

Material Safety Data Sheet

1. Product & Company Identification

Product:	Lithium-Ion battery (rechargeable), 18500
Nominal voltage:	3,7 V
Nominal capacity:	1400 mAh
Manufacturer:	Conrad Electronic SE
Address:	Klaus-Conrad-Str. 1, D-92240 Hirschau
Telephone:	+49 (0) 9604 / 40 - 8988
Date of issue:	06.06.2017

2. Hazards Identification

Emergency overview:

Under normal conditions of use, the solid electrode materials and liquid electrolyte they contain are non-reactive provided the battery integrity is maintained and seals remain intact. Caution, do not open or disassemble. Do not expose to fire or open flame. Do not mix with batteries of varying sizes, chemistries or types. Risk of fire, explosion and burns. Do not short-circuit, crush, incinerate or disassemble battery.

Classification of the substance or mixture:

Classification according to Regulation (EC) No 1272/2008 (EU-GHS/CLP)

Skin sensitization (Category 1)

Respiratory sensitization (Category 1)

Carcinogenicity (Category 2)

Classification according to EU directives 67/548/EEC or 1999/45/EC

Xn, Harmful R40, R42/43

Label elements

Labelling according Regulation (EC) No 1272/2008 (CLP)

Pictogram



Signal word: Warning

Hazard statement(s)

H317 May cause an allergic skin reaction.

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H351 Suspected of causing cancer.

Precautionary statement(s)

P102 Keep out of reach of children.

P211 Do not spray on an open flame or other ignition source.

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P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P310 Immediately call a Poison Center or doctor/physician.

Other hazards

Physical and chemical hazards: See section 10.

Human health hazards: See section 11.

Environmental hazards: See section 12.

3. Composition/Information on Ingredients

Component	CAS No.	Formula	Composition	EC No.	Classification	GHSCLAS
Nickel cobalt lithium manganate	182442-95-1	Li(NiCoMn)O ₂	38.09%	/	Xn, R40, R42/43	Car. 2 Skin Sens. 1 Resp. Sens. 1 H351 H317 H334
Conductive carbon black	1333-86-4	C	0.62%	215-609-9	Xn, R40	Carc. 2 H351
Graphite	7782-42-5	C	20.44%	231-955-3	/	/
Copper	7440-50-8	Cu	9.22%	231-159-6	/	Aquatic Chronic 1 H410
Aluminium	7429-90-5	Al	4.00%	231-072-3	F, R11, R15	Water-react 2 Flam. Sol. 1 H261 H228
Steel	/	/	25.06%	/	/	/
Sodium carboxymethyl cellulose	9004-32-4	C ₂₈ H ₃₀ Na ₈ O ₂₇	1.10%	/	/	/
Poly(vinylidene fluoride) (PVDF)	24937-79-9	(C ₂ H ₂ F ₂) _n	1.04%	/	/	/
Polypropylene	9003-07-0	(C ₃ H ₆) _n	0.23%	/	/	/
Poly(ethylene terephthalate)	25038-59-9	(C ₁₀ H ₈ O ₄) _n	0.2%	/	/	/

For full text of H-statements and R-Phrases mentioned in this section, see Section 16.

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4. First Aid Measures

Description of first aid measures

Eye contact:

If battery is leaking and material contacts the eye, flush thoroughly with copious amounts of running water for 15 minutes (remove contact lenses if easily possible). Occasionally lifting the upper and lower eyelids, until no evidence of the chemical remains. Get medical aid.

Skin Contact:

If battery is leaking and material contacts the skin, remove any contaminated clothing and flush exposed skin with copious amounts of running water for at least 15 minutes. If irritation, injury or pain persists, seek medical advice.

Ingestion:

Do not induce vomiting. Never give anything by mouth to an unconscious person. Get medical aid. Loosen tight clothing such as a collar, tie, belt or waistband.

Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention if irritation develops or persists.

WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Personal protective equipment for first-aid responders:

No further relevant information available.

Most important symptoms/effects, acute and delayed:

No further relevant information available.

Indication of immediate medical attention and special treatment needed:

Treat symptomatically.

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5. Fire Fighting Measures

Extinguishing media

Suitable Extinguishing Media:

In case of fire where lithium ion batteries present, flood the area with water. If any batteries are burning, water may not extinguish them, but will cool the adjacent batteries and control the spread of fire. CO₂, dry chemical, and foam extinguishers are preferred for small fires, but also may not extinguish burning lithium ion batteries. Burning batteries will burn themselves out. Virtually all fires involving lithium ion batteries can be controlled with water. When water is used, however, hydrogen gas may be evolved which can form an explosive mixture with air. LITH-X (powdered graphite) or copper powder fire extinguishers, sand, dry ground dolomite or soda ash may also be used. These materials act as smothering agents.

Special hazards arising from the substance or mixture:

Thermal decomposition can lead to release of irritating gases and vapors. Batteries evolve flammable hydrogen gas during charging and may increase fire risk in poorly ventilated areas near sparks, excessive heat or open flames. Thermal shock may cause battery case to crack open. Containers may explode when heated. Firefighting water runoff and dilution water may be toxic and corrosive and may cause adverse environmental impacts.

Advice for firefighters:

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

If the internal battery material leaks, notify safety personnel of large spills. Clean-up personnel should wear appropriate protective clothing to avoid eye and skin contact and inhalation of vapors or fumes. Increase ventilation. Remove ignition sources, keep away from heat and flame. Carefully collect batteries and place in an appropriate container for disposal. Damaged batteries that are not hot or burning should be placed in a sealed plastic bag or container.

Environmental precautions

Prevent material from contaminating soil and from entering sewers or waterways.

Methods and materials for containment and cleaning up

Sweep up and place in suitable containers or recycle or disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

Reference to other sections

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

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7. Handling and Storage

Precautions for safe handling

Do not expose the battery to excessive physical shock or vibration. Short-circuiting should be avoided, however, accidental short-circuiting for a few seconds will not seriously affect the battery.

Prolonged short circuits will cause the battery to rapidly lose energy, could generate enough heat to burn skin, even cause fire or explosion. Sources of short circuits include jumbled batteries in bulk containers, coins, metal jewelry, metal covered tables, or metal belts used for assembly of batteries in devices. To minimize risk of short-circuiting, the protective case supplied with the battery should be used to cover the terminals when transporting or storing the battery. Do not disassemble or deform the battery. The lithium ion battery should be between 10% and 50% of full charge when transportation. Do not carry batteries loose in a packet or bag. Do not remove battery tester or battery label. Do not allow contact with water. Do not store in direct sunlight.

Conditions for safe storage, including any incompatibilities

Store in a cool, dry, well ventilated area. Elevated temperatures can result in reduced battery service life, loss of battery performance, leakage or rust. Do not refrigerate - this will not make them last longer. Do not expose the battery to open flames, light and heat. Keep away from combustible materials, organic chemicals, reducing substances, metals, strong oxidizers and water.

Specific end uses

No data available

8. Exposure Controls/Personal Protection

Control parameters

Exposure limits:

CAS# 1333-86-4:

ACGIH: TLV - TWA: 3.5 mg/m³

OSHA: PEL-TWA: 3.5 mg/m³

NIOSH: REL-TWA: 3.5 mg/m³ in pres

Australia-TWA: 3 mg/m³

Belgium-TWA: 3.6 mg/m³

France - VME: 3.5 mg/m³

Japan-OEL: 1 mg/m³ (respirable dust); 4 mg/m³ (total dust)

Netherlands-MAC-TGG: 3.5 mg/m³

Russia-STEL: 4 mg/m³

United Kingdom-TWA: 3.5 mg/m³ STEL: 7 mg/m³

CAS# 7782-42-5:

ACGIH: TLV-TWA: 2 mg/m³ (respirable)

OSHA PEL: 15 mppcf

NIOSH REL: TWA: 2.5 mg/m³ (resp)

Belgium-TWA: 2 mg/m³ (resp. dust)

Denmark-TWA: 2.5 mg/m³ (respirable)

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Finland-TWA: 5 mg/m³

France-VLE: 2 mg/m³

Germany-MAK: 4 mg/m³ (inhalable); 1,5 mg/m³ (respirable)

Japan-OEL: 0.5 mg/m³ (respirable), 2 mg/m³ (total)

Korea-TWA: 10 mg/m³, 2.5 mg/m³

Netherlands-MAC-TGG: 2 mg/m³

United Kingdom-TWA: 10 mg/m³ (inhalable); 4 mg/m³ (respirable)

CAS# 7440-50-8:

ACGIH: TLV-TWA: 0.2 mg/m³ (fume); 1 mg/m³ (dust and mist)

OSHA: PEL-TWA: 1 mg(Cu)/m³, dusts and mists PEL-TWA: 0.1 mg(Cu)/m³, fume

NIOSH: REL-TWA: 1 mg/m³ (Cu, dusts and mists-air)

REL-TWA: 0.1 mg/m³ (Cu, fume-air)

Australia-TWA: 0.2 mg/m³ (fume), 1 mg/m³ (dust and mist)

Belgium-TWA: 0.2 mg/m³ (fume), 1 mg/m³ (dust, aerosol)

France-VME: 1 mg/m³ (dust), 1 mg/m³ (fume)

Netherlands-MAC-TGG: 0.2 mg/m³ (fume), 1 mg/m³ (dust)

Russia-TWA: 0.5 mg/m³, STEL: 1 mg/m³

CAS# 7429-90-5:

ACGIH: TLV-TWA: 10 mg/m³ (dust), 5 mg/m³ (pyro powders)

OSHA: PEL-TWA: 15 mg/m³ (total), TWA: 5 mg/m³ (resp)

NIOSH: REL-TWA: 10 mg/m³ (total), TWA: 5 mg/m³ (resp)

Australia-TWA: 2 mg (Al)/m³, 5 mg/m³ (pyro powders); 5 mg/m³ (welding fumes)

Belgium-TWA: 10 mg/m³ (pyro powders); 5 mg/m³ (welding fumes)

Denmark-TWA: 10 mg (Al)/m³; (dust)

France-VME: 10 mg/m³, 5 mg/m³ (fume, resp. dust)

Germany-MAK: 1.5 mg/m³ (respirable)

Japan-OEL: 0.5 mg/m³ (respirable); 2 mg/m³ (total)

Korea- TWA: 10 mg/m³ (metal dust); 5 mg/m³ (pyro powders); 5 mg/m³ (welding fumes)

Netherlands-MAC-TGG: 10 mg/m³

Russia-STEL: 2 mg/m³

United Kingdom-TWA: 10 mg/m³ (inhalable; 4 mg/m³ (respirable)

CAS# 9003 -07-0:

Russia- STEL: 10 mg/m³

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Engineering Controls

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Personal Protective Equipment

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

Skin Protection: Not necessary under normal conditions. Use neoprene or natural rubber gloves if handling an open or leaking battery.

Body Protection: Not necessary under normal conditions. Wear appropriate protective clothing if handling an open or leaking battery.

Respirators Protection: In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting batteries. Respiratory Protection is not necessary under conditions of normal use.

Other Protection: Do not eat, smoke or drink where material is handled, processed or stored. Wash hands carefully before eating or smoking, to maintain good health habits.

9. Physical and Chemical Properties

Appearance	Form: Cylindrical
Odour	No data available
Odour Threshold	No data available
pH	No data available
Melting point/freezing point	No data available
Initial boiling point and boiling range	No data available
Flash point	No data available
Evaporation rate	No data available
Flammability (solid, gas)	No data available
Upper/Lower flammability or explosive limits	No data available
Vapour pressure	No data available
Vapour density	No data available
Relative density	No data available
Water solubility	No data available
Partition coefficient: n-octanol/water	No data available
Autoignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Normal Voltage	3.7 V
Capacitance	1400 mAh
Charge current	400 mA
Weight	45.3 g

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10. Stability and Reactivity

Reactivity No data available

Chemical stability Stable under normal conditions.

Possibility of hazardous reactions

Hazardous Polymerization Will not occur.

Hazardous Reactions None under normal processing.

Conditions to avoid

Incompatible materials, excess heat, exposure to moist air or water.

Mechanical abuse such as crushing, piercing, and disassembly) and electrical abuse (voltage reversal and short-circuiting).

Incompatible materials:

Strong mineral aids, water, alkali solutions, strong oxidizing materials and conductive materials

Hazardous decomposition products

Thermal decomposition during fire produces hazardous oxides of carbon (mainly CO and other VOC's) and phosphorous, hydrofluoric acid and other toxic by-products.

Metallic compounds such Oxides of nickel, cobalt and copper. Electrolyte with water: Hydrofluoric acid (HF).

11. Toxicological Information

Information on toxicological effects

Acute toxicity:

CAS# 1333-86-4:

Oral, rat: LD50 > 15400 mg/kg

Skin, rabbit: LD50 > 3000 mg/kg

CAS# 7440-50-8:

Oral, mouse: LD50 = 413 mg/kg

CAS# 9003-07-0:

Intraperitoneal, rat: LD50 > 110.000 mg/kg

Intravenous, rat: LD50 > 99.000 mg/kg

Oral, mouse: LD50 = 5000 mg/kg

Oral, rat: LD50 > 8000 mg/kg

Skin corrosion/ irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitization

No data available

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Germ cell mutagenicity

No data available

Carcinogenicity

Nickel cobalt lithium manganate – The toxicological properties have not been thoroughly investigated.

Conductive carbon black - This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP or EPA classification. Group 2B – Possibly carcinogenic to humans.

Graphite - IARC: No component of this product present at levels greater than or equal to 0.1 % is identified as probable, possible or confirmed human carcinogen by IARC.

Copper - IARC: No component of this product present at levels greater than or equal to 0.1 % is identified as probable, possible or confirmed human carcinogen by IARC.

Aluminium - IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Steel - The toxicological properties have not been thoroughly investigated.

Sodium carboxymethyl cellulose - IARC No component of this product present at levels greater than or equal to 0.1 % is identified as probable, possible or confirmed human carcinogen by IARC.

Poly(vinylidene fluoride) (PVDF) - IARC : No component of this product present at levels greater than or equal to 0.1 % is identified as probable, possible or confirmed human carcinogen by IARC.

Polypropylene - IARC: No component of this product present at levels greater than or equal to 0.1 % is identified as probable, possible or confirmed human carcinogen by IARC.

Poly(ethylene terephthalate) - IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity – single exposure

No data available

Specific target organ toxicity – repeated exposure

No data available

Aspiration hazard

No data available

Potential Health Effects

Eye: No special hazard risk under normal use. Contact with battery contents may cause severe irritation and burns. Eye damage is possible.

Skin: No special hazard risk under normal use. Contact with battery contents may cause severe irritation and burns. May be absorbed through the skin causing localized inflammation.

Ingestion: May cause severe and permanent damage to the digestive tract. May cause circulatory system failure. Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.

Inhalation: Inhalation of vapors or fumes released due to heat or a large number of leaking batteries may cause respiratory irritation. Irritation may lead to chemical pneumonitis. Inhalation can produce chronic productive cough and shortness of breath.

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Signs and Symptoms of Exposure

Under normal conditions of use, the solid electrode materials and liquid electrolyte they contain are non-reactive provided the battery integrity is maintained and seals remain in tact. Caution, do not open or disassemble. Do not expose to fire or open flame. Do not mix with batteries of varying sizes, chemistries or types. Risk of fire explosion and burns. Do not short-circuit, crush, incinerate or disassemble battery.

Additional Information

RTECS#:

CAS# 182442-95-1: Unlisted /CAS# 1333-86-4: FF5800000/ CAS# 7782-42-5: MD9659600/

CAS# 7440-50-8: GL5325000/ CAS# 7429-90-5: BD0330000/ CAS# 9004-32-4: FJ5950000/

CAS# 24937-79-9: Unlistcd/ CAS# 9003-07-0: UD1842000/ CAS# 25038-59-9: TR2725000

12. Ecological Information

Toxicity

No data available

Persistence and degradability

No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Results of PUT and vPvB assessment

No data available

Other adverse effects

When promptly used or disposed the battery does not present environmental hazard. When disposed, keep away from Water, rain and snow.

13. Disposal Considerations

Waste treatment methods

Waste from Residues/Unused Products: Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

Contaminated packaging: Contaminated packaging material should be treated equivalent to residual chemical. Clean packaging material should be subjected to waste management schemes (recovery, recycling, reuse) according local legislation.

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14. Transport Information

Shipping Name (UN number)	Lithium ion batteries (UN3480)
	Lithium ion batteries packed with equipment (UN3481)
	Lithium ion batteries contained in equipment (UN3481)
Hazard class	Class 9 (Miscellaneous)
Packing group	II

Method	Organization	Special Provision
Air	IATA	Packaging Instruction 965-967
Marine	IMDG	SP188
Rail/Road	RID/ADR	SP188

Their regulations are based on the UN recommendations. Each special provision provides specifications on exceptions and packaging for lithium ion batteries shipping. A Shipper's Declaration for Dangerous Goods is not required when they meet the requirements of packing instruction 965 Section II or 966 Section II or Part 967 Section II of IATA-DGR (57th Edition) or SP188 of IMO-IMDG Code (2014 edition) or SP188 of ADR (2015 edition).

15. Regulatory Information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

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

No data available

Canada

CAS# 182442-95-1 is not listed on Canada's DSL and NDSL List. Other chemicals in this product with known CAS numbers are listed on Canada's DSL List.

US Federal

Toxic Substance Control Act (TSCA)

CAS# 182442-95-1 is not listed on the TSCA Inventory. Other chemicals in this product with known CAS numbers are listed on the TSCA Inventory.

China

Inventory of Existing Chemical Substances Produced or Imported in China (IECSC)

CAS# 182442-95-1 is not listed on the IECSC Inventory. Other chemicals in this product with known CAS numbers are listed on the IECSC Inventory.

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16. Additional Information

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Text of H-code(s) and R-phrases mentioned in Section 3

Carc. 2: Carcinogenicity (Category 2)

Skin Sens. 1: Skin sensitization (Category 1)

Resp. Sens. 1: Respiratory sensitization (Category 1)

Flamn. Sol. 1: Flammable solid (Category 1)

Water-react. 2: Substance or mixture which in contact with water emits flammable gas (Category 2)

Aquatic Chronic 1: Chronic aquatic toxicity (Category 1)

R 11 Highly Flammable.

R 15 Contact with water liberates extremely flammable gases.

R 40 Limited evidence of a carcinogenic effect.

R 42/43 May cause sensitization by inhalation and skin contact.

H228 Flammable solid

H261 In contact with water releases flammable gas

H317 May cause an allergic skin reaction

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H351 Suspected of causing cancer

H410 Very toxic to aquatic life with long lasting effects.

Other Information:

ACGIH: American Conference of Governmental Industrial Hygienists)

CAS: Chemical Abstracts Service

DSL: The Domestic Substances List of Canada)

EC: European Commission

IARC: International Agency for Research on Cancer

IATA: International Air Transport Association

IMDG: International Maritime Dangerous Goods

ADR: European Agreement Concerning the International Carriage of Dangerous Goods by Road

RID: Regulations Concerning the International Carriage of Dangerous Goods by Rail

LD50: Lethal dose, percent kill

NDSL: the Non-domestic Substances List of Canada

NIOSH: US National Institute for Occupational Safety and Health

NTP: US National Toxicology Program

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OSHA: US Occupational Safety and Health

PEL: Pennissible Exposure Level

REL: Recommended Exposure Limit

RTECS: Registry of Toxic Effects of Chemical Substances)

SEL: Short Term Exposure Limit

TDG: Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulations

TSCA: Toxic Substances Control Act of USA

TECSC: Inventory of Existing Chemical Substances Produced or Imported in China

TWA: Time Weighted Average

TLV: Threshold Limit Value