



Better Powder Handling for Battery Minerals

Better powder handling

FLOVEYOR



Battery minerals bulk material handling demands stringent purity requirements where clean design and quality assurance are crucial. Critical battery materials vary significantly between powder-like materials like lithium hydroxide and graphite compared to high-density, crystalline materials like nickel sulphate and cobalt sulphate. All require a gentle conveying method that preserves the integrity of the material during transfer.

The case for aero-mechanical conveying for battery metals

The aero-mechanical method of conveying (AMC) is ideal for the bulk materials handling of powders and granules. It's particularly suited to a battery minerals conveying requirement. Although every step in the battery minerals value chain has challenges, the contamination requirements in the parts-per-billion ranges demand each processing step is optimised.

AMC technology was invented and patented in 1958 by Floveyor, a company headquartered in Perth, Western Australia. More than 6,000 machines have been installed worldwide, with a focus on the rapid but safe conveying of bulk materials.

We service a direct distribution channel and a partner network of over 30 international agents and partners. Our customer base is in over 52 countries, including Thailand, India, Japan, Germany, and the USA.



The FloDisc® Technology difference



[Watch the FloDisc
Technology video](#)



Floveyor AMCs operate with an electric motor that drives an internal circulating rope assembly at high speed within fully enclosed conveying tubes. Material is fed into the conveyor at the feed housing and is accelerated in the conveying tubes by the rope assembly.

Low-pressure air pockets are created behind each polymer disc on the rope assembly. The bulk material is suspended in these air pockets, and is drawn rapidly but gently to the discharge point.

Floveyor has developed proprietary technology that creates this fluidising effect of powder handling. It's called FloDisc technology and no other AMC manufacturer has it.

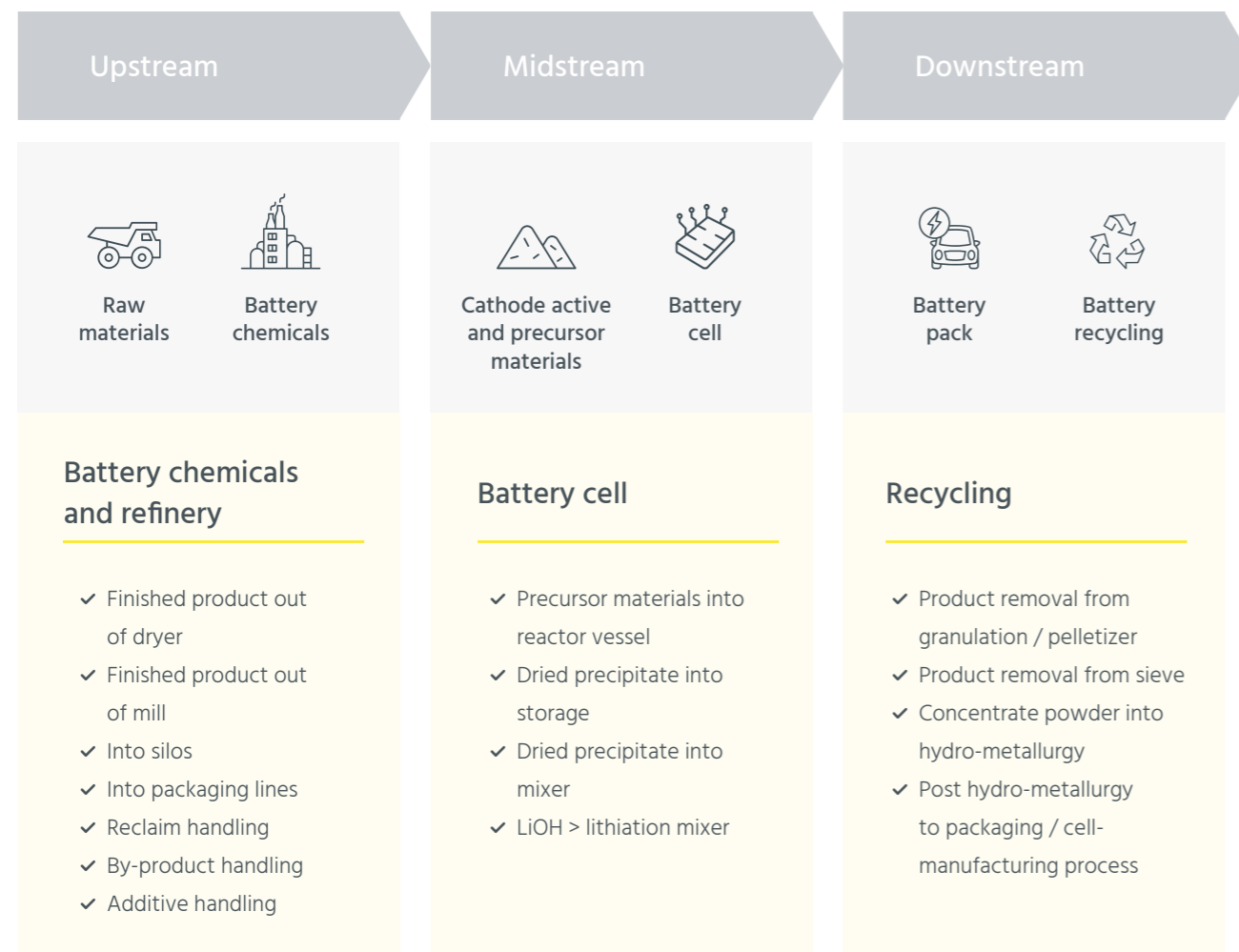
FloDisc technology results in the lowest possible friction between the material and the inner pipe surface. In addition to energy savings which support ESG initiatives, the biggest advantage is that the least possible metal contamination occurs due to the almost frictionless interaction between the material and its surrounding. View our FloDisc technology video for more information.

A Floveyor with FloDisc technology is the perfect materials handling solution for hazardous or environmentally sensitive materials. In addition, the machines are engineered for a range of product-contact materials, further reducing the risk of ferrous contamination. Floveyor AMCs can also be purged with an inert gas to eliminate CO₂ exposure.

Floveyor's capability in the battery minerals value chain

Floveyor adds value in multiple ways and at different phases of battery manufacturing. Our machinery and process line technology play an integral part in the battery minerals value chain, from handling lithium salts in the upstream raw material production, doing the heavy lifting for midstream minerals processing, and extending into downstream battery manufacturing and recycling.

Our FloDisc® Technology ensures safe, gentle, and contamination-free handling of battery-grade minerals.



Our capability with materials used for batteries

Lithium powders

- ✓ Lithium Hydroxide Monohydrate [LiOH]
- ✓ Lithium Carbonate [LiCO₃]
- ✓ Lithium Chloride [LiCl]
- ✓ Lithium Sulphate [Li₂SO₄]
- ✓ Lithium Bromide [LiBr]

Critical battery minerals

- ✓ Graphite
- ✓ Nickel Sulphate [NiSO₄]
- ✓ Cobalt Sulphate [CoSO₄]
- ✓ Manganese
- ✓ Nickel Powder
- ✓ Alumina

By-product recovery

- ✓ Calcium Carbonate [CaCO₃]
- ✓ Sodium Sulphate [Na₂SO₄]
- ✓ Potassium Chloride [KCL]
- ✓ Sodium Chloride [NaCl]
- ✓ Potassium Sulphate [K₂SO₄]
- ✓ Boric Acid [H₃BO₃]
- ✓ Magnesium Hydroxide [Mg(OH)₂]
- ✓ Ammonium Sulphate [(NH₄)₂SO₄]
- ✓ Aluminosilicates

Raw materials used in processing

- ✓ Sodium Carbonate (Soda Ash) [Na₂CO₃]
- ✓ Calcium Hydroxide (Slaked/ Hydrated Lime) [Ca(OH)₂]
- ✓ Beta-Spodumene (Post roast & mill)
- ✓ Dried Powdered Precipitate (Filter cake)

If your material is a powder or a granule, we can help you move it around your process.

Why the battery minerals industry relies on Floveyor

Battery mineral refiners and other resource and chemical companies have embraced Floveyor machinery and process line technology for its durability and reliability. The many benefits of mining and chemical processing include:

- ✓ Meets ATEX 2014/34/EU safety standards, suited for potentially explosive applications
- ✓ Contamination-free conveying of hazardous materials via a fully enclosed system
- ✓ Ability to O₂-free purge to maintain the integrity of LiOH
- ✓ Ability to substitute stainless steel for engineered polymers contact parts, to minimise ferrous contamination
- ✓ Total batch transfer with negligible residue
- ✓ High availability, even with heavy use
- ✓ Fast, easy cleaning with dry- and wet-clean options available, including clean-in-place (CIP)
- ✓ High throughput with a small footprint
- ✓ Energy efficient conveying
- ✓ Integrates easily with existing plant and equipment
- ✓ Operates at any angle without diminishing throughputs
- ✓ Requires minimal operational maintenance.



[Download](#) our white paper for more information about optimising battery minerals processing.

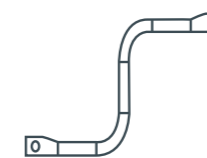
We offer key powder handling interfaces between critical processes

Our equipment has been specially designed and engineered to meet the requirements of this rapidly evolving industry.



Aero-mechanical Conveying

All aspects of powder and crystal transfer



Tubular Drag Conveyors

- ✓ Low throughput
- ✓ Complex routes



Tubular Vibratory Conveyors

- ✓ Mechanical-free horizontal transfer
- ✓ Metered feeding



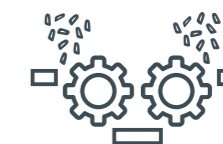
Screw Augers

- ✓ Controlled feeding
- ✓ Loss-in-weight systems



Loss-in-weight Dosing

Dosing precursor materials (battery cell production)



Lump Breaking

Material reclaim systems at refinery



FIBC Bulk Bag Discharging

- ✓ Refinery leaching stage, addition of raw materials soda ash and lime
- ✓ Reclaim systems
- ✓ Battery cell bulk materials



Bag Tipping Stations

Dosing precursor materials (battery cell production)



Sieving (Agreement with other OEM)

- ✓ Refining
- ✓ Lump removal from crystalliser

Our service excellence

Due to our long history as global powder handling specialists, we can share knowledge and observations of production practices that are relevant to your operation.

All Floveyor manufacturing functions are located under one roof. This ensures we have complete oversight of our conveyors and process line technology, beginning with the first query and continuing for the life of our products.



Powder handling
specialists



Industrial machinery
design



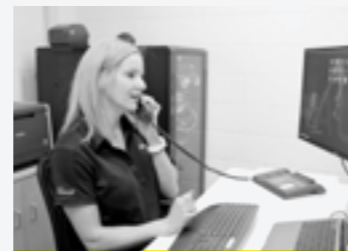
Engineering



Manufacturing



Installation and
commissioning



Aftermarket
support

Our services

Discovery and solution modelling

Our engagement begins with a focus on the desired outcomes for the project and the development of the right process solution and the choice of suitable equipment.

- ✓ Understanding the powder handling and material(s) challenges
- ✓ Understanding what success looks like
- ✓ Understanding the site constraints and desired layouts
- ✓ Understanding compliance requirements
- ✓ Defining the barrier limits
- ✓ Developing budgetary estimates and timelines
- ✓ Developing concept layouts

Applying our expertise to guide concept through to reality

Next, we make our commitment to better powder handling a reality. We carefully guide our project through Design, Engineering, Manufacturing, QA/QC, and FAT. Our project teams work directly with the client or EPC/M to deliver the project management and data documentation requirements, including:

- ✓ Project management
- ✓ Risk analysis
- ✓ EX concepts and compliance
- ✓ Engineering drawings
- ✓ QA qualification and validation
- ✓ FAT, performance testing, installation and commissioning documentation
- ✓ IOMM and maintenance packages
- ✓ Installation, commissioning, training and site supervision

Global support and expertise

Local support anywhere in the world and fast intervention are key requirements for the reliable, safe, and economic operation of your process line, but our services go well beyond this.

Multilingual training and knowledge transfer allow the efficient use of our equipment. Machine and process line modernisation are done in accordance with new requirements. We are also able to deliver suitable spare parts, as required.

Reliable, after sales support

- ✓ On-time startup of new installations
- ✓ Emergency intervention
- ✓ Preventive maintenance to reduce unexpected downtime
- ✓ Maintenance agreements
- ✓ On-demand service and maintenance
- ✓ Detailed reports on interventions



Get in touch with us

Where to find us

Floveyor is headquartered in Western Australia and has an office in New Zealand.

Perth

enquiries@floveyor.com
+61 (08) 9378 3333
6 Alice Street Bayswater
Western Australia 6053
ABN 14 114 153 927

New Zealand

nz@floveyor.com
+64 27 839 6353
PO Box 59023
Māngere Bridge
Auckland 2151

FLOVEYOR.COM