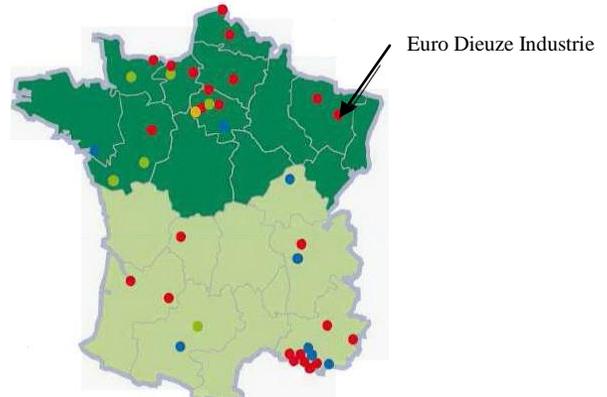


Euro Dieuze Industrie

SARP Industries is the European reference for hazardous waste treatment and recycling thanks to its several plants in France and in the world specialized in the incineration, chemical treatment, biological treatment, metal recovery and solvent recycling, etc.



Euro Dieuze Industrie (E.D.I.) is a French company located near the Metz-Nancy industrial corridor. Subsidiary of SARP Industries and of the Veolia Environment Waste Management Division, Euro Dieuze Industrie provides complete, permanent and effective solutions for used batteries recycling.



E.D.I. is specialized in three kinds of batteries:

- ❖ Alkaline and zinc carbon
- ❖ Nickel-Cadmium
- ❖ Primary and secondary lithium

Some figures:

4 000 tons of sorted batteries

5 000 tons of recycled batteries

Transit unit: 400 T.

Certified ISO 14 001 since January 2007

Certified OHSAS 18 001 December 2009

The recycling process

The recycling process is divided into several steps: sorting, shredding, separation of components and hydrometallurgy.

1. Sorting

To improve capacity and ergonomics, E.D.I. is equipped with 2 sorting lines since January 2011.



2. Shredding

Once sorting done, each kind of batteries are steered into a specific crusher.

Alkaline & Ni-Cd Shredding processes



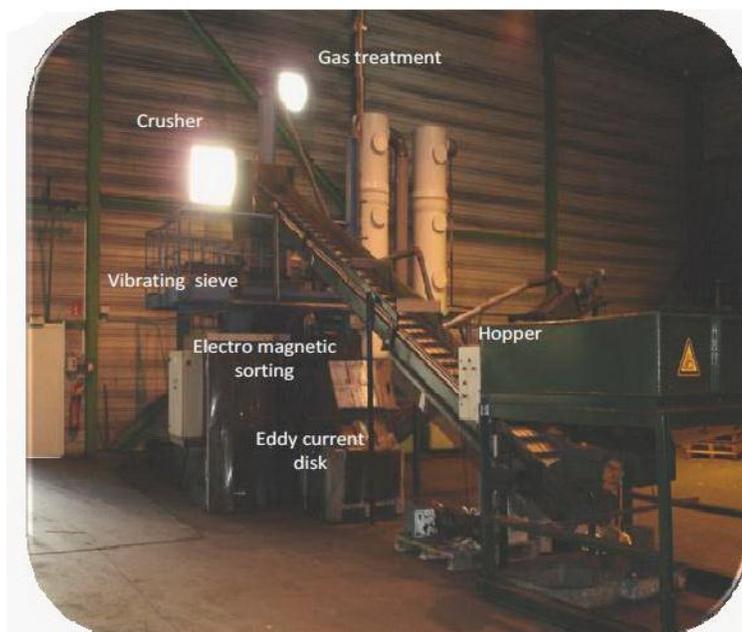
Specific lithium Shredding processes



The organic lithium shredding process is specific because it needs a water flow in order to catch the solvent present in lithium batteries.

3. Mechanical separation of components

The crusher allows separating of the different components of the batteries. The crushed batteries go through a vibrating sieve in order to separate the black mass powder and the shavings. Then the iron part is kept by an electro magnetic conveyor belt and finally the last part sorts the paper and plastic from the nonferrous shavings thanks to an eddy current disk.



Black Mass: metallic powder



Iron or Iron-Nickel part



Paper and plastic

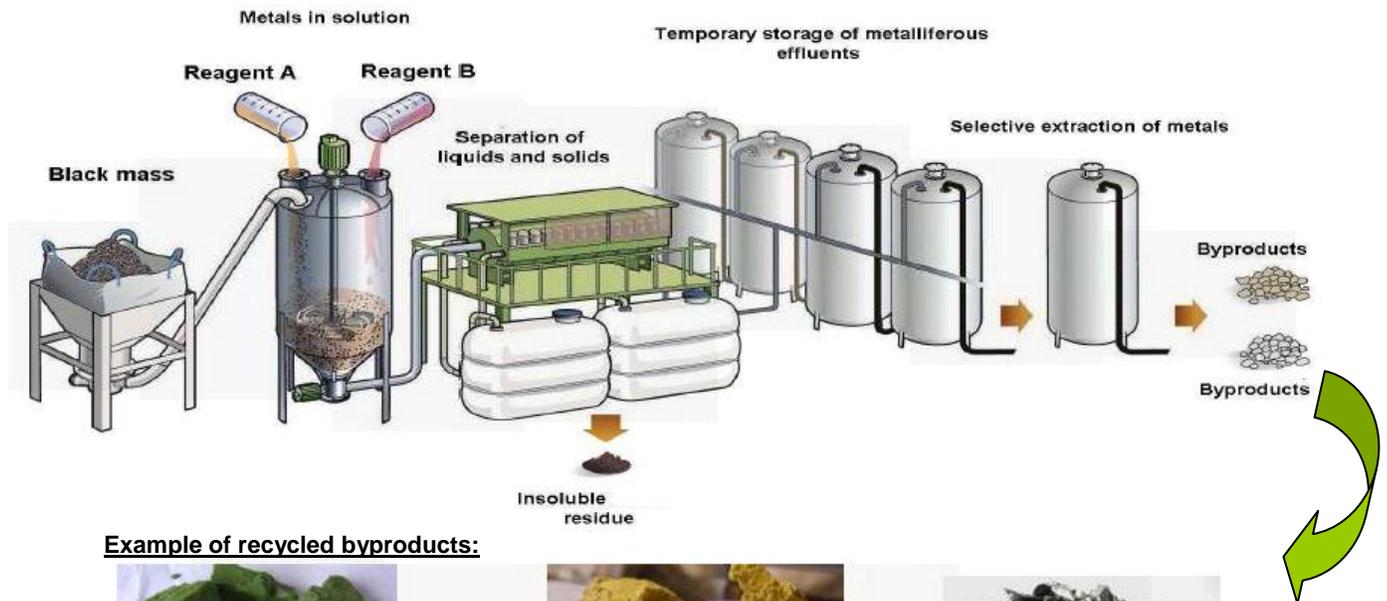


Nonferrous shavings

The gas which is released during the crushing goes through a scrubber to be treated.

4. Hydrometallurgical process : Ni-Cd batteries

Afterwards, the black mass fraction is leached by reagents and the metals in solution are oriented to a hydrometallurgical unit in order to extract the different metals and precipitate byproducts in metallic salts.



Example of recycled byproducts:



Nickel



Cadmium



Steel

Electric vehicles batteries recycling

E.D.I. participates in the Elibama project regarding safety measures for the diagnosis of the state of charge of the used batteries, the discharging and the dismantling.

1. Diagnosing and putting in safety

- Residual charge measures
- Electric risks identification
- Discharge



2. Dismantling/separation/shredding

- Mechanical separation
- Components recycling (Outer casing, connections, metallic plates...) toward dedicated recycling plants
- Cells & modules shredding
- Shredded parts recovered for recycling

E.D.I. shares also information with partners about logistic models and safe take back of used batteries from customers to recyclers.