

STANDARDIZED EQUIPMENT TO SIMPLIFY RECHARGING

Automobile manufacturers, parts makers, and energy companies are working to determine norms as to the type of electric plugs and outlets that will allow drivers effortless recharging of electric or rechargeable hybrid vehicles at home, at work, or on the street, and without the need of carrying numerous cord types or of experiencing the headache of choosing the proper outlet at charging terminals.

In the matter of connectors on the recharging infrastructure side, for reasons of safety and reliability, Europeans are currently moving toward a **"dedicated" and "specialized" plug** for vehicle recharging, and one therefore differing from the "classic" domestic model. In normal charging mode (3 kW tension), both outlet and plug must have the ability to handle several hours of current at up to 16 Amp, and in addition respond to thermal and mechanical constraints (daily connection and disconnection).

Up to 95% of charging needs will most likely fall into the "normal" category (230 Volt, 16 Ampere, single-phase). Nevertheless, rapid charging remains a necessity, to put novice users at ease, and, if need be, as a back-up.

The French government officially moved to adopt this position on October 1, 2009.

Concurrently, **the question of the universality of plugs and outlets for use on the recharging grid** (charging points at home, at parking facilities, and at street-side terminals) **is of critical importance** on three levels:

- **charging location:** identical connections should be available at home, at parking facilities, and at the roadside.
- **recharging power level:** the plug and outlet must be adapted to handle normal charging as well as rapid charging involving current strengths up to 43 kW and 63 Amp.
- **the country of residence of users in Europe**

The conclusions on the part of **the Franco-German work group** (conducted by *EDF* and *Daimler*), made public by the French government on October 1, 2009 address these issues, and should see Europe become a powerful point of reference in the establishment of future norms worldwide.



The Yazaki plug for electric and rechargeable hybrid vehicles
(Photo : DR)

And finally, there are a number of electric and hybrid rechargeable vehicle connection styles currently on offer. Adapted to handling normal charging tension (230 V, 16 Amp, single-phase), these vehicle-destined plugs and outlets must sustain **rapid charging**, which involves elevated power and current levels (400 Volt, 63 Amp, three-phase). If the U.S. and Japan are leaning toward connectors from the **Yazaki** Corporation, a group of German manufacturers are in favor equipment from **Mennekes**. Not to be outdone, Italy too is proposing a third type of equipment. Evolutions in the CEI 60196-2 norm concerning "vehicle" connectors should bring some clarity to the situation in the coming months.



The Mennekes plug for electric et rechargeable hybrid vehicles
(Photo : DR)

In the run-up to the adoption of standards based on the aforementioned principles, *EDF* has opted, for example, to use **the industrial-strength CEI 60309-2 plug and outlet** (230 Volt, 16 Ampere, single-phase) to equip recharging terminals in homes, workplaces, and at parking facilities involved in its electric and plug-in hybrid rechargeable vehicle testing program in Strasbourg, France.