

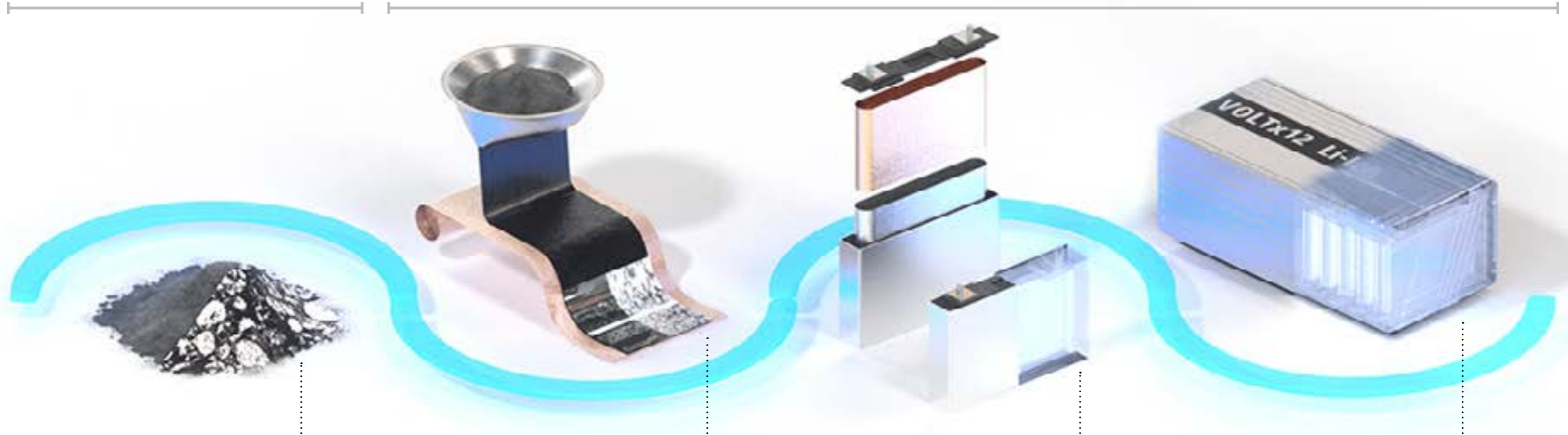
Quality Assurance for Battery Production

Batteries play an important role in the performance, range, and longevity of an electric car. Safety, service life, performance, and cost are essential to ensuring the success of battery technologies. These factors need to be addressed every step of the way, from R&D, quality control, and production to the processing of raw materials and the assembly of battery modules.

See below for a brief overview of the six quality gates that must be navigated during the development and production process. Further details can be found in the comprehensive focus brochure entitled [Battery Production Deep Dive](#).

Quality gates and solutions:
Battery Development

Quality gates and solutions:
Battery Production



Material Development and Structure Development

- The microscopic structure of the materials used, the chemical composition of particles, and the presence of impurities have a major influence on the performance of the cell
- Safe and efficient cell sample preparation and analytical solutions are needed to ensure the quality of the cell structure
- The original state of the cell structure must also be analyzed without disassembling the cell

Raw Material Processing and Electrode Production

- Visualizing and checking the microstructure of the raw material and the chemical element ratio of cathode particles is crucial to avoiding battery failure, as is the purity of anode particles
- Technical cleanliness
- Prevent particle contamination
- Electrodes are cut during production. The blade cutter may cause metal burrs that impair the performance of the batteries. It is therefore crucial to detect the ideal time for changing the blade so as to balance quality and cost

Cell Production

- Avoid safety hazards and subsequent waste by checking the alignment and position of electrodes in the cell and by checking for internal cell defects
- Given the speed of cell production and potential safety risks, quick inspection cycles with high resolution are required

Module Assembly

- The final check of the complete battery module represents a key challenge in the quality process
- Typical defects including metal contamination, overhang, and electrode misalignment demand high-performance systems, as do the size and density of the module itself



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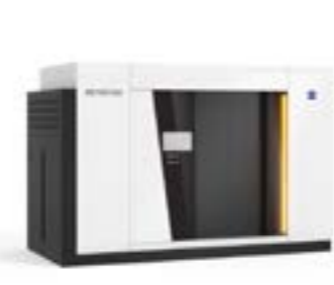
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