

From Mixed Streams to Consistent Fractions

Sortbat uses Smiths Detection's CIRQURA for Batteries to advance battery sorting with AI-powered classification.

The Challenge:

Confident classification across complex mixed streams

At Sortbat's battery-sorting facility in Belgium, portable batteries and packs received through collection schemes arrive in different chemistries, formats and conditions.

Batteries cannot always be reliably identified from their external appearance. Labels may be missing or unreliable, casings corroded, and items damaged or degraded. Portable battery packs add another layer of complexity because their external casing may reveal little about the construction or chemistry of the cells inside.

In manual and semi-manual operations, employees must make rapid classification decisions from incomplete visual information. The process is labour-intensive, can introduce variability into the resulting material fractions and requires employees to come into direct contact with potentially unpredictable items.

The objective was not simply to increase capacity. It was to automate the classification and sorting of individual portable batteries and battery packs weighing up to 5kg, reduce direct manual handling and improve consistency without compromising throughput.

The Solution:

AI-powered characterisation and automated sorting

Smiths Detection's CIRQURA for Batteries is an automated battery sorting solution that combines advanced sensing, AI-powered classification and automated separation to characterise and sort mixed portable batteries and battery packs by chemistry.

The sensor system captures data about each item's structure, format and physical characteristics. An AI model analyses these inputs, assigns a chemistry classification and creates a digital record used to route the item through the sorting process. Smaller batteries are separated through precision ejection, while portable battery packs follow a dedicated automated handling route for larger items.

The AI model is dynamic and can be refined as new battery types enter the waste stream. Operational data supports ongoing analysis, testing and model development, helping the system evolve alongside changing battery mixes.

The system also includes tools and procedures to identify potential safety issues early and remove affected items quickly. This creates valuable response time, reduces the need for direct intervention and prioritises rapid removal rather than attempting to extinguish an incident within the main sorting line.

Why Smiths Detection?

Smiths Detection brings more than 75 years of detection experience, with thousands of screening systems deployed in demanding aviation environments worldwide. Its technology is developed for highly regulated applications where accuracy, reliability and operational performance are critical.

That experience is supported by a global service network providing 24/7/365 support across 191 countries, backed by 1,200 engineers, alongside established capabilities in X-ray imaging and AI-powered object recognition. This combination of proven technology, regulatory experience and global support provides a strong foundation for bringing advanced detection intelligence to battery sorting.

The Outcome:

Greater consistency, safer handling and a clear investment case

Evidence from live operation shows how automated characterisation and sorting can improve consistency and safety while maintaining throughput under variable operating conditions.



Over
97%
classification accuracy

Up to
3 tonnes
per hour processing throughput



Batteries and packs weighing
up to 5kg
automatically classified and sorted

For a facility processing approximately 5,000 tonnes of portable batteries per year, indicative economic modelling based on classification accuracy above 97% suggests an estimated payback period of three to four years. The potential return is driven primarily by reductions in operating expenditure associated with manual chemistry classification and separation.

Actual payback will depend on site-specific factors, including the incoming material mix, existing process, labour costs, operating hours and selected system configuration.

The Sortbat deployment demonstrates that automated classification and separation of batteries and packs can operate at scale within a working recycling facility.

With a modular architecture, CIRQURA for Batteries provides a scalable platform for operators looking to improve consistency, reduce direct handling and automate battery sorting as waste streams evolve.



"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 Cheret. CEO, Sortbat



Why CIRQURA for Batteries?

- **Proven in live operation:**
performance demonstrated against changing input mixes and real operating conditions.
- **Integrated automated sorting:**
advanced sensing, AI-powered classification and automated separation work together to characterise and sort by chemistry.
- **Safety-focused design:**
early identification and rapid removal support safer handling and reduce the need for direct intervention.
- **Batteries and packs:**
automatically classify and sort individual portable batteries and battery packs weighing up to 5kg.
- **Dynamic, data-led model:**
operational data supports ongoing model refinement as new battery types enter the waste stream.