

**SAFETY DATA SHEET**  
In accordance with ISO 11014: 2009

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**Section 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**


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**Product identifier**

**Product name** Lithium ion battery pack JPL91450A  
**Product code** PJ99947

**Manufacture/supplier**

**Manufacture/supplier** MAX Co., Ltd.  
**Department in Charge** ENVIRONMENT QUALITY ASSURANCE DEPT.  
**Address** 1848 TAMAMURA-MACHI KAWAI, SAWA-GUN,  
GUNMA, JAPAN  
**Telephone number** +81-270-65-1381

**Recommended use and restriction on use**

For MAX battery operated power tool

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**Section 2: HAZARDS IDENTIFICATION**


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**Important hazards****GHS classification****Physical Hazards**

Not classified

**Health Hazards**

Not classified

**Environmental Hazards**

Not classified

**Label Elements**

**Pictogram** Not applicable

**Signal word** Not applicable

**Hazard Statements** Not applicable

**Precautionary Statements** Not applicable

**Other hazards**

These chemicals are contained in a sealed enclosure. Risk of exposure occurs only if the cell or pack is mechanically, thermally, electrically or physically 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.

**Important symptoms and an outline of an anticipated emergency**

No information

**Section 3: COMPOSITION/ INFORMATION ON INGREDIENTS****Substance/Mixture**

Mixture

**Compositions of battery pack**

Component	Concentration (wt %)
Cell	63.6
Polycarbonate	24.5
Base, electronic parts	2.5
Urethane	1.3
Copper	1.8
Nylon	1.1
POM resin	1.4
Nickel	1.1
Iron	0.7
Polyethylene	0.7
Chloroprene rubber	0.2
Stainless steel	1.1

**Compositions of cell**

Ingredient	Chemical name	CAS No.	Concentration (wt%)
Electrolyte	Electrolyte salt and solvents	-	5-20
Electrolyte salt	Lithium hexafluorophosphate	21324-40-3	0.05-5
Electrolyte solvent	Ethylene Carbonate	96-49-1	5-20
	Propylene Carbonate	108-32-7	
	Diethyl Carbonate	105-58-8	
PVDF	Polyvinylidene fluoride	24937-79-9	<1
Copper	Copper	7440-50-8	3-15
Aluminium	Aluminum	7429-90-5	2-10
Cathode	Lithium cobalt oxide	12190-79-3	20-50
Anode	Graphite	7782-42-5	10-30
Steel, Nickel, and inert components	-	Various	Balance

**Section 4: FIRST-AID MEASURES**

The hazardous components of this cell or battery are contained within a sealed unit. 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. The hazardous contents are caustic alkaline electrolytes contained in cells with lithium metal oxide cathodes, graphite and carbon anodes and Polyvinylidene fluoride binders.

**First aid procedures**

IF INHALED

Remove the patient from exposure into fresh air. If irritation or pain persists, seek medical attention.

IF ON SKIN	Immediately flush with water. If irritation or pain persists, seek medical attention.
IF IN EYES	If eye contact with contents of an open cell occurs, immediately flush the contaminated eye(s) with water. Quickly transport victim to an emergency care facility.
IF SWALLOWED	Have victim rinse mouth thoroughly with water. Do not induce vomiting. Quickly transport victim to an emergency care facility.

#### **Anticipated acute effects, anticipated delayed effects and most important symptoms/effects**

**ACUTE:** The contents of the battery are rated as corrosive. Ingestion of the electrolyte could lead to severe gastrointestinal tract irritation with nausea, vomiting and potentially burns. 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. Eye contact may lead to severe eye irritation or in worst case scenario irreversible damage and possible eye burns. 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.

#### **Protection of first-aiders**

Do not enter corrosive vapor contaminated areas without a respirator or Self Contained Breathing Apparatus. Wear adequate personal protective equipment as indicated in Section 8.

Eye wash bottle, fountain, safety showers or at least a source of running water are required in the area where the product is used.

#### **Note to an attending physician**

Treat symptomatically if the person comes into contact with the corrosive electrolyte liquid contents of a damaged battery.

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### **Section 5: FIRE-FIGHTING MEASURES**

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#### **Extinguishing media**

##### **Suitable extinguishing media**

Cold water and dry powder in large amount are applicable.

Use metal fire extinction powder or dry sand if only few cells are involved.

##### **Unsuitable extinguishing media**

Applying direct water may be dangerous because fire may expand to surroundings.

#### **Specific hazards arising from the chemical**

May form hydrofluoric acid if electrolyte comes into contact with water.

In case of fire, the formation of the following flue gases cannot be excluded: Hydrogen fluoride (HF), Carbon monoxide and carbon dioxide.

Cut off any ignition sources and extinguish with an appropriate agent.

Cool the surrounding tank and the buildings with direct water jet to avoid risk of fire spreading.

Take action from windward.

Keep out except responsible personnel.

Move container to a safe area if it can be done without risk.

If heated above 125°C, cell(s) can explode/vent.

Cell is not flammable but internal organic material will burn if the cell is incinerated.

### **Protective equipment and precautions for firefighters**

Wear suitable self-contained breathing apparatus and heat resistant protective clothing for eyes and skin.

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## **Section 6: ACCIDENTAL RELEASE MEASURES**

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### **Personal precautions**

As an immediate precautionary measure, isolate spill or leak area for at least 25 meters in all directions.

Keep unauthorized personnel away.

Stay upwind.

Keep out of low areas.

Ventilate closed areas before entering.

Wear adequate personal protective equipment as indicated in Section 8.

### **Environmental precautions**

Prevent from migration into soil, sewers and natural waterways – inform local authorities if this occurs.

### **Methods and materials for containment and cleaning up**

Evacuate spill area immediately and remove sources of ignition.

Do NOT touch spilled material.

Clean up personnel must be trained in the safe handling of this product.

Spills may be absorbed on non-reactive absorbents such as vermiculite.

Place cells or batteries into individual plastic bags and then place into appropriate containers and close tightly for disposal.

Ensure that clean up procedures do not expose spilled material to any moisture.

Immediately transport closed containers outside.

Lined steel drums are suitable for storage of damaged cells or batteries until proper disposal can be arranged.

Do not eat or drink near handling and storage locations.

Prevent to flowing into drains, sewers, basements or closed areas.

### **Secondary disaster prevention measures**

No information

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## **Section 7: HANDLING AND STORAGE**

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### **Handling**

Technical measures

Install appropriate equipment and wear suitable protective apparatus described in Section 8 EXPOSURE CONTROLS/ PERSONAL PROTECTION.

Precautions such as local/total ventilation

Handle the product in a well-ventilated area. In case of mist/vapours generation, use local ventilation.

Precautions for safe handling

Avoid short circuiting the cell.

Prevention of contact	<p>Avoid mechanical damage of the cell.</p> <p>Do not open or disassemble.</p> <p>Keep away from open flames, hot surfaces and sources of ignition.</p> <p>Wash hands thoroughly after handling.</p> <p>Do not eat, drink or smoke when using this product.</p> <p>Incompatible materials</p>
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## Storage

Technical measures	<p>In the storage area, install adequate light and ventilation systems to handle hazardous materials.</p> <p>Take precautionary measures against static discharge.</p>
Incompatible materials and mixtures	Metal products, water, sea water, strong oxidizer, strong acid
Conditions for safe storage	Store in cool dark place (temperature - 20 to 35°C, humidity 45 to 85%) avoiding direct sunlight, high temperature and humidity. The nominal capacity should be 20 to 60%.
Packing material	Use original insulation container that will not break.

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## Section 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

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### Permissible concentration

#### Occupational Exposure Limits

ACGIH TLV-TWA (2016)	<p>1mg/m<sup>3</sup> (Copper)(Dust and mist)</p> <p>1mg/m<sup>3</sup> (Aluminum, metal and insoluble compounds)</p> <p>2mg/m<sup>3</sup> (Graphite, natural)</p> <p>0.1mg/m<sup>3</sup> (Nickel, soluble compounds, as Ni)</p> <p>0.02mg/m<sup>3</sup> (Cobalt and inorganic compounds, as Co)</p>
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### Engineering controls

Special ventilation is not required when using these products in normal use scenarios.

Ventilation is required if there is leakage from the cell or battery.

Eye wash bottle, fountain, safety showers or at least a source of running water are required in the area where the product is used.

### Personal protective equipment

Respiratory protection	<p>During routine operation, a respirator is not required.</p> <p>However, if dealing with an electrolyte leakage and irritating vapors are generated, an approved half face inorganic vapor and gas/acid/particulate respirator is required.</p>
Hand protection	<p>Hand protection is not required when handling the cell or battery during normal use. PVC gloves are recommended when dealing with a leaking or ruptured cell or battery.</p>
Eye protection	<p>Eye protection is not required when handling cells or batteries during normal use. Wear safety glasses/goggles if handling a leaking or ruptured cell or battery.</p>
Skin and body protection	<p>Skin protection is not required when handling the cell or battery during normal use. Wear long sleeved clothing to</p>

avoid skin contact if handling a leaking or ruptured cell or battery. Soiled clothing should be washed with detergent prior to re-use.

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### Section 9: PHYSICAL AND CHEMICAL PROPERTIES (as cell)

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Appearance (physical state, form and colour)	Black solid
Odour	Odourless
Odour threshold	No information
pH	No information
Melting point/ freezing point	No information
Boiling point, initial boiling point and boiling range	No information
Flashpoint	No information
Evaporation rate	No information
Flammability	No information
Upper/lower explosive limits	No information
Vapour pressure	No information
Vapour density	No information
Specific gravity	No information
Solubility	Insoluble in water
<i>n</i> -octanol/water partition coefficient	No information
Auto-ignition temperature	No information
Decomposition temperature	No information
Viscosity	No information
Other information	No information

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### Section 10: STABILITY AND REACTIVITY

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Chemical stability	Stable under normal handling condition.
Hazardous reactions	No hazardous reaction expected under normal handling.
Conditions to avoid	Avoid short circuit, high temperature (over 60°C), direct sunlight, high humidity. Do not puncture, crush or incinerate.
Incompatible materials	Water, chain, metal etc. (materials that cause short circuiting)
Hazardous decomposition products	In case of open cells, there is the possibility of hydrofluoric acid and carbon monoxide release.

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### Section 11: TOXICOLOGICAL INFORMATION

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#### Toxicological information for product

Skin irritation/corrosion:	The electrolyte contained within the cell or battery 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.
Eye damage/irritation:	The electrolyte contained within the cell or battery is classified as a corrosive liquid and is expected to exhibit serious Damage/Corrosivity.

Carcinogenicity:	The electrolyte contained within the cell or battery is not expected to be a carcinogen. The cathode contains Cobalt and Nickel components. 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.
Specific target organ toxicity (single exposure):	The electrolyte contained within the cell or battery is corrosive and is expect to cause respiratory irritation by inhalation. 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.

### Toxicological information for ingredients

#### Propylene Carbonate

Acute toxicity (oral):	Rat LD <sub>50</sub> ≥ 29,000 mg/kg
Acute toxicity (dermal):	Rabbit LD <sub>50</sub> >20,000 mg/kg
Eye damage/irritation:	The substance was found to be a moderate irritant in rabbit tests. In other rabbit tests (OECD Guidelines 405), its scores for corneal clouding and conjunctival erythema were 1.72 and 2.67, respectively, leading to the conclusion that the substance is irritating.

#### Diethyl Carbonate

Acute toxicity (oral):	Rat LD <sub>Lo</sub> = 15 g/kg
Specific target organ toxicity (single exposure):	In a 2-hour inhalation test in rats, exposure resulted in gasping, loss of coordination, foaming at the mouth and nose, pneumonia and finally death. The exposure dose of 8,000 ppm (38 mg/L). Additionally, there is a report of strong irritant for human.

#### Copper

Skin sensitization:	Japan Society for Occupational Health, copper and its compounds are classified into the second group of skin sensitizing substances.
Specific target organ toxicity (single exposure):	In humans, the respiratory tract (airway irritation) in the inhalation route is the main acute toxicity symptom. In oral exposure, gastrointestinal symptoms (nausea, vomiting, abdominal pain, etc.) are observed when drinking water or the like containing large amount of copper is ingested, mainly causing nausea and vomiting.

#### Aluminium

Specific target organ toxicity (single exposure):	In humans, inhaling this substance (dust) causes lung damage such as pneumoconiosis (aluminum lung disease).
Specific target organ toxicity (repeated exposure):	For humans, an epidemiological survey of 1,142 workers involved in the production of aluminum and aluminum

compounds showed effects on pulmonary function due to exposure to high concentrations of dust.

## Nickel

Acute toxicity (oral):	Rat LD <sub>50</sub> > 9,000 mg/kg
Respiratory sensitization:	The substance is classified into Category 2 for respiratory tract sensitizer in Japan Society For Occupational Health (JSOH), and as respiratory tract sensitizer by Japanese Society of Occupational and Environmental allergy and DFG.
Skin sensitization:	There are human case reports of eczema, contact dermatitis and positive results in patch tests. In addition, the substance is classified into Category 1 for skin sensitizer by Japan Society For Occupational Health (JSOH), and as a skin sensitizer by Japanese Society of Occupational and Environmental allergy and DFG.
Carcinogenicity:	There are the classifications of "2B" in IARC, "R" in NTP and "Carcinogenicity. Category 3; R40" in EU classification. Occurrence of carcinoma and sarcoma is reported in inhalation, subcutaneous, intramuscular, intrathoracic and intraperitoneal administration tests in rats.
Specific target organ toxicity (single exposure):	In an inhalation (single intratracheal exposure) test in male rats, cytotoxicity in the alveolar epithelial cells was observed at 0.5 mg and higher concentrations. Inhalation exposure of humans induced "alveolar wall damage and edema in alveolar spaces in the lung and marked tubular necrosis in the kidney".
Specific target organ toxicity (repeated exposure):	It was reported that a high risk of mortality from respiratory disease is found among workers exposed occupationally to nickel oxides and metal nickel at concentrations of 0.04 mg/m <sup>3</sup> and higher. In addition, rhinitis, sinusitis, nasal septal perforations and dysplasia of the nasal mucosa were reported in nickel refinery and nickel plating workers. In a 13-week inhalation exposure test in rats (OECD TG413), pulmonary alveolar proteinosis and glaucomatous inflammation in the lung were observed in females, and mononuclear cell infiltration in the lung was observed in males at a concentration of 1 mg/m <sup>3</sup> (0.0001 mg/L) and higher levels. In a 21-month inhalation exposure test in rats, pleuritis, pneumonia, congestion and edema were observed at a dose level of 15 mg/m <sup>3</sup> (0.015 mg/L). In addition, pneumonia was noted at a dose level of 1 mg/m <sup>3</sup> (0.001 mg/L) in a 6-month inhalation exposure test in rabbits.

## Lithium

Skin irritation/corrosion:	It was set as Category 1A-1C from description that caustics or severe irritation is indicated to the skin.
Eye damage/irritation:	It was set as Category 1 from description that caustics or severe irritation is indicated to the eye.



Specific target organ toxicity (single exposure): Respiratory system was judged as target organ. When inhaling it, pulmonary edemas is caused.

#### Cobalt

Acute toxicity (oral): Rat LD<sub>50</sub> = 6,171 mg/kg

Respiratory sensitization: Based on the classification by the Japan Society for Occupational Health and the Japanese Society of Occupational Allergy (Respiratory Tract Sensitizing Substance).

Skin sensitization: Based on the classification by the Japan Society for Occupational Health and the Japanese Society of Occupational Allergy (Skin Sensitizing Substance).

Carcinogenicity: Due to the fact that the substance is classified as Category A3 (as cobalt and inorganic compounds) by ACGIH, Group 2B (cobalt and cobalt compounds) by IARC and Category 1 (as cobalt and cobalt compounds) by the Japan Society for Occupational Health.

Reproductive toxicity: It was reported that histological changes of testes and reduction in survival rates of offspring are observed, though no descriptions are available regarding the general conditions of parental animals.

Specific target organ toxicity (single exposure): Based on the human evidence including "respiratory irritation".

Specific target organ toxicity (repeated exposure): Based on the human evidence including "respiratory irritation, stridor, asthma, pneumonia, fibrosis, myocardiosis, functional effects on the cardiac vehicles, cardiac hypertrophy, cardiac failure due to occupational exposure to cobalt". The effects are observed in the respiratory organs and heart, while those on the heart are considered secondary effects and hence are not taken into account.

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## Section 12: ECOLOGICAL INFORMATION

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### Ecological information for product

Ecotoxicity	No information
Persistence and degradability	No information
Bioaccumulative potential	No information
Mobility in soil	No information
Hazardous to the ozone layer	Not applicable

### Ecological information for ingredients

#### Propylene Carbonate

Ecotoxicity (acute)	Fish (carp) 96hr LC <sub>50</sub> > 1,000 mg/L Crustaceans ( <i>Daphnia magna</i> ) 48hr EC <sub>50</sub> > 1,000 mg/L Algae ( <i>Scenedesmus subspicatus</i> ) 72hr EC <sub>50</sub> > 900 mg/L
Ecotoxicity (chronic)	No information
Persistence and degradability	28-day BOD degradability = 79%, GC degradability = 89%

Bioaccumulative potential	No information
Mobility in soil	No information
Hazardous to the ozone layer	Not applicable

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### Section 13: DISPOSAL CONSIDERATIONS

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#### Remaining product

The product that you have purchased contains a rechargeable battery cell. The Battery is recyclable. At the end of its useful life, under various country and local laws, it may be illegal to dispose of this Battery into the municipal waste stream. Check with your local waste officials for details in your area for recycling options or proper disposal.

#### Contaminated containers and packaging

Used container should be recycled after cleaning or dispose of in compliance with related laws and local regulations. Contents should be removed completely when dispose of empty containers.

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### Section 14: TRANSPORT INFORMATION

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#### International regulation

	Battery pack alone	Tool included product
UN number	3480	3481
UN proper shipping name	LITHIUM ION BATTERIES (including lithium ion polymer batteries)	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)
Transport hazard class(es)	9	
Subsidiary risk	-	
Packing group	II	
Marine pollutant	Not applicable	
IBC Code	Not applicable	

When transporting, confirm no damage to containers. Avoid handling violently or leaking wet. Load to prevent fall or falling down containers and take preventive measures of collapse.

#### Response to UN Recommendations on TRANSPORT OF DANGEROUS GOODS

The battery pack complies with UN Recommendation on TRANSPORT OF DANGEROUS GOODS and satisfies the test criteria of T1 to T8 below.

#### Test result of UN Recommendation on TRANSPORT OF DANGEROUS GOODS

Manual of Test and Criteria (38.3 Lithium batteries)		
No.	Test Item	Test Result
T1	Altitude Simulation	Passed
T2	Thermal Test	Passed
T3	Vibration	Passed

T4	Shock	Passed
T5	External Short Circuit	Passed
T6	Impact	Passed
T7	Overcharge	Passed
T8	Forced Discharge (cell)	Passed

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**Section 15: REGULATORY INFORMATION**


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**US Federal regulation**

**TSCA inventory:** Not applicable

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**Section 16: OTHER INFORMATION**


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**Specification**

**Nominal voltage** 14.4V  
**Rated capacity** 4.9Ah  
**Rated electric energy** 70.6Wh  
**Battery cell array** 4 series, 2 parallel

**Reference**

NITE GHS classification (2017)

ACGIH, American Conference of Governmental Industrial Hygienists (2016) TLVs and BEIs.

**[Disclaimer]**

This SDS has been prepared on the basis of laws, regulations and information available at this time. It is user's responsibility to modify or update any contents in this SDS regarding information on hazardous properties and/or instruction for safe handling of the product when they become available. Precautionary measures in this SDS are only applicable for normal handling conditions and it is necessary to take appropriate additional measures to ensure safe handling which depend on your specific use conditions or situations.