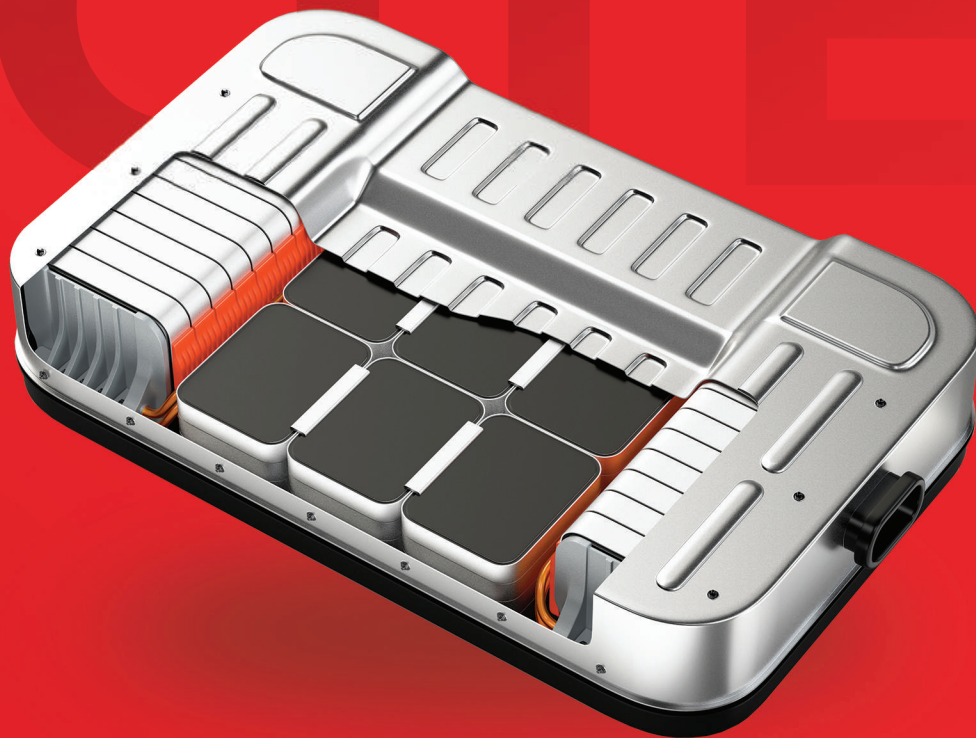


APPLICATION NOTES

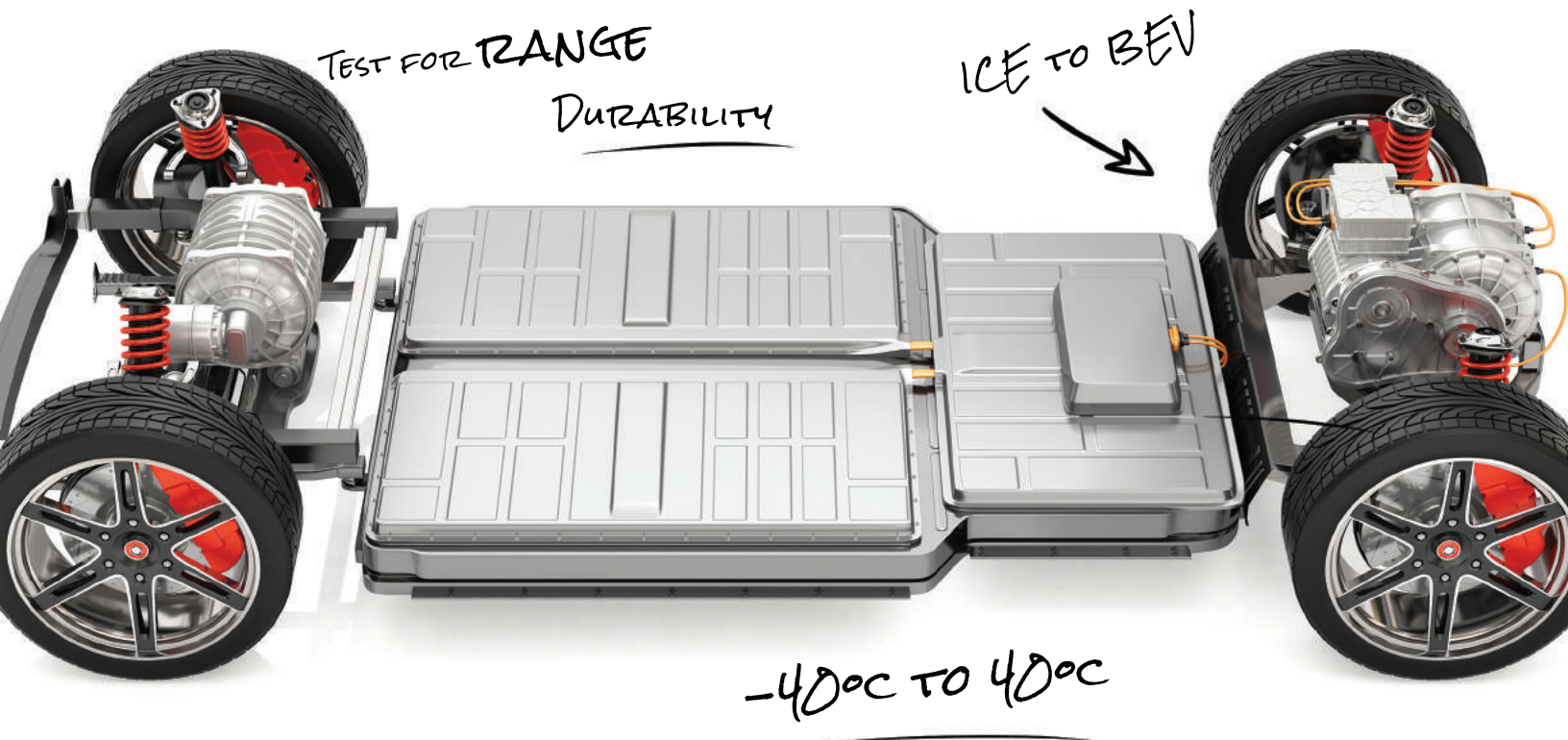


Recirculating Chillers for **Automotive Battery Testing**

Julabo.us
T E M P E R A T U R E C O N T R O L

Accelerating the Need for Battery Testing

The transition from internal combustion engine (ICE) vehicles to hybrid or battery electric vehicles (BEV) in the automotive and transportation industry requires an enormous amount of engineering and testing. National and state governments have enacted emissions restrictions to reduce and eventually eliminate greenhouse gas emissions from ICE vehicles, catalyzing established and start-up vehicle and battery manufacturers to bring BEV products to market. Extensive testing and temperature control are essential to ensure BEV performance, range, and durability.



Application Overview for Automotive Battery Testing

Before market introduction, automotive components undergo thorough lifetime testing to ensure safety, performance, reliability, and longevity. These principles also apply to battery packs in hybrid and BEV vehicles. Testing typically takes place in an environmental chamber, which can rapidly adjust the atmospheric temperature from -40°C to 40°C . When testing liquid-cooled batteries, a recirculating cooler supplies the automotive coolant to the battery, mimicking the vehicle cooling system. Testing of the battery involves various charge/discharge cycles under an array of temperature conditions. The recirculating chiller must have adequate heating and cooling capacity and flow rate/pressure capabilities to simulate actual operational conditions. Additionally, an external control system monitors and records all testing data for analysis.

Challenges & Workflow Optimization

SMALL-VOLUME CIRCULATORS
RESPOND QUICKLY TO CHANGES

60 PSI

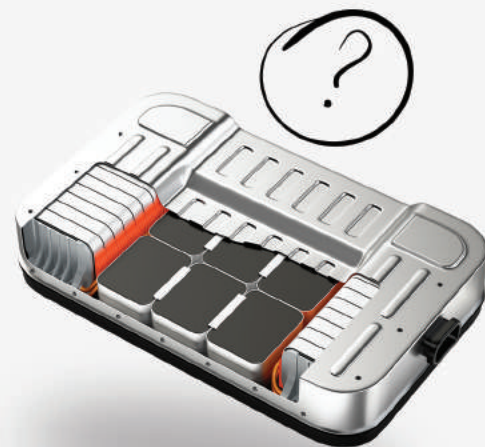
When specifying a recirculating chiller for battery component testing, several factors come into play.

- 1 Required cooling/heating capacity** – the circulator must have the necessary heating/cooling power based on the load requirements of the battery and the testing protocol.
- 2 Time-to-temperature** – an environmental chamber can adjust ambient conditions very quickly, and the circulator must adapt accordingly. Circulators with a small internal fluid volume function work well for this.
- 3 Pressure/flow rate** – depending on the design of the battery, a pressure limit for the automotive coolant will exist. The recirculating chiller must mimic the vehicular coolant pump capabilities; thus, a pump with 60 PSI capability cannot be used. In cases with low-pressure requirements, a circulator with integrated pressure control easily adjusts this parameter. Flow rate also plays an important role. Integration of a by-pass and flow meter on the circulator regulates coolant flow to the desired rate.
- 4 Input/output (I/O)** – The circulator must integrate into the external control software or Programmable Logic Controller (PLC). Battery testing incorporates many variables, including the recirculating chiller. A circulator with multiple I/O facilitates integration into the PLC for automated test operation.

How To Find a Circulator for Battery Testing

Finding the appropriate recirculating chiller for your battery testing application is a science in itself, one that requires careful considerations and calculations. As we mentioned, it's essential to select a chiller with the necessary heating and cooling capacities and pressure and flow rates. You'll also want to consider how the circulator fits into your workflow and whether it has by-pass and flow meter capabilities.

JULABO USA provides personalized product recommendations for the automotive industry to help you determine the optimal unit for your process. If you have questions regarding the proper circulator for battery testing, JULABO can help you find a circulator that meets your testing and communication requirements.



DOWNLOAD APP!

Additionally, the JULABO USA App allows you to find chillers based on your application, including temperature ranges, time-to-temperature, and more.



Chillers & Products for Automotive Battery Testing

The PRESTO highly dynamic temperature control systems work well for battery test procedures. Many automotive manufacturers use the PRESTO daily for battery testing. Single-stage units can operate directly with automotive coolant to the test stand. Cooling capacities range from 1.2 to 25.8 kW and heating from 2.3 to 27 kW. In testing that requires high cooling power at -40 °C, the PRESTO W91 and W92 provide 10.5 kW at -40 °C to a test stand requiring the use of a heat exchanger. The new PRESTO W56x can use water/glycol (40:60) directly in applications with 2.3 kW cooling at -40 °C. All PRESTO units incorporate pressure control with an available remote in-line pressure sensor. For control of flow rate, the PRESTO line has a by-pass accessory and multiple flow meter options. All PRESTO models incorporate remote Pt100 sensor capability with RS232, USB, Ethernet (integrated ModBus), and optional analog communication for integration into external control systems.

40:60 Mix
80 PSI PRESSURE LIMIT
AS LOW AS -40°C →
IDEAL FOR HIGH VISCOSITY APPLICATIONS



PRESTO W56x

► Visit www.JULABO.us for more information!

Conclusion

As BEV production and transportation innovation grows, so will the need for reliable temperature control products. JULABO has in-depth experience working with automotive research and development teams. In addition to battery testing, JULABO products are also used for developing and testing DC/AC converters/inverters, wireless charging systems, clean diesel injection systems, gearbox/bearing testing, solar technologies, and more. JULABO provides highly advanced temperature control for chamber tests, component/material testing, and environmental simulations.

For personalized product recommendations and application assistance, please reach out to JULABO USA directly:



sales@julabo.us



(610) 231-0250