

# Cooling fins help keep Chevrolet volt battery at ideal temperature

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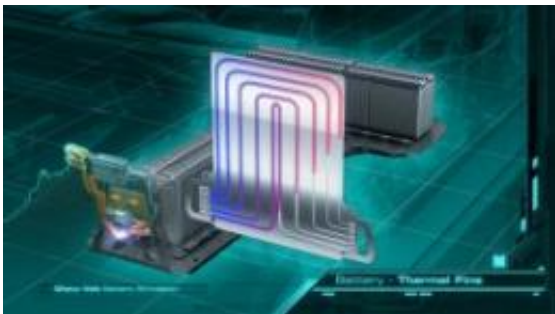
Engineers of the four-seat Chevrolet Volt electric car often refer to its 435-pound battery pack as the fifth passenger. Given the care taken to keep the pack at just the right temperature in all temperature conditions, there is a lot of truth to that.

The Volt's ability to operate gasoline-free on a day-to-day basis and carry an eight-year/100,000-mile [battery](#) warranty is due to active thermal management of the advanced lithium ion battery pack.

“Every battery has a temperature sweet spot where it provides the optimal blend of power output, energy capacity and long life and we keep the Volt right on that target,” said Bill Wallace, General Motors

director of Global Battery Systems. Batteries that are too cold are reluctant to release electrons while batteries that run too hot can see a significantly shorter life.

The Volt's T-shaped battery pack consists of 288 individual cells arranged into nine modules. Plastic frames hold pairs of lithium-ion cells that sandwich an aluminum cooling fin. The design and construction of that aluminum plate is critical to ensuring an even temperature distribution with no hot or cool spots across the flat, rectangular cell. The battery pack has its own cooling circuit that is similar to, but independent from, the engine cooling system.



The Dana Corp-manufactured cooling fin consists of two lightweight aluminum plates joined by a proprietary clean nickel-brazing process. The carefully designed grooves stamped into the plates form channels that allow battery coolant that is pumped through the pack to flow over the entire cell surface.

“Three different systems are used to regulate the temperature of the coolant,” said Wallace. “When the Volt is plugged in and charging in cold weather, an electric heater at the front of the battery pack is used to

warm the coolant and pre-heat the battery. During normal operations, the coolant is passed through a heat exchanger at the front of the car, while a chiller in the air conditioning circuit can be used to dissipate heat from the battery when temperatures really climb.”

The management system monitors feedback from 16 thermal sensors arranged throughout the [battery pack](#) to maintain a spread of no more than 2 degrees centigrade from the optimal temperature across the pack.

Getting the battery temperature just right was a product of lessons learned from the EV1 and 15 years of testing fuel cell stacks. GM engineers and researchers learned a lot about how to circulate coolant to maintain an even temperature distribution. Those learnings went straight into the cooling system of the Volt battery.

Source: General Motors

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