SAFETY DATA SHEET

Section 1. Chemical Product and Company Identification

Products Name	Lithium-ion Battery
Mode/Type reference	NBP2 18V 9.0Ah 162Wh
Nominal Voltage	18V
Typical Capacity	9.0Ah
Typical Power	162Wh
Manufacture Name	Zhejiang VALUE Mechanical & Electrical Products CO.,LTD
Address	jiulong Avenue, Western Industrial District, Wenling, Zhejiang, China
Postcode	317500
Emergency Telephone No.	0576-86992913
Technical Support Telephone No.	0576-86992919
Fax	0576-86992919
E-mail	tong.haoqi@worldvalue.cn
SDS Code	VALUE-SDS003
Date Prepared	2019-12-16

Section 2. Hazards Identification

Classification

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200) this product is an article which is a sealed battery and as such does not require an MSDS per the OSHA hazard communication standard unless ruptured. The hazards indicated are for a ruptured battery.

Skin corrosion/irritation	Category 4
Serious eye damage/eye	Category4
Skin sensitization	Category3
Carcinogenicity	Category5
Specific target organ toxicity (repeated exposure)	Category3

GHS Label elements, including precautionary statements

Emergency Overview

Signal word: Danger

Hazard Statements

Causes skin irritation

Causes serious eye irritation

May cause an allergic skin reaction

May cause cancer

This product is an article which contains a chemical substance. Safety information is given for exposure to the article as sold.
Intended use of the product should not result in exposure to the chemical substance This is a battery. In case of rupture: the above hazards exist.

Appearance Gray **Physical State** Solid **Odor** Odorless

Precautionary Statements - Prevention	Obtain special instructions before use Do not handle until all safety precautions have been read and understood Use personal protective equipment as required Wash face, hands and any exposed skin thoroughly after handling Contaminated work clothing should not be allowed out of the workplace Wear protective gloves Do not breathe dust/fume/gas/mist/vapors/spray Do not eat, drink or smoke when using this product
Precautionary Statements - Response	IF exposed or concerned: Get medical advice/attention Specific treatment (see supplemental first aid instructions on this label) IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing If eye irritation persists: Get medical advice/attention IF ON SKIN: Wash with plenty of soap and water Take off contaminated clothing and wash before reuse If skin irritation or rash occurs: Get medical advice/attention
Precautionary Statements - Storage	Store locked up
Precautionary Statements - Disposal	Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)	Not applicable
Unknown Toxicity	-
Other information	May be harmful if swallowed Very toxic to aquatic life with long lasting effects Repeated or prolonged skin contact may cause allergic reactions with susceptible persons
Interactions with Other Chemicals	No information available.

Section 3. Composition/Information on Ingredients

Chemical Name	CAS Number	Weight-%	Trade Secret
Lithium transition metal oxidate	12190-79-3 12057-17-9 182442-95-1	20~60%	
Aluminium	7429-90-5	1~10 %	
Carbon	7782-42-5 7440-44-0	10~30 %	
Copper	7440-50-8	1~15%	
Organic electrolyte principally involves ester carbonate	___	5%~25%	
Iron	7439-89-6	1~30%	

(*) Main ingredients: Lithium hexafluorophosphate, organic carbonates.

* The exact percentage (concentration) of composition has been withheld as a trade secret.

Section 4. First Aid Measures

General Advice	First aid is upon rupture of sealed battery. **Eye contact:** If symptoms persist, call a physician. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Remove contact lenses, if present and easy to do. Continue rinsing. Do not rub affected area. **Skin contact:** Wash off immediately with soap and plenty of water for at least 15 minutes. In the case of skin irritation or allergic reactions see a physician. May cause an allergic skin reaction. **Inhalation:** Remove to fresh air. If symptoms persist, call a physician. Get medical attention immediately if symptoms occur. **Ingestion:** Do NOT induce vomiting. Rinse mouth immediately and drink plenty of water. Never give anything by mouth to an unconscious person. Call a physician. **Self-protection of the first aider:** Avoid contact with skin, eyes or clothing. Use personal protective equipment as required. Wear personal protective clothing (see section 8).
Most important symptoms and effects, both acute and delayed	**Most important symptoms and effects:** Itching. Coughing and/ or wheezing.
Indication of any immediate medical attention and	**Notes to Physician:** Treat symptomatically. May cause sensitization of susceptible persons.
special treatment needed	

Section 5. Fire Fighting Measures

Suitable extinguishing Media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable	CAUTION: Use of water spray when fighting fire may be inefficient.

Extinguishing Media	
Specific Hazards arising from the chemical	Product is or contains a sensitizer. May cause sensitization by skin contact.
Hazardous Combustion Products	Carbon oxides.
Explosion Data	**Sensitivity to Mechanical Impact:** No. **Sensitivity to Static Discharge:** No.
Protective Equipment and precautions for firefighters	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

Section 6. Accidental Release Measures

Personal Precautions, protective equipment, and emergency procedures	**Personal Precautions:** Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. **Other Information:** Refer to protective measures listed in Sections 7 and 8.
Environmental Precautions	Refer to protective measures listed in Sections 7 and 8. Prevent further leakage or spillage if safe to do so.
Methods and material for containment and cleaning up	**Methods for Containment:** Prevent further leakage or spillage if safe to do so. **Methods for cleaning up:** Pick up and transfer to properly labeled containers.

Section 7 – Handling and Storage

Precautions for safe handling	**Handling:** In case of rupture. Use personal protection equipment. Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Do not breathe dust/fume/gas/mist/vapors/spray.
Conditions for safe storage, including any	**Storage:** Keep containers tightly closed in a dry, cool and well-ventilated place.
incompatibilities	**Incompatible Products:** Strong acids. Strong oxidizing agents. Strong bases.

Section 8. Exposure Controls/Personal Protection

Control parameters

Exposure Guidelines

Exposure Guidelines	ACGIH TLV	OSHA PEL	NIOSH IDLH
Lithium Cobalt Oxide (CoLiO2) 12190-79-3	TWA: 0.02 mg/m³	---	---
Copper 7440-50-8	TWA:0.2mg/m³ fume TWA:1mg/m³ Cu dust and mist	TWA:0.1mg/m³ fume TWA:1mg/m³ dust and mist (vacated) TWA:0.1g/m³ Cu dust,fume,mist	IDLH:100mg/m^{3}dust,fume and mist TWA:1 mg/m^{3}dust and mist TWA: 0.1 mg/m^3 fume

Aluminum 7429-90-5	TWA:1mg/m³ respirale frcation	TWA:15mg/m^3 total dust TWA:5mg/m^3 respirable fraction(vacated) TWA:15mg/m^3 total dust(vacated) TWA:5mg/m^3 respirable fraction(vacated) TWA:5mg/m^3 AL Aluminum	TWA:10 mg/m^3 total dust TWA:5mg/m^3 respirable dust
Graphite 7782-42-5	TWA:2mg/m^3 Respirable fraction all forms except graphite fibers	TWA:15mg/m^3 total dust synthetic TWA:5mg/m^3 respirable fraction synthetic TWA:2.5mg/m^3 respirable dust natural(vacated) TWA:10mg/m^3 total dust synthtic	IDLH:1250 mg/m^3 TWA:2.5 mg/m^3 respirable dust

*ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value
OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits NIOSH
IDLH Immediately Dangerous to Life or Health

Other Exposure Guidelines

Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992) See section 15 for national exposure control parameters

Engineering Controls	Keep away from heat and open flame.
Ventilation	Not necessary under conditions of normal use. In case of abuse, use adequate mechanical ventilation (local exhaust) for the battery that vent gas or fumes.
Respiratory Protection	Not necessary under conditions of normal use. If battery is burning, leave the area immediately. During fire fighting fireman should use self-contained breathing, full-face respiratory equipment. Fires may be fought but only from safe fire fighting distance, evacuate all persons from the area of fire immediately.
Eye Protection	Not necessary under conditions of normal use. Use safety glasses with side shields if handling a leaking or ruptured battery.
Body Protection	Not necessary under conditions of normal use. Use rubber apron and protective working in case of handling a leaking of ruptured battery.
Protective Gloves	Not necessary under conditions of normal use. Use chemical resistant rubber gloves if handling a leaking or ruptured battery.
Others	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.

Section 9. Physical and Chemical Properties

Information on basic physical and chemical properties

State	No data available
Colour	No data available
Odor	No data available
Odor Threshold	No data available
pH	No data available
Melting / freezing point	No data available
Boiling point / boiling range	No data available
Flash Point	No data available

Evaporation Rate	No data available
Flammability (solid, gas)	No data available
Explosion Limits(vol% in air)	No data available
Vapor pressure	No data available
Vapor density	No data available
Specific Gravity	No data available
Water Solubility	No data available
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	0.0001
Autoignition temperature	130℃
Decomposition temperature	No data available
Kinematic viscosity	No data available
Dynamic viscosity	0.0001
Explosive properties	No data available
Oxidizing Properties	No data available
Other Information	
Softening Point	No data available
VOC Content (%)	No data available
Particle Size	No data available
Particle Size Distribution	No data available

Section 10. Stability and Reactivity

Stability	Stable
Conditions to Avoid	Do not heat, throw into fire, disassemble, short circuit, immerse in water or overcharge, etc.
Incompatibility	None during normal operation. Avoid exposure heat, open flame and corrosives.
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Decomposition Products	The battery may release irritative gas once the electrolyte leakage.

Section 11. Toxicological Information

Information on likely routes of exposure

Product Information	Product does not present an acute toxicity hazard based on known or supplied information. In case of rupture:.
Inhalation	Specific test data for the substance or mixture is not available. May cause irritation of respiratory tract.
Eye Contact	Specific test data for the substance or mixture is not available. Expected to be an irritant based on components. Irritating to eyes. May cause redness, itching, and pain. May cause temporary eye irritation.
Skin Contact	Specific test data for the substance or mixture is not available. Expected to be an irritant based on components. Irritating to skin. Prolonged contact may

	cause redness and irritation.
Ingestion	Specific test data for the substance or mixture is not available. Ingestion may cause irritation to mucous membranes. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Component Information	
Information on toxicological effects	**Symptoms:** Erythema (skin redness). May cause redness and tearing of the eyes. Itching. Rashes. Hives.
Delayed and immediate effects as well as chronic effects from short and long-term exposure	**Sensitization:** May cause sensitization of susceptible persons. May cause sensitization by skin contact. **Mutagenic Effects:** No information available. **Carcinogenicity:** The table below indicates whether each agency has listed any ingredient as a carcinogen

Chemical Name	**ACGIH**	**IARC**	**NTP**	**OSHA**
Lithium Cobalt Oxide (CoLiO2) 12190-79-3	A3	Group 2B		X

ACGIH (American Conference of Governmental Industrial Hygienists)

A3 - Animal Carcinogen

IARC (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

Group 2B - Possibly Carcinogenic to Humans

Group 3 - Not Classifiable as to Carcinogenicity in Humans

OSHA (Occupational Safety and Health Administration of the US Department of Labor)

X – Present

Reproductive Toxicity	No information available.
STOT - single exposure	No information available.
STOT – repeated exposure	Causes damage to organs through prolonged or repeated exposure. Based on classification criteria from the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200), this product has been determined to cause systemic target organ toxicity from chronic or repeated exposure. (STOT RE).
Chronic Toxicity	Contains a known or suspected carcinogen. Avoid repeated exposure. Prolonged exposure may cause chronic effects. May cause adverse liver effects.
Target Organ Effects	Respiratory system. Eyes. Skin. Gastrointestinal tract (GI). Central Vascular System (CVS).Kidney. Liver. Lungs. Heart.
Aspiration Hazard	No information available.
Numerical measures of toxicity Product Information	
The values which are on the right are calculated based on chapter 3.1 of the GHS document.	**ATEmix (oral)** **ATEmix (dermal)** **ATEmix (inhalation-dust/mist)**

Section 12. Ecological Information

Ecotoxicity

Very toxic to aquatic life with long lasting effects

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water flea)
Copper 7440-50-8	96h EC50: 0.031 - 0.054 mg/L (Pseudokirchneriella subcapitata) 72h EC50: 0.0426 - 0.0535 mg/L (Pseudokirchneriella subcapitata)	96h LC50: 0.0068 - 0.0156 mg/L (Pimephales promelas) 96h LC50: = 0.112 mg/L(Poecilia reticulata) 96hLC50: = 0.3 mg/L (Cyprinus carpio) 96h LC50: = 0.8mg/L (Cyprinus carpio) 96h LC50: = 1.25 mg/L(Lepomis macrochirus) 96h LC50: =0.052 mg/L (Oncorhynchus mykiss) 96h LC50: = 0.2mg/L (Pimephales promelas) 96h LC50: < 0.3 mg/L (Pimephales promelas)		48h EC50: = 0.03 mg/L

Persistence and Degradability	No information available.
Bioaccumulation	No information available
Other adverse effects	No information available

Section 13. Disposal Considerations

Waste treatment methods

Disposal methods: This material, as supplied, is not a hazardous waste according to Federal regulations (40CFR 261). This material could become a hazardous waste if it is mixed with or otherwise comes in contact with a hazardous waste, if chemical additions are made to this material, or if the material is processed or otherwise altered. Consult 40 CFR 261 to determine whether the altered material is a hazardous waste. Consult the appropriate state, regional, or local regulations for additional requirements.

Contaminated Packaging: Dispose of in accordance with federal, state and local regulations.

California Hazardous Waste Codes 141

This product contains one or more substances that are listed with the State of California as a hazardous waste

Chemical Name	California Hazardous Waste
Lithium Cobalt Oxide (CoLiO2) 12190-79-3	Toxic
Copper 7440-50-8	Toxic
Aluminum 7429-90-5	Ignitable powder

Section 14. Transport Information

The Li-Ion battery as stated in Appendix are made in compliance to the requirements stated in the latest edition of the IATA Dangerous Goods Regulations Packing Instruction 965 section Ⅱ such that they can be transported as a NOT RESTRICTED (non-hazardous/non-dangerous) goods. However, if those Li-Ion batteries are packed with or contained in an equipment, then it is the responsibility of the shipper to ensure that the consignment are packed in compliance to the latest edition of the IATA Dangerous Goods

Regulations section Ⅱ of either Packing Instruction 966 or 967.
With regard to transport, the following regulations are cited and considered:
- The International Civil Aviation Organization (ICAO) Technical Instructions, Packing instruction 965 or 966 or 967, section Ⅱ (2019 Edition).
- The International Air transport Association (IATA) Dangerous Goods Regulations, Packing instruction 965 or 966 or 967, section Ⅱ (60th Edition, 2019).
- Special provision 188 of the International Maritime Dangerous Goods (IMDG) Code (Amendment 38-16 Edition).
- The US Hazardous Materials Regulation 49 CRF (Code of Federal Regulations), sections 173-185 Lithium batteries and cells.
- The UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria 38.3 Lithium batteries, Rev.6.
These products are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to all the applicable international and national governmental regulations, not limited to the above mentioned. We further certify that the enclosed products have been tested and fulfilled the requirements and conditions in accordance with UN Recommendations (T1 – T8) on the Transport of Dangerous Goods Model Regulations and the Manual of Tests and Criteria.

Test results of the UN Recommendation on the Transport of Dangerous Goods

Manual of Test and Criteria (38.3 Lithium battery)			
No.	**Test items**	**Test results**	**Remark**
T1	Altitude simulation	Pass	
T2	Thermal test	Pass	
T3	Vibration	Pass	
T4	Shock	Pass	
T5	External short circuit	Pass	
T6	Impact / Crush	Pass	
T7	Overcharge	Pass	
T8	Forced discharge	Pass	

Additional Requirements for air transport:
1. Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
2. Cells and batteries must be manufactured under a quality management program.
3. The Watt-hour rating must be marked on the outside of the battery case except those manufactured before 1 January 2009.
4. Cells and batteries must be packed in strong outer packagings. (applicable to PI 965 only)
5. Maximum number of cells per package must not be more than 8 cells. (applicable to PI 965 only)
6. Cells and batteries must be packed in inner packagings that completely enclose the cell or battery.To provide protection from damage or compression to the batteries, the inner packagings must be placed in a strong rigid outer packaging of one of the packaging types shown below.
7. Each package must be capable of withstanding a 1.2 m drop test in any orientation without
(applicable to PI 965 only):
- damage to cells or batteries contained therein;
- shifting of the contents so as to allow battery to battery (or cell to cell) contact;
- release of contents.
8. Each consignment must be accompanied with a document with an indication that:
- the package contains lithium ion cells or batteries;

• the package must be handled with care and that a flammability hazard exists if the package is damaged;
• special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and a telephone number for additional information.
9. Each package must be labelled with a lithium battery handling label (Figure 7.4.H).
10. A Shipper's Declaration for Dangerous Goods is not required.
11. The words "Lithium ion batteries in compliance with Section II of PI 965" must be included on the air waybill, when an air waybill is used. The information should be shown in the "Nature and Quantity of Goods" box of the air waybill. (applicable to PI 965 only)
12. Any person preparing or offering cells for transport must receive adequate instruction on these requirements commensurate with their responsibilities.
13. The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation. (applicable to PI 966 only)
14. The maximum number of batteries in each package must be the minimum number required to power the equipment plus two spares. (applicable to PI 966 only)
15. The words "Lithium ion batteries in compliance with Section II of PI 966" must be included on the air waybill, when an air waybill is used. The information should be shown in the "Nature and Quantity of Goods" box of the air waybill. (applicable to PI 966 only).

Section 15. Regulatory Information

Law Information

《California Proposition 65》
《Canadian Domestic Substances List/Non-Domestic Substances List》(DSL/NDSL)
《Classification and code of dangerous goods》
《Code of Federal Regulations》(CFR)
《Consumer Product Safety Act》(CPSA)
《Dangerous Goods Regulation 56th Editon》
《Federal Environmental Pollution Control Act》(FEPCA)
《International Maritime Dangerous Goods 38-16 Editon》
《Occupational Safety and Health Act》(OSHA)
《Recommendations on Transport of Dangerous Goods Model Regulations》
《Resource Conservation and Recovery Act》(RCRA)
《Safety Drinking Water Act》(CWA)
《Superfund Amendments and Reauthorization Act III(302/311/312/313)》(SARA)
《Technical Instructions for the Safe Transport of Dangerous Goods》
《The Oil Pollution Act》(OPA)
《Toxic Substances Control Act》(TSCA)
《US Federal Regulations》

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	CAS No	Weight-%	SARA 313 – Threshold Values %
Lithium Cobalt Oxide($LiCoO_2$)	12190-79-3	40%~44%	0.1
Copper Foil	7440-50-8	8%~11%	1.0
Aluminum Foil	7429-90-5	4%~6%	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA -Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA -Hazardous Substances
Copper Foil 7440-50-8		×	×	

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40CFR 302)

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Copper Foil 7440-50-8	5000lb		RQ 5000 lb final RQ RQ 2270 kg final RQ

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Rhode Island	Illinois
Lithium Cobalt Dioxide ($LiCoO_2$) 12190-79-3	X		X	X	X
Graphite 7782-42-5	X	X	X		
Copper 7440-50-8	X	X	X	X	X
Aluminum 7429-90-5	X	X	X	X	

International Regulations

Mexico

National occupational exposure limits

Component	Carcinogen Status	Exposure Limits
Copper Foil 7440-50-8		Mexico: TWA=1 mg/m³ Mexico: TWA=0.2 mg/m³ Mexico: STEL=2 mg/m³
Aluminum Foil 7429-90-5		Mexico: TWA=10mg/m³
Graphite 7782-42-5		Mexico: TWA= 2 mg/m3

Mexico - Occupational Exposure Limits – Carcinogens

Canada

WHMIS Hazard Class

Non-controlled

Chemical Name	NPRI
Aluminum	X

In accordance with all Federal, State and local laws.

Section 16. Other Information

NFPA	**Health Hazards 1**	**Flammability** 0	**Instability** 0	**Physical and Chemical Hazards** - **Personal Protection** X
HMIS	**Health Hazards 0**	**Flammability** 0	**Instability** 0	

Revision Date: 2019-01-01

Revision Note: No information available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

---End of Safety Data Sheet---