

SAFETY DATA SHEET

Section 1: Identification of the substance/mixture

Product Identifier: Tesla Powerwall
Identified Uses: Storage of electrical energy
Prohibited Uses: Use only as intended
Company: Tesla Motors Australia, Pty Ltd.
North Sydney, NSW 2060
Australia
Emergency Contact: CHEMTREC (Contract Number: CCN204273)
- Within USA and Canada: +1-800-424-9300
- Asia/Australia/New Zealand (24x7): +61 2 432 802 81
Non-Emergency Contact: 1800 686 705

Section 2: Hazards Identification

Hazard Symbols: The Tesla Powerwall system (unit) is classified as a pre-assembled integrated lithium-ion battery energy storage system containing individual sealed lithium-ion cells. The unit is not hazardous when used in accordance with Tesla recommendations. The hazard is associated with the contents of the cells within the unit. For the battery cell, chemical materials are stored in a hermetically sealed metal or metal laminated plastic case, designed to withstand temperatures and pressures encountered during normal use. There is no access for the Customer/installer to the lithium-ion cell chemistry (cathode, anode and electrolyte).

As a result, the potential for human contact should not exist unless the cells within the unit leak, are exposed to high temperatures or are mechanically, electrically, or physically abused/damaged.

It is noted that under normal operating or fault conditions, explosive gases and toxic fumes/gases are not generated.

GHS Classification: Not Applicable (Article)

Signal Word: Danger

GHS Hazard Statements:

- **Physical Hazard Statements:**
 - H227: Combustible liquid and vapour
- **Health Hazard Statements:**
 - H315: Causes skin irritation
 - H319: Causes serious eye irritation
 - H335: May cause respiratory irritation
 - H360: May damage fertility or the unborn child
- **Precautionary Statements:**
 - P102: Keep out of reach of children
 - P103: Read label before use
 - P202: Do not handle until all safety precautions have been read and understood
 - P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
 - P234: Keep only in original container
 - P370 + P378: In case of fire: use CO₂ and/or water fire extinguisher
 - P501: Dispose of contents/container to an approved waste disposal plant

Section 3: Composition and Information on Ingredients

Under recommended use conditions, exposure to hazardous ingredients within the cells are not expected.

Component	Material	Concentration range (wt %)	CAS No.	EC No.
Positive Electrode	Lithium mixed-metal oxide	20-60%	182442-95-1	695-690-9
	Li[M] _x [O] _y ¹			
	Aluminum Proprietary Additives	1-10%	7429-90-5	231-072-3
Negative Electrode	Carbon	10-30%	7440-44-0	231-153-3
	Silicon		7440-21-3	231-130-8
	Copper Proprietary Additives	1-15%	7440-50-8	231-159-6
Electrolyte	Lithium		21324-40-3	244-334-7
	Hexafluorophosphate		96-49-1	202-510-0
	Ethylene Carbonate		616-38-6	210-478-4
	Dimethyl Carbonate		623-53-0	433-480-9
	Ethyl Methyl Carbonate Proprietary Additives			
Case	Nickel		7440-02-0	231-111-4
	Steel		N/A	

¹ M represents the transition metal, which may include Co, Mn, Ni, Al, Fe and/or P. The compound includes one or more of these metals

X and y represent the specific number of atoms.

Section 4: First Aid Measures

General Advice: The hazardous components of this unit are contained within hermetically sealed battery cells. The hazardous contents are caustic alkaline electrolytes with lithium metal oxide cathodes, graphite and carbon anodes, binders and various organic carbonates. The following measures are only applicable if exposure has occurred to components when a cell or battery leaks, is exposed to high temperatures or is mechanically, electrically or physically abused/damaged.

If the contents of a damaged and an opened cell are inhaled, remove the source contamination or person, **consult a medical professional** and undertake the following:

- **If inhaled:** Move person into fresh air and consult a medical professional.
- **In case of skin contact:** Remove contaminated clothes and shoes immediately. Wash off with soap and plenty of water. If irritation or pain persists, consult a medical professional.
- **In case of eye contact:** Rinse thoroughly with plenty of water for at least 15 minutes and consult a medical professional.
- **If swallowed:** Do NOT induce vomiting. Rinse mouth with water. Immediately consult a medical professional.

Most important symptoms and effects, both acute and delayed:

- **Acute:** Battery contents are corrosive and/or flammable.
- **Ingestion:** Ingestion of the electrolyte could lead to gastrointestinal tract irritation with nausea, vomiting and potentially burns.
- **Inhalation:** The gas released may lead to irritation of the mouth and upper respiratory tract with a burning sensation, pain, burns and inflammation in the nose and throat; there may also be coughing or difficulty breathing.
- **Eye contact:** Eye contact with the electrolyte gas may cause sores and irritation.
- **Skin contact:** May lead to irritation and possible skin burns.
- **Chronic:** Skin contact may aggravate/exacerbate existing skin conditions, such as

dermatitis. Chronic inhalation may lead to the same symptoms as listed for acute inhalation above.

- **Notes to medical professional:** Treat symptomatically and supportively.

Section 5: Firefighting Measures

First Responders

Tesla is committed to helping fire departments and first responders safely handle emergency situations involving Tesla products. Refer to https://www.tesla.com/en_AU/firstresponders for the most up-to-date first response information for all Tesla products.

Extinguishing Media

- **Suitable extinguishing media:** If a fire develops and visible flames appear, **do not apply direct suppression** to the unit. Water spray may be used to protect vulnerable exposures, rather than directly onto the burning unit. The unit is designed to fully consume itself if a thermal event occurs. Direct suppression techniques may prolong the burning of the unit and also creates the risk of stranded energy in unburnt cells.
- **Special hazards arising from the substance or mixture:** Products of combustion can include hydrofluoric acid, carbon dioxide, carbon monoxide, soot, oxides, and oxides of Nitrogen (NO_x).
- **Advice for fire fighters:** Wear self-contained breathing apparatus for firefighting.
- **Further information:** Individual battery cells and sealed battery packs exposed to heat or flames above 120°C may build up pressure and burst. Use water spray to cool unopened containers and neighboring battery enclosures. Never open battery packs for the sole purpose of firefighting. The use of a thermal imagery camera or IR camera is recommended to observe temperatures after the extinguishment with water or completion of thermal event. Once ambient temperatures are observed without the increase in temperature, further overhaul can proceed. Constant monitoring of temperatures should be continued as overhaul is being conducted.

Section 6: Accidental Release Measures

In the event a cell within the unit is damaged and releases contents as outlined in **Section 2**, the following measures must be undertaken:

- **Personal precautions, protective equipment and emergency procedures:** Use personal protective equipment (PPE). Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition and heat. Evacuate personnel to safe areas and to an adequate distance from the unit. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. For additional personal protection see **Section 8**.
- **Environmental precautions:** Prevent further leakage or spillage, if safe to do so. Do not let product enter drains or waterways.
- **Methods and materials for containment and cleaning up:** Do not touch spilt material without hand protection. Contain spillage, neutralize any liquids with calcium carbonate absorbent and then collect remains and place in container for disposal according to local regulations (see **Section 13**). Keep in suitable, closed container for disposal. Loose battery cells can be inerted by placing into a water bath (do not add salt).

Section 7: Handling and Storage

Precautions for safe handling: Keep away from sources of ignition – no smoking. Do not puncture battery pack or individual cells. Take measures to prevent the buildup of electrostatic charge and/or short circuiting. For precautions see **Section 2**.

Conditions for safe storage, including any incompatibilities: Do not open individual battery cells or battery packs. Keep away from open flames, hot surfaces and sources of ignition. Store undamaged batteries in -40°C – 60°C, as per Tesla's Transportation and Storage Guidelines.

Specific end use(s): Electrical energy storage for specific Tesla products.

Section 8: Exposure Controls and Personal Protection

Control Parameters

- **Exposure Limit Values:** Airborne exposures to hazardous substances are not expected when the unit is used for its intended purpose. Exposure standards are not applicable to the sealed articles.
- **Biological Occupational Exposure Limits:** Not applicable
- **Derived No Effect Level (DNEL):** Not Applicable
- **Predicted No Effect Concentration (PNEC):** Not Applicable

Exposure Controls

- **Appropriate engineering controls:** Ventilation is not required when using this product as intended. Ventilation is only required if there is leakage from a battery cell within the unit.

Personal Protective Equipment

- **Eye/Face protection:** Eye protection is not required under recommended use.
 - o Wear safety glasses if handling a leaking or ruptured cell or battery.
- **Skin protection:** Skin protection is not required under recommended use.
 - o Wear laminate film gloves and sleeves if handling a leaking or ruptured cell. Soiled clothing should be washed thoroughly prior to re-use.
- **Respiratory protection:** Respiratory protection is not required under recommended use.
 - o If handling a leaking or ruptured cell and vapors or fumes are generated, utilize an approved half-face respirator with organic vapor/acid gas/particulate cartridge.
- **Control of environmental exposure:** Do not let product release to the environment.

Section 9: Physical and Chemical Properties

Appearance:	Solid
Odour:	None
Odour Threshold:	N/A
pH:	N/A
Melting Point & Freezing Point:	N/A
Initial Boiling Point and Boiling Range:	100°C
Flash Point:	N/A
Evaporation Rate:	N/A
Flammability (solid/gas):	Not flammable under normal conditions
Upper/Lower Explosion Limit:	N/A
Vapour Pressure:	N/A
Vapour Density:	N/A
Relative Density:	<i>Not available</i>
Water Solubility:	Not soluble
Partition Coefficient: n-octanol/water:	N/A
Auto-Ignition Temperature:	100°C
Decomposition Temperature:	80°C
Viscosity:	N/A
Oxidizing Properties:	N/A

Volatile Organic Compounds (VOC)
Concentration:

N/A

Section 10: Stability and Reactivity

- **Reactivity:** No hazardous reactions if stored and handled as prescribed/indicated.
- **Chemical stability:** Stable under recommended storage and use conditions.
- **Possibility of hazardous reactions:** Exothermic reaction. Reacts with strong acids and heat.
- **Conditions to avoid:** Keep away from open flames, hot surfaces and sources of ignition. Do not puncture, crush or incinerate.
- **Incompatible materials:** Strong acids
- **Hazardous decomposition products:** Products of combustion can include hydrofluoric acid, carbon dioxide, carbon monoxide, soot, oxides, and oxides of Nitrogen (NO_x). In the event of fire: see Section 5.

Section 11: Toxicological Information

Information on Toxicological Effects: The hazardous components of this unit are contained within a sealed unit. The hazardous contents are caustic alkaline electrolytes contained in cells with lithium metal oxide cathodes, graphite and carbon anodes, binders and various organic carbonates.

The following information is **only applicable** if:

- A cell or battery leaks;
- A cell or battery is venting; or
- A cell or battery is mechanically, electrically or physically abused/damaged.

Personal routes of entry: Inhalation, skin contact, eye contact, ingestion.

- **Acute Toxicity:** Toxic fumes/gases are not generated under normal or fault conditions.
- **Inhalation:** Inhalation of vapors from a leaking cell is expected to cause severe irritation of the mouth and upper respiratory tract with a burning sensation, pain, burns and inflammation in the nose and throat; there may also be coughing or difficulty breathing.
- **Skin:** The electrolyte contained within a cell is a corrosive liquid and it is expected that it would cause skin burns or severe irritation to the skin if not washed off immediately. Correct handling procedures should minimize the risk of skin irritation. People with pre-existing skin conditions, such as dermatitis, should take extreme care so as not to exacerbate any conditions.
- **Eye:** The electrolyte contained within a cell is a corrosive liquid and it is expected that it would cause irreversible damage to the eyes. Contact may cause corneal burns. Effects may be slow to heal after eye contact.
- **Ingestion:** The electrolyte contained within a cell is a corrosive liquid. Ingestion of this electrolyte would be harmful. Swallowing may result in nausea, vomiting, diarrhea, abdominal pain and chemical burns to the gastrointestinal tract. During normal usage ingestion should not be a means of exposure.
- **Skin corrosion/irritation:** The electrolyte contained within a cell is classified as a corrosive liquid and is expected to exhibit dermal corrosivity and/or irritation.
- **Serious eye damage/eye irritation:** The electrolyte contained within a cell is classified as a corrosive liquid and is expected to exhibit eye damage and/or irritation.
- **Respiratory or skin sensitization:** The electrolyte contained within a cell is not expected to be a respiratory tract or skin sensitizer.
- **Germ cell mutagenicity:** The electrolyte contained within a cell is not expected to be mutagenic.

- **Carcinogenicity:** The electrolyte contained within a cell is not expected to be a carcinogen. The cathode electrode contains Nickel compounds and may contain cobalt, manganese, iron and/or phosphate. Some of these components are classified as IARC 2B – possibly carcinogenic to humans, however they do not pose a threat when contained in the cell or battery sealed unit.
- **Reproductive toxicity:** The electrolyte contained within the cell is not expected to be a reproductive toxin.
- **Developmental toxicity / teratogenicity:** The electrolyte contained within the cell is not expected to be a teratogen.
- **Specific target organ toxicity – single exposure:** The electrolyte contained within the cell is corrosive and may cause respiratory and dermal irritation.
 - Inhalation: May cause respiratory irritation. Inhalation of vapors may lead to severe irritation of the mouth and upper respiratory tract with a burning sensation, pain, burns and inflammation in the nose and throat; there may also be coughing or difficulty breathing.
 - Dermal: May cause dermal irritation or burns.
- **Specific target organ toxicity – repeated exposure:** The cells are not expected to cause organ damage from prolonged or repeated exposure.
- **Aspiration hazard:** The cells are not classified as an aspiration hazard.

Section 12: Ecological Information

- **Toxicity:** *No data available*
- **Persistence and degradability:** *No data available*
- **Bioaccumulation / Bioconcentration:** *No data available*
- **Mobility in soil:** *No data available*
- **Results of PBT and vPvB assessment:** *Not available as chemical safety assessment, not required / not conducted*
- **Other adverse effects:** *No data available*

Section 13: Disposal Considerations

Waste Treatment Methods:

- **Recycling:** Please consult with manufacturer.
- **Unusable Product:** Please consult with manufacturer.
- **Contaminated packaging:** Dispose of in accordance with local regulations.

Section 14: Transport Information

Department of Transportation (Australia)	
UN/NA Number	UN3480
Class	9
Packing Group	N/A
Proper Shipping Name	Lithium-ion battery
Marine Pollutant	No
Poison Inhalation Hazard	No

International Maritime Dangerous Goods	
UN/NA Number	UN3480
Class	9
Packing Group	N/A
Proper Shipping Name	Lithium-ion battery
Marine Pollutant	No
Poison Inhalation Hazard	No
International Air Transportation Association	
UN/NA Number	UN3480
Class	9
Packing Group	N/A
Proper Shipping Name	Lithium-ion battery
Marine Pollutant	No
Poison Inhalation Hazard	No

Section 15: Regulatory Information

- AUS/NZ SUSMP: Not applicable
- AICS: All components are listed with the AICS.
- HSNO: Not applicable
- NOHSC:10008 Risk Phrases:
 - o R34: Causes Burns.
 - o S1: Keep locked up.
 - o S2: Keep out of reach of children.
 - o S23: Do not breathe vapor.
 - o S24/25: Avoid contact with skin and eyes.
 - o S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
 - o S27/28: After contact with skin, take off immediately all contaminated clothing and wash immediately with plenty of water.
 - o S36/37/39: Wear suitable protective clothing, gloves and eye/face protection.
 - o S56: Dispose of this material and its container at hazardous waste or special waste collection point.
 - o S62: If swallowed, DO NOT induce vomiting: seek medical advice immediately and show this container or label.
 - o S64: If swallowed, rinse mouth with water (Only if the person is conscious).

Section 16: Other Information

HMIS Rating*:

- Health Hazard: 2
- Flammability: 2
- Physical Hazard: 1
- Personal Protection: None

NFPA 704 Rating*:

- Health Hazard: 2
- Fire Hazard: 2
- Reactivity Hazard: 2
- Special Hazard: None

*All components are sealed and will not be released without major disturbance

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