



Powerwall Emergency Response Guide

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PRODUCT SPECIFICATIONS

All specifications and descriptions contained in this document are verified to be accurate at the time of printing. However, because continuous improvement is a goal at Tesla, we reserve the right to make product or documentation modifications at any time, with or without notice.

The images provided in this document are for demonstration purposes only. Depending on product version and market region, details may appear slightly different.

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1 Introduction and Scope

This emergency response guide (ERG) serves as a resource for emergency responders and Authorities Having Jurisdiction (AHJs) with regard to safety surrounding Tesla Powerwall products. This guide should also be reviewed by customers, site managers, and operators to ensure a clear understanding of potential hazards and the procedures to follow in case of emergencies.

Tesla Powerwall products are defined as rechargeable lithium-ion battery energy storage products designed, manufactured, and sold by Tesla, and include products such as Powerwall 2 and Powerwall+, collectively referred to in this guide as "Powerwall," or "the product," unless otherwise noted. The information and recommendations set forth in this ERG are made in good faith and believed to be accurate as of the date of preparation.

This guide is available in various languages. Information in this guide is periodically updated and translations are periodically added. Check the Tesla First Responders Information page at <https://www.tesla.com/firstresponders> for the latest revision of this guide, for ERGs for other Tesla products, and for the latest additional translated versions.



2 Company, Contact, & Product Info

2.1 Identification of Company and Contact Information

Table 1. Company and Contact Information

Products	Tesla Powerwall products, designed for residential and commercial energy applications, and modules and sub-assemblies that can be installed in such products. Descriptions and specific part numbers are listed in Product Description on page 4 .	
Locations	Headquarters (USA)	<p>1 Tesla Road</p> <p>Austin, TX 78725 USA</p> <p>Tel. No. +1 512-516-8177 (do not use for emergencies; see below)</p>
	Europe and Africa	<p>Burgemeester Stramanweg 122</p> <p>1101EN Amsterdam, The Netherlands</p> <p>Tel. No. +31 20 258 3916 (do not use for emergencies; see below)</p>
	Australia and Asia	<p>Level-14, 15 Blue Street</p> <p>North Sydney NSW, 2060, Australia</p> <p>Tel. No. 1800 686 705 (do not use for emergencies; see below)</p>
	Manufacturer (USA)	<p>1 Tesla Road</p> <p>Austin, TX 78725 USA</p> <p>Tel. No. +1 512-516-8177 (do not use for emergencies; see below)</p>
Emergency Contacts	CHEMTREC (Transportation)	<p>For hazardous materials (or dangerous goods) incidents during transportation such as spill, leak, fire, exposure, or accident, call CHEMTREC, day or night.</p> <p>Contract Number: CCN204273</p> <p>Within USA and Canada: 1-800-424-9300</p> <p>Outside USA and Canada: (+international prefix) +1 703-741-5970 (collect calls accepted)</p>
	Tesla Energy Technical Support Contacts	<p>Hotline telephone numbers:</p> <ul style="list-style-type: none"> • North America (24x7): +1 877-961-7652 • Asia/Australia/New Zealand (24x7): +61 2 432 802 81 • Germany: +49 8955 0520235 • Italy: +39 028 731 7132 • South Africa: +27 87 550 3480



- Switzerland: +41 618 553028
- United Kingdom: +44 162 845 0630

Email support:

- North America: PowerwallSupportNA@tesla.com
- Australia/New Zealand: PowerwallSupportNA@tesla.com
- Japan: EnergyCustomerSupportJP@tesla.com
- Europe/Middle East/Africa: EnergySupportEmea@tesla.com

2.2 SDS Information

Safety Data Sheets (SDS) are available for materials in Tesla Energy products. Contact Tesla for a copy of these documents.

Table 2. Thermal Contents

Materials with SDS	Approximate Quantity
Ethylene glycol 50/50 mixture with water	<ul style="list-style-type: none"> • Powerwall 1: 1.6 L of 50/50 mixture • Powerwall 2: 2.3 L of 50/50 mixture • Powerwall+: 2.3 L of 50/50 mixture

2.3 Lithium-Ion Cells

The products contain sealed lithium-ion battery cells (cells). Cells each contain lithium-ion electrodes, which can be composed of:

- Lithium Nickel Cobalt Aluminum Oxide (NCA material), LiNixCoyAlzO_2
- Lithium Nickel, Manganese, Cobalt Oxide (NMC material) $\text{LiNi}_x\text{Mn}_y\text{Co}_z\text{O}_2$
- Lithium Iron Phosphate (LFP material) LiFePO_4
- Lithium Nickel, Manganese Oxide (NMO material), $\text{LiNi}_x\text{Mn}_y\text{O}_2$
- Lithium Cobalt Oxide, LiCoO_2
- or a mixture of these compounds

The cells and batteries do not contain metallic lithium. Individual cells have nominal voltages of up to approximately 3.6 V.

2.4 Product Description

Powerwall is Tesla's battery system for residential and light commercial use. Powerwall+ is an integrated solar battery system. Wherever "Powerwall" is mentioned, it applies to Powerwall and Powerwall+ units unless otherwise noted.



NOTE: Images below are indicative representations designed to assist with product identification. Existing product models may vary.



Figure 1. Powerwall (Left) and Powerwall+ (Right)



Figure 2. Example of a Powerwall Installed on a House





Table 3. Approximate Powerwall Specifications

Part Number (Reman Number if available)	Description	Module Voltage - as shipped (V)	Max System DC Voltage	Max System AC Voltage	Weight	Height	Width	Depth
Powerwall 1 Versions								
1050100-x*y*-z*	POWERWALL, 2KW, 7KWH	<40 (DC)	450 (DC)	-	95 kg (210 lb)	130 cm (51 in)	86 cm (34 in)	18 cm (7 in)
1067000- x*y*-z*	POWERWALL, 3.3KW, 7KWH	<40 (DC)	450 (DC)	-	95 kg (210 lb)	130 cm (51 in)	86 cm (34 in)	18 cm (7 in)
1068000-x*y*-z*	POWERWALL, 6.6KW, 10KWH	<40 (DC)	450 (DC)	-	101 kg (223 lb)	130 cm (51 in)	86 cm (34 in)	18 cm (7 in)
* The 8th or 9th digit could be any number or letter and the 10th digit could be any letter.								
Powerwall 2 Versions								
1092170-x*y*-z*	AC POWERWALL	<40 (DC)	450 (DC)	300 (AC)	114 kg (251.3 lb)	115 cm (45.3 in)	75 cm (29.6 in)	14 cm (5.75 in)
1112170-x*y*-z*	DC POWERWALL	<40 (DC)	450 (DC)	-	115 kg (254 lb)	112 cm (44 in)	74 cm (29 in)	14 cm (5.5 in)
2012170-x*-y*-z*	AC POWERWALL	<40 (DC)	450 (DC)	300 (AC)	114 kg (251.3 lb)	115 cm (45.3 in)	75 cm (29.6 in)	14 cm (5.75 in)
3012170-x*-y*-z*	AC POWERWALL	<40 (DC)	450 (DC)	300 (AC)	114 kg (251.3 lb)	115 cm (45.3 in)	75 cm (29.6 in)	14 cm (5.75 in)
* The 8th or 9th digit could be any number or letter and the 10th digit could be any letter.								

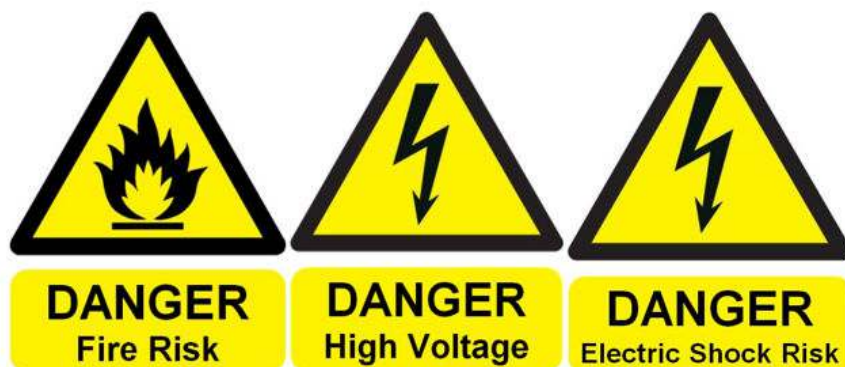


Part Number (Reman Number if available)	Description	Module Voltage - as shipped (V)	Max System DC Voltage	Max System AC Voltage	Weight	Height	Width	Depth
Powerwall+ Versions								
2012170-x*-y*-z*	POWERWALL+	<40 (DC)	450 (DC)	300 (AC)	140 kg (310 lb)	159.6 cm (62.8 in)	75.5 cm (29.7 in)	16 cm (6.3 in)
3012170-x*-y*-z*	POWERWALL+	<40 (DC)	450 (DC)	300 (AC)	140 kg (310 lb)	159.6 cm (62.8 in)	75.5 cm (29.7 in)	16 cm (6.3 in)
* The 8th or 9th digit could be any number or letter and the 10th digit could be any letter.								



3 Handling, Use, & Hazard Precautions

3.1 General Precautions



The products described by this document are dangerous if mishandled. Injury to property or person, including loss of life is possible if mishandled.

The products contain lithium-ion batteries. A battery is a source of energy. Do not short circuit, puncture, incinerate, crush, immerse, force discharge or expose to temperatures above the operating temperature range of the product as discussed in [Hazards Associated with Elevated Temperature Exposure on page 9](#). An internal or external short circuit can cause significant overheating and provide an ignition source resulting in fire, including surrounding materials or materials within the cell or battery. Under normal conditions of use, the electrode materials and electrolyte they contain are not exposed, provided the battery integrity is maintained and seals remain intact. The risk of exposure may occur only in cases of abuse (mechanical, thermal, electrical).

3.2 High-Voltage Hazards

Under normal conditions of use, provided that the product enclosure remains closed, handling the product does not pose an electrical hazard. Numerous safeguards have been designed into the product to help ensure that the high voltage battery is kept safe and secure under a number of expected abuse conditions. All of the component battery cells are sealed within the product as sub-groups within enclosures contained within the unit casing and are not accessible to non-Tesla personnel.

A high voltage and electrocution risk may present if the product's outer enclosure and/or safety circuits have been compromised or have been significantly damaged. A battery pack, even in a normally discharged condition, is likely to contain substantial electrical charge and can cause injury or death if mishandled. If the product has been significantly visibly damaged or its enclosure compromised, practice appropriate high-voltage preventative measures until the danger has been assessed (and dissipated if necessary).



WARNING: Never cut into a sealed product enclosure due to high voltage and electrocution risks.

For proper installation / removal instructions, contact Tesla ([Identification of Company and Contact Information on page 3](#)).



3.3 Hazards Associated with Elevated Temperature Exposure

This product is designed to withstand operating ambient temperatures up to 50°C (122°F), or as indicated in the product specification, with up to 100% operating humidity (condensing). This product is designed to withstand storage temperatures up to 60°C (140°F), or as indicated in the product specification, and <95% relative humidity (non-condensing) for up to 24 hours without affecting the health of the unit.

Prolonged exposure of the product to conditions beyond these limits may increase the potential of thermal runaway and result in a fire. Exposure of battery packs to localized heat sources such as flames may result in cell thermal runaway reactions and should be avoided.

3.4 Hazards Associated with Mechanical Damage

Mechanical damage to the product can result in a number of hazardous conditions (discussed below) including:

- Leaked battery pack coolant (see [Hazards Associated with Leaked Coolant on page 9](#))
- Leaked cell electrolyte (see [Hazards Associated with Leaked Electrolyte on page 9](#))
- Rapid heating of individual cells due to exothermic reaction of materials (cell thermal runaway), venting of cells, and propagation of self-heating and thermal runaway reactions to neighboring cells.
- Fire

To prevent mechanical damage to the product, these items should be properly stored in their original packaging when not in use or prior to being installed (see [Storage Precautions on page 17](#)).

3.5 Hazards Associated with Leaked Coolant

Thermal management of the product is achieved via liquid cooling using a 50/50 mixture of ethylene glycol and water. A typical Powerwall unit includes about 1.6 L of coolant (Powerwall 1) or about 2.3 L of coolant (Powerwall 2). Mechanical damage to a product that has been installed could result in leakage of the coolant. The fluid may be blue, green, or orange in color and does not emit a strong odor.

For information regarding the toxicological hazards associated with ethylene glycol, as well as ecological effects and disposal considerations, refer to the specific Safety Data Sheet (SDS) for battery coolant (see [SDS Information on page 4](#)).

Extended exposure of the product to leaked coolant could cause additional damage to the product such as corrosion and compromise of protection electronics.

3.6 Hazards Associated with Leaked Electrolyte

The possibility of an electrolyte spill from the product's cells is very remote for the following reasons:

- Liquid electrolyte is largely absorbed within the cell materials during the manufacturing process. The electrolyte also gets consumed during the normal operation of the batteries.
- The cells are hermetically sealed. Even if a single cell were damaged in a manner that could cause a leak, the volume would be of negligible concern.
- Cells are assembled into enclosed module compartments and inaccessible to personnel. The product architecture prevents any direct contact with the battery cells.

As such, the absence of free liquid electrolyte makes it impractical to report the volume of electrolyte within the product, and the cell and product design prevent the possibility for spills at the project site.



3.7 Hazards Associated with Vented Electrolyte


Lithium-ion cells are sealed units, and thus under normal usage conditions, venting of electrolyte should not occur. If subjected to abnormal heating or other abuse conditions, electrolyte and electrolyte decomposition products can vaporize and be vented from cells. Vented gases are a common early indicator of a thermal runaway reaction – an abnormal and hazardous condition.


Regulatory testing has shown that the products of combustion of lithium-ion batteries can include flammable and nonflammable gases. Based on this testing, the flammable gases are found to be below their lower flammable limit (LFL) and do not pose a deflagration or explosion risk to first responders or the general public. The nonflammable gases were found to be comparable to smoke encountered in a Class A structure fire and do not produce any unique, or atypical, gases beyond what you would find in the combustion of modern combustible materials.


In close proximity, vented gases may irritate the eyes, skin, and throat. Cell vent gases are typically hot; upon exit from a cell, vent gas temperatures can exceed 600°C (1,110°F). Vented electrolyte is flammable and may ignite on contact with a competent ignition source such as an open flame, spark, or a sufficiently heated surface. Vented electrolyte may also ignite on contact with cells undergoing a thermal runaway reaction.



4 In Case of Emergency

 **WARNING:** In case of emergency, severe physical impact, or transportation accident, do not approach or attempt to open the product.

 **WARNING:** In case of severe physical impact or transportation accident, it may take time before any visible indication of an abnormal and hazardous condition (e.g., smoke or fire) can be observed. Contact Tesla for guidance ([Identification of Company and Contact Information on page 3](#)).

 **CAUTION:** Response should only be performed by trained professionals.

4.1 During Storage or Operation

During storage or operation, emergencies include but are not limited to:

- Suspicious odor observed near the product
- Smoke or fire emanating from the product
- Severe physical impact on the product

In case of emergency, isolate, deny entry, and perform the following:

1. If possible, and if trained and properly equipped, shut off the unit/system (see [Shutting Down in an Emergency on page 14](#)).
2. Evacuate the area.
3. If not already present, notify appropriately trained first responders, the local fire department, and any appointed subject matter expert (SME) if available.
4. Contact Tesla for guidance ([Identification of Company and Contact Information on page 3](#)).



4.2 During Transportation

During transportation, emergencies include but are not limited to:

- Suspicious odor observed near the product
- Smoke or fire emanating from the product
- Transportation accident causing a severe physical impact on the product

In case of emergency, perform the following:

1. If possible, move the unit/system to an open area and away from exposures (such as buildings, flammable material, or people).
2. Evacuate the area.
3. Notify appropriately trained first responders, the local fire department, and any appointed subject matter expert (SME) if available.
4. Contact Tesla for guidance ([Identification of Company and Contact Information on page 3](#)).



5 Firefighting Measures



WARNING: Response should only be performed by professionals trained in high voltage and arc flash emergencies. In the event of a response to a Tesla product fire or hazardous event, contact Tesla for guidance ([Identification of Company and Contact Information on page 3](#)).

5.1 Firefighter PPE

Firefighters should wear self-contained breathing apparatus (SCBA) and structural firefighting gear. Industry testing has shown that standard structural firefighting gear provides adequate protection.

5.2 Responding to a Venting Powerwall

Smoke or suspicious odor emanating from a Powerwall can be an indication of an abnormal and hazardous condition. Battery thermal runaway fires are preceded by a period of smoke. If fire, smoke, or suspicious odor is observed emanating from the product at any time, perform the following:

1. If possible, shut off the unit/system (see [Shutting Down in an Emergency on page 14](#)).
2. Evacuate the area of all non-emergency personnel.
3. If not already done, contact Tesla for assistance ([Identification of Company and Contact Information on page 3](#)).
4. If a Powerwall is actively on fire, use a wide stream fog nozzle to prevent extension to any attached structure and for cooling the casing of the battery. Do NOT pull from the wall or attempt to open the Powerwall.
5. Once the fire is extinguished, monitor temperature of the unit while cooling as needed:
 - Use a thermal imaging camera to determine if there are signs of elevated temperature.
 - If elevated temperature is detected in the unit, attempt to cool exterior casing with low-volume fog stream for 15 minutes and re-evaluate.
 - Powerwall is considered stable if temperature is ambient with no elevation for a minimum of 45 minutes.
6. Contact Tesla for next steps ([Identification of Company and Contact Information on page 3](#)).

5.3 Responding to a Structure Fire with a Powerwall

If there is a structure fire with a Powerwall not affected by the fire, treat it as a standard structure fire. Perform the following steps:

1. Announce presence and location of any alternate power sources, including Powerwall and solar, to command during size-up.



NOTE: Building and fire codes require labeling to alert emergency personnel. This is typically found at the main electrical service location.

2. Shut down the Powerwall ([Shutting Down in an Emergency on page 14](#)), as you would with any utilities during a building fire. DO NOT pull Powerwall from its mounting.
3. If the fire is in close proximity to the Powerwall, monitor its temperature during overhaul for any elevation.
4. Contact Tesla as early as practicable ([Identification of Company and Contact Information on page 3](#)).



6 Shutting Down in an Emergency

WARNING: Shutting off power to the product does not de-energize the battery, and a shock hazard may still be present.

WARNING: If smoke or fire is visible, do not approach or attempt to open the product.

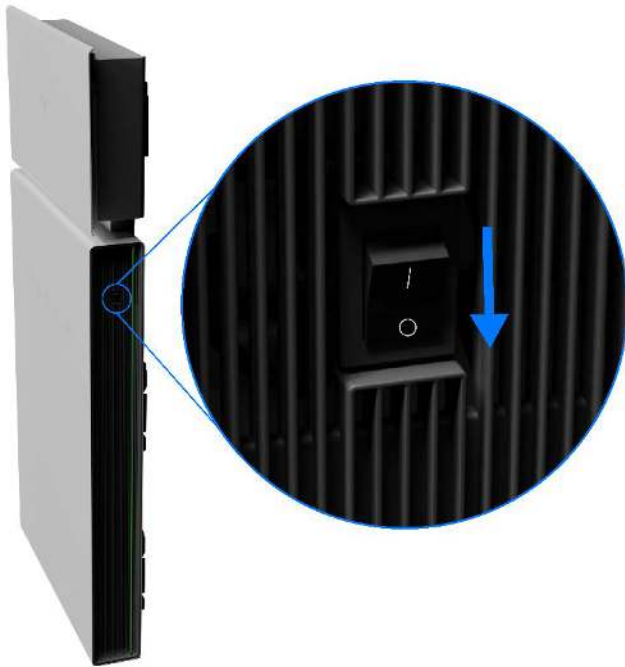
WARNING: In case of flooding, stay out of the water if any part of the product or its wiring is submerged.

To shut the product down in an emergency, perform the appropriate steps below and then contact Tesla ([Identification of Company and Contact Information on page 3](#)):

If Safe to Access Switches and Breakers

1. If there is solar generation on-site, turn off the AC breaker for each inverter.
2. If an E-Stop button or external shutdown switch is present, engage it.
3. If it is safe to access the Powerwall(s), turn off each Powerwall using its on/off switch.

Figure 3. Powerwall+ On/Off Switch



4. Turn off the AC breaker for each Powerwall.
5. If there is a Backup Gateway installed, turn off the Backup Gateway breaker.



Figure 4. Powerwall+ and Backup Gateway 2



6. If the emergency affects the rest of the site, turn off the entire site by opening the main service disconnect(s).

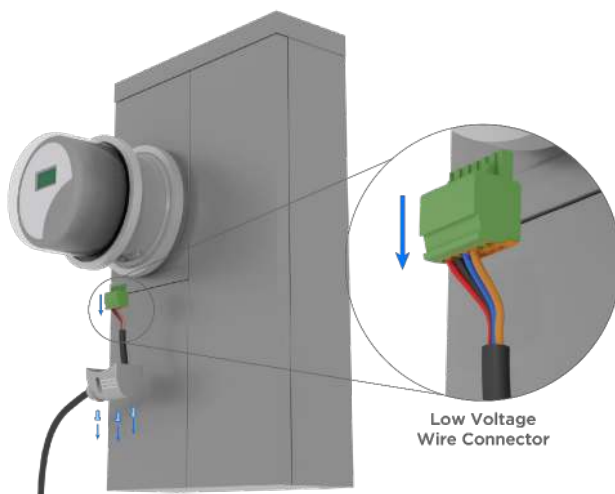
If Unable to Access Switches and Breakers

WARNING: Pulling the utility meter or Backup Switch from the meter socket is NOT a means of shutting down the Powerwall system. Do not pull the utility meter unless authorized to do so by the utility that owns it. Do not pull the Backup Switch unless authorized by Tesla.

To shut down the system in the event that Powerwall switches and/or breakers are not safely accessible:

1. If safe to do so, loosen the three (3) captive screws on the Backup Switch conduit hub and remove the conduit hub.
2. Pull the green low-voltage (<50 V) wiring connector to unplug OR cut the low voltage communication cable directly (cutting all four wires within the cable jacket) to force Powerwalls to cease charge/discharge.

Figure 5. Low-Voltage Wire Connector





7 First Aid Measures

7.1 Electric Shock / Electrocutation

Seek immediate medical assistance if an electrical shock or electrocution has occurred (or is suspected).

7.2 Contact with Leaked Electrolyte

Battery cells are sealed. Contents of an open (broken) battery cell can cause skin irritation and/or chemical burns. If materials from a ruptured or otherwise damaged cell or battery contact skin, flush immediately with water, remove all clothing around affected area, and wash affected area with soap and water. If a chemical burn occurs or if irritation persists, seek medical assistance.

For eye contact, flush with significant amounts of water for 15 minutes without rubbing and see a physician at once.

7.3 Inhalation of Electrolyte Vapors

If inhalation of electrolyte vapors occurs, move person into fresh air. If throat irritation is present, seek immediate medical assistance.

7.4 Vent Gas Inhalation

Battery cells are sealed and venting of cells should not occur during normal use. If inhalation of vent gases occurs, move person into fresh air. If signs of respiratory distress are present, seek immediate medical assistance.



8 Storage Precautions

Powerwall should be stored in approved packaging prior to installation.

Elevated temperatures can result in reduced battery service life. The product can withstand ambient temperatures of -40°C to 60°C (-40°F to 140°F) for up to 24 hours. Do not store the product near heating equipment.

Ideally, the product should be stored at 50% state of charge (SOC) or less. The product should not be stored for extended periods either at a full SOC or completely discharged since both conditions adversely impact battery life.

The storage area should be protected from flooding.

Long-term storage areas should be compliant with the appropriate local fire code requirements.

Acceptable storage density of battery packs and storage height of battery packs will be defined by the local authority having jurisdiction (AHJ). Requirements and limits will be based upon a number of factors including the structural and fire protection characteristics of the storage area and recommendations for fire protection promulgated by the National Fire Protection Association (NFPA) and similar organizations. At the time of this writing, no standard Commodity Classification has been defined for lithium-ion cells or battery packs (see 2016 NFPA 13: Standard for the Installation of Sprinkler Systems). The product only has a 30-40% state of charge (SOC) while in storage which reduces the energy impact on fire occurrences. As an example of the reduced energy, the 30% level has been determined to be acceptable for air flight shipping based upon extensive testing and analysis in conjunction with the FAA. Tesla recommends treating lithium-ion cells and batteries in packaging as equivalent to a typical Group A plastic commodity.



9 Damaged Product Handling

This section describes the handling, storage, and transportation of damaged products.

If the event of damage to a product, contact Tesla immediately ([Identification of Company and Contact Information on page 3](#)).

If a product has been damaged (for example, its battery enclosure has been dented or compromised), it is possible that heating is occurring that may eventually lead to a fire. Damaged or opened cells/batteries can result in rapid heating (due to exothermic reaction of constituent materials), the release of flammable vapors, and propagation of self-heating and thermal runaway reactions to neighboring cells.

Before handling or transporting a damaged product, wait at least 24 hours. Smoke may be an indication that a thermal reaction is in progress. If no smoke, flame, sign of coolant leakage, or signs of heat has been observed for 24 hours, the product may be disconnected and moved to a safe location. Contact Tesla ([Identification of Company and Contact Information on page 3](#)) to obtain specific instructions for evaluating, disconnecting, and preparing a damaged product for transport.

A damaged product should be monitored during storage for evidence of smoke, flame, sign of coolant leakage, or signs of heat. If full-time monitoring of the product is not possible (for example during extended storage), the product should be moved to a safe storage location.

A safe storage location for a damaged battery will be free of flammable materials, accessible only by trained professionals, and 50 feet (15 m) downwind of occupied structures. For example, a fenced, open yard may be an appropriate safe location. Do not store damaged products adjacent to undamaged products. It is possible that a damaged product may sustain further damage during transportation and may lead to a fire. To further reduce this risk, handle the damaged product with extreme caution.



10 Disposal Procedures

For disposal after a fire or thermal event, contact Tesla for guidance ([Identification of Company and Contact Information on page 3](#)).

In most cases, the product can be recycled. Contact Tesla to return the product to a Tesla facility for disassembly and further processing. If disposing of the product without returning it to Tesla, consult with local, state and/or federal authorities on the appropriate methods for disposal and recycling of lithium-ion batteries. Note that the products do not contain heavy metals such as lead, cadmium, or mercury.



11 Maintenance or Repair

Tesla requests all maintenance, service, and repairs of the product be performed by Tesla-approved service personnel or Tesla-authorized repair facilities. This includes all proactive and corrective maintenance over the lifetime of the product. Improper service or repair by personnel not approved nor authorized by Tesla could void the product's Limited Warranty, lead to failure of the product, and potentially result in development of an unsafe condition and unexpected electrical events.

12 Transportation

Lithium-ion batteries are regulated as Class 9 Miscellaneous dangerous goods (also known as “hazardous materials”) pursuant to the International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air, International Air Transport Association (IATA) Dangerous Goods Regulations, the International Maritime Dangerous Goods (IMDG) Code, European Agreements concerning the International Carriage of Dangerous Goods by Rail (RID) and Road (ADR), and applicable national regulations such as the USA’s hazardous materials regulations (see 49 CFR 173.185). These regulations contain very specific packaging, labeling, marking, and documentation requirements. The regulations also require that individuals involved in the preparation of dangerous goods for transport be trained in how to properly package, label, mark and prepare shipping documents.

 **NOTE:** Transportation regulations vary by region. To ensure compliant transportation, always refer to local regulations as applicable.

UN Number	3480
Proper Shipping Name	Lithium-Ion Batteries
Hazard Classification	Class 9 Miscellaneous
Packing Group	N/A



Revision History

Revision	Date	Description
1.0	November 11, 2022	<ul style="list-style-type: none">Initial revision of Powerwall guide, decoupled from previous Industrial Energy guide. Visit https://tesla.com/firstresponders for all versions.

TESLA