# Safety Data Sheet

## RRC Standard Batteries

**Revision status**

| Revision | Valid from | Changes | Author |
|---|---|---|---|
| A | 25Feb2025 | First released version | TN |

**Content**

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

### 1.1. Product identifier

| Product name | Model name | Cell configuration | Nominal ratings | Battery weight |
|---|---|---|---|---|
| Rechargeable Lithium-Ion Battery Pack | RRC2024 | 4S3P | 14.40V / 6.60Ah / 95.00Wh | ~600g |

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

- Identified uses: Energy storage for electronic devices, medical equipment, etc.
- Uses advised against: Applications other than specified from manufacturer.
- **Important Note:** As a solid, manufactured article, exposure to hazardous ingredients is not expected with normal use. This battery is an article pursuant to 29 CFR 1910.1200 and, as such, is not subject to the OSHA Hazard Communication Standard requirement. The information contained in this Safety Data Sheet contains valuable information critical to the safe handling and proper use of the product.

### 1.3. Details of the supplier of the safety data sheet

| **Headquarter (Supplier of this safety data sheet)** | |
|---|---|
| RRC power solutions GmbH<br>Technologiepark 1<br>66424 Homburg/Saar<br>Mail: regulatory-affairs@rrc-ps.com | Germany |

**Subsidiaries / national contacts:**

| | |
|---|---|
| RRC power solutions Inc.<br>18340 Yorba Linda Blvd. Suite 107-437 Yorba Linda, CA 92886-4104<br>Mail: usa@rrc-ps.com | USA |
| RRC power solutions Ltd.<br>Room 1306, C Building, Tianan International building, Renmin South Road, Luohu District, Shenzhen 518021<br>Mail: hkrrc@rrc-ps.cn | China |
| RRC power solutions Ltd.<br>S-V,6/F, Valiant Industrial Centre 2-12 Au Pui Wan Street Fo Tan, N.T.<br>Mail: hkrrc@rrc-ps.cn | Hong Kong |

### 1.4. Emergency telephone number

USA and Canada: +1-800-535-5053
International: +1-352-323-3500

***Remark:***
The information and recommendations set forth are made in good faith and believed to be accurate as of the date of preparation. RRC power solutions GmbH makes no warranty, expressed or implied, with respect to this information and disclaims all liabilities from reliance on it.

## SECTION 2: Hazards Identification

### 2.1. Classification of the substance or mixture

- Preparation Hazards and Classification:
  This product is classified as an article under REACH and is not hazardous under normal conditions of use and when used according to the recommendations of the manufacturer.
  Misuse, damage, or improper handling may lead to hazardous situations.

  Under recommended use conditions, the electrode materials and liquid electrolyte are non-reactive provided that the cell or battery integrity remains, and the seals remain intact.

  The potential for exposure should not exist unless the cell or battery leaks, is exposed to high temperatures or is mechanically, electrically, or physically abused/damaged.

  If the cell or battery is compromised and starts to leak, based upon the battery ingredients, the contents are classified as hazardous.

### 2.2. Label elements

No label elements required for intact battery packs. If damaged, refer to Section 11 for toxicological risks.

### 2.3. Other hazards

- Risk of fire or explosion if damaged or improperly used.
- Contains flammable electrolyte.
- May cause skin or eye irritation in case of leakage.
- Hazard summary:
  - Physical hazards: Not classified for physical hazards.
  - Health hazards: Not classified for health hazards.
  - Environmental hazards: Not classified for hazards to the environment.
  - Specific hazards: Exposure to contents of an open or damaged cell or battery:

- Main Symptoms: Symptoms include itching, burning, redness and tearing.

- Hazardous Materials Information Label (HMIS)
  Health: 0
  Flammability: 1
  Physical Hazard: 0

- NFPA Hazard Ratings
  Health: 0
  Flammability: 1
  Reactivity: 0
  Unique Hazard:-/-

- GHS precautionary statements

| | |
|---|---|
| Precautionary Statement(s) Prevention | P102: Keep out of reach of children.<br>P103: Read label prior to use.<br>P202: Do not handle until all safety precautions have been read and understood.<br>P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking.<br>P234: Keep only in original container. P254: Wash hands thoroughly after handling. |
| Response (If cell/battery leaks) | P260: Do not breathe vapour or spray.<br>P280: Wear protective gloves/protective clothing/eye protection/face protection.<br>P301/330/331: IF SWALLOWED: Rinse mouth. DO NOT induce vomiting.<br>P303/361/353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.<br>P304/340: If INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.<br>P305/351/338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.<br>P310: Immediately call a POISON CENTER or doctor/physician.<br>P363: Wash contaminated clothing before reuse.<br>P370: In case of fire: Use carbon dioxide, dry chemical, or water extinguisher. |
| Storage (Store as indicated in Section 7) | P402: Store in a dry place.<br>P405: Store locked up.<br>P410: Protect from sunlight. |
| Disposal | P406: Store any spilled/leaking electrolyte material in a corrosive resistant container with a resistant inner liner.<br>P501: Dispose of batteries in accordance with applicable hazardous waste regulations. |

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Not applicable. (Battery pack is a mixture of components)

### 3.2. Mixtures

| Chemical Name | CAS No. | EC No. | *Mass range in cell (g/g %) | Classification acc. Regulation (EC) No 1278/2008 (CLP) |
|---|---|---|---|---|
| Lithium transition metal oxide | 182442-95-1 | -/- | 20-60 | -/- |
| Carbon (graphite) | 7782-42-5 | -/- | 10-30 | -/- |
| Aluminium | 7429-90-5 | -/- | 1-10 | -/- |
| Copper | 7440-50-8 | -/- | 1-15 | -/- |
| Cell case | 7439-89-6 | -/- | 1-30 | -/- |
| Electrolyte | 96-49-1<br>623-53-0<br>616-38-6<br>21324-40-3 | -/- | 5-25 | -/- |

Because of the cell structure the dangerous ingredients will not be released if battery pack is used properly. During charge process a lithium graphite intercalation phase is formed.

## SECTION 4: First Aid Measures

### 4.1. Description of 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.

- Inhalation: Move to fresh air. Seek medical attention.
- Skin contact: Wash with soap and water. Seek medical attention.
- Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Seek immediate medical attention.
- Ingestion: Do not induce vomiting. Rinse mouth and seek immediate medical attention.
- Protection for First aiders: Do not enter corrosive vapour contaminated areas without a respirator or Self-Contained Breathing Apparatus. Wear adequate personal protective equipment as indicated in Section 8.
- FIRST AID FACILITIES: Eye wash bottle, fountain, safety showers or at least a source of running water are required in the area where the product is used.

### 4.2. Most important symptoms and effects, both acute and delayed

**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 vapours 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.

### 4.3. Indication of any immediate medical attention and special treatment needed

**ADVICE TO DOCTOR:** Treat symptomatically if the person comes into contact with the corrosive electrolyte liquid contents of a damaged battery.

## SECTION 5: Firefighting measures

### 5.1. 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.

### 5.2. Special hazards arising from the substance or mixture

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.
Risk of explosion if battery is exposed to fire.

### 5.3. Advice for firefighters

Wear self-contained breathing apparatus and protective suit. If possible, remove cell(s) from firefighting area. 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. Evacuate personnel to a safe area.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) 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.

### 6.2. Environmental precautions

Absorb spilled material with non-reactive absorbent such as vermiculite, clay, or earth. Prevent from into migration soil, sewers, and natural waterways – inform local authorities if this occurs.

### 6.3. Methods and material 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.

## SECTION 7: Handling and Storage

### 7.1. Precautions for safe handling

Avoid short circuiting the cell. Avoid mechanical damage of the cell. Do not open or disassemble.
Advice on protection against fire and explosion.
Keep away from open flames, hot surfaces, and sources of ignition.

### 7.2. Conditions for safe storage, including any incompatibilities

Storage at room temperature (approx. 20°C) at approx. 20~60% of the nominal capacity (OCV approx. 3.60 - 3.90 V/cell). Keep in closed original container.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

No specific exposure limits for intact batteries.

### 8.2. Exposure controls

Engineering controls: Not required for intact batteries.

PPE: Use gloves and goggles if handling damaged batteries.

## SECTION 9: Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

| | |
|---|---|
| Form: | Solid |
| Colour: | Various |
| Odour: | Odourless |

### 9.2. Other information

| Test method | |
|---|---|
| PH Value: | n.a. |
| Flash point: | n.a. |
| Lower explosion limits: | n.a. |
| Vapour pressure: | n.a. |
| Density: | n.a. |
| Water solubility: | Insoluble |
| Ignition temperature: | n.a. |

## SECTION 10: Stability and Reactivity

### 10.1. Reactivity

Stable

### 10.2. Chemical stability

Keep away from open flames, hot surfaces and sources of ignition.
Do not puncture, crush or incinerate.

### 10.3. Possibility of hazardous reactions

No materials to be especially mentioned.

### 10.4. Conditions to avoid

In case of open cells, there is the possibility of hydrofluoric acid and carbon monoxide release.

### 10.5. Incompatible materials

Will not occur.

### 10.6. Hazardous decomposition products

No decomposition if stored and applied as directed.

## SECTION 11: Toxicological Information

### 11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

The hazardous components of the cell or battery are contained within a sealed unit. Under recommended use conditions, the electrode materials and liquid electrolyte are non-reactive provided that the cell or battery integrity remains and the seals remain intact. The potential for exposure should not exist unless the battery leaks, is exposed to high temperature or is mechanically, electrically or physically abused/damaged. The following toxicology data is in respect to if a person comes into contact with the electrolyte.

### 11.2. Information on other hazards

**Swallowed:** The electrolyte contained within the cell or battery is a corrosive liquid.
Ingestion of this electrolyte would be harmful. Swallowing may result in nausea, vomiting, diarrhea, abdominal pain and chemical burns to the gastrointestinal tract. During normal usage ingestion should not be a means of exposure.
**Eye:** The electrolyte contained within the cell or battery is a corrosive liquid and it is expected that it would cause irreversible damage to the eyes. Contact may cause corneal burns. Effects may be slow to heal after eye contact. Correct handling procedures incorporating appropriate eye protection should minimize the risk of eye irritation.
**Skin:** 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.
Correct handling procedures should minimize the risk of skin irritation. People with pre-existing skin conditions, such as dermatitis, should take extreme care so as not to exacerbate the condition.
**Inhaled:** Inhalation of vapours from a leaking cell or battery is expected to cause 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.

**Skin Corrosion/Irritation:** The electrolyte contained within the cell or battery is classified as a corrosive liquid and is expected to exhibit dermal corrosively/irritation.

**Serious Eye Damage/Irritation:** The electrolyte contained within the cell or battery is classified as a corrosive liquid and is expected to exhibit serious damage/corrosively.

**Respiratory or Skin Sensitization:** The electrolyte contained within the cell or battery is not expected to be a skin sensitizer according to OECD test 406, based on the available data and the known hazards of the components. The electrolyte contained within the battery is not expected to be a respiratory tract sensitizer, based on the available data and the known hazards of the components.

**Germ Cell Mutagenicity:** The electrolyte contained within the cell or battery is not expected to be mutagenic according to test such as OECD tests 471, 475, 476, 478 and 479, based on the available data and the known hazards of the components.

**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.

**Reproductive Toxicity:** The electrolyte contained within the cell or battery is not expected to be a reproductive hazard according to test such as OECD tests 414 and 421, based on the available data and the known hazards of the components.

**Specific Target Organ Toxicity (STOT) – Single Exposure:** The electrolyte contained within the cell or battery is corrosive and is expect to cause respiratory irritation by inhalation. Inhalation of vapours 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.

**Specific Target Organ Toxicity (STOT) – Repeated Exposure:** The cells or batteries are not expected to cause organ damage from prolonged or repeated exposure according to tests such as OECD tests 410 and 412, based on the available data and the known hazards of the components.

**Aspiration Hazard:** The cells or batteries are not classified as an aspiration hazard, based on the available data and the known hazards of the components. However, due to the corrosive nature of the product if

swallowed, do NOT induce vomiting. If vomiting has occurred after ingestion the person should be observed to ensure that aspiration into the lungs has not occurred and assessed for chemical burns to the gastrointestinal and respiratory tracts.

## SECTION 12: Ecological Information

### 12.1. Toxicity

Ecological injuries are not known or expected under normal use.
Do not flush into surface water or sanitary sewer system.

### 12.2. Persistence and degradability

Not known or expected under normal use.

### 12.3. Bioaccumulative potential

Not known or expected under normal use.

### 12.4. Mobility in soil

Not known or expected under normal use.

### 12.5. Results of PBT and vPvB assessment

Not Applicable, since no chemical safety report is required for this Product.

### 12.6. Endocrine disrupting properties

Not known or expected under normal use.

### 12.7. Other adverse effects

Not known or expected under normal use.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

For recycling consult manufacturer: Contaminated packaging disposal in accordance with local regulations.

## SECTION 14: Transport information

### 14.1. UN Number or ID Number

UN3480 – Batteries without equipment
UN3481 – Batteries packed with or contained in equipment.

### 14.2. UN proper shipping name

Secondary li-ion battery

### 14.3. Transport hazard class(es)

Class 9 “miscellaneous dangerous goods” as specified UN Model regulation.

### 14.4. Packaging group

Packing Group II

### 14.5. Environmental hazards

The product is a Lithium-ion cell or battery and is therefore classified as an article and is not hazardous when used according to the recommendations of the manufacturer. The hazard is associated with the contents of the cell or battery. Under recommended use conditions, the electrode materials and liquid electrolyte are non-reactive provided that the cell or battery integrity remains, and the seals remain intact. The potential for exposure should not exist unless the cell or battery leaks, is exposed to high temperatures or is mechanically, electrically, or physically abused/damaged. If the cell or battery is compromised and starts to leak, based upon the battery ingredients, the contents are classified as hazardous.

### 14.6. Special precautions for user

No special precautions for user required. Handle goods according to the recommendation of the manufacturer.

### 14.7. Maritime transport in bulk according to IMO instruments

Products not intended to be transported in bulk. There not applicable.

## SECTION 15: Regulatory Information

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

**Transportation Tests:**

RRC's batteries have been successfully tested and comply with the UN Model Regulations, Manual of Test and Criteria, Part III, subsection 38.3. Product batteries have been manufactured under a quality management program as specified in 2.9.4 of the UN Model Regulations.
In Accordance with the latest IATA Dangerous Good regulations, all listed Batteries have passed 1.2m drop test and 3m stack test.

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

| Manual of Test and Criteria (38.3 Lithium battery) | | Test Results | Remark |
|---|---|---|---|
| No | Test item | | |
| T1 | Altitude Simulation | Pass | |
| T2 | Thermal Test | Pass | |
| T3 | Vibration | Pass | |
| T4 | Shock | Pass | |
| T5 | External Short Circuit | Pass | |
| T6 | Impact | Pass | Tested on cell level |
| T7 | Overcharge | Pass | |
| T8 | Forced Discharge | Pass | Tested on cell level |

RRC's batteries contain no more than 20Wh/cell and 100Wh/battery pack and meet the requirements for transportation under:

- UN Model Regulations Revision 8 (2023) revised Edition; Special Provisions 188 and 230
- International Civil Aviation Organization (ICAO) Technical Instructions and the International Air Transport Association (IATA) Dangerous Goods Regulations Edition 66 (2025).
  Packing Instructions:
  - 965 Section IB (UN3480, Lithium ion batteries)
    - These batteries will be offered for transport at a state of charge (SOC) not exceeding 30% of their rated design capacity.
  - 966 Section II (UN3481, Lithium-ion batteries packed with equipment)
  - 967 Section II (UN3481, Lithium-ion batteries contained in equipment)
- The International Maritime Dangerous Good (IMDG) Code 2025 Edition, Special Provision 188.
- European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) Special Provisions 188 and 230

- U.S. Department of Transportation (DOT) 49 CFR 173.185 and 173.185(c)
- Canadian Transport of Dangerous Goods Regulations (TDGR) Special Provision 34

**Canada:**
These products have been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.
WHMIS Classification: Not Controlled, manufactured article.
New Substance Notification Regulations: Lithium hexafluorophosphate is listed on the Non-Domestic Substance List (NDSL). All other ingredients in the product are listed, as required, on Canada's Domestic Substances List (DSL).
National Pollutant Release Inventory (NPRI) Substances: These products do not contain any NPRI chemicals.

**United States Federal and State Regulations**
TSCA Status: All ingredients in these products are listed on the TSCA inventory.
OSHA: These products do not meet criteria as per Part 1910.1200, manufactured article.
SARA EPA Title III: None.
Sec. 302/304: None.
Sec. 311/312: None.
Sec. 313: None.
CERCLA RQ: None.

**Australia and New Zealand**
**SUSMP:** Not applicable
**AICS:** All ingredients are on the AICS list.
**HSNO Approval number:** Not applicable
**HSNO Group Title:** Not applicable
**NOHSC: 10008 Risk Phrases:** R34 - Causes Burns.
**NOHSC: 1008 Safety Phrases:**
S1 – Keep locked up.
S2 – Keep out of reach of children.
S23 – Do not breathe vapour.
S24/25 – Avoid contact with skin and eyes.
S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S27/28 – After contact with skin, take off immediately all contaminated clothing and wash immediately with plenty of water.
S36/37/39 – Wear suitable protective clothing, gloves and eye/face protection.
S56 – Dispose of this material and its container at hazardous waste or special waste collection point.
S62 – If swallowed, DO NOT induce vomiting: seek medical advice immediately and show this container or label.
S64 – If swallowed, rinse mouth with water (Only if the person is conscious).

**EC Classification for the Substance/Preparation**
These products are not classified as hazardous according to Regulation (EC) No. 1272/2008.
Keep out of the reach of children.

**EU Restrictions on use**
Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended: Aluminium (CAS 7429-90-5)

**Other EU Regulations**
This Safety Data Sheet complies with the requirements of Regulation (EC) No. 1907/2006 which includes the changes in Annex II trough EU Directive 2020/878.

**Japanese Regulations**
Japanese Industrial Standards (JIS) JIS Z 7253:2019
Waste disposal and public cleaning law
Law for Promotion of Effective Utilization of Resources

**Taiwanese Regulations**
Regulation of Labelling and Hazard Communication of Dangerous and Harmful Materials:

Labelling requirements and other relevant provision of chemicals, this product is not classified as dangerous goods.
Toxic Chemicals Substance Control Law: Not Listed.
CNS 1030016 Safety of primary and secondary lithium cells and batteries during transport.

**Chinese Regulations**
General Rule for Classification and Hazard Communication of Chemicals (GB 13690-2009):
Specifies the classification, labelling and hazard communication of chemicals in compliance with the GHS standard for chemical production sites and labelling of consumer goods.
General Rule for Preparation of Precautionary Labels for Chemicals (GB 15258-2009):
Specifies the relevant application methods of precautionary labels for chemicals.
Safety Data Sheet for Chemical Products Content and Order of Sections (GB/T 16483-2008)

**Chemical safety assessment**
Not applicable. No further chemical safety assessment required for this kind of product.

## SECTION 16: Other information

**Full text of R-phrases referred under section 8**

| | |
|---|---|
| R10 | Flammable. |
| R11 | Highly flammable. |
| R15 | Contact with water liberates extremely flammable gases. |
| R17 | Spontaneously flammable in air. |
| R20/22 | Harmful by inhalation and if swallowed. |
| R22 | Harmful if swallowed. |
| R24 | Toxic in contact with skin. |
| R34 | Causes burns. |
| R36 | Irritating to eyes. |
| R37 | Irritating to respiratory system. |
| R38 | Irritating to skin. |
| R40 | Limited evidence of a carcinogenic effect. |
| R43 | May cause sensitization by skin contact. |
| R48/23 | Toxic: danger of serious damage to health by prolonged exposure through inhalation. |
| R49 | May cause cancer by inhalation. |
| R50 | Very toxic to aquatic organisms. |
| R51 | Toxic to aquatic organisms. |
| R53 | May cause long-term adverse effects in the aquatic environment. |
| R62 | Possible risk of impaired fertility. |
| R65 | Harmful: may cause lung damage if swallowed. |
| R67 | Vapours may cause drowsiness and dizziness. |

**Further Information**

Data of sections 4 to 8, as well as 10 to 12, do not necessarily refer to the use and the regular handling of the product (in this sense consult package leaflet and expert information), but to release of major amounts in case of accidents and irregularities. The information describes exclusively the safety requirements for the product(s) and is based on the present level of our knowledge. This data does not constitute a guarantee for the characteristics of the product(s) as defined by the legal warranty regulations. "(n.a. = not applicable; n.d. = not determined)"
The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor’s safety data sheet.