Detroit Engineered products (DEP), is an engineering services, product development, software development, consulting and talent acquisition company. Since its inception in 1998 in Troy, USA, DEP is now a global company with footprints in Europe, China, Korea, Japan, and India. DEP uses the accelerated and transformed product development process, accomplished by utilizing our proprietary platform, DEP MeshWorks, which rapidly reduces the development time of products for all segments. The MeshWorks platform delivers tool sets that accelerate virtual validation activities associated with powertrain development across all stages for both conventional and electric powertrain.

The demand for safe, reliable & high performing batteries have never been so high. With the world moving closer to more affordable and eco-friendly electric vehicles, manufacturers are looking for batteries with high energy and power density, increased safety and long life span at a minimum weight, least size and an affordable cost. DEP, with our advanced battery design & development solutions, help customers to design batteries with optimal power-to-weight ratios, specific energy and density; that can efficiently power the vehicle and its array of supporting electronic systems. As pioneers in the auto industry, we designed techniques that achieve safety and performance goals at reduced developmental costs. Our multi-disciplinary approach for the battery product development, aids customers modeling the effects of the design on battery's safety, performance, capacity & durability. Our expertise covers complex assembly factors by connecting the engineering, manufacturing & quality aspects.

DEP's battery design solutions are based on a holistic approach. It integrates the electro-chemical, mechanical, electrical, controls and software aspects of the design. Our team has extensive expertise in thermal management systems, and can evaluate requirements starting from battery cooling features to temperature distribution and structural chemistry. Our solutions support manufacturers in every phase of the design & development, helping clients maximizing battery range with more energy dense battery structures. Supported by world-class engineering, state-of-art tools and a wealth of expertise garnered in mobility segment, we are delivering turn-key solutions that promise to usher in a new transportation era.

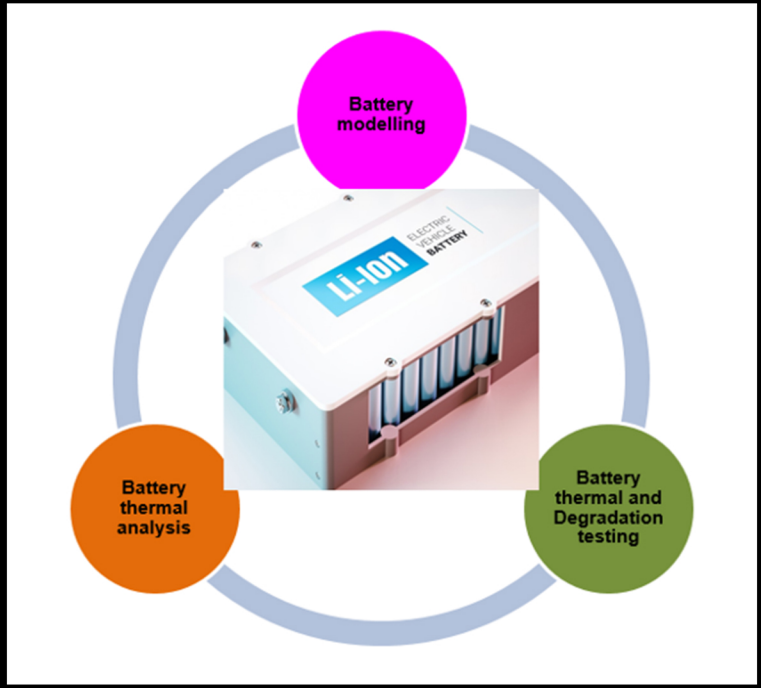
Smarter solutions. Realized.

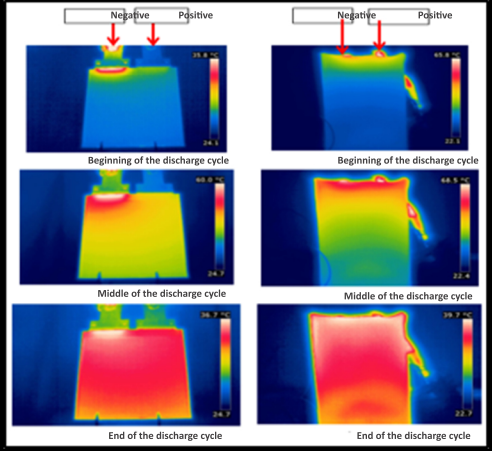
BATTERY SOLUTIONS

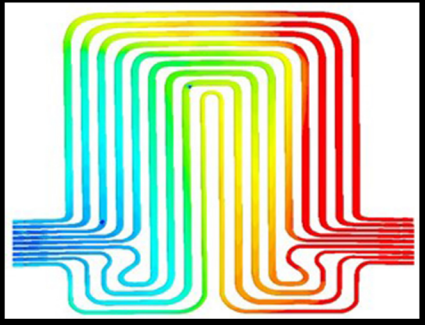
Electrification is the most viable way to achieve clean and efficient transportation that is crucial for the sustainable development of the world. In the near future, Electric Vehicles (EVs) including Hybrid Electric Vehicles (HEVs), Plug-in Hybrid Electric Vehicles (PHEVs), and pure Battery Electric Vehicles (BEVs) will dominate the clean vehicle market. The key enabling technology to this revolutionary change is the batteries.

Extensive research efforts and investments are made in this advanced battery technologies that are used in EVs

The uptake of today's EVs has a lot to do with the advent of Lithium battery technology. Lithium-ion batteries are comparatively lightweight, energy dense and can be recharged.





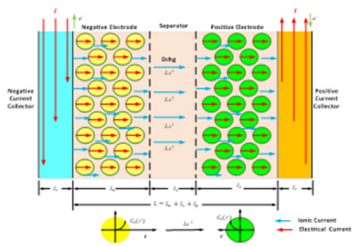


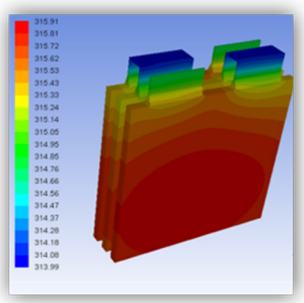
Battery Modeling

- The performance and utility of clean energy mobility models like Hybrid Electric Vehicles (HEVs), Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs) primarily depends on the performance and efficiency of the battery package which is the powerhouse for the above means of transport.

- Usage of battery always leads to heat generation and absorption. Therefore, the design and implementation of a successful thermal analysis phase is extremely important in battery manufacturing. With the precise set of outputs we can measure the impact of every aspect of the battery like raw material used, cell designs and the components that form the design during its performance & life cycle.

- DEP's key capabilities:
  - Battery electrochemical model
  - Battery thermal model
  - CFD model
  - Battery degradation model



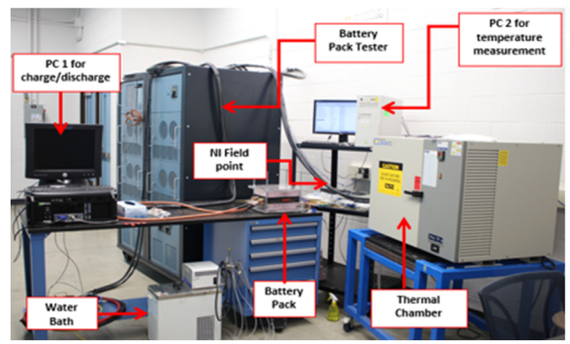


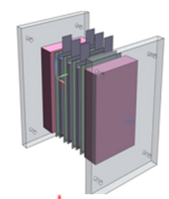
Battery Thermal Testing

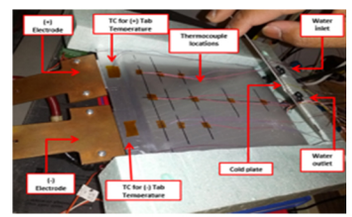
- The apparatus can measure the surface temperature distribution i.e the heat flux near the cathode, the anode, and at the center of the pouch cell along the height of the pouch cell. Also, it measures the heat rejection to the dual cold plates under varied discharge rates with different boundary conditions. All readings are taken for various charge/discharge profile, from several types of batteries with diverse chemistry.

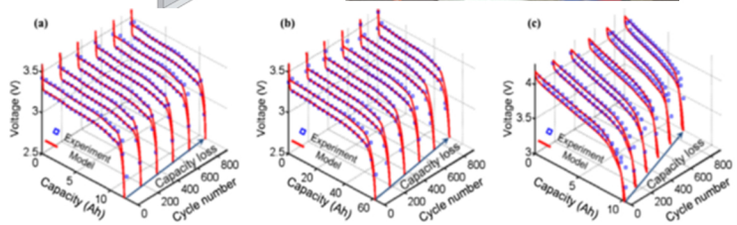
- The IR imaging will visually observe and report the locations of highest heat generation and temperature distribution.

- The effect of discharge rates and operating temperature on the battery discharge capacity can also be determined as a result of thermal testing.









Battery Thermal Analysis

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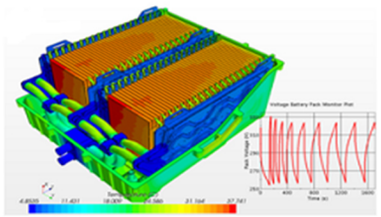
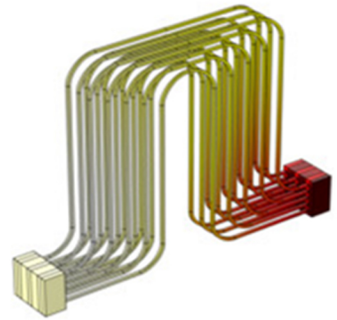
- DEP's key capabilities:
  – Thermal abuses (over current)
  – Pressure drop and Full CHT
  – Sensing circuit analysis
  – 1D AMESIM model for system simulation





Coolant channels

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