

SAFTY DATA SHEET

1. Identification of Material and Suppliers.

1.1 Product Identifier:

Product Name: LiFe4833P / LiFe2433P Li Ion Battery Pack

1.2 Details if the supplier and Products

Supplier Name: PowerPlus Energy Pty Ltd
 Address: 4/21 Power Rd Bayswater Vic 3154
 Phone: (04) 2982 9000
 Email: info@powerplus-energy.com.au
 Website: www.powerplus-energy.com.au

2. Hazards Identification.

2.1 Classification of the substance or mixture:

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

2.2 Label elements:

No signal word, pictograms, hazard or precautionary statements have been allocated.

2.3 Other Hazards:

For the battery cell, chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage. However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress by misuse, the gas release vent will be operated. The battery cell case will be breached at the extreme. Hazardous materials may be released. Moreover, if heated strongly by the surrounding fire, acrid or harmful fume may be emitted.

3. Composition/ Information on Ingredients.

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content
LITHIUM IRON PHOSPHATE	15365-14-7	-	22.4 to 24.8%
IRON	7439-89-6	231-096-4	16 to 19.2%
ADDITIVE(S)	-	-	Remainder
CARBON BLACK	1333-86-4	215-609-9	12 to 13.2%
2,5-FURANDIONE, POLYMER WITH ETHENYLBENZENE	9011-13-6	-	4.5 to 9.3%
COPPER	7440-50-8	231-159-6	7.2 to 8%
ETHYL METHYL CARBONATE	623-53-0	-	4 to 5.6%
POLYBUTADIENE, PHENYL TERMINATED	25038-44-2	-	1.6 to 4.7%
CARBONIC ACID, DIMETHYL ESTER	616-38-6	210-478-4	2.4 to 2.9%
POLYVINYL CHLORIDE (PVC)	9002-86-2	618-338-8	2%
LITHIUM HEXAFLUORO PHOSPHATE	21324-40-3	244-334-7	1.2 to 1.4%
POLYVINYL ACETATE COPOLYMER	24937-78-8	607-457-0	0.1%
ALUMINIUM FOIL	7429-90-5	-	3.2 to 3.6%
ETHYLENE CARBONATE	-	-	2 to 2.4%
POLYPROPYLENE 9003-07-0 618-352-4 1.6 to 2.4%	9003-07-0	618-352-4	1.6 to 2.4%
NICKEL HYDRIDE	14332-32-2	-	0.9%
POLYVINYLIDENE FLUORIDE	24937-79-9	607-458-6	0.7 to 0.9%
STYRENE - BUTADIENE COPOLYMER 9003-55-8 618-370-2 0.3 to 0.4%	9003-55-8	618-370-2	0.3 to 0.4%
CARBOXYMETHYL CELLULOSE	9000-11-7	-	0.2%

4. First Aid Measures.

4.1 Description of first aid measures:

- Eye:** Exposure is considered unlikely unless casing is damaged. Flush gently with running water. Seek medical attention if irritation develops.
- Inhalation:** Exposure is considered unlikely. Due to product form / nature of use, an inhalation hazard is not anticipated.
- Skin:** Exposure is considered unlikely unless casing is damaged. Gently flush affected areas with water. Seek medical attention if irritation develops.
- Ingestion:** For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting. Ingestion is considered unlikely due to product form.
- First aid facilities:** Eye wash facilities should be available.

4.2 Most important symptoms and effects, both acute and delayed:

Adverse effects not expected from this product. Exposure to battery contents may cause irritation and potential burns.

4.3 Immediate medical attention and special treatment needed:

Treat symptomatically.

5. Fire Fighting Measures.

5.1 Extinguishing media:

Dry agent. Do NOT use water. Prevent contamination of drains and waterways.

5.2 Special hazards arising from the substance or mixture

Contents react with water. May explode if exposed to high temperatures due to pressure build up in battery casing. Lithium may burn in a fire situation and may be ejected from the battery. Damaged cells may evolve toxic and flammable vapours.

5.3 Advice for fire fighters:

Evacuate area and contact emergency services. Toxic gases may be evolved in a fire situation. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

5.4 Hazchem code:

4W

4 Dry Agent (water MUST NOT be allowed to come into contact with substance).

W

Risk of violent reaction or explosion. Wear liquid-tight chemical protective clothing and breathing apparatus. Contain spill and run-off.

6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Wear Personal Protective Equipment (PPE) as detailed in section 8 of the SDS.

6.2 Environmental precautions:

Prevent product from entering drains and waterways.

6.3 Methods of cleaning up:

If spilt, collect and reuse where possible. If battery is broken or damaged, absorb liquid with sand or similar. Contain spillage, then collect and place in suitable containers for disposal. CAUTION: Avoid exposure to contents.

6.4 Reference to other sections:

6.5 See Sections 8 and 13 for exposure controls and disposal.

7. Handling and Storage.

7.1 Precautions for safe handling:

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

7.2 Conditions for safe storage, including any incompatibilities:

Store tightly sealed in a cool, dry, well ventilated area, removed from water, incompatible substances, heat or ignition sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Check regularly for leaks or spills.

7.3 Specific end use(s)

No information provided.

8. Exposure Controls / Personal Protection.

8.1 Control parameters

Exposure standards:

Ingredient	Reference	TWA		STEL	
		ppm	mg/m ³	ppm	mg/m ³
Carbon black	SWA (AUS)	-	3	-	-
Copper (fume)	SWA (AUS)	-	0.2	-	-
Copper, dusts & mists (as Cu)	SWA (AUS)	-	1	-	-
Fluorides, as F	SWA (AUS)	-	2.5	-	-
Iron oxide fume (Fe ₂ O ₃) (as Fe)	SWA (AUS)	-	5	-	-
Iron salts, soluble, as Fe	SWA (AUS)	-	1	-	-
Vinyl acetate	SWA (AUS)	10	35	20	70

Biological limits:

Ingredient	Determinant	Sampling Time	BEI
POLYVINYLIDENE FLUORIDE	Fluoride in urine	Prior to shift	2 mg/L
	Fluoride in urine	End of shift	3 mg/L

8.2 Exposure controls:

Engineering controls Avoid inhalation. Use in well ventilated areas.

8.3 PPE

Eye / Face Not required under normal conditions of use.
Hands Wear PVC or rubber gloves.
Body Not required under normal conditions of use.
Respiratory Not required under normal conditions of use.

9. Physical and Chemical Properties.

9.1 Information on basic physical and chemical properties

Appearance	SOLID (ENCLOSED)	Melting point	NOT AVAILABLE
Odour	SLIGHT ODOUR	Evaporation rate	NOT AVAILABLE
Flammability	NON FLAMMABLE	pH	NOT AVAILABLE
Solubility (water)	REACTS	Specific gravity	NOT AVAILABLE
Flash point	NOT RELEVANT	Vapour pressure	NOT AVAILABLE
Boiling point	NOT AVAILABLE	Upper explosion limit	NOT AVAILABLE
Vapour density	NOT AVAILABLE	Lower explosion limit	NOT AVAILABLE
Partition coefficient	NOT AVAILABLE	Auto ignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE	Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE	Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE		

10. Stability and Reactivity.

10.1 Reactivity:

Carefully review all information provided in sections 10.2 to 10.6.

10.2 Chemical stability:

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions:

Polymerization will not occur.

10.4 Conditions to avoid.

Heat above 70°C or incinerate. Deform. Mutilate. Crush. Pierce. Disassemble. Recharge. Short circuit. Expose over a long period to humid conditions.

10.5 Incompatible materials:

Battery contents are incompatible with water (evolving flammable gas), oxidising agents (e.g. hypochlorites), acids (e.g. nitric acid), alkalis (e.g. sodium hydroxide), heat and ignition sources.

10.6 Hazardous decomposition products

May evolve hydrogen and lithium oxides when heated to decomposition.

11. Toxicological Information

11.1 Information on toxicological effects

11.2 Acute toxicity

No specific acute toxicity data exists for this product. Batteries consist of a hermetically sealed metallic container containing a number of chemicals and materials of construction that may be hazardous upon release. Over exposure considered unlikely unless battery ruptures and contact with contents occurs. Contents may be harmful.

11.3 Information available for the ingredient(s):

Ingredient	Oral Toxicity (LD50)	Dermal Toxicity (LD50)	Inhalation Toxicity (LC50)
Iron	20000 mg/kg (guinea)	-	-
Carbon Black	> 8000 mg/kg (rat)	-	-
2,5-FURANDIONE, POLYMER WITH ETHENYL BENZENE	21000 mg/kg (rat)	-	-
COPPER	-	> 2000 mg/kg (rat)	-
CARBONIC ACID, DIMETHYL ESTER	13000 mg/kg (rat)	> 5000 mg/kg (rabbit)	-

Skin

Not classified as a skin irritant unless the battery ruptures. Contact with contents may cause irritation, redness, dermatitis and possible burns with prolonged contact.

Eye

Not classified as an eye irritant unless the battery ruptures. Contact with contents may cause irritation, redness and possible burns with prolonged contact.

Sensitisation

Not classified as causing skin or respiratory sensitisation.

Mutagenicity

No evidence of mutagenic effects.

Carcinogenicity

No evidence of carcinogenic effects.

Reproductive

No relevant or reliable studies were identified.

STOT - single Not classified as causing organ damage from single exposure due to the product form and nature of use.

Exposure

Exposure to internal contents is not anticipated unless the battery ruptures. Exposure to contents may cause respiratory irritation.

STOT – repeated Not expected to cause organ effects from repeated exposure due to the product form and nature of use. Exposure to internal contents is not anticipated unless the battery ruptures.

Aspiration

Not relevant.

12. Ecological Information.

12.1 Toxicity

This product may be hazardous to the environment.

12.2 Persistence and degradability

This product is not readily biodegradable.

12.3 Bioaccumulative potential

Limited information was available at the time of this review.

12.4 Mobility in soil

This product has low mobility in soil.

12.5 Other adverse effects

No information provided.

13. Disposal Considerations.

13.1 Waste treatment methods

Waste disposal

Reuse or recycle where possible. Return to manufacturer/supplier. Contact your state EPA or the manufacturer for additional information.

Legislation

Dispose of in accordance with relevant local legislation.

14. Transport Information.

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE



14.1 UN Number	3480	3480	3480
14.2 Proper Shipping Name	LITHIUM ION BATTERIES (including lithium ion polymer batteries)	LITHIUM ION BATTERIES (including lithium ion polymer batteries)	LITHIUM ION BATTERIES (including lithium ion polymer batteries)
14.3 Transport hazard class	9	9	9

14.4 Environmental hazards

Not a Marine Pollutant

14.5 Special precautions for user

Hazchem code 4W

15. Regulatory Information.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

Poison schedule

A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

15.2 Classifications

15.3 Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

The classifications and phrases listed below are based on the Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)].

Hazard codes None allocated.

Risk phrases None allocated.

Safety phrases None allocated.

Inventory listing(s) **AUSTRALIA: AICS (Australian Inventory of Chemical Substances)** All components are listed on AICS, or are exempt.

16. Other Information.

Additional information:

EXPOSURE STANDARDS - TIME WEIGHTED AVERAGES: Exposure standards are established on the premise of an 8 hour work period of normal intensity, under normal climatic conditions and where a 16 hour break between shifts exists to enable the body to eliminate absorbed contaminants. In the following circumstances, exposure standards must be reduced: Strenuous work conditions; hot, humid climates; high altitude conditions; extended shifts (which increase the exposure period and shorten the period of recuperation).

WORKPLACE CONTROLS AND PRACTICES: Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:

The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:

It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations:

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m ³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

[End of SDS]