

CIRQURA for Batteries

Decades of detection expertise.
Now applied to battery sorting.

Smiths Detection's automated solution uses advanced sensing and AI-powered classification to characterise and sort mixed portable batteries and battery packs up to 5kg by chemistry.

See more. Know more. Sort smarter.

THE CHALLENGE

Seeing Beyond the Surface

Every battery has a chemistry. CIRQURA for Batteries sees it.

Portable batteries arrive at recycling facilities in different chemistries, formats and conditions. Labels may be missing or unreliable, casings may be damaged or degraded, and battery packs can reveal little about the cells inside. External appearance alone is not always enough for confident classification.

Accurate classification helps direct batteries and packs to the appropriate recycling route, produce more consistent material fractions for downstream processing and prevent potentially higher-risk items from entering unsuitable streams.

For decades, Smiths Detection has used X-ray detection and advanced imaging to identify what cannot be understood from external appearance alone. CIRQURA for Batteries applies that expertise to one of the circular economy's growing challenges.



THE SOLUTION

From Mixed Streams to More Consistent Fractions

CIRQURA for Batteries is a modular sorting solution combining material preparation, multi-sensor characterisation, AI-powered classification and automated separation.

Each suitable battery or pack is presented individually, analysed and assigned a chemistry classification. A digital record follows the item through the process and enables it to be directed to the appropriate output fraction.

CIRQURA for Batteries helps recycling operators to:

-  **Improve output consistency:** produce cleaner, more consistent chemistry-specific fractions for downstream processing.
-  **Automate sorting:** automatically characterise, classify and sort portable batteries and battery packs up to 5kg.
-  **Reduce direct manual handling:** limit operator contact with damaged, degraded and difficult-to-identify items during the core sorting process.
-  **Adapt to changing streams:** use operational data to analyse uncertain items and support future model refinement as battery streams evolve.
-  **Configure and scale:** select individual process stages or create an integrated end-to-end solution configured around the facility's requirements.

MODULE 0: Pre-sort

Creating a safer, cleaner input stream

Non-battery waste, unsuitable material and oversized items are removed before automated processing begins. This protects downstream equipment and helps reduce avoidable stoppages.

MODULE 1: Sieve

Separating by size and format

The sieve removes fine material, separates button cells and directs smaller batteries and larger packs towards the processing routes appropriate to their size and format.

MODULE 2: Feed

Presenting every item consistently

Batteries are spaced, aligned and presented individually for analysis. Larger battery packs enter a dedicated route designed for their size and format.

MODULE 3: Characterise

Identifying chemistry using multi-sensor data and AI

Advanced sensing captures structural and visual data from each item. AI analyses the combined data to determine chemistry, including where labels are missing, damaged or unreliable.

How CIRQURA for Batteries Works

From mixed input material to cleaner, chemistry-specific fractions, each stage prepares, identifies and directs batteries through a connected sorting process.

MODULE 4: Sort

Directing each item to the appropriate fraction

Each item's digital identity follows it through the system. Precision ejection separates smaller batteries, while dedicated mechanisms handle larger packs and direct them to the appropriate chemistry fraction.

Integrated Safety

Protection designed across the process

Early identification, targeted removal and reduced direct manual handling help operators manage the inherent risks associated with mixed battery streams.

Data and Continuous Improvement

Turning sorting data into operational insight

The digital record created for each item supports performance monitoring, reporting and the analysis of uncertain batteries. This data can also inform future refinement of the classification model.



Performance and safety

Performance Demonstrated in Live Operation



Over **97%**
classification accuracy
in live operation



Up to **3 tonnes**
per hour processing
throughput



Up to **5kg** Portable
batteries and battery packs
automatically classified and
sorted



MODULAR
staged or end-to-end
configuration

Reported figures reflect project data from live operation at Sortbat. Performance will depend on the incoming material mix, operating conditions and selected system configuration.

Detect Early. Remove Quickly. Reduce Direct Intervention.

Safety is designed across the sorting process. Early identification and rapid removal of affected items create valuable response time and reduce the need for direct intervention.

Together with reduced manual handling during classification and separation, this helps operators manage the inherent risks associated with damaged, degraded and unpredictable batteries.

LIVE-OPERATION PROOF

Proven in Real-world Battery Streams

CIRQURA for Batteries has demonstrated its performance against changing input mixes and real operating conditions at Sortbat's facility in Belgium.

The installation processes streams containing alkaline and lithium-based cells and portable battery packs, demonstrating automated classification and sorting at scale in a working recycling environment.

A tangible business case

3–4 years indicative payback

Indicative modelling for a facility processing approximately 5,000 tonnes per year, based on classification accuracy of over 97%. Actual payback will depend on site-specific factors including the incoming material mix, existing process, labour costs, operating hours and selected system configuration.

Why Smiths Detection?

Smiths Detection brings more than 75 years of detection experience and thousands of screening systems deployed in demanding, regulated environments worldwide.

Expertise in X-ray imaging, advanced sensing and AI is backed by a global service network providing 24/7/365 support across 191 countries, supported by 1,200 engineers.

Together, these capabilities provide the technology, operational experience and global infrastructure behind CIRQURA for Batteries.



CIRQURA for Batteries has significantly improved safety by reducing the need for our operators to handle damaged, degraded and unpredictable batteries directly. The ability to automatically classify and sort portable battery packs as well as individual batteries is equally important when processing mixed battery streams."

Daniel Chéret, CEO, Sortbat

Contact us

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Explore CIRQURA for Batteries

Discover how CIRQURA for Batteries could be configured around your input streams, target outputs and site requirements.

TALK TO OUR EXPERTS.



www.smithsdetection.com

Smiths Detection is a global leader in threat detection and security screening technologies, dedicated to making the world a safer place. We provide advanced solutions for aviation, ports and borders, urban security, defence and the circular economy. Our cutting-edge technologies ensure the safety of people and infrastructure. Backed by 80 years of experience, a global footprint, and a commitment to innovation, Smiths Detection is trusted by governments, airports, and security agencies worldwide. From tailored training to lifecycle service support, we help customers to meet their operational demands and adapt to evolving threats with precision, reliability, and integrity.

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