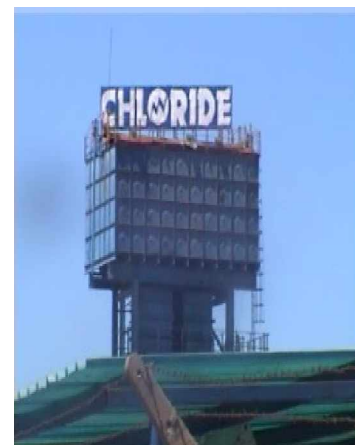


CLEANER PRODUCTION IN EGYPT SUCCESS STORY IN CHLORIDE EGYPT

The Factory: Chloride Egypt is an Egyptian joint stock company established in 1982, it is a leading company in manufacturing several types and models of batteries such as car batteries, solar batteries, industrial batteries both acidic and alkaline, standby batteries and UPS.

It is worth mentioning that great deals of the products are manufactured from A to Z and some products are assembled in the company.

The results achieved from the CP are summarized. The information serves to demonstrate how CP and Energy Efficiency can be successfully implemented in industries in Egypt.



GENERAL INFORMATION	COMPANY	Chloride Egypt
	SECTOR	Chemical
	PRODUCTS	Car batteries, industrial batteries, solar batteries, UPS
	MARKET	Local and international
	EMPLOYEES	450
	WORKING SYSTEMS	Three shifts 5 days /week 12 months/year
PRODUCTION	PROCESSES	The production process can be summarized in three main stages: • Lead oxide - baste production • Plate charging unit (tank formation area). • Acid filling and batteries charging Area (Jar formation).
PRODUCTION (CONT.)	RAW MATERIALS	Lead, Lead – Antimony alloy,



ENERGY SOURCES

H₂SO₄ , Carbon black
-LPG 72 tons/yr.
- Gas oil 600 tons/yr.
-Electricity 150000Kwh/month.

WASTES AND EMISSIONS

1- Gaseous emissions
gaseous emissions sources can be categorized as follows:

- a. Acid vapors emissions (tank and Jar formation area).
- b. Lead -lead oxide emissions (melting furnaces, cutting and enveloping processes).
- c. Fuel combustion.

The factory does not contain emissions treatment system, while dust collection system exists in some areas but does not work efficiently.

2-Solid wastes

Solid wastes generated are:

- Lead - Lead alloys scrap.
- Lead oxide dust.
- Out of specification + Ve and – Ve baste.
- Packaging materials.



Occupational health and safety: (OHS)

There are some occupational perils against workers' health and safety, such as:

- Risks related to exposure to lead emission.
- Risks related to exposure to acid vapors
- For casual workers there is a problem concerning training and personal protective equipments.
- High temperatures around melting furnaces and grid casting machines.
- The measurements of airborne lead carried out by Chloride have demonstrated that the concentrations in the air in most areas are beyond the limit values. It is assessed that a major reason for the non-compliance with the limit values are spreading of the dust

- Sometimes, personal protection devices are not used in the factory the matter that may expose workers to accidents, especially, when handling melted metal.
- It was observed that some of the exhaust systems did not efficiently take away fumes and smokes from the machines. It is recommended that the efficiency of the exhaust systems is checked by a simple smoke test.

CP OPTION



BEFORE



AFTER



BEFORE



IN INSTALLATION

Specifying cleaner production Opportunities:

1- Installing an acid vapors extraction and collection system in the tank formation area.

- Current state: the workers in the tank formation area are exposed to the emitted uncontrolled acid vapors leading to high health hazard in addition to acid spillage from the tanks and that increases the loads of pollutants in the waste water and also affects vigorously the infrastructure.
- Needed action: installation of acid vapors extraction and collection system will provide a solution for the emitted fumes in the work environment in addition to lower the consumption of sulfuric acid due to the reuse of the collected acid.

2- Installing automatic acid filling and leveling machine in the Jar formation area.

- Current state: the process of filling the assembled batteries with sulfuric acid is completely manual which leads to acid spillage affecting the quality of waste water and also leads to direct contact to the workers.
- Needed action: Switching from manual filling to automatic filling will lower sulfuric acid consumption, improve waste water quality, improve work environment condition and reduce health hazards in addition to increase in productivity.

3- Installation of grid casting machine working with LPG instead of electricity.

- Current state: the process of grid casting starts by melting the lead ingot in open melting pots via electrical heaters and that leads to health hazards due to



BEFORE

AFTER (GRID CASTING MACHINE,
LPG)

exposure to lead emissions. Also there is a significant loss in energy as the melting pots are completely opened.

- Needed action: installing a grid casting machine working with LPG instead of electricity will control the lead emissions as the melting pots are completely closed and thus improving the work environment conditions. Also a comparison has been made between LPG and electricity and, it was found that LPG will be more economically.

4- Installation of dust collecting system in the cutting and enveloping area.

- Current state: the main pollutant in the area of cutting and enveloping is the lead dust coming from the dry baste (+Ve or -Ve baste) and that affects the health and safety of the workers.
- Needed action: installing a dust collector will control the dust emission and that helps in improving the working conditions and reduces the health hazards for workers, also the collected dust will be used to regenerate lead and this will lower the consumption of the raw material.

5- Installation of WWTP.

- Current state: the WW analysis shows that almost all the parameters required by law are out of specification especially the COD, TDS and heavy metals despite of the fact that the company performs some primary treatment.
- Needed action: installing a WWTP will improve the WW quality; help the factory to comply with the EEL 4/94. Also the design the WWTP will enable the factory to reuse part of the treated water inside the factory for cleaning processes.

RESULTS

During the CP assessment that was conducted by a team of ECO experts, 5 CP options were identified for the company.

The five most feasible and rewarding options are described below:

Option	Environmental Benefits	Economic Aspects		
		Savings [L.E./y]	Investment [L.E.]	Payback [year]
Option 1: Acid vapors extraction and collecting system	- improving working environment - Help in achieving compliance with EEL law - improve the waste water quality - reduction in H₂SO₄ consumption by 51.2 ton/yr - reduction in water consumption by 3210 m³/yr	283327	1050000	3.7
Option 2: Automatic sulfuric acid dosing system in the SSP production line	- improve waste water quality - help in achieving compliance with EEL - reduce health hazards for workers - reduction in H₂SO₄ consumption by 37.1 ton/yr	53483	110000	2.1
Option 3: Grid casting machine working with LPG	- Improve working environment conditions - Control of lead emissions in the grid casting area - Reduce health hazards due to exposure to lead emissions	152170	648625	5.5

	- CO₂ reduction = 113.6379 ton/yr - SO₂ reduction = 6.8806 ton/yr - Heavy Metal reduction = 0.0023 ton/yr			
Option 4: Dust collector for the cutting and enveloping area	- Reduce lead dust emissions - Improve working condition - Improve health conditions - Help to comply with EEL - Heavy Metal reduction = 17.9904 ton/yr - Regenerated lead from collected dust = 4.7 ton/yr	122220	303000	2.4
Option 5: WWTP	- Achieve compliance with EEL - Lowering water consumption by reusing treated water - Heavy Metal reduction = 0.2946 ton/yr - COD reduction= 9.3139 ton/yr	110880	691500	6.2

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