



Testing Matters

TÜV SÜD New Energy Vehicle (NEV) Labs
We support you in ensuring the safety
and performance of electric vehicles.



Add Value.
Inspire Trust.

TÜV SÜD at a glance:



15,000+

technical
experts



150+

years of safety,
security & sustainability



1,000+

locations
worldwide



30,000

TÜV SÜD
employees



€2.9

billion in
annual revenue



100 %

independent
& impartial

TÜV SÜD global experts are committed to helping you manage risks and access global markets through a comprehensive portfolio of technical solutions

TÜV SÜD Services for Electric Vehicles Manufacturers



Global Market Access

- Identify and evaluate regulations and standards that are applicable in target countries
- Guidance on application documentation and completion



Testing

- Reliable and comprehensive worldwide Lab Network
- Testing against applicable technical standards and national deviations



Certification

- Worldwide type approval of all EV batteries, systems and components
- Listed Technical Service at all major Authorities worldwide



Auditing

- Support of ongoing certificate maintenance and market surveillance requirements
- In Service Conformity and market surveillance services
- Conformity of Production



Training

- TÜV SÜD Academy is one of the leading global providers of professional training and development. We provide effective training programs for individuals or organizations
- We offer expert-led training in high voltage (HV) aimed at any employee working for companies dealing with HV systems in cars and other motor vehicles.
- Learn your way: We offer flexibility to learn in the way that works best for you. Our training programs are available to customers in various formats, so you can choose a delivery method that suits you: Public Instructor-led, In-house, self-paced courses. Learn more here: tuvsud.com/en-us/store/academy-us



Testing Capabilities

North American leader in EV Battery Testing since 2009.

EV and ESS Battery Testing

- Cell / Module / Pack
- Safety / Abuse
- Performance / Life Cycle
- All Global Standards
- 1200V / 1000A / 1100 kW

EMC Testing

- ESA + Subsystem + Vehicle
- 3m / CISPR chambers
- 10m Chamber + Dyno
- High Voltage Capable
- E-Marking

Environmental Testing

- Vibration / MAST
- Temperature + Humidity
- Electrical / Electronic Testing
- NDT and X-Ray Analysis

BSR - NVH - Vehicle Quality Experts

- Mobile Environmental 4 - poster
- Vehicle analysis for BSR and wind noise
- Driver services
- Vehicle and system prep and analysis



“We’ve been testing batteries in North America since 2009. Combined with our Auburn NEV (New Energy Vehicle) Lab, our Plymouth EMC Lab, New Brighton, and Newmarket, Ontario, we are the leaders in battery and abuse testing and the most experienced and capable testing Lab in North America and Canada.”

– Jonathan Drew | Head of Transportation for
TÜV SÜD North America

At TÜV SÜD, we are committed to delivering the highest quality and performance in our EV battery and system solutions.

We recognize the importance of safety and reliability in these systems through product development and validation, and that's why we used the combined experience from our North America, European, and Asian battery labs to develop the most capable independent battery test lab in North America.

We recently opened our state-of-the-art testing lab in Auburn Hills, Michigan.



Unique Lab Equipment

We're equipped to handle all aspects of testing battery performance and safety ourselves. With our Plymouth Lab, we can conduct high voltage EMC testing and assess battery management systems (BMS). This means we can support you from the design phase through safety testing and beyond. We collaborate closely with our customers, providing tailored support and expert advice every step of the way.

- UL9540A cell level testing services - fully accredited and equipped to evaluate your ESS against all applicable standards
- High-power battery cyclers: up to 1200V, 200A, 1100kW
- Full environmental scrubber system for all safety/abuse chambers
- Five (5) safety/abuse bunkers, all indoors, steel-reinforced concrete – unique in Detroit for the quantity of chambers
- Can do full fire testing indoors in the bunkers
- Battery crush up to 1 MN
- 350kN vibration table – for large scale capabilities
- Electric MAST table (Multi-Axial Simulation Table) for 6-degrees of freedom testing – faster response, higher frequency, quieter, more efficient than any other on the market. Can support EV battery specifically but also seats, instrument panels, etc.
- Can handle battery performance AND safety/abuse testing in-house
- Coupled with Plymouth Lab able to run high-voltage EMC testing on battery & BMS (battery management systems) – offer the complete solution in the USA



UL9450A Cell Level Testing Capabilities:

TÜV SÜD offer specialized UL 9540A cell level testing services. Our capabilities include:

- Flammability characterization tests
- Cell failure tests in pressure vessels
- Analysis of combustible gases

TÜV SÜD's testing laboratories are A2LA and ISO/IEC 17025-accredited and are fully equipped to evaluate your ESS against the requirements of all applicable standards, including NFPA 70, NFPA 855, UL 9540, UL 9540A, UL 1973, UL 1642, UL 2580, UL 2271 and IEC 62619.

Our broad expertise, combined with global support, provides a single source solution to ESS producers, suppliers, and end users.



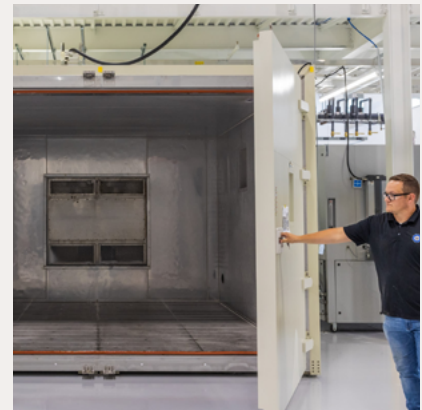
High-power battery cyclers:

1MW High-Power Battery Cyclers:
Up to 1200V, 200A, 1100kW.



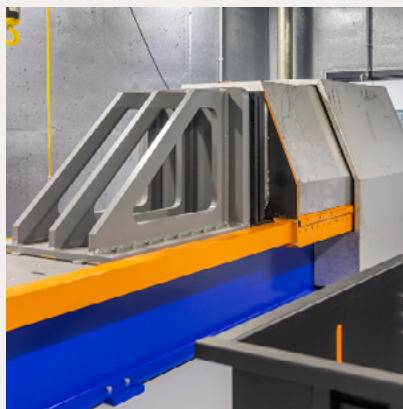
Full environmental scrubber system for all safety/abuse chambers:

Prevents harmful toxins from going into the atmosphere after testing.



Battery crush up to 1 MN:

Battery crushers simulate accidents or abuse on batteries to test their safety. They apply mechanical force to see if batteries can withstand damage and prevent hazards like short circuits or leaks. These tests are crucial for ensuring automotive batteries meet safety standards for vehicles.



Safety / Abuse Bunkers:

Five (5) safety/abuse bunkers, all indoors, steel-reinforced concrete – unique in Detroit for the quantity of chambers.

Full-scale vehicle fire testing.

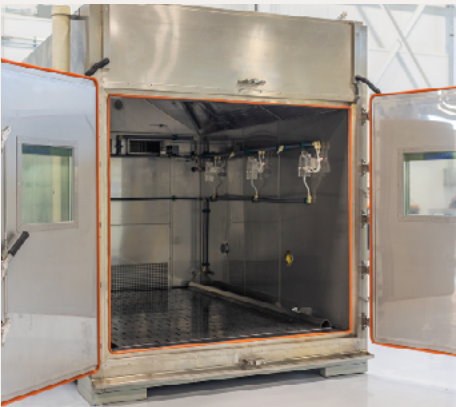
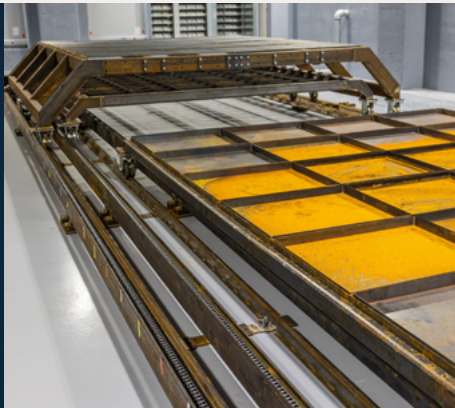


Reach-In Environmental Chambers:

These chambers are designed to simulate and control temperature, humidity, pressure, light, and other environmental factors in order to assess how a product or material will perform under different conditions before being deployed in real-world scenarios.

Fire Testing Rig:

For performing UNECE R100 Section 6.5 EV battery fire resistance test and UNECE R34 Annex 5.5 plastic fuel tank fire resistance test. We supply all the compliance paperwork and offer a full service, from inspection to certification, for our customers.



Walk-in corrosion chambers:

Sized and rated for batteries with interior dimensions of 6.5ft x 10 ft x 6.5 ft (2000mm x 3000mm x 2000mm).



Walk-in Altitude Chambers:

Interior dimensions 6.5ft x 10ft x 6ft (2000mm x 3000mm x 1800mm). A walk-in altitude chamber, also known as an altitude simulation chamber or hypobaric chamber, is a specialized type of walk-in environmental chamber designed to replicate the reduced atmospheric pressure conditions experienced at higher altitudes.

350kN vibration table:

350kN vibration table with a vast AGREE chamber, TÜV SÜD can now handle the vibration requirements of the entire range of EV battery pack sizes in the industry for large scale capabilities.



X-ray / CT Scanning capabilities:

High power microscope/camera for sectioning/mounting/measuring/analyzing failures.



MAST table:

Electric MAST table (Multi-Axial Simulation Table) for 6-degrees of freedom testing – faster response, higher frequency, quieter, more efficient than any other on the market. Can support EV battery specifically but also seats, instrument panels, etc.



mCrest:

The mobile Combined Road Environmental Simulation Testing (m-CREST) unit is a fully transportable vehicle 4-Poster utilizing Servo Electric Actuators (SEA) with an enclosed environmental chamber.



We can handle battery performance AND safety/abuse testing in-house. Coupled with Plymouth Lab able to run high-voltage EMC testing on battery & BMS (battery management systems) we offer the complete solution in the USA for your Automotive Testing needs.



Our Electromagnetic Compatibility (EMC) testing solutions



Our global laboratories have the capabilities to conduct a comprehensive range of EMC tests and provide you with EMC certifications. Depending on your product, this may include:

- Antenna immunity to RF voltage
- Antenna input immunity
- Antenna screening effectiveness
- Conducted disturbances immunity
- Conducted emissions (continuous and discontinuous interference)
- Electrostatic discharge (ESD) immunity
- Electrical disturbances from conduction and coupling immunity for vehicles
- Electrical fast transient / burst immunity
- Harmonic current emission
- Harmonics and interharmonics immunity
- Immunity from radiated fields
- On-site EMC testing
- Power frequency magnetic field / oscillatory waves immunity
- Power interference
- Power supply conditioning
- Radiated emissions
- Radiated field immunity
- Voltage fluctuation / flicker
- Voltage surge immunity
- Voltage dips / interruptions immunity
- Magnetic field measurement (EMF)
- Electric field measurement (EMF)
- Electromagnetic field measurement (EMF)
- Induced current density due to the electric field (EMF for lightning equipment)

EMC Testing Solutions and Capabilities



Communication

DIN SPEC 70121	Digital communication for DC charging stations
ISO 15118 series of standards	Vehicle to grid communication interface
OCPP 1.5 / 1.6 / 2.0	Open charge point protocol
GB / T 27930	Digital communication for DC charging stations



Connectors and other components (examples)

IEC / EN 62196 series of standards	Charging couplers
SAE J 1772	Charging couplers
UL 2251	Charging couplers
GB / T 20234 series of standards	Charging couplers
IEC 62955	RDC-DD for Mode 3 chargers
IEC / EN 62477-1	Power electronic converter systems



Grid connection guidelines

EN 50549-1 and 2	European grid code standard
VDE-AR-N 4100, 4105 and 4110	Grid connection guidelines for Germany
CEI 0-16 and 0-21	Grid connection guidelines for Italy



For automotive OEMs and suppliers; we provide end to end solutions throughout the entire automotive value chain

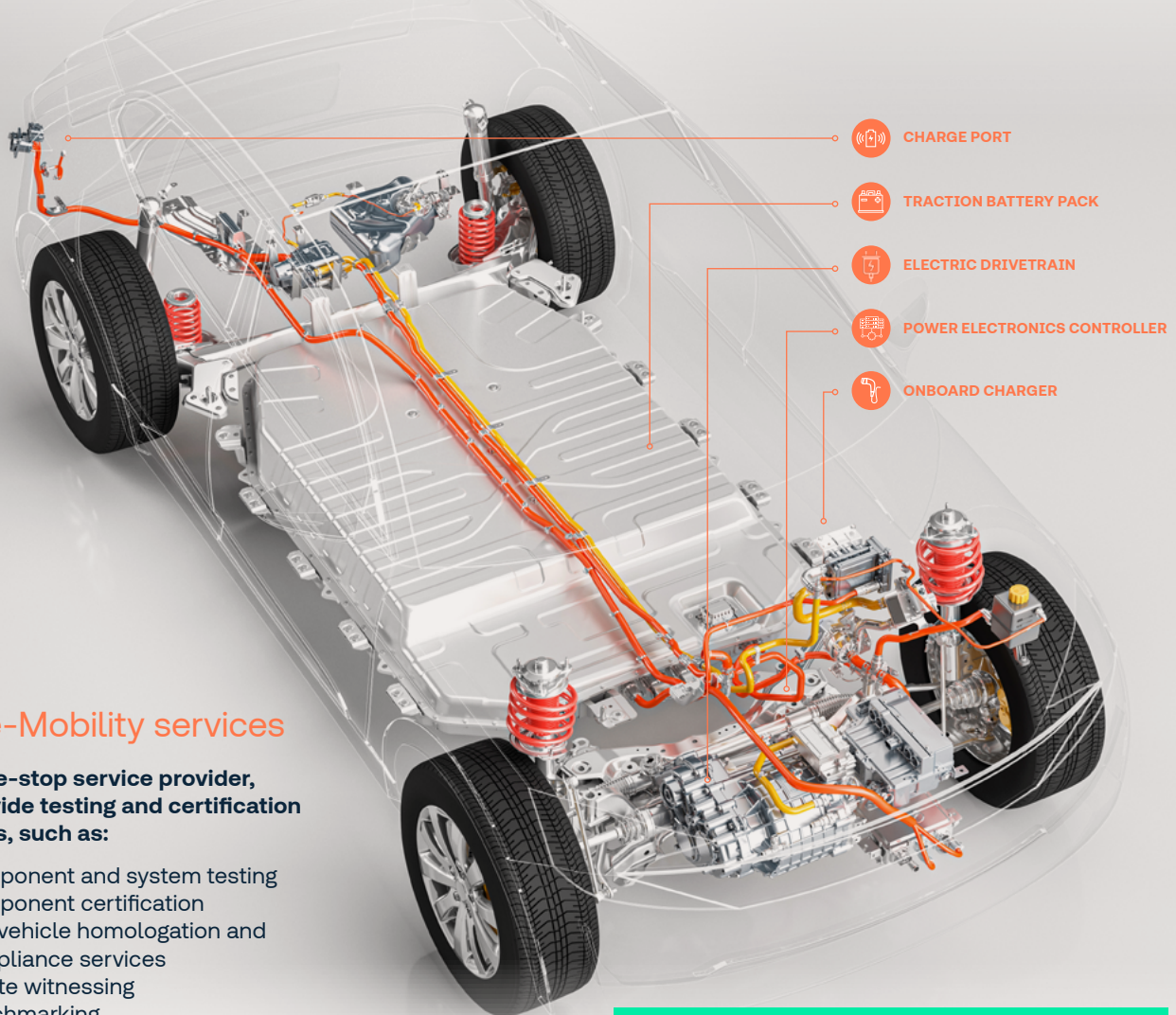


In addition, TÜV SÜD provides IATF 16949 Certification. Developed by the International Automotive Task Force (IATF), IATF 16949 is a globally recognized quality management system (QMS) standard designed for the automotive industry. It is based on the ISO 9001 standard and covers various aspects of quality management, including product development, manufacturing, and customer satisfaction. The standard aims to establish a common quality framework and ensure consistency and continual improvement in the automotive supply chain. Automotive manufacturers often require compliance with this standard as a condition of doing business. At TÜV SÜD, we provide expert IATF 16949 certification services to help automotive suppliers meet the rigorous quality requirements of the industry and gain a competitive advantage.

Your one-stop service provider for all your e-Mobility needs

Our holistic approach to electric vehicles

At TÜV SÜD, we see mobility as a system – one that requires a systemic view and a sound understanding of all regulations to ensure overall safety. To fully support you along the value chain, TÜV SÜD is your one-stop service partner for all your e-Mobility needs – from production facility audits, functional safety assessments, global market access, to full vehicle and component testing, certification, homologation, and training.



Our e-Mobility services

As a one-stop service provider, we provide testing and certification services, such as:

- Component and system testing
- Component certification
- Full-vehicle homologation and compliance services
- Onsite witnessing
- Benchmarking.

We provide those services for various components and advanced energy storage devices and systems for all types of vehicles. This includes:

- Secondary batteries
- Battery units
- Supercapacitors
- Inverters
- Electric motors
- Charging units
- Other electric vehicle components and systems

Our experts work closely with you to ensure:



Quality



Performance



Safety

Full-vehicle homologation and compliance services

We support you with your highly automated driving technologies, functional safety, cybersecurity and homologation process

With the widespread use of electric vehicles and the deployment of electric drive trains the development and validation processes in the automotive industry have changed fundamentally. Combined with control units and permanent monitoring devices, intelligent software solutions have taken over a significant portion of the overall safety and security of vehicles. TÜV SÜD offers a wide range of services around ISO 26262 requirements in terms of training, advisory and review. Right from the beginning, we support you in the preparation for type approval to bring your vehicles and / or systems to global markets.



Achieve a smooth roll out of your automated technologies

- We provide a network of more than 40 experts in the field of highly automated driving and ADAS based in Germany, Czech Republic, Singapore, USA, Korea and China
- ALKS type approval and AV permit for AV piloting
- Assessment of automated vehicles with scenario-based testing – combination of virtual simulation, test track and public road testing



Ensure functional safety & cybersecurity of your future connected vehicles

- Automotive functional safety services according to ISO 26262
- Cybersecurity assessment for automotive components, for connected and automated vehicles, cybersecurity management systems and software updates
- Safety Of The Intended Functionality (SOTIF) training and assessment



Streamline the homologation process for your electric battery vehicles, systems and components

- We provide a network of more than 170 authorised signatories and homologation experts based in Germany, Czech Republic, China, Japan, Korea, Turkey, USA and India
- International homologation services for e-mobility including emissions and EV endurance testing
- Retrofit approvals for prototypes and serial vehicles
- ECE/EC, FMVSS/CMVSS, KMVSS, GOST, ADR, VSTD, KC Mark, OTTC, INMETRO, TRIAS, CMVR, CCC Mark (GB-Standards) etc.



Ensure active & passive safety of your vehicles

- We provide a network of more than 35 experts based in Germany, Czech Republic, USA, Korea and China
- Physical crash simulations of frontal, rear and side impacts, EuroNCAP tests, component tests (airbags, seats, roof racks, etc.)

Are you interested to learn more about these topics? Explore our [training courses](#) focused on the automotive industry and start acquiring skills to help you advance in your career!

Testing is conducted in ISO 17025 accredited labs located strategically in key automotive and transportation markets



Lab:



Automotive



Battery



EMC &
Wireless



Environmental



Hydrogen



Burning
Behaviour



Tires /
Wheels



Passive /
Active Safety



Emission



Mirror



Why Choose TÜV SÜD?

Since 2009, we've led EV battery testing in North America. Our global reach and expertise in battery safety allow us to operate in multiple countries, including the USA, Canada, Germany, China, South Korea, Japan, Thailand, and Singapore. We provide customized solutions and support throughout the process. With over 100 years of global safety and certification experience, we continually expand our capabilities in Michigan to serve our clients better.

"In the next ten years, although internal combustion engines will remain part of the market, the future will be electric. Lithium-ion and new chemistry batteries will continue to drive the EV industry. Solid-state batteries and hydrogen fuel cells are also emerging but will grow more slowly. TÜV SÜD is already working on solutions for these technologies, so we will be ready for whatever comes."

– **Jonathan Drew**, Head of Automotive & Transportation Testing Services, USA

Comprehensive Testing for All Vehicle Types:



Passenger Car and Light Truck



Medium/Heavy Truck & Bus



Aerospace



Powersports & Off-Road Vehicles



Agricultural Vehicles



Marine



Performance Vehicles

Contact us today
to learn more
about our services
for electric vehicles



automotive@tuvsud.com
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