

Conrad Electronic SE, Klaus-Conrad-Str. 1, D-92240 Hirschau

Item no. 1233684

Material Safety Data Sheet

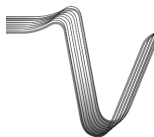
1. Product & Company Identification:

Product:	Lithium iron phosphate (LiFePo4) battery 18650
Manufacturer:	Conrad Electronic SE. Klaus-Conrad-Str. 1, D-92240 Hirschau
Nominal voltage:	3,7 V
Nominal capacity:	2000 mAh
Telephone:	+49 (0) 9604 / 40 - 8988
Date of issue:	03.02.2015

These products are exempted from Material Safety data Sheet regulations. However, this manual provides you with referential information to safely use the products.

2. Composition/Information on Ingredient:

Chemical name	CAS No.	Formula	Composition	EC No.
Lithium iron phosphate	/	Li-Ion	47,8%	/
Carbon	7440-44-0	C	26%	231-153-3
Copper	7440-50-8	Cu	8%	231-159-6
Polyvinylidene fluoride (PVC)	24937-79-9	(C ₂ H ₂ F ₂) _n	4%	/
Aluminium	7429-90-5	Al	3%	231-072-3
Ethylene carbonate (EC)	96-49-1	C ₃ H ₄ O ₃	1%	202-510-0
Dimethyl carbonate (DMC)	616-38-6	C ₃ H ₆ O ₃	1%	210-478-4
Dimethyl ether	115-10-6	C ₂ H ₆ O	1%	210-478-4
Lithium hexafluorophosphate	21324-40-3	LiPF ₆	0.5%	244-334-7
Polypropylene	9003-07-0	[C ₃ H ₆] _n	0.3%	/
Sodium carboxymethyl cellulose	9004-32-4	/	0.2%	/
Propylene carbonate	108-32-7	C ₄ H ₆ O ₃	10%	203-572-1
Saturated polyester plastics	/	/	1.7%	/
Coupling agent	/	/	1%2.7%	/



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3. Hazards Identification:

Emergency overview:

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.

Potential health effects

Eye: No special hazard risk under normal use. Contents of an open battery can cause severe irritation and chemical burns.

Skin: No special hazard risk under normal use. Contents of an open battery can cause skin irritation and/or chemical burns. Ethylene carbonate and dimethyl carbonate 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 a mist of this material may cause respiratory tract irritation. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain. Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma.

4. First Aid Measures:

For: Materials leak from battery.

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids, until no evidence of the chemical remains. Get medical aid.

Skin: Flush skin with soap and water. Remove contaminated clothing and shoes. If a chemical burn occurs or if irritation persists, seek medical attention.

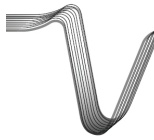
Ingestion: Seek medical attention immediately.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. If breathing is difficult, give oxygen. Seek medical attention if irritation develops or persists.

5. Fire Fighting Measures:

General information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Burning lithium ion batteries can produce toxic fumes including HF, oxides of carbon, aluminium, lithium, copper. Volatile phosphorus pentafluoride may form at a temperature above 230°F.

Extinguishing media: In case of fire where lithium ion batteries are 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. LIT-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.



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6. Accidental Release Measures:

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the protective equipment section. Avoid generating dusty conditions. Provide ventilation. Damaged batteries that are not hot or burning should be placed in a sealed plastic bag or container. Prevent material from contaminating soil and from entering sewers or waterways.

7. Handling and Storage:

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 allow contact with water. Do not store in direct sunlight.

Storage: The lithium ion battery should be between 40% and 60% of full charge when stored for a long period of time. Store in a cool, dry, well ventilated area. Elevated temperatures can result in loss of battery performance, leakage, or rust. Do not expose the battery to open flames. Store protected from moisture.

8. Exposure Controls, Personal Protection:

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

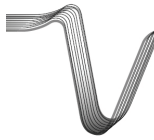
Personal Protective Equipment:

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

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

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

Respirators: 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.



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9. Physical and Chemical Properties:

Physical State:	Cylindrical
Color:	Depending on packaging
Odor:	Odorless
Normal Voltage:	3.7 V
Weight:	40 g
Capacitance:	2000 mAh
Solubility in water:	Insoluble

10. Stability and Reactivity:

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, excess heat, exposure to moist air or water. Mechanical abuse and electrical abuse.

Incompatibilities with Other Materials: Strong oxidants.

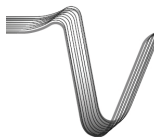
Hazardous Decomposition Products: Hazardous decomposition products may formed under fire conditions.

Hazardous Polymerization: Has not been reported.

11. Toxicological Information:

RTECS#:

CAS#	7440-44-0:	FF5250100
CAS#	7440-50-8:	GL5325000 GL7440000 GL759000
CAS#	24937-79-9:	None listed
CAS#	7429-90-5:	BD0330000 BD102000
CAS#	96-49-1:	FF9550000
CAS#	616-38-6:	FG0450000
CAS#	115-10-6:	PM4780000
CAS#	21324-40-3:	None listed
CAS#	9003-07-0:	UD1842000
CAS#	9004-32-4:	FJ5950000
CAS#	108-32-7:	FF9650000



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LD50/LC50:

CAS# 7440-44-0:	Intravenous, mouse: LD50 = 440 mg/kg
CAS# 96-49-1:	Oral, rat: LD50 = 10 g/kg Skin, rabbit: LD50 > 3 g/kg
CAS# 616-38-6:	Oral, mouse: LD50 = 6 g/kg Oral, rat: LD50 = 13 g/kg Skin, rabbit: LD50 >5 g/kg
CAS# 115-10-6:	Inhalation, rat: LC50 = 308,000 mg/m ³
CAS# 9003-07-0:	Intraperitoneal, rat: LD50 > 110.000 mg/kg Intravenous, rat: LD50 > 99.000 mg/kg
CAS# 9004-32-4:	Inhalation, rat: LC50 > 5800 mg/m ³ /4H Oral, mouse: LD50 > 27 g/kg Oral, rabbit: LD50 > 27 g/kg Oral, rat: LD50 = 27000 mg/kg Skin, rabbit: LD50 > 2 g/kg
CAS# 108-32-7:	Oral, rat: LD50 > 29100 ul/kg Inhalation, rat: LC50 > 5,000 mg/m ³ Oral, mouse: LD50 = 20700 mg/kg

Sensitisation: No information available

Carcinogenicity:

Lithium iron phosphate: The toxicological properties have not been thoroughly investigated.

Carbon: Not listed as a carcinogen by ACGIH, IARC, NTP or CA Prop. 65.

Copper: Not listed as a carcinogen by ACGIH, IARC, NTP or CA Prop. 65.

Polyvinylidene fluoride: 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: Not listed as a carcinogen by ACGIH, IARC, NTP or CA Prop. 65.

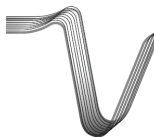
Ethylene carbonate: IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Dimethyl carbonate: 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.

Dimethyl ether: 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.

Lithium hexafluorophosphate: 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.



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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.

Propylene carbonate: 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.

Saturated polyester plastics: The toxicological properties have not been thoroughly investigated.

Coupling agent: The toxicological properties have not been thoroughly investigated.

Other: See actual entry in RTECS for complete information.

12. Ecological Information:

Persistence and Degradability: No information available

Ecotoxicity: No information available

Further information on ecology: No information available

Other: When promptly used or disposed the battery does not present environmental hazard. When disposed, keep away from water, rain or snow.

13. Disposal Precautions:

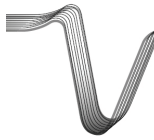
Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification. Contaminated packaging material should be treated equivalent to residual chemical. Clean packaging material should be subjected to waste management schemes (recovery recycling, reuse) according to local legislation.

14. Transportation Precautions:

See IATA DGR for relevant information.

See IMDG Code for relevant information.

See RID/ADR for relevant information.



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15. Regulatory Information:

Regulatory Information: Reference to the local, national and EU/international regulations.

Hazard Symbols: Xn: Harmful

N: Dangerous for the environment



Risk Phrases:

R20/22 Harmful by inhalation and if swallowed

R40 Limited evidence of a carcinogenic effect

R43 May cause sensitization by skin contact

R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Safety Phrases:

S16 Keep away from sources of ignition

S24 Avoid contact with eyes

S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

S60 This material and its container must be disposed of as hazardous waste

S61 Avoid release to the environment. Refer to special instructions/safety data sheets

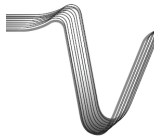
Canada:

CAS# 7440-44-0, CAS# 7440-50-8, CAS# 24937-79-9, CAS# 7429-90-5, CAS# 96-49-1, CAS# 616-38-6, CAS# 115-10-6, CAS# 9003-07-0, CAS# 9004-32-4, CAS# 108-32-7 are listed on Canada's DSL list. CAS# 21324-40-3 is listed on Canada's NDSL list.

US Federal

Toxic Substance Control Act (TSCA)

Components of this product are listed on the TSCA Inventory.



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16. Additional Information:

The above information is based on the data of which we are aware and is believed to be correct as of the data hereof. Since this information may be applied under conditions beyond our control and with which may be unfamiliar and since data made available subsequent to the data hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

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, 50 percent kill

NDSL: the Non-domestic Substances List of Canada

NIOSH: US National Institute for Occupational Safety and Health

NTP: US National Toxicology Program

OSHA: US Occupational Safety and Health

RTECS: Registry of Toxic Effects of Chemical Substances

TDG: Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulations

TSCA: Toxic Substances Control Act of USA