

# BATTERY



# RECYCLING SOLUTIONS



*- More Than Business -*



# OVER 40 YEARS OF EXPERIENCE IN FERROUS AND NON-FERROUS RECYCLING

MTB has become a major player in the management of current and future industrial waste. Concerned about the future of our planet, the company's values of «Zero Waste, Premium Quality and For Our Children» guide its development.

Electric mobility is often blamed for shifting pollution from the manufacturing phase to the end-of-life phase of lithium-ion batteries. That is the reason why, MTB R&D resources have been allocated to find solutions for battery recycling and increase Europe's resilience in terms of critical raw materials.



## PRETREATMENT CHARACTERISTICS

- + Collection of battery packs, modules, cells and production scrap
- + Dismantling the packs to module level
- + Draining the fluid coolant
- + Deep discharging of the packs, modules and cells to a low voltage (0.5V per cell) to reduce the electrical and chemical hazards during shredding

## REDUCED ENVIRONMENTAL IMPACT

Based on an assessment by Weloop, the recycling impact of the MTB process is reduced by around **20%** compared with the average process in Europe.

## INPUT

MTB process is effective for the treatment of all types of battery wastes: modules, cells, small packs and production scraps.

Suitable for every cells chemistry and geometry.



**UP TO**  
1000 X 500 X 500 mm



## EVAPORATION

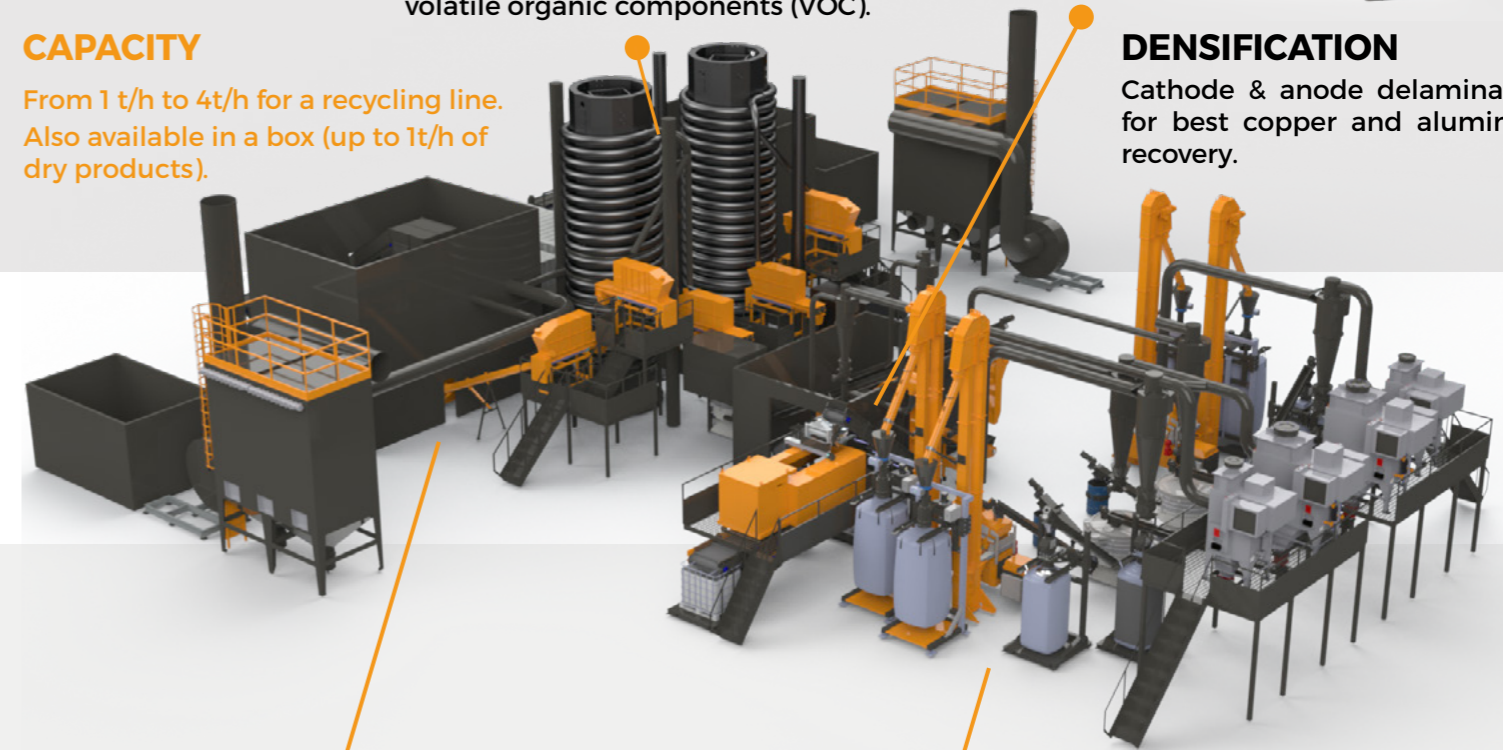
Evaporate and separate the electrolyte from the solid fraction, secure and remove volatile organic components (VOC).

## CAPACITY

From 1 t/h to 4t/h for a recycling line.  
Also available in a box (up to 1t/h of dry products).

## DENSIFICATION

Cathode & anode delamination for best copper and aluminum recovery.



## SORTING

Light fraction sorting unit : separate & refine the multilayers from cells present in the battery and obtain the best purity of output.  
Sorting option : Air, Magnetic, Sieving.

Heavy fraction sorting unit : separate & refine the casings and PCB present in the battery and obtain the best purity of output.  
Sorting option : Magnetic, Eddy current, Optical.

## BVR SHREDDER

Used in nitrogen atmosphere

**Airlock system** : Ensure sealing of the cutting chamber.

**Inerting system** : Controlled atmosphere under nitrogen.

**Safety** : Fire extinguishing system Flame & IR detectors.



**1 STEP**  
of crushing  
for battery reduction

## RECYCLING PROCESS

### DISMANTLING & DISCHARGING    SHREDDING    ELECTROLYTE EVAPORATION    DENSIFICATION    REFINING & RECOVERY

Continuous operation



### GAS TREATMENT

4 steps :

- 1• Introduction of lime in pre-filtration of dust
- 2• Cyclonic washing
- 3• Drying
- 4• Secondary filtration with active carbons



### DUST COLLECTION

Elimination of dust  
HEPA or EFL filter



OPTIONAL

**ROBUST AND RELIABLE**  
Equipment

**CLEAN AND SAFE**  
Air quality control

**AUTOMATION**  
Control system



On our recycling site, a 1 T/h pilot unit is already on exploitation, which serve as a demonstrator for the commercialisation of industrial lines.



# PILOT RECYCLING LINE

# ZWB

## ZERO WASTE BATTERY

Trept



## SAFETY FIRST



BATTERIES STORAGE



AIR TREATMENT

## SECURE STORAGE

Batteries are stored in boxes on racks connected to an automatic detection and extinguishing system. Sensors measure static and thermovelocimetric temperature, as well as the presence of smoke. In the event of an anomaly, electrovalves activate the water network fed by a booster to flood the affected boxes.

Two temporary storage areas are also dedicated to checking or finalizing the electrical discharge of elements before storage. Charged cells that cannot be discharged by conventional electrical equipment are immersed in an aqueous salt solution bath to short-circuit them.

## INSIDE THE PILOT UNIT : 3 MAIN STEPS



EVAPORATOR

BVR 1200 SHREDDER

DRYCELL BOX

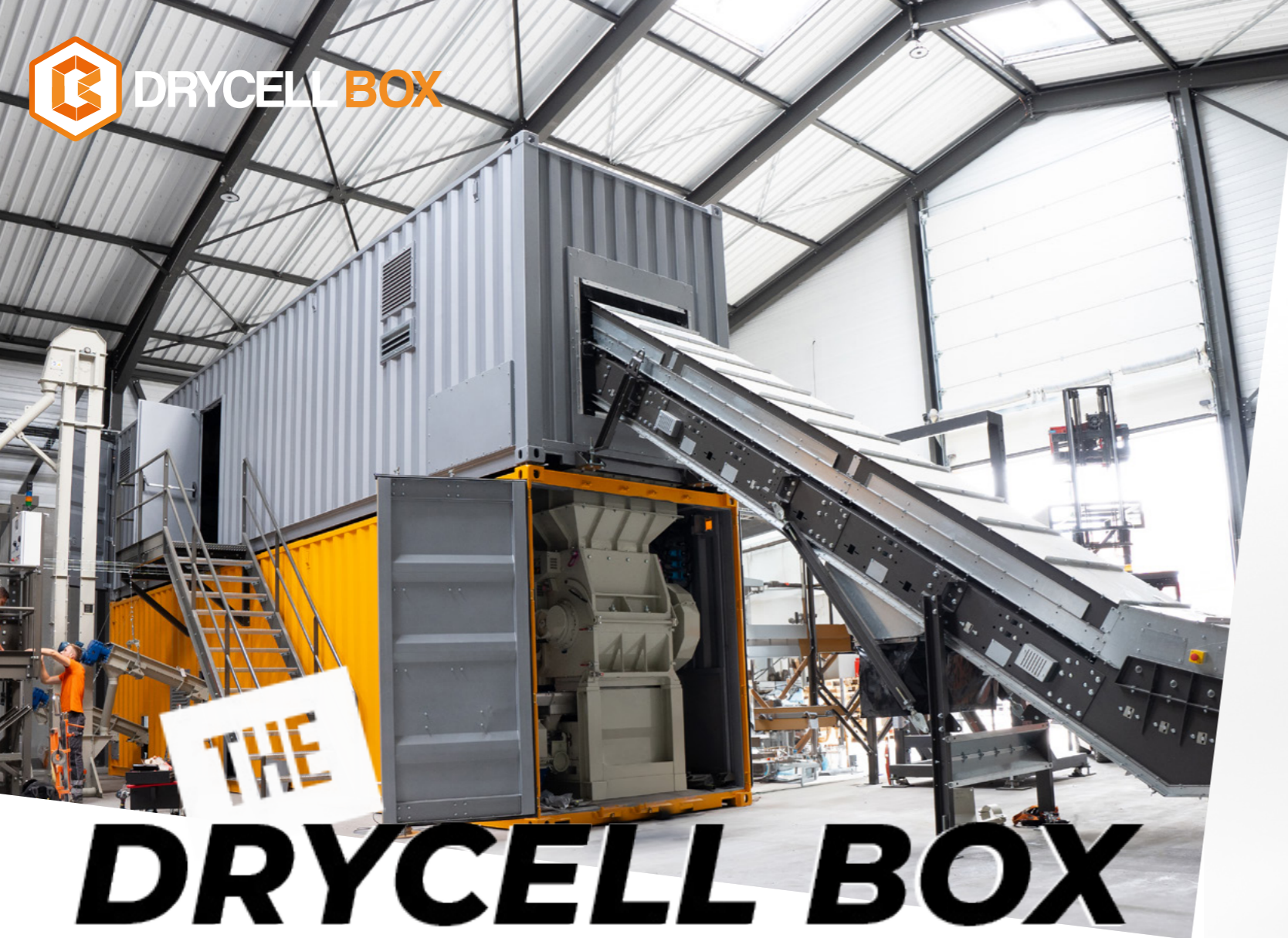
### How does it work ?

The electronically discharged battery modules are shredded into 20 mm fractions in the BVR1200 shredder. The operation is carried out under nitrogen inerting with an oxygen content of less than 5%.

The product is then conveyed to the evaporator to remove the electrolyte. An air treatment system treats incondensables and dust.

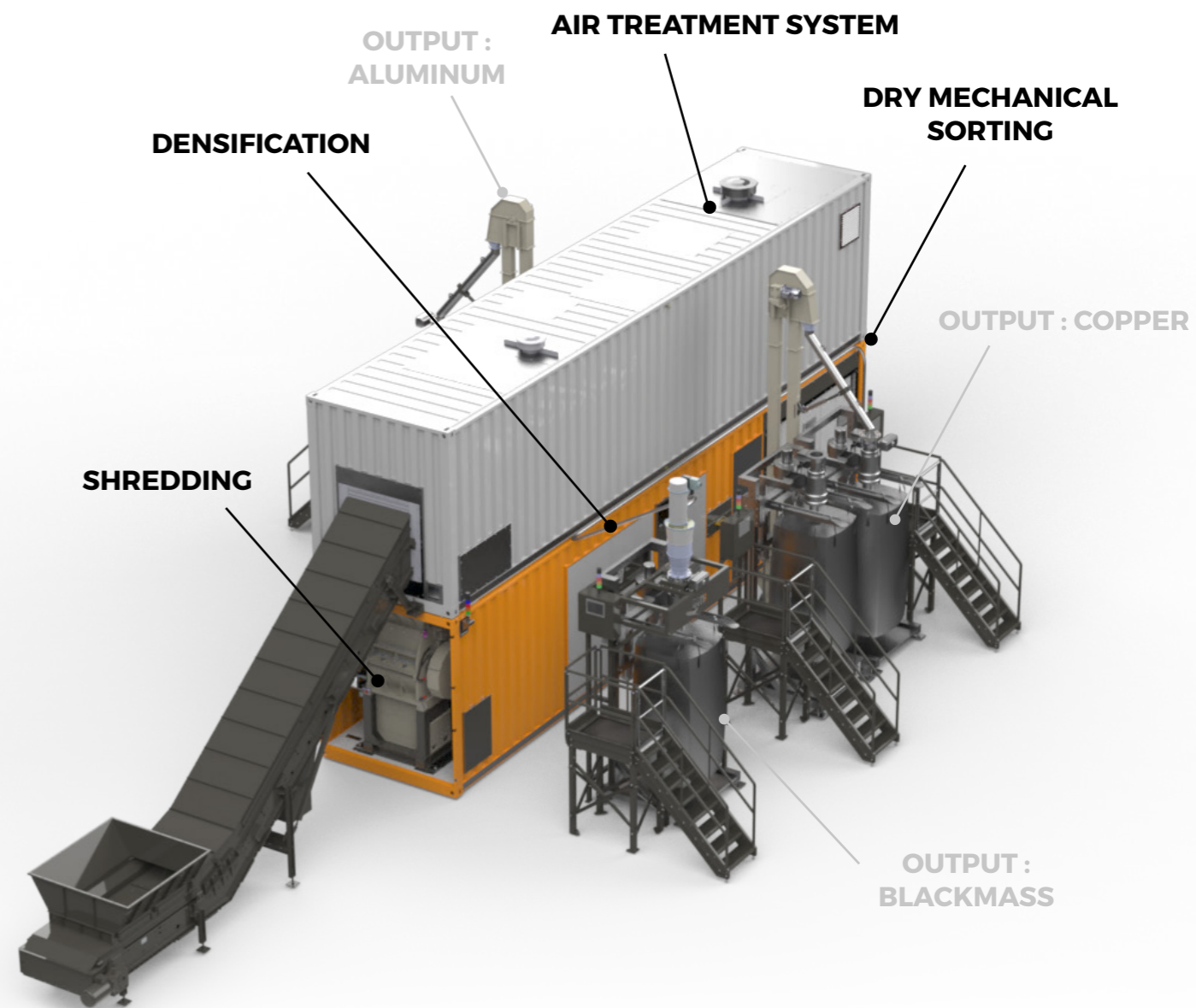
The dry product is sieved a first time to remove an initial blackmass. The remaining product then goes through an aeraulic sorting process to remove heavier materials, before passing through a densifier to break up the particles and release the blackmass. Finally, the product is screened to recover the blackmass, and the remaining aluminum, copper and plastic wires are sorted on densimetric tables.





# THE DRYCELL BOX

SYSTEM FOR ON-SITE BATTERY SCRAP RECYCLING  
WITHOUT ELECTROLYTE



## ADVANTAGES

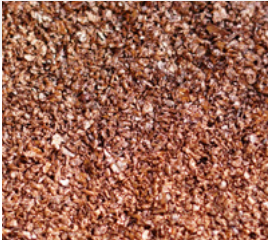
- Compact turnkey system
- Rapid and easy installation and startup
- Complies security norms
- Centralized control cabinet POWERBOX
- High quality of output products
- Custom-made MTB concept
- Duplicated robustness of our large scale installations
- Depth sorting of cases or foils baling option available
- Training and ultra-responsive customer service





# OUTPUT

With an active material recovery rate of over **95%**, MTB is well above the European average of 76%.



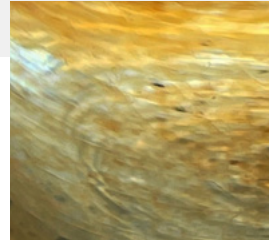
**10-15 %**

Copper foils



**5-10 %**

Aluminum foils



**10-15 %**

Electrolyte



**35-50 %**

Black Mass



**1-3 %**

Ferrous



**2-15 %**

Heavy non-ferrous



**2-4 %**

Plastics foils



**2-10 %**

Plastics

« Best liberated blackmass we have ever analyzed.

Great delamination by MTB of aluminum and copper foils from Lithium Ion Batteries. This recycling process liberates the active particles graphite and lithium metal oxides (here NiMnCoO<sub>2</sub>) of the BlackMass. Without any impurities of foils in the fine fraction, it's exactly what you wish to have!" **ERLABOR Advances Solutions GmbH**

Pollutec Innovation Awards 2023



Visit our website !

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