

Portland International Airport

Electric Ground Support Equipment (eGSE) Charging Station User Guide

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- 1. General Information..... 1**
 - **1.1 Purpose of Manual 1**
 - **1.2 Definitions 1**
- 2. eGSE Registration Process 1**
- 3. Charging Station Assignments 2**
 - **3.1 Designated Charging Stations..... 2**
 - **3.2 Common Use Charging Stations 2**
- 4. Roles and Responsibilities 3**
 - **4.1 Ownership 3**
 - **4.2 Maintenance..... 3**
 - **4.3 Training 4**
- 5. Charging Station Operating Instructions..... 4**
- 6. Data Management 6**
 - **6.1 Charging Station Data 6**
- 7. Safety Procedures..... 8**
 - **7.1 eGSE Operational Procedures..... 8**
 - **7.2 Battery Fire Response Procedures 8**
 - **7.3 Battery Acid Spill Response Procedures..... 9**
 - **7.4 Lithium-Ion Battery Safety Procedures..... 10**
 - **7.5 Handling and Disposal of Used Batteries..... 10**
 - **7.6 Battery Preventive Maintenance Best Practices 11**

1. General Information

1.1 Purpose of Manual

The Port of Portland (the Port) is providing charging stations to promote the deployment of eGSE at PDX. The purpose of this manual is to provide guidance for users charging electric Ground Support Equipment (eGSE) within the Air Operations Area (AOA) at Portland International Airport (PDX). The manual also provides guidance on bringing eGSE to PDX and the operations and maintenance as it pertains to safety and compatibility with charging stations. For more information, see the [PDX Rules](#), govern and regulate the activities and conduct of persons and entities using the Airport.

1.2 Definitions

BMID – Battery Monitoring and Identification Device. A device that is mounted on or integrated into eGSE batteries to manage the data associated with the battery and allows the charging station to adjust the charge automatically to match the requirements of the battery.

Charge Event – An occurrence in which an eGSE vehicle draws power from a charging station to replenish the vehicle's battery power.

Charging Station – A Port-installed device used to supply power to eGSE vehicles for airfield operational use.

Charging System – A system comprised of power infrastructure and charging station assets used to supply power to eGSE vehicles.

Common Use Chargers – eGSE charging stations that may be used by any user authorized to operate eGSE on the AOA and are marked with a sticker labeled "Common Use."

eGSE – Electric Ground Support Equipment. Electric-powered vehicle or machinery that is used to provide ground support services throughout the airport.

eGSE User – An entity that holds an agreement with the Port to access Port-managed eGSE charging stations.

Hot Disconnect – Disconnecting eGSE from the charging station while it is still energized.

Rapid Charging Intelligence – A feature built into the charging stations to make the system capable of charging more quickly than a conventional charger without damage to the battery. Monitors the battery voltage, temperature, and tracks the charge history of the battery pack.

2. eGSE Registration Process

Each piece of eGSE must be registered with PDX Operations. A unique identification number will be assigned based on the type of equipment, the operator or owner of the equipment, and the type of battery used for the eGSE. Follow the steps below to register eGSE.

Step 1: Confirm that eGSE meets charging station compatibility requirements prior to bringing equipment onsite (see **eGSE Charging Requirements** section and [PDX Rules](#)).

Step 2: Complete the Port's eGSE registration form located at <https://p.veoci.com/gse-registration>.

- A confirmation email will be sent once you have successfully registered the eGSE.

Step 3: The Port will provide an identification number for each eGSE's battery monitoring and identification device (BMID). A BMID is needed before the new eGSE can be charged.

- An 8-digit number will be assigned to each eGSE.

Step 4: The Port will contact you to schedule an appointment to connect the eGSE to the charging station.

- The Port will provide a decal for each eGSE charging port. The decal must be placed next to each charging Port and always be visible.
- For replacement decals, email a request to gseregistration@portofportland.com.

3. Charging Station Assignments

3.1 Designated Charging Stations

Port-owned charging stations within the AOA will be assigned to a designated gate based on its proximity to each gate. The Port reserves the right to make changes to charger assignment, as necessary.

3.2 Common Use Charging Stations

Common use chargers are charging stations that may be used by any user authorized to operate eGSE on the AOA and are marked with a sticker labeled "Common Use." Common Use chargers are located in areas shown in **Figure 1**.

At common use gates where charging stations are located, unless otherwise coordinated with the Airside Airport Operations Supervisor, staging of eGSE needed to service arriving flights may begin no earlier than thirty (30) minutes prior to the anticipated arrival time of the aircraft; and eGSE must be removed from the gate Ramp area no later than forty-five (45) minutes after the aircraft has left the gate for departure.

Equipment should be parked in an area near the eGSE user's assigned departure gate. For common use chargers that are not located near a gate area, or if a user is interested in accessing a charger at a common use gate where they are not operating a flight, the user must contact the ADM to inquire about availability. Use is on a first come, first served basis.

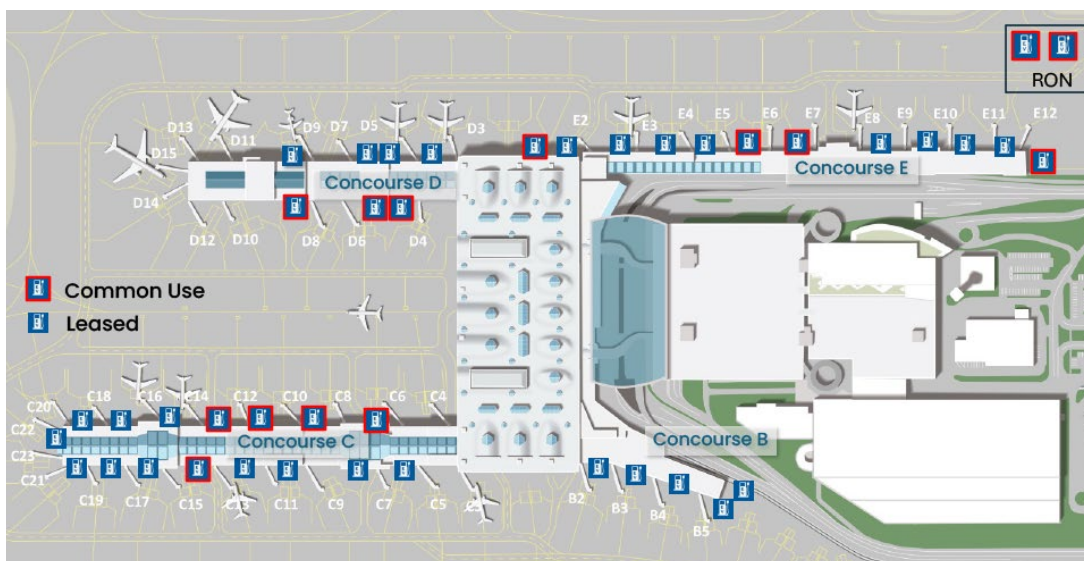


Figure 1: Charging Station Location Map. Source: Port of Portland

4. Roles and Responsibilities

4.1 Ownership

The PosiCharge Dual Vehicle System (DVS) 400 models are owned and operated by the Port of Portland, locations shown in Figure 1. The Port retains authority to review and approve eGSE equipment proposed for use at charging stations. Following approval, the leaseholder is responsible for operational oversight, including scheduling, access control, and usage management. This provision does not apply to common use charging stations (see the **Common Use Charging Stations** section for more information).

4.2 Maintenance

If a charging unit or cable is damaged, Port Maintenance will perform the necessary repair; however, the tenant is responsible for paying for the cost of repairs needed to any component damaged beyond the “Port/tenant break-away connector,” as shown in **Figure 2**.

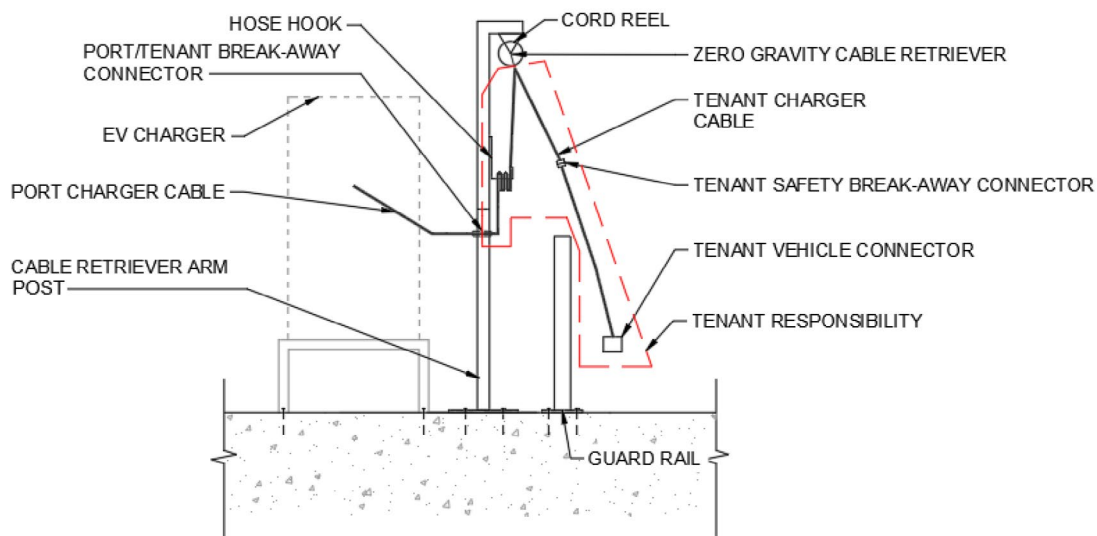


Figure 2: Typical Charging Station Cable Configuration. Source: Port of Portland

Contact Port Maintenance 503-460-4683 if the charging station has any of the following issues:

1. inoperable with fault or warning codes,
2. needs general repairs, maintenance,
3. power needs to be reset on the unit.

PDX Maintenance is not responsible for maintaining tenant-owned eGSE. The Port may require assistance to troubleshoot charging station repair and maintenance issues, including tenant operation of eGSE to evaluate reported issues.

For guidance specific to using the digital interface and operating the PosiCharge charging stations, users should refer to the [PosiCharge DVS400 Operation and Maintenance Manual](#).

See **Safety Procedures** section for further guidance on safe operations and maintenance related to eGSE batteries.

4.3 Training

Tenants are responsible for training on the safe and proper operation of eGSE and operating the charging stations using this manual and other references as needed.

5. Charging Station Operating Instructions

Prior to connecting to a charging station, the user shall take the following steps:

Step 1: Register each eGSE vehicle with the Port (see Section 2 **eGSE Registration Process**).

Step 2: Each eGSE must be compatible with the following PosiCharge charging station requirements prior to bringing equipment on site:

- eGSE using charging stations in the gate areas must be baggage tractors, belt loaders, or pushback tractors.
- Euro Connector charging plugs (see **Figure 3**) must be used to be compatible with PosiCharge model DVS400.
- Battery powered GSE must be equipped with a BMID or similar device that is compatible with PosiCharge chargers and enables the battery data to be transmitted to chargers.
- All eGSE batteries must be compatible with PosiCharge DVS400 charging stations (i.e., 24V to 96V industrial batteries).
- eGSE batteries should include safety features to comply with UL Listing and other safety standards.

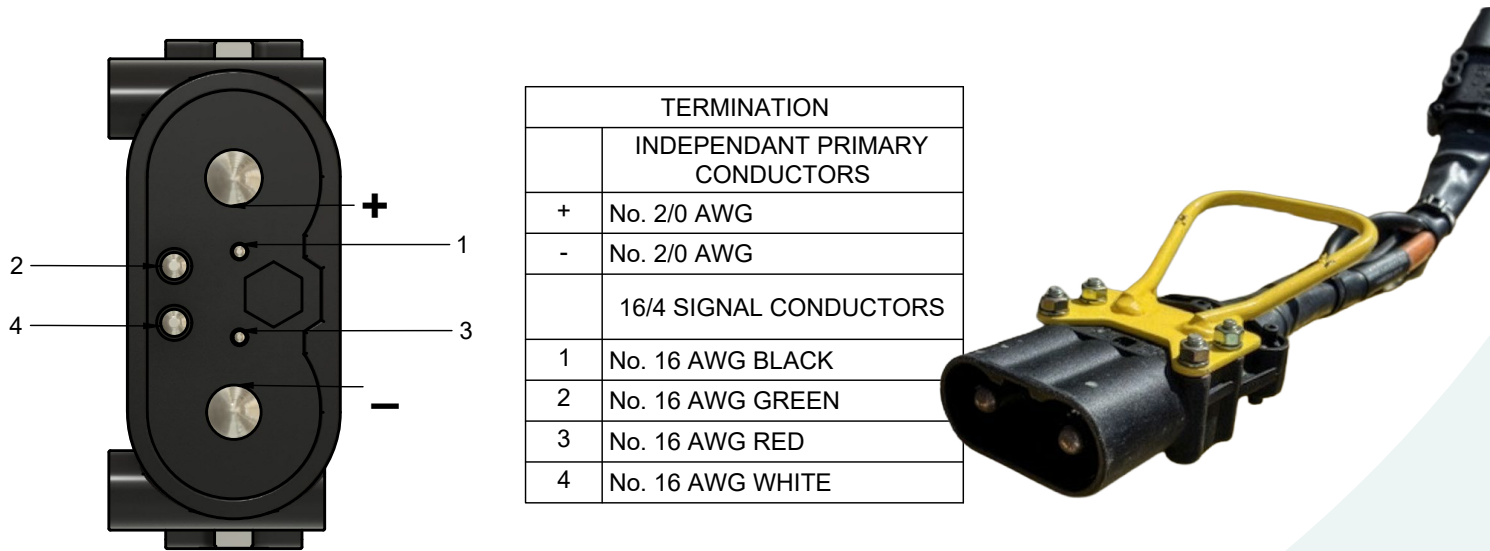


Figure 3: Euro Charger Cable Diagram. Source: Port of Portland / Averest

Step 3: Check that the eGSE vehicle battery and other components are in good condition and are not damaged.

Step 4: Check the charging station and charging cable for any damage. If there is damage, report it immediately by calling PDX Maintenance at (503) 460-4683.

Step 5: Start charging the eGSE. Connect the eGSE battery to either one of the ports on the charging station to start charging. The front panel (see **Figure 4**) of the charging station will display the status of the charging event associated with either charging port A or B, as described below.

LED Label	Color	When Steadily Lit	When Flashing
Equalize	Green	The battery is undergoing equalization.	The equalization is scheduled.
Charge Completed	Green	The charge is completed and stopped.	Not Applicable (NA)
80% Charged	Green	The battery State of Charge (SOC) is greater than or equal to 80%.	NA
Charging	Amber	The battery is connecting and charging.	NA
Fault/Warning	Red	Fault (the charge is stopped).	Warning (check the log)

Source: [DVS300/330 IP55/400 and MVS330/400 Operation & Maintenance Manual](#).

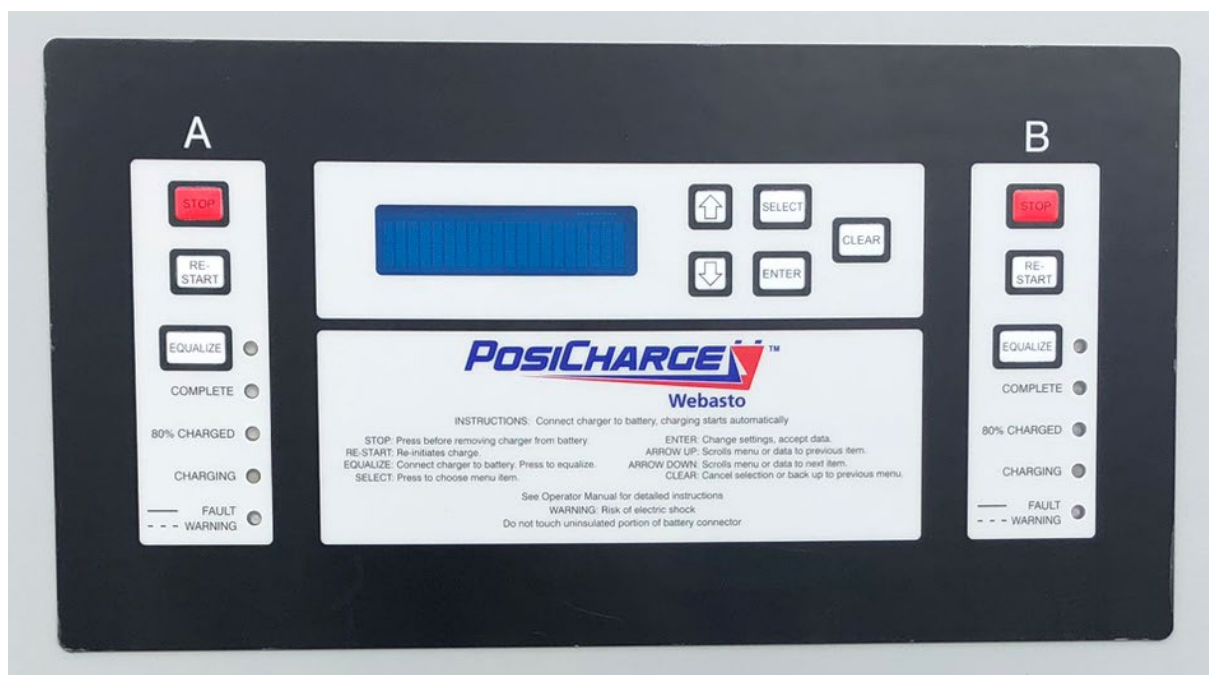


Figure 4: PosiCharge Charging Station Front Panel Layout.

Source: Port of Portland photo; [DVS300/330 IP55/400 and MVS330/400 Operation & Maintenance Manual](#).

Other operating instructions:

- The charging clips holding the cable to the cord reel should not be disconnected except in an emergency.
- Park eGSE in designated parking areas when charging. If the cable does not reach the vehicle and re-parking does not resolve the issue, contact Port Maintenance to adjust the cable length.

During a charge event, periodically check the charging status and monitor charging progress to ensure that charging is occurring properly.

Steps to stop charging are as follows:

Step 1: The charging station will stop the charge once the battery has completed charging and will illuminate the “Charge Completed” green LED light. Rapid Charging Intelligence (RCI) is built into the charging station system, which includes shutting the system off automatically after a charge is complete.

Step 2: The operator may stop charging at any time by pressing the stop button on the front panel. In the event of a hot disconnect, the PosiCharge charging stations have a safeguard to be used sparingly to automatically stop a charge event to prevent arcing or burning of the charger connections.

Step 3: When eGSE is done charging, disconnect the cables from the eGSE and properly stow cables behind the guard rail using the cable retriever and cable hook.

For additional details, refer to the [PosiCharge Operation and Maintenance Manual](#) for the DVS400 model.

6. Data Management

6.1 Charging Station Data

Each user may request access to their fleet’s charging data; access to other users’ data is restricted. Each charging station is equipped with an Advuez data management system, and both access and information about using the system is available upon request from the Port of Portland by contacting gseregistration@portofportland.com. The Advuez data management system can collect the following types of data for each charge event (see **Figure 5**):

- Charger name/location
- Charging port used (i.e., A or B port)
- Charge duration (start and end date/time)
- Kilowatt hours (kWh) used
- Amp hours used

CHARGING EVENT

Events List Charger

Event	Site	Infra Folder	Charger Name	Division	Connected Gse	Start Date	End Date	Port	Kwh	Amph
charger_charging	PDX - Portland	C Gates	C9-Charger B	N/A		2025-06-25T10:10:27.000Z	2025-06-25T11:12:43.000Z	B	2.5	254
charger_charging	PDX - Portland	C Gates	C9-Primary	N/A		2025-06-25T09:51:23.000Z	2025-06-25T10:55:09.000Z	N/A	2.47	255
charger_charging	PDX - Portland	C Gates	C9-Charger C	N/A		2025-06-25T08:19:17.000Z	2025-06-25T09:20:49.000Z	N/A	2.53	252
charger_charging	PDX - Portland	C Gates	C9-Charger B	N/A		2025-06-25T07:47:15.000Z	2025-06-25T10:10:27.000Z	B	22.04	2254
charger_charging	PDX - Portland	C Gates	C9-Primary	N/A		2025-06-25T07:45:08.000Z	2025-06-25T09:51:23.000Z	N/A	12.06	1246

Figure 5: Adveez Charging Event Data; Source: Adveez Data Management System

The Adveez dashboard can also display a summary of charging status for each charging station assigned to each airline, including the amount of time charging station was: available, charging, idle, faulted/not working¹, and unavailable (see Figure 6).

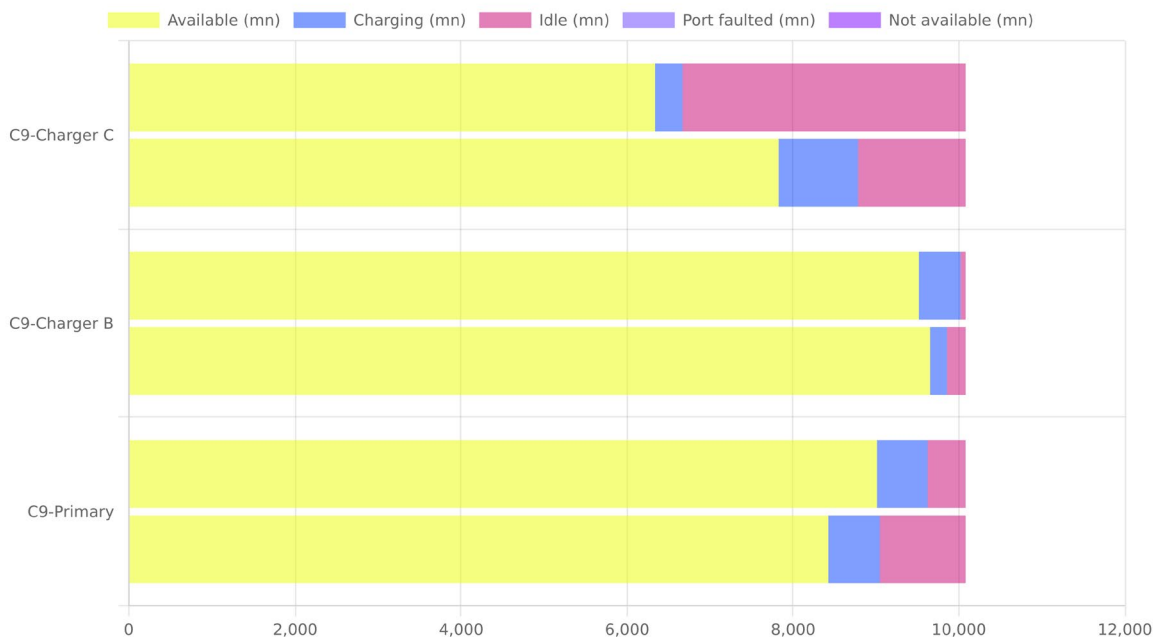


Figure 6: Adveez Charging Station Status Dashboard; Source: Adveez Data Management System

1. Inoperable chargers with fault or warning codes shown on the charging station display screen should be reported to Port maintenance staff at (503) 460-4683.

7. Safety Procedures

This section includes response procedures related to battery fires and spills, the safe handling and disposal of batteries, and preventive maintenance best practices for both eGSE and batteries.

7.1 eGSE Operational Procedures

Users are solely responsible for the safe operation of eGSE. The following practices provide general guidance about operating eGSE safely on the airfield.

- Operators should be aware of the instant torque and quiet operation of eGSE. Pedestrians may not hear the equipment approaching. Use horns or radios to make your presence known. Use reduced speeds in tight or shared spaces due to the equipment's fast acceleration.
- Chock blocks must be put in place when eGSE is not in use. eGSE can still move even when the battery is not functioning.
- Conduct a pre-use inspection before operating eGSE to ensure the equipment is in safe working order, particularly for critical components such as the battery, brakes, lights, horn, and steering.
- Inspect charging station and vehicle charging port(s) for damage prior to charging.
- Drivers of vehicles or equipment within the Restricted Area shall follow the requirements outlined in Chapter 23 (Restricted Area Vehicle Operations) of the [PDX Rules](#).
- Maintenance is the sole responsibility of the eGSE owner. The Port may determine, in its sole discretion, whether eGSE is safe or unsafe to operate in the Restricted Area.

7.2 Battery Fire Response Procedures

If a fire related to eGSE batteries occurs, take the following steps (see **Figure 7**):

- Call the Communications Center at (503) 460-4000.
- Push the red emergency shut off button on charging station (see **Figure 8** on next page).
- Avoid breathing in any vapors, gases, or smoke. Avoid contact with batteries and acids and remember that lithium-ion batteries can reignite.
- If it is safe to do so, turn off eGSE and unplug equipment from the charging station. Isolate the area (i.e., move other equipment in the area away and turn it off).
- If safe to do so, extinguish any open flames using fire extinguisher located closest to charging station.
 - Use a BC Type or Purple K wheeled fire extinguisher. Water may not be effective in suppressing a battery fire and should not be used.
 - Lithium-ion batteries can be extremely difficult to fully extinguish. Use portable fire extinguishers or hose lines to prevent the fire from spreading beyond the battery.

IN CASE OF FIRE 

Call (503) 460-4000

IF SAFE AND MANAGEABLE
TO DO SO:

1. Push the emergency shut off button.
2. Turn off equipment and unplug from charger.
3. Isolate area—move other operational equipment away from fire.
4. Extinguish any open flames with fire extinguisher.

Figure 7: Charging Station Fire Response Signage; Source: Port of Portland.



Figure 8: Emergency Shut-Off Button on Charging Stations; Source: Port of Portland.

7.3 Battery Acid Spill Response Procedures

In the event of a spill, the responsible party shall take all necessary actions to minimize the impact from the spill and shall immediately notify the Communication Center at (503) 460-4000. Tenants, airlines, and service providers are responsible for securing and maintaining the appropriate equipment for promptly responding to and cleaning up spills, including having spill kits with the necessary supplies and personal protective equipment (PPE) to respond to a lead-acid battery spill, and properly disposing of clean up related materials.

In the event of a lead-acid battery spill, complete the following spill procedure:

- Report the spill to the PDX Communications Center at (503) 460-4000 so that the appropriate departments can respond. Request that the Communications Center dispatch PDX Fire and Environmental to the scene.
- Using protective gear such as gloves and safety glasses, contain the source of the spill immediately with a battery-acid-resistant drip pan or protective battery mat. Efforts should be made to protect against chemicals entering any storm drains and to stop the leak/spills.
- Clean up the spill using battery acid absorbents or neutralizers.
- Clean up the area. Sweep up any loose absorbents and neutralizers and place all spent materials in disposal bags or containers. All cleanup materials must be disposed of by the responsible party off-site at appropriate disposal facilities, materials may not be disposed in Port provided waste receptacles.

For additional information on spill response procedures, refer to the [PDX Spill Response Procedures](#). Figure 9 shows signage provided at each charging station for reference in the event of a spill.



Figure 9: Charging Station Spill Response Signage; Source: Port of Portland.

7.4 Lithium-Ion Battery Safety Procedures

Lithium-ion batteries present safety hazards such as fire, explosions, and chemical byproducts. For that reason, it is recommended to follow the battery manufacturer's recommendations for storage, maintenance, and disposal.

Lithium-ion batteries can also present hazards resulting from thermal runaway, which is a chain reaction where the heat released from the failure of one cell damages other nearby cells. Operators of eGSE containing lithium-ion batteries should look for the following signs of thermal runaway and report issues to the person responsible for maintenance of the equipment:

- Increased temperatures
- Venting gas, vapor, or smoke from the battery
- Presence of fire
- Mechanical damage such as cracking (from abuse or dropping/collision).
- Bulging of the battery
- Popping or hissing

7.5 Handling and Disposal of Used Batteries

Lead acid and lithium-ion batteries are considered hazardous waste and should be handled, treated, and disposed of in accordance with local and state hazardous waste regulations. Users are responsible for all handling and proper disposal of eGSE batteries. Do not dispose of or abandon batteries away on airport property.

Handling:

- Handle batteries with acid resistant or leather gloves and safety glasses.
- If working on acid removal, wear a respirator rated to protect against lead.
- Keep sparks and flames and other sources of ignition away from batteries.
- Do not smoke in the vicinity of batteries.
- Avoid placing metal objects on top of the battery because it can cause sparks. Workers should remove rings, chains, and other metallic items before handling batteries.
- Avoid dropping, crushing, puncturing or otherwise damaging batteries in any way.
- Always inspect batteries for signs of damage.
- Always store batteries in an upright position to reduce the risk of leakage.

Disposal:

- Dispose of lithium-ion and lead-acid batteries, along with devices containing them, at designated recycling facilities. Do not throw batteries away in airport waste or recycling containers.
- Tape the battery terminals (or connections) with non-conductive tape and/or place lithium-ion batteries in separate plastic bags.
- Keep batteries in a cool, dry location away from direct sunlight and extreme temperatures until they are properly disposed of.
- If batteries are damaged, place them in a fire-resistant container (e.g., metal drum) with sand or other extinguishing agent, and dispose of in accordance with local, state, and federal regulations. Contact a local battery recycling center for disposal instructions.

7.6 Battery Preventive Maintenance Best Practices

- Develop a battery maintenance plan that includes procedures for cleaning and maintenance, establishing a schedule for service, and correcting any issues that can potentially arise.
- Handle batteries carefully to prevent damage.
- Ensure the battery terminals are clean and corrosion free to minimize risk of leaks.
- Isolate batteries that show any signs of damage. Clean battery case and terminals regularly with a rag dampened with a solution of water and battery acid neutralizing agent.
- Refrain from using leaking electric equipment and perform repairs before returning to service.
- Store batteries in a cool, dry place away from direct sunlight and extreme temperatures.
- Apply petroleum jelly or grease on battery terminals to slow down corrosion process.
- Use acid resistant drip pans sprinkled with battery acid neutralizing agent when filling or cleaning electric vehicle batteries.
- Always store batteries in an upright position to reduce the risk of leakage.
- Check the expiration date on batteries and replace them before they expire. Expired batteries are more likely to leak.
- Conduct routine inspections on electric vehicle batteries. Replace the battery if there are signs of damage, leaks, or corrosion.