Electric vehicle charging plug standards

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In December 2023, SAE International published the Technical Information Report (TIR) for J3400, which is an EV charging connector standard based on the North American Charging Standard (NACS) connector. The standardization of NACS as J3400 ensures that any supplier or manufacturer will be able to use, manufacture, or deploy the J3400 connector on electric vehicles (EVs) and at charging stations across North America.

The NACS connector is one of several connector types that enable fast charging of electric vehicles (EVs), in addition to the Combined Charging System (CCS1) and CHAdeMO. NACS can also be used for AC Level 1 and Level 2 charging and is compatible with the J1772 connector for these charging speeds through an adapter.

In May 2023, the Federal Highway Administration (FHWA) published requirements that allow for J3400/NACS adapters to be installed on all federally funded direct-current fast charging (DCFC) chargers as long as there is also a CCS1 connector.

In August 2024, the SAE EV Coupler Task Force voted to establish the J3400 standard as a Recommended Practice, marking a significant step forward in the standardization process. This milestone brings the J3400 standard closer to official publication in a format that can be cited in regulations and used by manufacturers with confidence.

DCFC enables rapid charging of EVs. There are three types of DCFC connectors in the United States:

Most EV models on the market today charge using the CCS1 connector, but most vehicle manufacturers have made commitments to incorporate the J3400 connector beginning in 2025. These companies have also indicated that they will provide J3400 adapters to owners of CCS vehicles beginning in 2024.

When building out EV charging infrastructure, it is helpful to become familiar with industry terminology. The following terms are commonly used:

23 CFR 680 includes the minimum standards and requirements for projects funded under the National Electric Vehicle Infrastructure (NEVI) Formula Program and projects for the construction of publicly accessible EV chargers that are funded with funds made available under Title 23, United States Code.

23 CFR 680 requires that EV charging stations have at least four network-connected charging ports. Each DCFC charging port must be capable of charging any CCS1-compliant vehicle, and each charging port must have a permanently attached CCS1 connector.

Requiring the CCS1 connector on all federally funded EV charging infrastructure ensures that most vehicles on the road today and those coming to market will be able to charge at federally funded stations. The final rule was modified from its original proposal to allow DCFC charging ports to have other "nonproprietary" connectors so long as each DCFC charging port can charge a CCS1-compliant vehicle.

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