Polymer Lithium Ion Battery

Section 1

Identification

1.1 Product identifier

Lithium-ion cells and battery packs	Li-Po
Model	FT532141P-2S/450mAh 7.4V
Watt-hour rate	3.33Wh
Manufacturer	Hangzhou Future Power Technology CO., Ltd.

1.2 Product use

Recommended Use:	Electrochemical energy storage - consumer use
Uses advised against:	Not applicable

1.3 Supplier

FE Sports
160 Bluestone Cct
Seventeen Mile Rocks
Queensland 4073
Australia

Website: https://www.fesports.com.au

1.4 Emergency telephone numbers and contact info:

+61- 411139383 or +61- 417760320

WHS@fesports.com.au / productsafety@fesports.com.au

Or

Local Poisons Information Centre

Section 2

Hazards Identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP]

- This product is considered a manufactured article, and not classified as hazardous according to EC 1272/2008.

Classification according to Directive 67/548/EEC

- This product is not classified as hazardous according to Directive 67/548/EEC.

Classification according to Directive 1999/45/EC

- This product is not classified as hazardous according to Directive 1999/45/EC.

2.2 Label elements

Symbols / Pictograms	No pictogram is used
Signal word	No signal word is used
Hazard statements	Not classified
Precautionary statements	Not classified

2.3 Other hazards

Primary route(s) to exposure

This product is safe with normal use. Exposure to the ingredients contained within and/or their combustion products could be harmful. *Risk of exposure occurs only if the battery is mechanically, thermally, or electrically abused and the enclosure is ruptured.* If this occurs, exposure to electrolyte can occur by inhalation, ingestion, eye contact, and skin contact. The battery should not be opened or burned.

Inhalation

- Inhalation of material from a sealed battery/cell is not an expected route of exposure. Vapours or mists from a ruptured battery/cell may cause respiratory irritation.

Ingestion

- Swallowing of material from a sealed battery/cell is not an expected route of exposure. Swallowing the contents of a ruptured cell may cause serious chemical burns of the mouth, oesophagus, and gastrointestinal tract.

Skin

- Contact between the skin and battery will not cause harm.
- Contact with the contents of a ruptured cell/battery can cause severe irritation or burns to the skin.

Eye

- Contact between the eye and battery will not cause harm.
- Contact with the contents of a ruptured cell/battery can cause severe irritation or burns to the eye.

Section 3

Ingredients

3.1 Substances:

Product is a manufactured article. Exposure to interior of article is not expected with normal use.

3.2 Mixture:

Product is a manufactured article. Exposure to hazardous ingredients is not expected with normal use.

Composition for Li-ion Cell used inside product.

Constituent composition				
Sub-component	**Homogenous Material Weight**	**Substance**	**CAS number**	**Homogenous Level**
Cathode Powder	41.51%	Cobalt	7440-48-4	75.00%
		Lithium	7439-93-2	25.00%
Aluminium Foil	0.37%	Aluminium	7429-90-5	100.00%
Aluminium Polar Lead	0.05%	Aluminium	7429-90-5	100.00%
Polypropolene Insulation Sheet	0.01%	Polypropylene C_3H_6	9003-07-0	100.00%
Anode Powder	21.27%	Carbon	7440-44-0	100.00%
Copper Foil	8.41%	Copper	7440-50-8	100.00%
Nickel Polar Lead	0.27%	Nickel	7440-02-0	100.00%
Polypropylene Insulation Sheet	0.01%	Polypropylene C_3H_6	9003-07-0	100.00%
Polyimide	0.75%	Polyimide or Kaptone	60842-76-4	100.00%
Diaphragm	1.19%	Polyethylene $(C_2H_4)_n$	9002-88-4	100.00%
Aluminium Polypropylene	0.60%	Aluminium	7429-90-5	100.00%
	4.94%	Polypropylene C_3H_6	9003-07-0	100.00%
Carbonate	20.61%	Ethylene Cellulose $C_3H_4O_3$	9004-57-3	39.07%
		Lithium hexafluorophosphate $LiPF_6$	21324-40-3	30.30%
		Diethylcarbonate for synthesis $CO(OC_2H_5)_2$	105-58-8	30.63%

Section 4

First Aid Measures

4.1 Description of first aid measures:

- **General advice**
  If in any doubt, or when symptoms persist, seek medical attention. Contact of electrolyte and extruded lithium with skin and eyes should be avoided.

- **Eyes**
  Not an expected route of exposure. Following eye contact, cautiously rinse affected eye with clean lukewarm water for at least 30 minutes. Remove contact lenses, if present and easy to remove. If eye irritation persists, seek medical attention.

- **Skin**
  Not expected to present as skin hazard under anticipated conditions of normal use. Following skin contact, immediately remove contaminated clothing and wash skin with copious amounts of soap and water. If irritation or pain persists, seek medical attention.

- **Ingestion**
  Following ingestion, rinse out mouth with water. DO NOT INDUCE VOMITING. Seek immediate medical attention.

- **Inhalation**
  Not an expected route of exposure. If inhaled electrolyte, remove victim to fresh air and remove source of contamination from area. Keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms, seek medical attention immediately.

4.2 Most important symptoms and effects, both acute and delayed

Acute effects

- Direct contact of internal electrolyte gel with eyes may cause severe burns or blindness.
- Direct contact of internal electrolyte gel with the skin may cause skin irritation or damaging burns.
- Vapor or mist can irritate the eyes, mucous membranes, and respiratory tract. Exposure can cause nausea, dizziness, and headache.

Chronic/delayed effects

- Overexposure to the internal electrolyte gel may cause reproductive disorder(s) based on tests with laboratory animals. Target organs affected could be kidneys, central nervous system, eyes, and male reproductive system.
- Overexposure may cause cancer. Target organs are the brain, intestine, mammary gland, haematopoietic system, and kidneys.

4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically

Section 5

Firefighting Measures

5.1 Extinguishing media:

SUITABLE EXTINGUISHING EQUIPMENT

- Sand
- Water
- Dry chemical powder
- Carbon dioxide (CO2) and
- Foam

are most effective to extinguish a battery fire. For small fires use only sand, dry chemical powder, CO2 or regular foam. Continuously apply until fire is extinguished.

For large fires, use copious quantities of water spray. Continuously apply media until fire is extinguished.

Large fires should only be extinguished by trained fire fighters.

UNSUITABLE EXTINGUISHING EQUIPMENT

- Do not use small quantities of water.
- If water spray is used, it must be continually applied until fire is extinguished.

5.2 Special hazards arising from the substance or mixture

- Battery may vent when subjected to excessive heat-exposing, fire or over voltage condition.
- Risk of explosion by fire is anticipated if batteries are disposed of in fire. Firefighting water runoff and dilution water may be toxic and corrosive and may cause adverse environmental impacts.
- The interaction of water or water vapour with electrolyte may result in the generation of hydrogen and hydrogen fluoride (HF) gas.
- Contact with battery electrolyte may be irritating to the skin, eyes and mucous membranes. Fire will produce irritating, corrosive and/or toxic gases. Fumes may cause dizziness or suffocation.
- Lithium-ion batteries contain flammable liquid electrolyte that may vent, ignite and produce sparks when subjected to high temperatures, when damaged or abused.
- Burning cells may ignite other cells or objects within close proximity.

5.3 Advice for firefighters

GENERAL INFORMATION

- Always wear full fire prevention gear. Collect extinguishing water to prevent it from draining into the sewer system. Dispose of contaminated water used for extinction and the remains of the fire according to applicable regulations.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS

- Normal firefighting clothing i.e.
  - fire kit (BS EN 469),
  - gloves (BS EN 659) and
  - boots (HO specification A29 and A30) in combination with
  - breathing apparatus (BS EN 137)

    (self-contained open circuit positive pressure compressed air)

Section 6

Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

FOR NON-EMERGENCY PERSONNEL

- Alert personnel responsible coordinating the response to such emergencies.
- Move away from the area affected by the accident if you are not in possession of the personal protective equipment listed in Section 8.

FOR EMERGENCY RESPONDERS

- Evacuate all personnel not suitably equipped to deal with the emergency.
- Wear suitable protective clothing and equipment, as set out in Section 8 of the safety data sheet, to prevent any contamination of the skin, eyes and personal clothing. Stop leak if safe to do so. Do not permit workers to access the area affected by the accident until safe conditions have been restored.
- Ventilate the affected areas.

6.2 Environmental precautions

The product *must not*

- penetrate into the sewer system or
- come into contact with surface water or ground water.

6.3 Methods and material for containment and cleaning up

- Collect the leaked product into a suitable container. Evaluate the compatibility of the container to be used, by checking section 10. Absorb the remainder with inert absorbent material.
- Make sure the leakage site is well aired.
- Contaminated material should be disposed of in compliance with the provisions set forth in point 13.

6.4 Reference to other sections

Any information on personal protection and disposal is given in sections 8 and 13.

Section 7

Handling and Storage

7.1 Precautions for safe handling

- Batteries are designed to be recharged. However, improperly charging a battery may cause the battery to explode or flame. When charging the battery, use dedicated chargers and follow the specified conditions.
- Never disassemble or modify a battery.
- Do not immerse, throw, or wet a battery in water.
- Should a battery unintentionally be crushed, thus releasing its contents, rubber gloves must be used to handle all battery components. Avoid the inhalation of any vapours that may be emitted.
- Short circuit causes heating. In addition, short circuit reduces the life of the battery and can lead to ignition of surrounding materials. Physical contact with to short-circuited battery can cause skin burn.
- Avoid reversing the battery polarity, which can cause the battery to be damaged or explode.
- In the event of skin or eye exposure to the electrolyte, refer to Section 4, First Aid Measures.

7.2 Conditions for safe storage, including any incompatibilities

- Batteries should be separated from other materials and stored in a non-combustible, well ventilated, sprinkler-protected structure with sufficient clearance between walls and battery stacks. Do not place batteries near heating equipment, nor expose to direct sunlight for long periods.
- Do not store batteries above 35℃ or below –20℃. Store batteries in a cool (about 20±5℃) in a long time, dry and ventilated area that is subject to little temperature change. Elevated temperatures can result in reduced battery cycle life. Battery exposure to temperatures in excess of 60℃ will result in the battery venting flammable liquid and gases.
- Keep batteries in original package until use and do not jumble them.

7.3 Specific end use(s)

No specific end uses are intended other than the relevant use/s set out in Section 1.2 of this safety data sheet.

Section 8

Exposure controls / personal protection

8.1 Control parameters

Occupational exposure limits

- Exposures to hazardous substances are not expected when product is used for its intended purpose.
- See Section 8.2 for ingredients with limit values that require monitoring at the workplace if a battery case has been compromised or damaged.

Biological limit values

- Exposures to hazardous substances are not expected when product is used for its intended purpose.

Exposure limits at intended use

- Exposures to hazardous substances are not expected when product is used for its intended purpose.

Derived No Effect Level (DNEL) / Predicted No Effect Concentration (PNEC) values

- Not applicable.

Risk management measures according to used control banding approach

- Not applicable.

8.2 Ingredients with limit values

- None stated with normal use.

8.3 Exposure controls

Appropriate engineering controls

Not necessary under normal conditions. Use good chemical hygiene practice. Wash hands thoroughly after cleaning-up a battery spill caused by leaking battery. No eating, drinking, or smoking in battery storage area.

Personal protective equipment

Eye/face protection:

- Not necessary under conditions of normal use. In case of battery rupture or leakage, use safety glasses with side shields if handling a leaking or ruptured battery.

Skin protection:

- Not necessary under conditions of normal use. In case of battery rupture or leakage, wear rubber apron and use chemical resistant rubber gloves if handling a leaking or ruptured battery. Inspect gloves prior to use.
- Remove dirty gloves by appropriate technique. Do not touch outer surface of glove.

Respiratory protection:

- Not necessary under conditions of normal use. In case of battery venting or rupture, inside an enclosed space, leave the area immediately.

8.4 Environmental exposure controls

Comply with the handling and storage guidelines in Section 7. Do not allow any spilled electrolyte from damaged product in any sewer, on the ground, or into any body of water.

Section 9

Physical and Chemical properties

9.1 Information on the basic physical and chemical properties

Property	Condition
Colour	Black
Odour	Odourless
Odour threshold	N/a
pH	N/a
Melting Point / freezing point	N/a
Initial boiling point / boiling range	N/a
Flash point	N/a
Evaporation rate	N/a
Flammability	N/a
Flammability limit in air	N/a
Vapour pressure	N/a
Vapour density	N/a
Density	N/a
Specific gravity	N/a
Solubility in water	Insoluble
Partition coefficient: n-octanol/water	N/a
Auto-ignition temperature	N/a
Decomposition temperature	N/a
Viscosity	N/a
Explosive properties	N/a
Oxidising properties	N/a

9.2 Other information

None stated

Section 10

Stability and reactivity

10.1 Reactivity

Stable under recommended storage and handling conditions (see Section 7, Handling and storage)

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

A shorted lithium battery can cause thermal and chemical burns upon contact with the skin. If a battery is severely heated by a surrounding fire, acrid or harmful fumes may be emitted.

If leaked, do not allow contact with strong oxidizers, mineral acids, strong alkalis, halogenated hydrocarbons.

10.4 Conditions to avoid

Avoid mechanical or electrical abuse, including external short circuit of battery, deformation by crushing, direct sunlight, high humidity, temperatures exceeding 60°C, puncture, sources of ignition, or installation with incorrect polarity.

10.5 Incompatible materials

Strong bases, combustible organic materials, reducing agents, strong oxidizers, sea water or other electrically conductive liquids, and open flame.

10.5 Hazardous decomposition products

A compromised battery may emit irritating or toxic fumes and gases, including metallic oxide, hydrogen fluoride, carbon monoxide, and carbon monoxide.

Section 11

Toxicological information

11.1 Information on toxicological effects

The battery does not elicit toxicological properties during routine handling and use. If the battery is opened through misuse or damage, discard immediately. Internal components of cells are irritating and sensitive.

Skin corrosion/irritation	Non-irritating to the skin under normal conditions. The electrolytes contained in this battery can irritate eyes with any contact. Prolonged contact with the skin or mucous membranes may cause irritation.
Serious eye damage/irritation	Non-irritating to the skin under normal conditions
Teratogenicity	No information available.
Carcinogenicity	Risk of exposure occurs only if the battery enclosure is compromised.
Mutagenicity	No information available.
Reproductive toxicity	Risk of exposure occurs only if the battery enclosure is compromised.

Section 12

Ecological information

12.1 Toxicity

- When properly used and disposed, the battery does not present environmental hazard.
- The battery does not contain mercury, cadmium, or lead.
- Do not let internal components enter marine environment. Avoid releasing to water ways, wastewater or ground water.

12.2 Persistence and degradability

- Not readily biodegradable.

12.3 Bioaccumulative potential

- No information available.

12.4 Mobility in soil

- No information available.

12.5 Results of PBT and vPvB assessment

- Not applicable.

12.6 Other adverse effects

- Batteries and cells released in the environment will slowly degrade and may release toxic or harmful substances. Batteries should be disposed or recycled according to local regulations.

Section 13

Disposal considerations

13.1 Waste treatment methods

Recycling is encouraged. Do not throw out a used battery or cell in the landfill. Electrolyte should not be dumped into any sewers, on the ground, or into any body of water. Recycle through a qualified recycling company.

The battery should be completely discharged prior to disposal and/or the terminals taped or capped to prevent short circuit. When completely discharged it is not considered electrically hazardous.

Section 14

Transport information

14.1 UN Number

UN Number: **UN 3480** **and** **UN 3481**

14.2 Proper Shipping Name:

Polymer Lithium Ion Battery
Lithium-Ion Batteries Contained in Equipment

14.3 Hazard Class

9

14.4 Packing Group:

Products are prevented from being short-circuited with each other and are packaged in an appropriate condition which satisfies packing **Group II** performance level.

14.5 Environmental Hazards

Dangerous Goods

14.6 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Worldwide **air** transportation:

The goods are packaged according to Section II of Packing Instructions 965(IB), 966 and 967 of the 63rd edition of the IATA Dangerous Goods Regulations. Lithium-ion batteries may be air transported on CARGO AIRCRAFT ONLY and are forbidden in passenger aircraft.

Worldwide **sea** transportation:

The Watt-hour rating is no more than 20Wh/cell and 100Wh/battery pack can be treated as "non-dangerous goods" by the United Nations Recommendations on the Transport of Dangerous Goods/Special Provision 188 of IMDG Code, 2020 Edition (Amdt.40-20)

14.5 Labelling

Use Class 9 Miscellaneous Dangerous Goods and UN Identification labels for transportation of lithium-ion batteries which are assigned Class 9. Refer to relevant transportation documents.

Lithium-ion batteries, under UN3480, PI 965, Section 1A, must be declared as CARGO AIRCRAFT ONLY (CAO) *if shipped by air.*

Section 15

Regulatory information

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

International: This SDS conforms to European Union (EU), the International Standards Organization (ISO) and the International Labour Organization (ILO)

USA: This SDS meets/exceeds OSHA requirements.

UL certification: The Future Power batteries are registered by Underwriters Laboratories, Northbrook, U.S.A. under file MH 30047.

PS. 1

When large amount of batteries are transported by ship, vehicle and railroad, avoid high temperature and dew condensation.

PS. 2

Avoid transportation which may cause damage of package.

Section 16

Other information

16.1 Revision summary

09 Nov 2023 New Document

16.2 Terms & Definitions

Key or legend to abbreviations and acronyms that may or may not be used in the SDS:

AICS	Australian Inventory of Chemical Substances
Ceiling	Maximum limit value
DSL/NDSL	Canadian Domestic Substances List / Non-Domestic Substances List
ENCS	Japan Existing and New Chemical Substances
EINECS/ELINCS	European Inventory of Existing Chemical Substances / European List of Notified Chemical Substances
IATA	International Air Transport Association
IECSC	China Inventory of Existing Chemical Substances
IMDG	International Maritime Dangerous Goods
KECL	Korean Existing and Evaluated Chemical Substances
NPRI	National Pollutant Release Inventory
STEL	Short Term Exposure Limit
TSCA	United States Toxic Substances Control Act
STOT RE	Specific Target Organ Toxicity – repeated exposure
TWA	Time Weighted Average
WHMIS	Workplace Hazardous Materials Information System

END OF SAFETY DATA SHEET