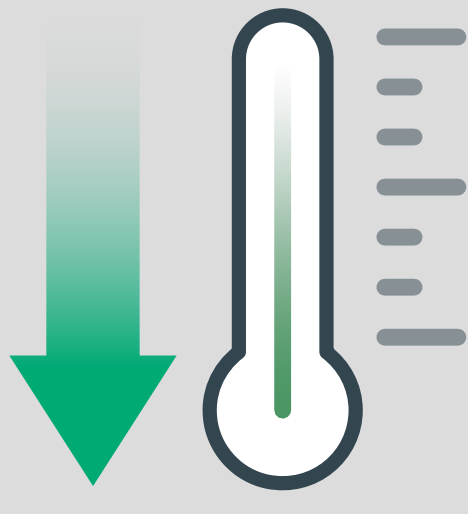


THE ROAD TO NET-ZERO:

How advanced materials make better EV batteries possible

The race to adopt EVs is on, and batteries will play the central role. But there are numerous engineering roadblocks that only advanced materials can overcome.

Roadblock #1: Heat



Advanced Solution: GAP FILLERS AND THERMAL ADHESIVES

How:

Provide mechanical support and transfer heat away from critical areas, so batteries last longer and charge faster.

>50% of overall battery life is determined by thermal management.

1,100°C
Henkel coatings can provide fire resistance at this temperature for up to 10 minutes.

14% of greenhouse gas emissions are from transportation.¹

4.6 metric tons of CO₂ are emitted each year by a typical passenger vehicle with an internal combustion engine.²

Roadblock #2: Safety



Advanced Solution: FOAMS AND FIRE PROTECTION COATINGS

How:

Two-component epoxy technology and foams safeguard EV operations and prevent thermal chain reactions.

Roadblock #3: Weight



Advanced Solution: LIGHTWEIGHT GASKETING AND ADHESIVES

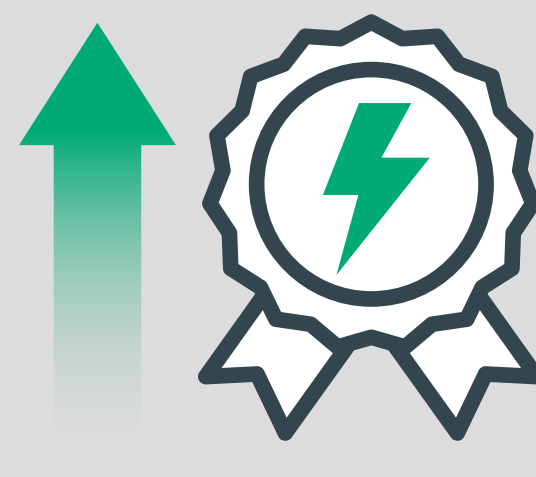
How:

Tailored chemical formulations replace heavier mechanical closure options, extending EV range while elevating production automation.

EV models can weigh **1,000–1,600 POUNDS** more than their ICE counterparts.³

30 MINUTES–12 HOURS
is the wide range of time it takes to charge the average EV battery.

Roadblock #4: Subpar Charging



Advanced Solution: ELECTRODE CONDUCTIVE COATINGS

How:

Conductive coatings reduce internal electrical resistance and increase adhesion to the cathode, significantly improving the battery cell's charging performance.

DRIVING INNOVATION TOGETHER

Henkel collaborates with manufacturers to accelerate EV adoption, leveraging deep expertise in advanced materials for EVs.

Learn more about the future of EV advanced materials

by reading our exclusive white paper, "Beneath the Battery: How Advanced Materials Enhance EV Battery Design and Production."

1. EPA.gov, "Global Greenhouse Gas Emissions Data," accessed September 23, 2022, <https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>

2. EPA.gov, "Greenhouse Gas Emissions from a Typical Passenger Vehicle," March 2018, <https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle>

3. Fox News, "Heavy: The GMC Hummer EV's battery weighs more than some cars," February 16, 2022, <https://www.foxnews.com/auto/the-electric-gmc-hummer-evs-battery-weighs-more-than-some-cars>