

SECTION 1: Identification of the substance/mixture and the company/undertaking

1.1 Product identifier

Lithium ion cells and battery packs, phosphate-based

1.1.1 Product names

IFR18650EC	U1-12RT	U27-12XP	P75-12
IFR26650EC	U1-12XP	U27-24XP	P30-36
IFR26650PC	U1-24RT	U27-36XP	C576-30
U1-12BMS	U24-12XP	UEV-18XP	20967-00001
U1-12RJ	U24-24XP	P40-24	

1.1.2 Other means of identification

Valence cell/module/battery/pack/system
Rechargeable lithium iron magnesium phosphate battery
Battery module/battery/pack/system
U-Charge module/battery/pack/system
Valence Proven cell

1.2 Relevant identified uses of the substance or mixture and uses advised against

1.2.1 Relevant identified uses

Electrochemical energy storage device: battery cell/module/pack/system.

1.3 Details of the supplier of the safety data sheet

1.3.1 Address

<u>USA</u>	<u>EMEA</u>
Lithium Werks	Lithium Werks
1807 W Braker Lane	Unit 63 Mallusk Enterprise Park
Suite 500	Mallusk Drive,
Austin, TX 78758	Mallusk, Newtownabbey
USA	Co. Antrim,
	Northern Ireland
	BT36 4GN

1.3.2 Telephone

USA: +1 (512) 527 2900
EMEA: +44 (0)28 9084 5400

1.3.3 Contact Form

<https://lithiumwerks.com/contact/>

1.4 Emergency telephone number

ChemTel:
+1 (888) 533-7762 (USA/Canada/Puerto Rico/Virgin Islands)
+01 (813) 248-0585 (International)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

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

This product is not classified as hazardous according to EC 1272/2008 under normal use.

2.1.2 Classification according to Directive 67/548/EEC

This product is not classified as hazardous according to Directive 67/548/EEC under normal use.

2.1.3 Classification according to Directive 1999/45/EC

This product is not classified as hazardous according to Directive 1999/45/EC under normal use.

2.2 Label elements

Not Applicable. This product is not classified as hazardous according to EC 1272/2008 under normal use.

2.3 Other hazards

2.3.1 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 to the point of compromising the enclosure. If this occurs, exposure to the electrolyte solution contained within can occur by inhalation, ingestion, eye contact, and skin contact. The battery should not be opened or burned.

2.3.2 Inhalation

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

2.3.3 Ingestion

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

2.3.4 Skin

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

2.3.5 Eye

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

2.3.6 Chemical compatibility:

Incompatible with conductive liquids, oxidizing agents, reducing agents, acids, and bases.

SECTION 3: Composition/information on ingredients**3.1 Substances**

Product is a manufactured article. Exposure to interior of article is not expected with normal use. Parts enclosed inside this product contain >0.1% w/w of 1,3 propane sultone, EC No. 214-317-9, CAS No. 1120-71-4. Parts enclosed inside this product contain >0.1% w/w dibutyl phthalate, EC No. 201-557-4, CAS No. 84-74-2. Parts enclosed inside this product contain >0.1% w/w N-N dimethylformamide, EC No. 200-679-5, CAS No. 68-12-2.

3.2 Mixtures

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

3.3 USA

This product is an article pursuant to 29 CFR 1910.1200 and, as such, is not subject to the OSHA hazard communication standard requirement.

3.4 Canada

This is not a controlled product under WHMIS. This product meets the definition of a “manufactured article” and is not subject to the regulations of the Hazardous Products Act.

SECTION 4: First aid measures**4.1 Description of first aid measures****4.1.1 Following inhalation**

If contents of an opened battery are inhaled, remove source of contamination and move victim to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration and obtain medical attention.

4.1.2 Following skin contact

Immediately remove contaminated clothing and flush skin thoroughly with soap or mild detergent and copious amounts of water for at least 20 minutes. If irritation or pain persists, seek medical attention.

4.1.3 Following eye contact

Immediately flush the contaminated eye(s) with copious amounts of water for at least 20 minutes. Assure adequate flushing of the eyes by separating the eyelids with finger and thumb. If irritation or pain persists, seek medical attention.

4.1.4 Following ingestion

If the exposed individual is unconscious or rapidly losing consciousness, do not give anything by mouth. If exposed individual is conscious, wash out mouth with water. In all cases, DO NOT INDUCE VOMITING. Quickly transport victim to an emergency care facility.

4.2 Most important symptoms and effects, both acute and delayed

In the event of exposure to the battery/cell contents, the following potential health effects could occur:

4.2.1 Acute effects

Vapor or mist can irritate the eyes, mucous membranes and respiratory tract. Direct contact can cause eye and skin irritation. Exposure can cause nausea, dizziness and headache. The electrolyte solution contained within the battery can be corrosive and cause burns.

4.2.2 Chronic/delayed effects

Overexposure 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 to battery electrolyte may cause cancer. Target organs are the brain, intestine, mammary gland, haematopoietic system and kidney.

4.3 Indication of any immediate medical attention and special treatment needed

See Section 4.1.

SECTION 5: Firefighting measures

5.1 Extinguishing media

5.1.1 Suitable extinguishing media

For small fires use only sand, dry chemical, CO₂, N₂, halon, or regular foam. Continuously apply media until fire is extinguished.

Large fires should only be extinguished by trained fire fighters. For large fires, use copious quantities of water spray. Continuously apply media until fire is extinguished. Move containers from fire area if it can be done without risk.

5.1.2 Unsuitable extinguishing media

Do not use small quantities of water. Do not use water jets or streams on energized high-voltage equipment. If water spray is used, it must be continually applied until fire is extinguished.

5.2 Special hazards arising from the substance or mixture

The interaction of water or water vapor 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

Large lithium ion battery fires should only be extinguished by properly equipped fire fighters with training specific to lithium ion battery fires.

Wear NIOSH/MSHA/EN469-approved self-contained breathing apparatus (SCBA) and protective clothing when fighting chemical fires.

SECTION 6: Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures**

Wear adequate protective equipment according to Section 8. Restrict access to contaminated area until completion of clean-up. Remove sources of ignition and ventilate closed areas.

6.2 Environmental precautions

Do not let product enter drainage system, surface and/or ground-water and soil. Do not flush down sewers or waterways. Consult federal, state, or local authorities for disposal procedures.

6.3 Methods and material for containment and cleaning up**6.3.1 For containment**

Stop the spill if safe to do so. Contain the spilled liquid with dry sand, earth, or approved spill absorber. Clean up spills immediately.

6.3.2 For cleaning up

Absorb the spilled material with inert absorbent material such as dry sand, earth or a commercial absorbing agent. Collect all absorbent material and dispose of per Section 13. Contain used absorbent and broken battery components inside a sealed airtight container. Preferred container material is plastic. Glass containers are not suitable for broken lithium ion battery residues. Wash the affected area with plenty of water and detergent. Properly dispose all contaminated cleaning water.

SECTION 7: Handling and storage**7.1 Precautions for safe handling**

Do not open, disassemble, crush, or burn battery. Do not expose battery to extreme heat or fire. Remove metallic accessories and jewelry when handling live batteries.

7.2 Conditions for safe storage, including any incompatibilities

Store battery in cool, dry area. Avoid storing in or near excessive heat. The recommended storage temperature is -40°C–25°C, not to exceed 75°C. Elevated temperatures can result in shortened battery life. Keep out of reach of children.

7.3 Specific end use(s)

Use only for intended purpose in Section 1.2.

SECTION 8: Exposure controls/personal protection**8.1 Control parameters****8.1.1 Occupational exposure limits**

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

8.1.2 Biological limit values

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

8.1.3 Exposure limits at intended use

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

8.1.4 DNEL/PNEC-values

Not applicable.

8.1.5 Risk management measures according to used control banding approach

Not applicable.

8.2 Exposure controls**8.2.1 Appropriate engineering controls**

Not necessary under normal conditions. Handle broken or leaking batteries in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. Do not eat, drink or smoke while handling leaking batteries.

8.2.2 Personal protective equipment**8.2.2.1 Eye/face protection**

Not necessary under normal conditions. Wear safety glasses or side shields if handling an open or leaking battery.

8.2.2.2 Skin protection

Not necessary under normal conditions. Wear nitrile, neoprene, or natural rubber gloves when handling an open or leaking battery. Inspect gloves prior to use. Change disposable gloves within 30 minutes of obvious contamination by electrolyte. Remove dirty gloves by appropriate technique. Do not touch outer surface of glove.

8.2.2.3 Respiratory protection

Not necessary under normal conditions. In the event battery case has been ruptured inside an enclosed space, use NIOSH approved or equivalent self-contained breathing apparatus.

8.2.3 Environmental exposure controls

Comply with the handling and storage guidelines in Section 7.

SECTION 9: Physical and chemical properties

9.1 Information on the basic physical and chemical properties

9.1.1 Appearance

Appearance:	Battery system, battery module, or cell
Physical state:	Solid
Color:	Various
Granulometry:	Not applicable
Odor:	Odorless
Odor threshold:	Not applicable

9.1.2 Safety relevant basic data

pH:	Not applicable—article
Melting point / freezing point:	Not applicable—article
Initial boiling point and boiling range:	Not applicable—article
Flash point:	Not applicable—article
Evaporation rate:	Not applicable—article
Flammability (solid, gas):	Not applicable—article
Upper/lower flammability or explosive limits:	Not applicable—article
Vapor pressure:	Not applicable—article
Relative density:	Not available
Solubility in water:	Insoluble
Partition coefficient: n-octanol/water:	Not applicable—article
Auto-ignition temperature:	Not applicable—article
Decomposition temperature:	Not applicable—article
Viscosity:	Not applicable—article
Explosive properties:	Not applicable—article
Oxidizing properties:	Not applicable—article

SECTION 10: Stability and reactivity

10.1 Reactivity

Not reactive when used as intended.

10.2 Chemical stability

Stable.

10.3 Possibility of hazardous reactions

Not available.

10.4 Conditions to avoid

Avoid exposing the battery to fire or temperatures above 75°C. Do not disassemble, open, crush, puncture, incinerate, short across the terminals, or install with incorrect polarity. Avoid mechanical or electrical abuse.

10.5 Incompatible materials

Sea water or other electrically conductive liquids.

10.6 Hazardous decomposition products

This product may release toxic fumes if burned or exposed to fire. A compromised battery may release hydrogen fluoride, carbon monoxide, carbon dioxide, and phosphorous oxide fumes.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

11.1.1 Acute Toxicity

Acute oral, dermal, and inhalation toxicity data are not available for this article.

11.1.2 Skin corrosion/irritation

Risk of irritation occurs only if the battery is mechanically, thermally, or electrically abused to the point of compromising the enclosure. If this occurs, irritation to the skin may occur.

11.1.3 Serious eye damage/irritation

Risk of irritation occurs only if the battery is mechanically, thermally, or electrically abused to the point of compromising the enclosure. If this occurs, irritation to the eyes may occur.

11.1.4 Respiratory or skin sensitization

Not available.

11.1.5 Germ cell mutagenicity

Not available.

11.1.6 Carcinogenicity

Risk of exposure occurs only if the battery is mechanically, thermally or electrically abused to the point of compromising the enclosure.

11.1.7 Reproductive toxicity

Risk of exposure occurs only if the battery is mechanically, thermally or electrically abused to the point of compromising the enclosure.

11.1.8 Summary of evaluation of the CMR properties

Not available.

11.1.9 STOT-single exposure

Not available.

11.1.10 STOT-repeated exposure

Not available.

11.1.11 Aspiration hazard

Not available.

SECTION 12: Ecological information

12.1 Toxicity

Not available.

12.2 Persistence and degradability

Not readily biodegradable.

12.3 Bioaccumulative potential

Not available.

12.4 Mobility in soil

Not available.

12.5 Results of PBT and vPvB assessment

Not applicable.

12.6 Other adverse effects

Batteries and cells released in to 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

Battery recycling is encouraged. Waste should not be dumped into any sewers, on the ground, or into any body of water. Store material for disposal as indicated in Section 7.

13.1.1 In the USA

Dispose in accordance with local, state, and federal laws and regulations.

13.1.2 In Canada

Dispose in accordance with local, provincial, and federal laws and regulations.

13.1.3 In Europe

Waste must be disposed of in accordance with relevant EC Directives and national, regional, and local environmental control regulations. For disposal within the EC, the appropriate code according to the European List of Wastes (LoW) should be used.

SECTION 14: Transport information

	Land transport (ADR/RID)	Inland waterway transport (ADN)	Sea transport (IMDG)	Air transport (IATA 60 th ed.)
14.1 UN number	UN3480*	UN3480*	UN3480*	UN3480*
14.2 UN proper shipping name	Lithium ion batteries	Lithium ion batteries	Lithium ion batteries	Lithium ion batteries
14.3 Transport hazard class	9	9	9	9
14.4 Packing group	–	–	–	–
14.5 Environmental hazards	Not applicable	Not applicable	Not applicable	Not applicable

*UN3481 when packed with or contained in the device or apparatus for which the cells or batteries will provide electrical power for its operation. UN3171 for battery-powered vehicles with installed batteries. Refer to relevant regulations for transport guidance.

SECTION 15: Regulatory information

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

This product is not classified as hazardous according to Regulation (EC) No 1272/2008 under normal use.

This product is not classified as hazardous according to Directive 67/548/EEC under normal use.

This product is not classified as hazardous according to Directive 1999/45/EC under normal use.

Per (EC) No 1907/2006 this product contains articles that contain >0.1%w/w of at least one substance of very high concern (SVHC.) As a battery, this product is subject to directive 2006/66/EC.

SECTION 16: Other information

16.1 Date of preparation

January 6, 2020

16.2 Revision summary

May 29, 2014:	New document
April 16, 2015:	Added N ₂ as suitable extinguishing media in 5.1.1. Added U1-12RJ to product names in 1.1.1.
March 28, 2016:	Updated USA Address in 1.3.1. Added substances on ECHA SVHC to 3.1. Added chronic/delayed effects to 4.2.2. Added further guidance for handling contaminated absorbent to 6.3.2. Added further guidance for handling leaking battery to 8.2.1. Added further guidance for glove usage in 8.2.2.2. Removed Packing group identification from 14.4. Added EU REACH and Battery Directive regulatory information to 15.1.
May 21, 2016	Added IFR26650EC to product names in 1.1.1. Updated emergency contact information in 1.4.
Sept. 27, 2016	Added UN classification UN3481 footnote to Section 14
Oct. 13, 2016	Added UN classification UN3171 footnote to Section 14
Dec. 21, 2016	Added U27-24XP and U24-24XP to product names in 1.1.1 Removed contract number from 1.4.
Mar. 25, 2019	Updated company name and logo throughout document
Apr. 10, 2019	Added standard edition information to Section 14
Jan 6, 2020	Delete contact email, date change

16.3 Manufacturer disclaimer

Read all precautionary information. This document is intended only as a guide to the appropriate precautionary handling of this product by a person trained in, or supervised by a person trained in, chemical handling. Exposure to chemicals present in this product may have serious adverse health effects. Lithium Werks cannot warn of all the potential dangers of use or interaction with other chemicals or materials. The user is responsible for determining the precautions and dangers of this product for his or her particular application.

The information provided in this SDS is provided in good faith and is believed to accurate at the date of preparation. Valence does not assume any liability for consequences of the use of this information since it may be applied under conditions beyond Lithium Werks' control or knowledge.