

New EVSE standards

Testing to the SAE Electric Vehicle and Plug-in Hybrid Electric Vehicle Conductive Charge Coupler Standard is set to benefit the further development of eco-friendly vehicles

▶ Following the much-anticipated revision of SAE J1772, the new North American safety standard for PHEV and EV conductive charge couplers, in October 2012, manufacturers from around the world are working hand-in-hand with Intertek's vehicle test engineers to meet the growing demand for innovative EV technology.

SAE J1772 provides critical safety guidelines for charging controls and connectors that are used to charge plug-in vehicles. It was developed to accommodate the latest generation of plug-in vehicles with high-energy batteries. The new Combo coupler combines the interfaces of the existing SAE J1772 AC connector with new direct DC coupling terminals. More plainly, the Combo system must incorporate both the AC and DC output circuits and corresponding communication circuits, as well as use the new-format connector.

Most notably, this standard has reduced charging time from as much as 8 hours to as little as 20 minutes.

SAE J1772 benefits the industry by providing a standard for both AC and DC charging stations, which gives direction to OEMs and certification bodies, as well as guidance on charging infrastructure. But as with any new standard, manufacturers are now faced with the challenge of understanding new safety requirements and their impact on compliance in the USA. However, with the guidance of an experienced testing partner, electric vehicle supply equipment (EVSE) manufacturers can simplify their certification processes and learn to adopt the new harmonized standard. Rich Byczek, technical lead for electric vehicles and energy storage at Intertek, and author of *The Q&A Guide to Electric Vehicle Supply Equipment Certification*



Engineer Nick Van Klompenberg of Intertek tests the safety circuits within an EVSE, using custom-fabricated test fixtures capable of simulating various environmental and fault conditions that may be seen in the real world

in North America, outlines a customizable testing regimen for an application covering primary EVSE standards for AC and DC circuits. The regimen includes: UL Subject 2594 – covers the AC pass-through circuit; UL 2202 – covers the DC charger circuit; and UL 2231-1 and 2231-2 – covering the CCID circuits, and can be separate devices for each AC and DC output circuit.

Fortunately for existing listed AC charge stations, the new standard is backward compatible, meaning that there are no changes needed to comply with the latest SAE standard if the equipment is already using the J1772 AC connector. However, existing listed DC charge stations (CHAdeMO or other) need additional testing to verify continued compliance per the following: if greater than 80A/40kW, change to new combo connector to UL 2251; if less than 80A/40kW, change to the standard J1772 connector to UL 2251.

Additional requirements for existing DC charge stations include an update to the control software,

necessitating a change from CAN interface to PLC communication, with the potential for testing to UL 1998. Similarly, manufacturers need to update their existing UL 2202 certification to include the alternate new-format connector.

Specifically regarding new combo systems, control and power circuits must be evaluated to a combination of UL 2202 and UL Subject 2594; AC and DC CCID circuits must be evaluated to UL 2231-1/-2. However: if DC Level 1 – can maintain the standard J1772 connector, UL 2251; if DC Level 2 – use the new combo connector, UL 2251.

With the advancement of EV technologies and increased acceptance for hybrid and electric vehicles throughout North American consumer markets comes a growing concern over the safe use of EVSE, including charging systems/stations, cord sets, plugs, and ancillary components. A testing and certification laboratory can help ensure that the customer's EV-related products and

components are certified compliant with SAE and UL standards, allowing the customer to stay competitive and accomplish market goals without delays.

Intertek is a nationally recognized testing laboratory in the USA, with more than 50 years of experience in the automotive testing industry. It is one of the first labs to significantly invest in state-of-the-art capabilities across North America, Europe, and Asia for testing EV supply equipment to the following standards: on-board battery chargers – SAE J2894 and UL 2202; charging inlet – SAE J1772 and UL 2251; charging station/cord sets – SAE J2293 and UL Subject 2594; charging plug – SAE J1772 and UL 2251; and personnel protection circuitry – UL 2231-1 and UL 2231-2.

With unsurpassed expertise in helping manufacturers meet national and international standards testing and certification, Intertek can work with manufacturers to cut through the incidentals and provide the critical data they need. Intertek empowers customers to make the choices about testing, approval, and listing that will help drive the product to market more quickly. ☺

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