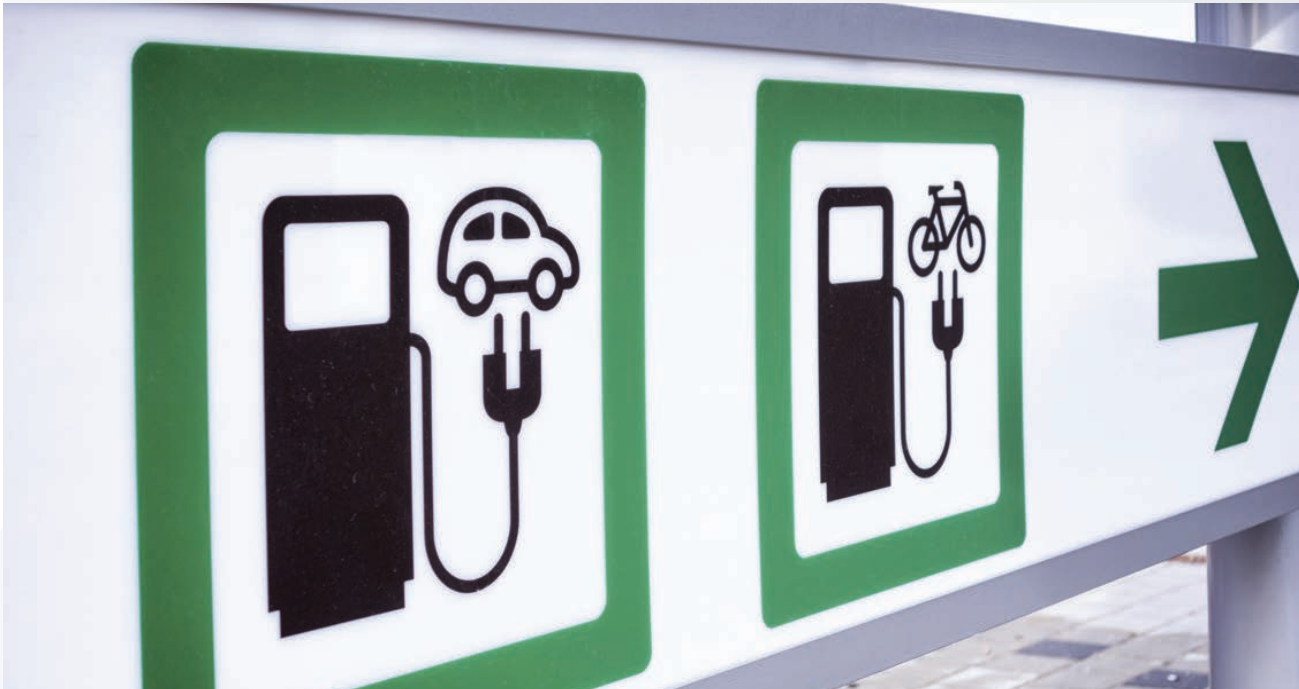




Trinseo Material Solutions for Electrical Vehicle (EV) Charging Stations



Governments worldwide are keen to see **increasing penetration of EVs**

Urbanization, rising fuel costs and the desire to reduce carbon emissions have created a demand for electric transportation as a viable strategy to address these important concerns. Nearly every major automotive OEM has plans to launch an Electrical Vehicle (EV) in the near future, and experts predict EV sales will grow from 2.7million vehicle sales in 2014 to 6.4 million in 2023.

Governments worldwide are keen to see increasing penetration of EVs due to the environmental, economic, and energy security benefits they provide. Regulations have caused automakers to develop and promote plug-in hybrid and battery-powered vehicles with the aim of creating a more sustainable environment.

This has given rise to the need for residential, commercial and public charging stations. After all, recharging a vehicle needs to occur everywhere life happens - at home, at work, and during travel and commute. Manufacturers worldwide are accommodating this demand and developing innovative equipment to fulfill the need to make battery charging convenient and accessible.

Supporting this Evolution is Trinseo, which offers a portfolio of plastics that has long been in demand for automotive, electrical and utility smart meter applications. Trinseo's broad plastics offering in polycarbonate and polycarbonate blends delivers solutions for EV charging stations for both indoor and outdoor use.

Material Solutions

Trinseo materials for EV charging station applications range from plastics developed to address known industry needs to highly customized solutions. Our approach to product development is to utilize our backbone polymers, technology building blocks, and new innovations in ways that result in exciting features and benefits for our customers.

Typical requirements for EV charging stations and modules include:

- Protection against vandalism
- Flame retardancy, according to UL 94
- High impact, maintaining performance down to -60°C
- Light weight compared to metal
- Transparent and opaque materials in wide range of colours
- Weather resistance to the most extreme outdoor conditions

Throughout our product development and production processes we are intensely focused on our customers' objectives, driven by current and future needs and marketplace concerns. We let this knowledge drive us, and ultimately this focused approach provides us with the assurance that, in the end, our materials will make a difference and we are providing the right solution.

We go beyond performance features and benefits of the resin and quantify desired end results, which include reduction in cost, improvement in customer satisfaction, improvement in manufacturing/processability and product differentiation.

We leverage our cross-industry participation as well as our experiences with our customers' requirements of intimacy, flexibility, agility and profitable growth. We share our expertise and collaborate, and, by joining forces this way, we have found that we can give our customers exactly what they need ... and, ultimately, help them win.

Trinseo Resins for Residential Charging Stations

Residential Charging Stations are designed for locations such as private garages or carports. They are mainly found indoors or in areas where exposure to harsh environmental conditions are minimal.

EMERGE™ PC 8701HH Advanced Resins

- 10% glass-reinforced PC, delivering high stiffness, high heat resistance and impact resistance
- Flame-retardant: UL 94 V0@1.6mm, 5VA@3.0mm
- Wide selection of opaque colours
- Available with UV package, as EMERGE™ PC 8731HH for outdoor applications; f1 listing according to UL746C
- Design freedom

EMERGE™ PC/ABS 7710 Advanced Resins

- Impact resistance, down to -30°C
- Flame-retardant: UL 94 V0@1.5mm, 5VB@2.0mm and 5VA@2.5mm
- Wide selection of opaque colours
- Available with UV package, as EMERGE™ PC/ABS 7700 for increased weatherability resistance
- Design freedom, and excellent processability
- Enhanced chemical resistance
- Excellent aesthetics

EMERGE™ PC 8410-15 Advanced Resins

- Impact resistance
- Flame-retardant: UL 94 V0@1.8mm, 5VB@2.0mm and 5VA@2.5mm
- Available as transparent material and in wide selection of opaque colours
- Available with UV package, as EMERGE™ PC 8430-15 for outdoor applications; f1 listing according to UL746C
- Design freedom, excellent aesthetics

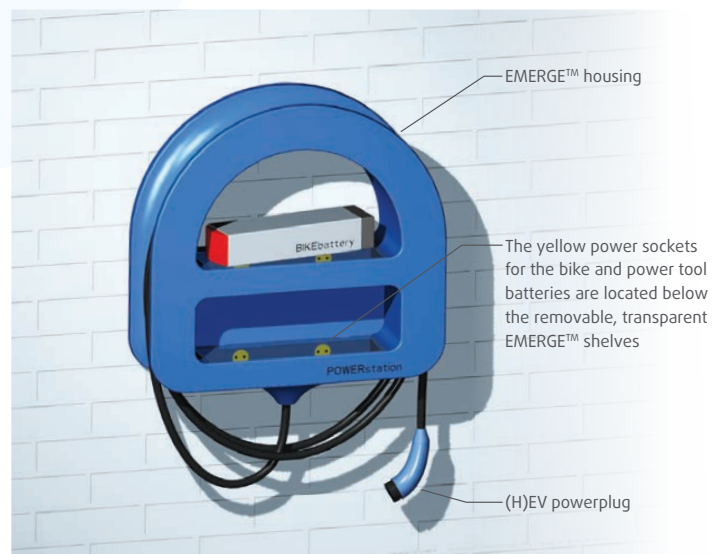


Figure 1: Concept/wall-mount 'POWERstation'

Trinseo Resins for Public Charging Stations

Public Charging Stations are installed mostly outdoors, in strategic locations throughout our cities. In addition to the materials positioned for residential charging stations, Trinseo has a range of Polycarbonate (PC) Siloxane copolymer resins that perform in the most extreme weather conditions. Materials specifically for public stations include:

XZ 92705.00 Experimental PC/Si Advanced Resins

- Impact resistance, down to -60°C
- Flame-retardant: UL 94 V0@2.0mm, 5VB & 5VA@2.5mm
- Available in wide selection of opaque colours
- Excellent impact retention under extreme weather conditions – avoids need for lacquering or painting
- Excellent surface aesthetics
- Very easy processing and demoulding
- Design freedom

XZ 92706.00 Experimental PC/Si Advanced Resins

- Impact resistance, down to -60°C
- Flame-retardant: UL 94 V0@2.5mm, 5VB & 5VA@3.0mm
- Available in transparent colours
- Excellent impact retention under extreme weather conditions – avoids need for lacquering or painting
- Excellent surface aesthetics
- Very easy processing and demoulding
- Design freedom

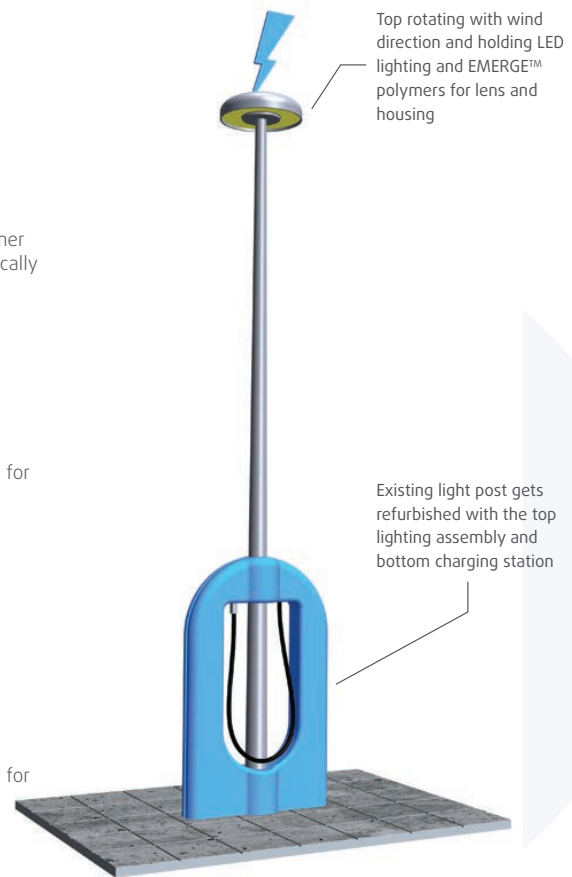


Figure 2: Concept/stand-alone (H)EV charging station

Trinseo Resins for Coupler Applications

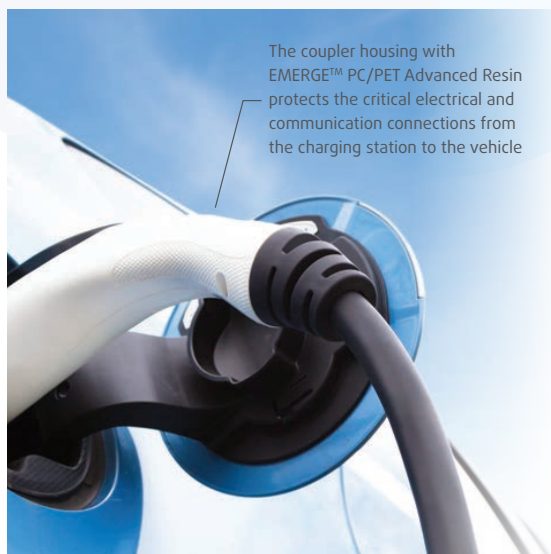


Figure 3: Coupler Applications

EMERGE™ PC/PET Advanced Resins series

- Combines heat and chemical resistance
- Excellent electrical insulation properties, processability and aesthetics
- Available with or without flame retardants
- Versions with or without reinforcements allowing for low distortion/warpage of parts for excellent dimensional control

EMERGE™ PC/PET 9500CR Advanced Resins

- Flame retardant: V1@1.5mm, V0@2.0mm, 5VA@2.5mm
- Good material of choice for electric vehicle coupler applications
- Available in a wide range of colours



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