

RISK CONTROL CONSULTING

Electric Vehicle Charging Stations – Best Practices

With over 2 million electric vehicles on the road in the United States and that number expected to climb over the next five to ten years, electric vehicle charging station (EVCS) sites will soon populate more commercial, residential, transportation, and community sites across the country.

This document outlines the best practices for the safety and well-being of employees as well as the public in maintaining and using an EV charging station (EVCS). The information contained in this best practice is current as of October 2022.

Equipment

There are three primary charging levels: 1, 2 and 3 (DC fast), delivering voltage from 120 (AC) up to 480+ (DC). Each charging receptacle should be installed according to the National Electric Code for safe charging of EVs and should comply with local building codes. Charging equipment should be certified by a Nationally Recognized Testing Laboratory. In addition, it should conform to International Electrotechnical Commission (IEC), and Federal Communication Commission (FCC) standards to ensure safety, performance, and energy efficiency.

Some states, such as California, have adopted standards for EV charging stations. Cities, in turn, adopt guidelines for permitting, installation requirements, signage, safety and ownership.

Note: Standards for the [National Electric Vehicle Infrastructure \(NEVI\) Formula Program](#) may vary. At the time of publishing this document, the [NPRM rulemaking](#) had not been voted on/adopted.

Access

Employers or building management may opt to limit EVCS use to employees or residents, while others may permit visitor use during limited hours of the day. Management should identify who will be responsible for enforcing charging policies – security personnel, garage attendants or employee/resident self-monitoring. If selecting to regulate authorized users, consider implementing these safety protocols:

- **Registration** – requiring employees/residents to register their EV allows an accurate count and type of vehicles actively using the stations. If feasible, an access card or key fob may then be issued to restrict access.

- *Waiver* – A waiver of liability/user agreement should stipulate that the user accepts responsibility for any risks associated with the use of the EVCS. Consult with legal counsel regarding potential liability.
- *Time Limits* – Establish limits to ensure efficient use and avoid disputes among users.

Personal Safety

Regardless of who will use the EVCS, special consideration should be made in preventing against vandalism and theft after hours. Not only is property damage at stake, employees, residents, and the general public may be placed at risk of injury. To alleviate this, consider the most prudent options such as anti-theft chargers, ample lighting, motion detectors, emergency call buttons, security guards, and anti-vandalism hardware.

Post signage near EVCS warning users to not loiter in or around the vehicle, lock it when unattended, and to remove all valuables.

Hazards

The powerful voltage needed to charge and operate these vehicles present hazards that must be carefully addressed to avoid damage, loss, and injury. The most significant hazard is fire, which can occur during charging. While equipment is designed to help prevent fire, the exposure cannot be eliminated.

Electric Shock	1. Maintaining cable insulation, plugs and wiring can reduce the risk of electric shock. Regularly inspect all components of your charging equipment.
	2. Do not allow the use extension cords.
	3. Post signage informing users: • Never use equipment that shows signs of excess wear • Where to report equipment damage • What to do if someone receives high-voltage electric shock
High-voltage Fires	Lithium-ion batteries are relatively new technology. When the battery fails, due to damage, overheating, overcharging, or product defect. This can cause a spontaneous fireball event, burning at extremely high temperatures. While these events are rare, pre-cautionary measures should be taken: 1. Develop Emergency Action Plans to address this hazard.

	2. Implement a maintenance program for the equipment to ensure safety features are operational.
	3. If possible, install charging equipment away from buildings.
Cyber Security	EVCSs communicate over a wireless network and are susceptible to cyber attacks which compromise the charging station, users' personal data, and the power grid.
	1. Increased awareness of this emerging risk, EVCSs manufacturers are developing strategies to strengthen security. Ensure that you are staying informed of the new technology for your chargers.
	2. Consider investing in technology to protect against hackers.

Emergency Response

With electrical exposure comes the risk of fire: electrical charging equipment and vehicles. Small live electrical fires on charging equipment should be extinguished using a CO² or ABC extinguisher. Vehicles fires should be extinguished with water.

Protocols should be incorporated into your Emergency Action Plan that addresses emergency shutoff procedures by qualified individuals, activating the emergency fire alarm, calling 9-1-1 and evacuating buildings in proximity.

References

[Safety Risks to Emergency Responders from Lithium-Ion Battery Fires in Electric Vehicles](#)

[U.S. Department of Energy – Workplace Charging for Electric Vehicles](#)

[U.S. Department of Energy – Charging Infrastructure Procurement and Installation](#)

[U.S. Department of Energy – Developing Infrastructure to Charge Electric Vehicles](#)

[California Energy Commission – Charging 101](#)

[International Electrotechnical Commission – Electric Vehicles](#)

[Cybersecurity of Smart Electric Vehicle Charging: A Power Grid Perspective](#)

Alliant Risk Control Consulting fact sheet is not intended to be exhaustive. The discussion and best practices suggested herein should not be regarded as legal advice. Readers should pursue legal counsel or contact their insurance providers to gain more exhaustive advice.