heavy plastic (separators)

The crushing and the separation is done using energy and water.

The water is constantly reused so to reduce consumption.

This allows the plant to be placed everywhere.

The crushed pieces of batteries are washed to remove all sulphuric acid pollution, so we have:

- Lead, grids and poles, clean and with purity from 98% to 99%, to be processed or sold
- Polypropylene washed, to be sold
- Lead paste from grids, collected and drained (up to 14% w. content) to be sold or processed
- Heavy plastic (agm and poliethilene separators, wood etc) collected to go to disposal
- Electrolyte filtered can be re-used or sold

MATERIAL BALANCE:
HYPOTHETIC 200 TONS DAY

weight	materials %
55,6	27,8% grids/poles
72	36,0% paste S = 6,5%
11,2	5,6% polypropylene
16,4	8,2% Separators, PVC, Rubber,
44,8	22,4% electrolyte: as 85% water, 15% acid
T200	100,0% LEAD BATTERIES

So you can calculate easily the return on investment and the payback time only looking to lead market price*T day produced.

lead smelter and refining

After this first part, complete and ecologically friendly, is possible to set up an unit with some kettles and or a rotary furnace, to process the lead to have bullions and alloys.
This part depends on the factory layout, the quantity of battery to process monthly and the investment capacity.
We can support the customer to tailor the correct dimensions of the breaker, the separation station, the utilities, and the right shape of th rotary furnace with the kettles to produce alloys.

Lead smelter and refining kettles

This part of the plant concern the supplying of a rotary furnace and kettles to melt grids/poles and Paste,
to produce hard (Pb/Sb) and soft alloys

The plant is designed to work 24 hours day so you have to buy double smelting department.

Here is indicated the complete day production system

PROCESS DESCRIPTION

The process is based on smelting grids and paste in rotary furnace on different time:

- Pb-paste and Pb-sludge (PbO, PbO2, PbSO4, PbCO3): to produce soft lead bullion.

- Grids to produce hard lead bullion. The soft and hard lead bullions are refined in the kettles on the follow operations:
  - Copper removal
  - Tin removal
  - Antimony removal
  - final refining
  - casting of 25 Kg ingots

The rotary slags are sent to disposal.
The refining ash and drosses will be re-charged to the rotary.
Any dirty gas are collected and sent to de-dusting system (wet scrubber or bag filter) before to sent to atmosphere.

Composition:
- grids and poles, up to 37 MT day, at 97% purity, moisture 2% +-
- Paste and sludge up to 57 MT day, at 75% +- (see your analyzes) yield, 25% to 9% moisture (filterpressed), 5% approx. of Sulphur.

To reduce costs of smelting plant, we supply also the stirring tank and paste density adjustment, and the filter press.

Our filterpress can reduce the moisture down to 9% max.
This unit is also (option) ready for desulphurization plant.