

1. Identification

Product identifier

Trade name: 4E64-3 - Lithium Ion batteries

Relevant identified uses of the substance or mixture and uses advised against

General use: Lithium-ion battery for orthopedic procedures
For commercial user only.

Details of the supplier of the safety data sheet

Company name: Otto Bock Health Care
Street/POB-No.: 3820 W. Great Lakes Drive
Zip code, city: Salt Lake City, UT 84120
USA

WWW: www.ottobockus.com

Telephone: +1 (801) 956-2400

Telefax: +1 (801) 956-2401

Department responsible for information:

Quality Department,
Telephone: +1 (801) 954-2304 (7 AM – 3 PM, Mountain Time),
Email: USRegulatory@ottobock.com

Additional information:

Corporate headquarters:
Ottobock SE & Co. KGaA
Max-Näder-Straße 15
Duderstadt
Germany

Emergency telephone number

CHEMTREC, Telephone: +1 (800) 424-9300

Transport:

CONSULTANK Lutz Harder GmbH (Contract QUALI003)

Telephone: +49 (0)178-4337434 (from USA: 01149 178 4337434)

2. Hazard identification

Classification of the substance or mixture

Article not subject to hazard labelling or classification.

Label elements

not applicable

Other hazards

The battery is hermetically sealed.

Danger of releasing ingredients, mentioned in section 3, by damaging the battery

- with strong mechanical action,
- in case of heating and/or Fire,
- with influence of water,
- short circuit.

Hazard statements:

May cause cancer. Causes damage to organs through prolonged or repeated exposure.

Fatal if inhaled.

Electrolyte, organic:

Highly flammable liquid and vapor. Causes serious eye irritation. May cause damage to organs through prolonged or repeated exposure.

3. Composition/information on ingredients

Mixtures

Chemical characterization: Lithium-ion battery - Article.

The chemical materials are stored in a hermetically sealed metal case.

Contains Aluminium (< 40%), Graphite (< 30%), Carbon (< 30%), Copper (< 15%).

Relevant ingredients:

CAS No.	Designation	Concentration	Classification
CAS 12190-79-3	Cobalt lithium dioxide	< 60 %	Reproductive toxicant - Category 2.
CAS 12057-17-9	Lithium manganese oxide	< 60 %	Acute Toxicity - oral - Category 4. Acute Toxicity - inhalative - Category 4. Aquatic toxicity - chronic - Category 4.
CAS 182442-95-1	Lithium Cobalt Manganese Nickel Oxide	< 60 %	Acute Toxicity - inhalative - Category 2. Carcinogenicity - Category 1B. Specific Target Organ Toxicity (Repeated Exposure) - Category 1. Aquatic toxicity - chronic - Category 3.
CAS 623-53-0	Ethyl methyl carbonate	< 25 %	Flammable Liquid - Category 2.
CAS 105-58-8	Diethyl carbonate	< 25 %	Flammable Liquid - Category 3.
CAS 96-49-1	Ethylene carbonate	< 25 %	Acute Toxicity - oral - Category 4. Eye Irritation - Category 2. Specific Target Organ Toxicity (Repeated Exposure) - Category 2.

The actual concentration or concentration range is withheld as a trade secret.

Additional information: Contains aluminium, Graphite, carbon and copper. The maximum workplace exposure limits are, where necessary, listed in section 8.

4. First aid measures

General information:	In case of damaged battery cases: Release of dangerous ingredients possible. In case of heating: Generates dangerous gases or fumes in contact with.
In case of inhalation:	In case of damaged battery cases: Provide fresh air. Keep victim at rest in half upright position. Seek medical attention.
Following skin contact:	In case of damaged battery cases / In case of exposure to hazardous ingredients: Clean with plenty of water. If possible, also wash with polyethylene glycol 400. Take off immediately all contaminated clothing and wash it before reuse. Seek medical treatment in case of troubles.
After eye contact:	In case of damaged battery cases / In case of exposure to hazardous ingredients: Immediately flush eyes with plenty of flowing water for 10 to 15 minutes holding eyelids apart. Remove contact lenses, if present and easy to do. Continue rinsing. Afterwards, consult an ophthalmologist immediately.
After swallowing:	Induce vomiting when the affected person is not unconscious. In case of damaged battery cases / In case of exposure to hazardous ingredients: Drink large quantities of water. Do not induce vomiting. Immediately get medical attention. Do not try to neutralize.

Most important symptoms/effects, acute and delayed

No hazardous reaction when handled and stored according to provisions.
In case of damaged battery cases /
In case of exposure to hazardous ingredients: Harmful if swallowed. Fatal if inhaled.
Causes damage to organs through prolonged or repeated exposure.

Information to physician

Treat symptomatically.

5. Fire-fighting measures

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media:

Water spray jet, dry chemical powder, nitrogen, carbon dioxide

Extinguishing media which must not be used for safety reasons:

Full water jet.

Specific hazards arising from the chemical

In case of fire may be liberated: Toxic metal oxide smoke, corrosive gases/vapors, carbon monoxide and carbon dioxide.

Protective equipment and precautions for firefighters

Wear a self-contained breathing apparatus and chemical protective clothing.

Additional information:

Keep upwind.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

In case of damaged battery cases:

Remove all sources of ignition.

Provide fresh air. Avoid contact with skin and eyes.

Wear suitable gloves. Take off immediately all contaminated clothing and wash it before reuse.

In case of development of vapors or dust:

Do not inhale vapors or dust particles. Keep unprotected people away.

Environmental precautions:

Discharge into the environment must be avoided. If necessary, notify appropriate authorities.

Methods and material for containment and cleaning up

Methods for clean-up:

Take up mechanically. Dispose of waste according to applicable legislation.

Electrolyte, organic: Take up with non-flammable, liquid binding material (e.g. sand/earth/diatomaceous earth/vermiculit) and perform disposal according to instructions. Final cleaning.

Additional information:

In case of damaged battery cases: Special danger of slipping by leaking/spilling product.

7. Handling and storage

Precautions for safe handling

Advices on safe handling:

Provide adequate ventilation, and local exhaust as needed. Do not eat, drink or smoke when using this product.

Avoid damage to the battery casing.

In case of damaged battery cases: Avoid exposure. Avoid contact with skin and eyes.

Wear suitable gloves. Take off immediately all contaminated clothing and wash it before reuse. When handling large quantities, supply emergency spray.

Precautions against fire and explosion:

Avoid short circuit. Avoid damage to the battery casing.

In case of damaged battery cases: Remove all sources of ignition.

Conditions for safe storage, including any incompatibilities

Requirements for storerooms and containers:

Provide adequate ventilation. Store in a dry place.

Protect from: humidity, heat, UV-radiation/sunlight.

Storage temperature: -68 °F up to 95 °F.

Air humidity: 45% up to 85%.

Hints on joint storage:

Do not store together with metals, strong acids, strong oxidizing agents. Protect from humidity and water.

8. Exposure controls/personal protection

Control parameters

Occupational exposure limit values:

CAS No.	Designation	Type	Limit value
7429-90-5	Aluminium	USA: ACGIH: TWA	1 mg/m ³
		USA: NIOSH: Ceiling	5 mg/m ³ (inhalable fraction)
		USA: NIOSH: TWA	10 mg/m ³ (inhalable fraction)
		USA: NIOSH: TWA	5 mg/m ³ (inhalable fraction)
		USA: OSHA: TWA	15 mg/m ³ (inhalable fraction)
		USA: OSHA: TWA	5 mg/m ³ (respirable fraction)
7782-42-5	Graphite	USA: ACGIH: TWA	2 mg/m ³ (respirable fraction)
		USA: IDLH: TWA	1,250 mg/m ³
		USA: NIOSH: TWA	2.5 mg/m ³ (respirable fraction)
		USA: OSHA: TWA	15 mg/m ³ (total dust)
		USA: OSHA: TWA	5 mg/m ³ (respirable fraction)
7440-44-0	Carbon	USA: ACGIH: TWA	10 mg/m ³
			(Dust limit value, inhalable fraction)
		USA: ACGIH: TWA	3 mg/m ³
			(Dust limit value, respirable fraction)
		USA: OSHA: TWA	15 mg/m ³ (inhalable fraction)
		USA: OSHA: TWA	5 mg/m ³ (respirable fraction)
7440-50-8	Copper	USA: ACGIH: TWA	0.2 mg/m ³ (Smoke)
		USA: ACGIH: TWA	1 mg/m ³
			(Dusts and mist calculated as Cu)
		USA: IDLH: TWA	100 Cu/m ³ (dust and mist)
		USA: IDLH: TWA	100 Cu/m ³ (Smoke)
		USA: NIOSH: TWA	1 mg/m ³
		USA: OSHA: TWA	0.1 mg/m ³ (Smoke; calculated as Cu)
		USA: OSHA: TWA	1 mg/m ³
			(Dusts and mist calculated as Cu)

Additional information: The chemical materials are stored in a sealed battery case.

Appropriate engineering controls

In case of damaged battery cases: Provide adequate ventilation.

In case of development of vapors or dust:

The use of local exhaust ventilation is recommended.

Personal protection equipment (PPE)

Respiratory protection: In case of damaged battery cases:
Respiratory protection must be worn whenever the TLV (WEL) levels have been exceeded.
Half mask with particle filter P according to OSHA Standard - 29 CFR: 1910.134 or ANSI Z88.2.
If necessary: When vapors form combination filter Use filter type A, B, K according to OSHA Standard - 29 CFR: 1910.134 or ANSI Z88.2.

Hand protection: In case of damaged battery cases:
Protective gloves according to OSHA Standard - 29 CFR: 1910.138.
Glove material: rubber - breakthrough time >480 min.
Observe glove manufacturer's instructions concerning penetrability and breakthrough time.

Eye protection: In case of damaged battery cases:
Tightly sealed goggles according to OSHA Standard - 29 CFR: 1910.133 or ANSI Z87.1-2010.

Body protection: In case of damaged battery cases:
Wear suitable protective clothing.

General hygiene considerations:
In case of damaged battery cases:
Do not inhale vapors or dust particles.
Avoid contact with skin and eyes.
Keep away from sources of ignition - No smoking.
Wash hands before breaks and after work. When handling large quantities, supply emergency spray.

Environmental exposure controls

Do not allow to enter into ground-water, surface water or drains.

9. Physical and chemical properties

Information on basic physical and chemical properties

Physical state at 68 °F and 101.3 kPa	solid
Color:	metallic
Odor:	odorless
Odor threshold:	No data available
Melting point/freezing point:	No data available
Initial boiling point and boiling range:	No data available
Flammability:	No data available
Explosion limits:	No data available
Flash point/flash point range:	Not applicable
Evaporation rate:	No data available
Auto-ignition temperature:	No data available
Decomposition temperature:	No data available
pH:	Not applicable
Viscosity:	No data available
Solubility:	No data available
Partition coefficient: n-octanol/water:	No data available
Vapor pressure:	No data available
Density:	No data available
Vapor density:	No data available
Particle characteristics:	No data available

Additional information

Additional information: No data available

10. Stability and reactivity

Reactivity: Refer to subsection "Possibility of hazardous reactions".

Chemical stability: Stable under recommended storage conditions.

Possibility of hazardous reactions:

Fire hazard in case of technical defects.

In case of damaged battery cases:

Electrolyte, organic: Flammable.

After contact with water: formation of Hydrogen fluoride.

Conditions to avoid:

> 212 °F: Generation of heat. Ignition.

Protect from: humidity, water, marine water, heat, UV-radiation/sunlight

Avoid short circuit. Avoid damage to the battery casing.

In case of damaged battery cases:

Keep away from sources of ignition - No smoking. Protect from: water.

Incompatible materials:

Keep away from strong acids, strong oxidizing agents and metals.

In case of damaged battery cases:

Electrolyte, organic: Protect from humidity and water.

Hazardous decomposition products:

Toxic metal oxide smoke, corrosive gases/vapors, carbon monoxide and carbon dioxide.

11. Toxicological information

Information on toxicological effects

Toxicological effects:

The statements are derived from the properties of the single components. No toxicological data is available for the product as such.

Acute toxicity (oral): Lack of data.

Acute toxicity (dermal): Lack of data.

Acute toxicity (inhalative): Lack of data.

Skin corrosion/irritation: Lack of data.

Serious eye damage/irritation: Lack of data.

Sensitisation to the respiratory tract: Lack of data.

Skin sensitisation: Lack of data.

Germ cell mutagenicity/Genotoxicity: Lack of data.

Carcinogenicity: Lack of data.

Reproductive toxicity: Lack of data.

Effects on or via lactation: Lack of data.

Specific target organ toxicity (single exposure): Lack of data.

Specific target organ toxicity (repeated exposure): Lack of data.

Aspiration hazard: Lack of data.

Other information: In case of damaged battery cases:
Lithium Cobalt Manganese Nickel Oxide:
May cause cancer. Fatal if inhaled. Causes damage to organs through prolonged or repeated exposure.
Lithium manganese oxide:
Harmful if swallowed. Harmful if inhaled.
(Manganese: LD50 Guinea pig oral 9000 mg/kg)
(Nickel: LD50 Guinea pig oral 5 mg/kg)
Aluminium:
LC50 Rat, inhalative 888 mg/L
Copper:
Mucous membrane irritation, cough, shortage of breath. TDLo Rabbit, hypodermic 375 mg/kg.
Electrolyte, organic:
LD50 oral: > 2,000

12. Ecological information

Ecotoxicity

Further details: No data available

Persistence and degradability

Further details: Product is not biodegradable.

Bioaccumulative potential

Partition coefficient: n-octanol/water:

No data available

Mobility in soil

No data available

Other adverse effects

General information: Discharge into the environment must be avoided.

13. Disposal considerations

Waste treatment methods

Product

Recommendation: Dispose of waste according to applicable legislation.

Package

Recommendation: Dispose of waste according to applicable legislation.
Packing can be recycled or disposed of.

14. Transport information

UN number

DOT: UN3480

IMDG, IATA-DGR: UN 3480

UN proper shipping name

DOT, IMDG, IATA-DGR: UN 3480, LITHIUM ION BATTERIES

Transport hazard class(es)

DOT: 9

IMDG: Class 9, Subrisk -

IATA-DGR: Class 9



Packing group

DOT, IATA-DGR: not applicable

IMDG: -

Environmental hazards

Marine pollutant: no

Transport in bulk according to IMO instruments

No data available

Special precautions for user

USA: Department of Transportation (DOT)

Labels: 9

Special Provisions: 388, 422, A54, A100

Packaging – Exceptions: 185

Packaging – Non-bulk: 185

Packaging – Bulk: 185

Quantity limitations – Passenger aircraft / rail:

Forbidden

Quantity limitations – Cargo only: 35 kg

Vessel stowage – Location: A

Vessel stowage – Other: 156

Sea transport (IMDG)

EmS:	F-A, S-I
Special Provisions:	188 230 310 348 376 377 384 387
Limited quantities:	0
Excepted quantities:	E0
Package - Instructions:	P903, P908, P909, P910, P911, LP903, LP904, LP905, LP906
Package - Provisions:	-
IBC - Instructions:	-
IBC - Provisions:	-
Tank instructions - IMO:	-
Tank instructions - UN:	-
Tank instructions - Provisions:	-
Stowage and handling:	Category A. SW19
Properties and observations:	Electrical batteries containing lithium ion may react (e.g., flame, heat, emission of toxic, corrosive or flammable gases or vapours) or disassemble due to damage, defects or short circuit.
Marine pollutant:	no
Segregation group:	none

Air transport (IATA)

Proper shipping name:	UN 3480, LITHIUM ION BATTERIES
Hazard label:	Lithium batt or Sodium-ion batt
Excepted Quantity Code:	E0
Passenger and Cargo Aircraft: Ltd.Qty.:	Forbidden
Passenger and Cargo Aircraft:	Forbidden
Cargo Aircraft only:	Pack.Instr. See 965 - Max. Net Qty/Pkg. See 965
Special Provisions:	A88 A99 A154 A183 A201 A213 A331 A334 A802
Emergency Response Guide-Code (ERG):	12FZ

15. Regulatory information

National regulations - U.S. Federal Regulations

This product is an article as defined by TSCA regulations, and is exempt from TSCA inventory listing requirements.

National regulations - U.S. State Regulations

Copper: New York Right-To-Know: listed

Further regulations, limitations and legal requirements

No data available

16. Other information

Revision date:	1/1/2026
Date of first version:	8/22/2018
Reason of change:	Changes in section 14: IATA-DGR 2026

Hazard rating systems:



NFPA Hazard Rating:

Health: 0 (Minimal)

Fire: 1 (Slight)

Reactivity: 1 (Slight)

HMIS Version III Rating:

Health: 0 (Minimal)

Flammability: 1 (Slight)

Physical Hazard: 1 (Slight)

Personal Protection: X = Consult your supervisor

HEALTH	0
FLAMMABILITY	1
PHYSICAL HAZARD	1
	X

In case of damaged battery cases: NFPA/HMIS: F3

Abbreviations and acronyms:

Acute Toxicity: Acute toxicity
 Aquatic toxicity - chronic: Hazardous to the aquatic environment - chronic
 AS/NZS: Australian Standards/New Zealand Standards
 Carcinogenicity: Carcinogenicity
 CAS: Chemical Abstracts Service
 CFR: Code of Federal Regulations
 CLP: Classification, Labelling and Packaging
 DMEL: Derived minimal effect level
 DNEL: Derived no-effect level
 DOT: Department of Transportation's Safety Regulations (USA)
 EC: European Community
 EmS: Emergency Response Procedures for Ships Carrying Dangerous Goods
 EN: European Standard
 EQ: Excepted quantities
 Eye Irritation: Eye irritation
 Flammable Liquid: Flammable liquid
 IATA: International Air Transport Association
 IATA-DGR: International Air Transport Association – Dangerous Goods Regulations
 IBC Code: International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk
 IMDG Code: International Maritime Dangerous Goods Code
 IMO: International Maritime Organization
 LC50: Median lethal concentration
 LD50: Lethal dose 50%
 MARPOL: Maritime Pollution: The International Convention for the Prevention of Pollution from Ships
 OEL: Occupational Exposure Limit Value
 OSHA: Occupational Safety and Health Administration
 PBT: Persistent, bioaccumulative and toxic
 PNEC: Predicted no-effect concentration
 Reproductive toxicant: Reproductive toxicity
 STOT RE: Specific target organ toxicity - repeated exposure
 TLV: Threshold Limit Value
 TRGS: Technical Rules for Hazardous Substances
 TSCA: Toxic Substance Control Act
 UN: United Nations
 UV: Ultraviolet
 vPvB: Very persistent and very bioaccumulative
 WEL: Workplace Exposure Limit

Department issuing data sheet

Contact person: see section 1: Department responsible for information

The information in this data sheet has been established to our best knowledge and was up-to-date at time of revision. It does not represent a guarantee for the properties of the product described in terms of the legal warranty regulations.