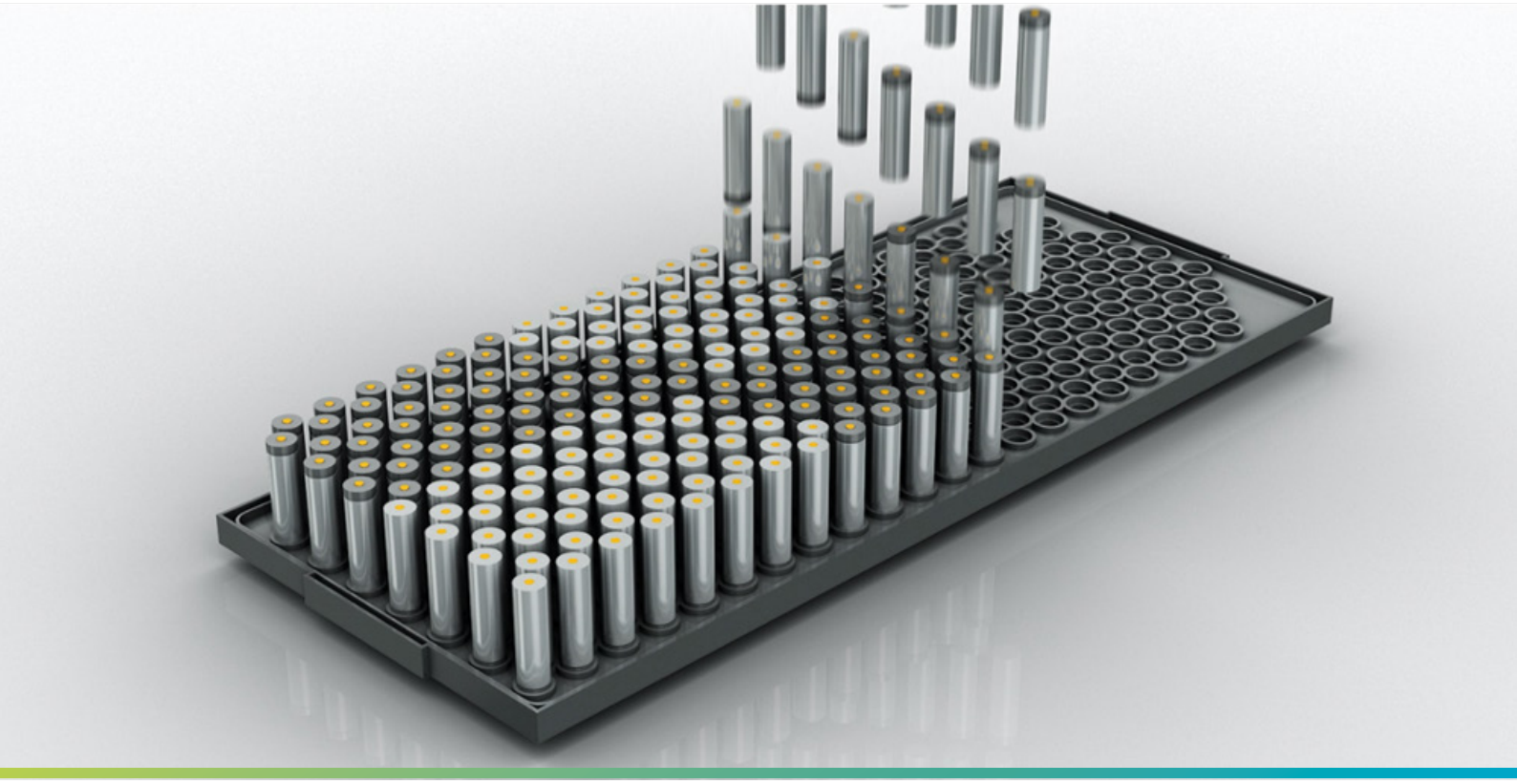
EV battery manufacturing

Efficiently manufacture high quality, cost-effective cells



The heart of any electric vehicle is the battery. Batteries are the single most expensive part of an EV, accounting for about 30% of the total cost to consumers and require a minimum eight-year warranty. Batteries must be engineered, simulated, manufactured, and rigorously tested for safety, quality, reliability, performance, and range. OEMs take these matters seriously, as these factors will determine the success of the EV.

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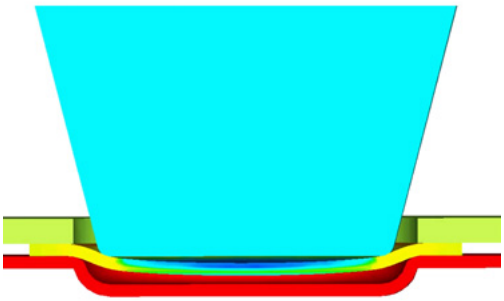
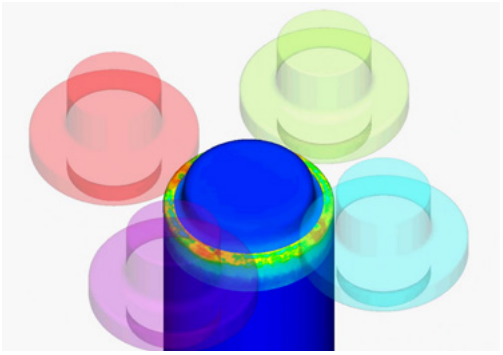
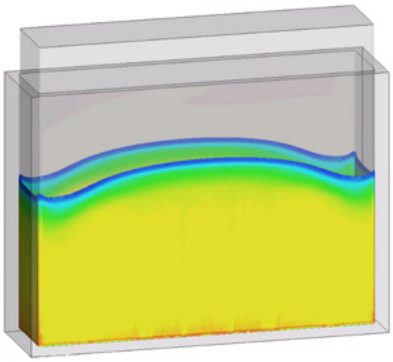
Lithium-ion batteries are composed of four main components cathode, anode, electrolyte, and separator rolled into thin layers of substrate and assembled as cylindrical or prismatic/pouch style batteries. The rigid cylindrical or rectangular casing houses the battery to protect the fragile component from debris or impingement and account for cathode/anode/separator stack and housing tolerance stack-up issues.

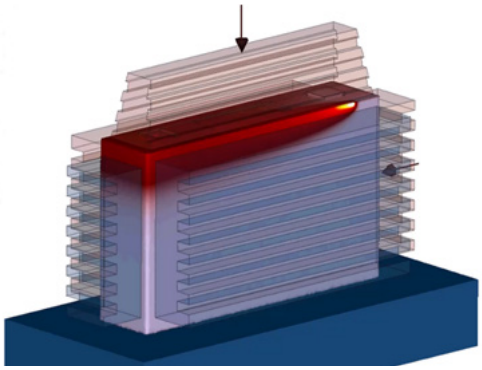
Manufacturing process simulation, material costing, and manufacturing feasibility risk assessment are studied, optimized, and validated with Hexagon's FormingSuite and Simufact Forming technology. The enclosure is a lightweight stamped or extruded rigid case that provides structure and protection from temperature, shock, vibration, dust, air, and water. The outer case must mechanically withstand the internal pressures (swelling) due to the cyclical charge/discharge process and achieve final assembly tolerance requirements (±20 to 50µm).





Cylindrical battery case manufacturing





Prismatic battery case manufacturing

Simufact Welding and Simufact Joining enable the adaption of different joining technologies that influence the central characteristics of the battery pack in terms of battery performance, capacity, and lifetime. Joining techniques include laser welding, and resistance welding, friction spot welding, force fitting, and soldering. Manufacturing simulation accounts for pre-stressed from forming/extruding and accurately predicts distortions due to welding. The selection of joining technology requires consideration of electrical/mechanical properties and an assessment of production and operational conditions.

Hexagon offers more than 30-years of experience developing leading technology, supporting OEMs, start-up EV companies, and Tier 1 suppliers in manufacturing. Our manufacturing simulation software delivers higher efficiency, repeatability, increased quality, safety, and shorter development cycle time while reducing your production costs. Hexagon supports all aspects of your EV battery cell and packs from design, engineering, manufacturing, and quality inspection to enhance your world-class operations.

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