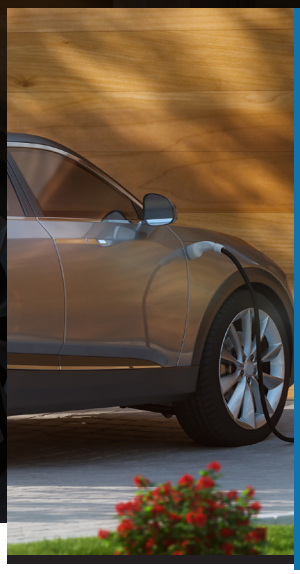
CASE STUDY

Battery Testing for High-Amperage Solutions

In the electric vehicle (EV) industry, the next innovation is often just around the corner. Consider how much has changed in the last decade. What was once a niche market has now expanded to include nearly every major automotive manufacturer in the world, not to mention an influx of startups, thanks to consumer demand, legislative pressure, and a desire to reduce carbon emissions.



The Project at a Glance

THE COMPANY
Electric Vehicle Manufacturer

THE CHALLENGE
Build a test chamber that can accommodate high-amperage (1000 Amps) batteries

KEY CAPABILITIES OF AES:
- Collaboration to understand the request and construct a plan
- Engineering to build chambers for high-amperage battery testing
- Expertise to advise on the layout of labs, power requirements, supply chain challenges, and more
- Iterative designs and cutting-edge technology

EVs aren't just fit for consumer use. There's a trend in building them bigger (SUVs and pickup trucks, but also public transit, shipping, construction vehicles, and more) and better.

Although the entire design of vehicles is optimized, one part in particular drives the future of the industry: a fast-charging, lightweight battery.

Read on to find out how Associated Environmental Systems built high-current test chambers to support an EV manufacturer's battery research, development, and production.

THE CHALLENGE: THE SHIFT TO PRISMATIC CELLS

A recent shift has occurred in EV development. Companies have turned their focus from cylindrical cells to lithium-iron-phosphate (LFP) prismatic cells. There are a few reasons for this:

- ✓ LFPs pose less of a threat for battery thermal events (BTEs) than cylindrical cells.
- ✓ They're less expensive to produce.
- ✓ They're lighter and potentially offer a breakthrough for fast-charging, long-lasting EVs, eliminating 'range anxiety' as a result.

One EV manufacturer, with an eye on pickup trucks and SUVs, approached AES seeking a method to test their LFP, prismatic cells at 1000 amps. Testing at such high currents ensures their batteries can withstand difficult, off-road driving (think of powering up an inclined, dirt trail) and can charge quickly.

They currently utilize traditional cylindrical cells in their vehicles with the hopes of improving performance two, three, and four years down the road.

THE SOLUTION: COLLABORATION AND HIGH-AMPERAGE TESTING

In the past, AES's primary battery testing solutions centered on consumer electronics. They built the ATPPRIME chambers and ATPFLEX fixtures to support innovations in mobile phones, tablets, laptops, and the like. Although AES had worked with EV companies before, this particular challenge was unique. They had to take the features of the ATPPRIME—ease of use, organization, and safety—and ramp it up to accommodate high-amperage testing.

Prior to heading to the manufacturing floor, however, AES first set about collaborating with the client. After internal conversations to cultivate ideas, they engaged in bi-weekly meetings and were in touch almost daily to go over all the details of the product. These included discussions about chambers, fixtures, cyclers, and holders but also important considerations that fell outside testing: lab layout, power requirements, supply chain constraints, and more.

AES then built prototypes for the client. They wanted to get a sense of how the holder would work for the prismatic cells and also the spacing in the chambers. In being so thorough, both parties developed a full understanding of the scope of the project and the client received an effective solution: A series of 8-cubic-foot temperature chambers, internally dubbed super 508s, capable of testing batteries up to 1000 amps.

RESULTS: INNOVATION DOESN'T STOP

This company's approach to prismatic cells is emblematic of the industry. What works today can be improved for tomorrow.

The same is true of AES's approach to battery testing solutions. For instance, AES has adjusted the super 508s slightly as the project continues. The initial design required a user to reach into the chamber to connect the battery to the cycler. Now, AES is developing a mechanism that lifts the cell up to make contact with connectors. It will add a level of safety to the chamber and reduce the risk of shorting the system out.

The high-amperage test chambers, initially a custom build, are now standard as part of AES's ATP series. Ideas become conversations which become solutions which inspire innovation. In a market as important (and competitive) as EVs, that methodology can have a world-changing effect.

If you're interested in learning more about high-amperage battery testing, contact Associated Environmental Systems today.