

# Li-MnO<sub>2</sub> Button Cell(Lithium Metal Battery) CR2032

## Safety Data Sheet

This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200

Date of issue: 22/08/2019

Revision date: 22/08/2019

Version: 1.0

### SECTION 1: Identification

#### 1.1. Identification

Product form : Article  
Trade name : Li-MnO<sub>2</sub> Button Cell(Lithium Metal Battery) CR2032  
Other means of identification : Voltage : 3V  
Lithium Weight: 0.052g  
Battery Weight: 3g

#### 1.2. Recommended use and restrictions on use

Main use category : Power supply.  
Restrictions on use : No information available.

#### 1.3. Supplier

Supplier : CHANGZHOU JINTAN CHAOCHUANG BATTERY CO., LTD.  
Address : Rm.13A10-11,Baoyuan Huafeng Headquarter Economy Building,Xiyang Rd.Bao'an District,Shenzhen,China.  
Postal Code : 511483  
Tel. : +86-755-27597836  
Fax : +86-755-29369623  
E-mail : boss@chaochuang.com

#### 1.4. Emergency telephone number

+86-13510093096

### SECTION 2: Hazard(s) identification

#### 2.1. Classification of the substance or mixture

##### GHS-US classification

The batteries are not hazardous when used according to the instructions of manufacturer under normal conditions. In case of abuse, there's risk of rupture, fire, heat, leakage of internal components, which could cause casualty loss.

In the case of rupture, the following hazards may expose:

Skin corrosion/irritation, Category 2

Serious eye damage/eye irritation, Category 2

Reproductive toxicity, Category 1B

#### 2.2. GHS Label elements, including precautionary statements

##### GHS-US labeling

Hazard pictograms (GHS US) :



Signal word (GHS US) :

Danger

Hazard statements (GHS US) :

Causes skin irritation.  
Causes serious eye irritation.  
May damage fertility or the unborn child.

Precautionary statements (GHS US) :

Obtain special instructions before use.  
Do not handle until all safety precautions have been read and understood.  
Wash hands, forearms and face thoroughly after handling.  
Wear protective gloves/protective clothing/eye protection/face protection.  
If on skin: Wash with plenty of water/...  
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
If exposed or concerned: Get medical advice/attention.  
If skin irritation occurs: Get medical advice/attention.  
If eye irritation persists: Get medical advice/attention.  
Take off contaminated clothing and wash it before reuse.

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Store locked up.

Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation

### 2.3. Other hazards which do not result in classification

This product should not present a health hazard when used under reasonable conditions. If contact with the internal components of the battery may be irritating to skin, eyes and mucous membranes. Fire will produce irritating, corrosive and/or toxic gases. May damage fertility or the unborn child.

### 2.4. Unknown acute toxicity (GHS US)

Not applicable

## SECTION 3: Composition/Information on ingredients

### 3.1. Substances

Not applicable

### 3.2. Mixtures

Name	Product identifier	%
Stainless steel	(CAS-No.) 12597-68-1	50.5
Manganese oxide (MnO <sub>2</sub> )	(CAS-No.) 1313-13-9	30.99
Perchloric acid, lithium salt	(CAS-No.) 7791-03-9	4.00
Polypropylene	(CAS-No.) 9003-07-0	3.76
Propylene carbonate	(CAS-No.) 108-32-7	3.00
Graphite	(CAS-No.) 7782-42-5	2.17
Polytetrafluoroethylene	(CAS-No.) 9002-84-0	2.17
Lithium	(CAS-No.) 7439-93-2	1.91
Ethylene glycol dimethyl ether	(CAS-No.) 110-71-4	1.50

Full text of hazard classes and H-statements : see section 16

## SECTION 4: First-aid measures

### 4.1. Description of first aid measures

First-aid measures general	: No hazards which require special first aid measures. If you feel unwell, seek medical advice (show directions for use or safety data sheet if possible).
First-aid measures after inhalation	: There will be no dangerous during normal use. But breathe in a large number of batteries, or heat released from the gas, it will stimulate the respiratory tract and eyes. Remove to fresh air immediately. Get medical treatment immediately
First-aid measures after skin contact	: There will be no dangerous during normal use. But contacting battery electrolyte, may cause severe irritation or burns.
First-aid measures after eye contact	: There will be no dangerous during normal use. But contacting battery electrolyte can burn the eyes. Flush the eyes with plenty of clean water for at least 15 minutes immediately, without rubbing. Get immediate medical treatment. If appropriate procedures are not taken, this may cause eye injury.
First-aid measures after ingestion	: Ingestion of internal chemical materials may cause mouth, throat and intestinal irritation and damage. Rinse mouth Get medical attention Never give anything by mouth to an unconscious person

### 4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects	: This product should not present a health hazard when used under reasonable conditions. If contact with the internal components of the battery may be irritating to skin, eyes and mucous membranes. May damage fertility or the unborn child.
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### 4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

## SECTION 5: Fire-fighting measures

### 5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media	: Carbon dioxide, dry chemical, or foam
Unsuitable extinguishing media	: No information available.

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### 5.2. Specific hazards arising from the chemical

- Fire hazard : Battery can be overheated by an external source or by internal shorting and develop metal hydroxide mist.  
Toxic vapor may release in case of fire.  
Containers may explode when heated.  
Fire fighting water runoff and dilution water may be toxic and corrosive and may cause adverse environmental impacts.  
Since vapour, generated from burning batteries may make eyes, nose and throat irritates, be sure to extinguish the fire on the windward side. Wear the respiratory protection equipment in some cases.  
Exposure to the ingredients contained within the battery pack could be harmful under some circumstances.
- Toxic vapor may release in case of fire. : Thermal decomposition can lead to release of irritating and toxic gases and vapors

### 5.3. Special protective equipment and precautions for fire-fighters

- Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.
- Other information : Evacuate personnel to a safe area. Ensure adequate ventilation, especially in confined areas. Eliminate every possible source of ignition. Move containers from fire area if it can be done without personal risk. Cool tanks/drums with water spray/remove them into safety. Stay upwind/keep distance from source.

## SECTION 6: Accidental release measures

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

#### 6.1.1. For non-emergency personnel

- Emergency procedures : No open flames, no sparks, and no smoking. Avoid contact with skin, eyes and clothing. Do not breathe dust/fume/gas/mist/vapors/spray.

#### 6.1.2. For emergency responders

- Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
- Emergency procedures : Stop leak if safe to do so. Evacuate personnel to a safe area. Ensure adequate ventilation, especially in confined areas.

### 6.2. Environmental precautions

Avoid release to the environment.

### 6.3. Methods and material for containment and cleaning up

- For containment : Collect spillage. Move containers from fire area if it can be done without personal risk. Contain large spillage with sand or earth.
- Methods for cleaning up : Take up liquid spill into absorbent material. Clean up any spills as soon as possible, using an absorbent material to collect it. Notify authorities if product enters sewers or public waters.
- Other information : Dispose of materials or solid residues at an authorized site.

### 6.4. Reference to other sections

For further information refer to section 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

- Precautions for safe handling : When packing the batteries, do not allow battery terminals to contact each other, or contact with other metals.  
Be sure to pack batteries by providing partitions in the packaging box, or in a separate plastic bag so that the single batteries are not mixed together.  
Use strong material for packaging boxes so that they will not be damaged by vibration, impact, dropping and stacking during their transportation.  
Do not short-circuit, recharge, deform, throw into fire or disassemble.  
Do not mix different type of batteries.  
Do not solder directly onto batteries.  
Insert the battery correctly in electrical equipment.
- Hygiene measures : Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

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

- Storage conditions :
- Store in a cool and dry area, but prevent condensation on cell or battery terminals.
  - High temperature may damage the performance of the battery.
  - Protect from physical damage and short circuits.
  - To avoid risk of fire or explosion, keep sparks and other sources of ignition away from the battery.
  - Do not allow metal objects to simultaneously contact both positive and negative terminal of batteries.
  - Do not stack battery directly on another battery.
  - Do not store batteries on electrically conductive surfaces.
  - Keep containers tightly closed in a dry, cool and well-ventilated place (-20 - 45 °C, humidity: 45-75%)
  - Keep locked up and out of reach of children
  - Keep away from food, drink and animal feeding stuffs
  - Store in accordance with local regulations

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

<b>Stainless steel (12597-68-1)</b>		
Not applicable		
<b>Polypropylene (9003-07-0)</b>		
Not applicable		
<b>Manganese oxide (MnO<sub>2</sub>) (1313-13-9)</b>		
Not applicable		
<b>Lithium (7439-93-2)</b>		
Not applicable		
<b>Perchloric acid, lithium salt (7791-03-9)</b>		
Not applicable		
<b>Polytetrafluoroethylene (9002-84-0)</b>		
Not applicable		
<b>Graphite (7782-42-5)</b>		
ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (all forms except graphite fibers-respirable particulate matter)
OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	15 mg/m <sup>3</sup> (synthetic-total dust) 5 mg/m <sup>3</sup> (synthetic-respirable fraction)
IDLH	US IDLH (mg/m <sup>3</sup> )	1250 mg/m <sup>3</sup>
NIOSH	NIOSH REL (TWA) (mg/m <sup>3</sup> )	2.5 mg/m <sup>3</sup> (natural-respirable dust)
<b>Propylene carbonate (108-32-7)</b>		
Not applicable		
<b>Ethylene glycol dimethyl ether (110-71-4)</b>		
Not applicable		

### 8.2. Appropriate engineering controls

- Appropriate engineering controls : Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Remove all sources of ignition.
- Environmental exposure controls : Avoid release to the environment.

### 8.3. Individual protection measures/Personal protective equipment

#### Hand protection:

Under normal condition of use and handling no special protection is required for sealed battery. In the event of battery case breakage, should be wear appropriate safety gloves

#### Eye protection:

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Under normal condition of use and handling no special protection is required for sealed battery. Use appropriate safety glasses when there is the risk of splash

### Skin and body protection:

Under normal condition of use and handling no special protection is required for sealed battery. It is recommended to wear appropriate protective clothing when the battery case is broken.

### Respiratory protection:

If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

## SECTION 9: Physical and chemical properties

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

Physical state	: Solid
Color	: Metallic color
Odor	: Odourless.
Odor threshold	: No data available
pH	: Not applicable
Melting point	: No data available
Boiling point	: No data available
Flash point	: Not applicable
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: Not flammable
Vapor pressure	: Not applicable
Relative vapor density at 20 °C	: No data available
Relative density	: No data available
Solubility	: Not applicable
Log Pow	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity, kinematic	: Not applicable
Viscosity, dynamic	: Not applicable
Explosion limits	: Not applicable
Explosive properties	: Not applicable
Oxidizing properties	: No data available

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

### 10.2. Chemical stability

Stable under normal conditions.

### 10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

### 10.4. Conditions to avoid

Avoid contact with hot surfaces. Heat. No flames, no sparks. Eliminate all sources of ignition. Avoid contact with incompatible materials

### 10.5. Incompatible materials

Oxidizing agent. Strong acid. Strong base. Water. Seawater. Conductive materials

### 10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

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### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity : Not classified

<b>Manganese oxide (MnO<sub>2</sub>) (1313-13-9)</b>	
LD50 oral rat	9000 mg/kg
<b>Propylene carbonate (108-32-7)</b>	
LD50 oral rat	29000 mg/kg
LD50 dermal rabbit	> 3000 mg/kg
<b>Ethylene glycol dimethyl ether (110-71-4)</b>	
LD50 oral rat	> 4000 mg/kg
LD50 dermal rabbit	1000 - 2000 mg/kg
LC50 inhalation rat (mg/l)	20 - 63 mg/l (Exposure time: 6 h)

Skin corrosion/irritation : Causes skin irritation.  
Serious eye damage/irritation : Causes serious eye irritation.  
Respiratory or skin sensitization : Not classified  
Germ cell mutagenicity : Not classified  
Carcinogenicity : Not classified

<b>Polypropylene (9003-07-0)</b>	
IARC group	3 - Not classifiable

<b>Polytetrafluoroethylene (9002-84-0)</b>	
IARC group	3 - Not classifiable

Reproductive toxicity : May damage fertility or the unborn child.  
Specific target organ toxicity – single exposure : Not classified

Specific target organ toxicity – repeated exposure : Not classified

Aspiration hazard : Not classified

### SECTION 12: Ecological information

#### 12.1. Toxicity

Ecology - general : The product is not considered harmful to aquatic organisms or to cause long-term adverse effects in the environment.

<b>Propylene carbonate (108-32-7)</b>	
LC50 fish	> 1000 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static])
EC50 Daphnia	> 500 mg/l (Exposure time: 48 h - Species: Daphnia magna)

#### 12.2. Persistence and degradability

No additional information available

#### 12.3. Bioaccumulative potential

<b>Manganese oxide (MnO<sub>2</sub>) (1313-13-9)</b>	
Log Pow	< 0 (at 20 °C)

<b>Propylene carbonate (108-32-7)</b>	
Log Pow	0.48 (at 25 °C)

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### 12.4. Mobility in soil

No additional information available

### 12.5. Other adverse effects

Effect on the global warming : No known effects from this product.  
GWPmix comment : No known effects from this product.

## SECTION 13: Disposal considerations

### 13.1. Disposal methods

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.  
Product/Packaging disposal recommendations : Dispose of contents/container in accordance with licensed collector's sorting instructions.

## SECTION 14: Transport information

### Department of Transportation (DOT)

In accordance with DOT

Not applicable

### Transportation of Dangerous Goods

Not applicable

### Transport by sea

Not applicable

### Air transport

Not applicable

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

#### Polypropylene (9003-07-0)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

EPA TSCA Regulatory Flag

XU - XU - indicates a substance exempt from reporting under the Chemical Data Reporting Rule, (40 CFR 711).

#### Manganese oxide (MnO<sub>2</sub>) (1313-13-9)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

#### Lithium (7439-93-2)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

#### Perchloric acid, lithium salt (7791-03-9)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

#### Polytetrafluoroethylene (9002-84-0)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

EPA TSCA Regulatory Flag

XU - XU - indicates a substance exempt from reporting under the Chemical Data Reporting Rule, (40 CFR 711).

#### Graphite (7782-42-5)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

#### Propylene carbonate (108-32-7)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

#### Ethylene glycol dimethyl ether (110-71-4)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

EPA TSCA Regulatory Flag

S - S - indicates a substance that is identified in a final Significant New Use Rule.

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### 15.2. International regulations

#### CANADA

<b>Polypropylene (9003-07-0)</b>
Listed on the Canadian DSL (Domestic Substances List)
<b>Manganese oxide (MnO<sub>2</sub>) (1313-13-9)</b>
Listed on the Canadian DSL (Domestic Substances List)
<b>Lithium (7439-93-2)</b>
Listed on the Canadian DSL (Domestic Substances List)
<b>Perchloric acid, lithium salt (7791-03-9)</b>
Listed on the Canadian DSL (Domestic Substances List)
<b>Polytetrafluoroethylene (9002-84-0)</b>
Listed on the Canadian DSL (Domestic Substances List)
<b>Graphite (7782-42-5)</b>
Listed on the Canadian DSL (Domestic Substances List)
<b>Propylene carbonate (108-32-7)</b>
Listed on the Canadian DSL (Domestic Substances List)
<b>Ethylene glycol dimethyl ether (110-71-4)</b>
Listed on the Canadian DSL (Domestic Substances List)

#### EU-Regulations

<b>Manganese oxide (MnO<sub>2</sub>) (1313-13-9)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
<b>Lithium (7439-93-2)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
<b>Perchloric acid, lithium salt (7791-03-9)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
<b>Graphite (7782-42-5)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
<b>Propylene carbonate (108-32-7)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
<b>Ethylene glycol dimethyl ether (110-71-4)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

#### National regulations

<b>Stainless steel (12597-68-1)</b>
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the TCSI (Taiwan Chemical Substance Inventory)
<b>Polypropylene (9003-07-0)</b>
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Japanese ISHL (Industrial Safety and Health Law) Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Listed on INSQ (Mexican National Inventory of Chemical Substances) Listed on the TCSI (Taiwan Chemical Substance Inventory)



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### Manganese oxide (MnO<sub>2</sub>) (1313-13-9)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Japanese ISHL (Industrial Safety and Health Law)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Japanese Pollutant Release and Transfer Register Law (PRTR Law)  
Listed on INSQ (Mexican National Inventory of Chemical Substances)  
Listed on the TCSI (Taiwan Chemical Substance Inventory)

### Lithium (7439-93-2)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Listed on INSQ (Mexican National Inventory of Chemical Substances)  
Listed on the TCSI (Taiwan Chemical Substance Inventory)

### Perchloric acid, lithium salt (7791-03-9)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Japanese ISHL (Industrial Safety and Health Law)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on the TCSI (Taiwan Chemical Substance Inventory)

### Polytetrafluoroethylene (9002-84-0)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Japanese ISHL (Industrial Safety and Health Law)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Listed on INSQ (Mexican National Inventory of Chemical Substances)  
Listed on the TCSI (Taiwan Chemical Substance Inventory)

### Graphite (7782-42-5)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Listed on INSQ (Mexican National Inventory of Chemical Substances)  
Listed on the TCSI (Taiwan Chemical Substance Inventory)

### Propylene carbonate (108-32-7)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Japanese ISHL (Industrial Safety and Health Law)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Listed on INSQ (Mexican National Inventory of Chemical Substances)  
Listed on the TCSI (Taiwan Chemical Substance Inventory)

### Ethylene glycol dimethyl ether (110-71-4)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Japanese ISHL (Industrial Safety and Health Law)  
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### 15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

### SECTION 16: Other information

**Issue date** : 22/08/2019

**Revision date** : 22/08/2019

Key or legend to abbreviations and acronyms used in the safety data sheet

ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMDG	International Maritime Dangerous Goods
IATA	International Air Transport Association
ADN	European Agreement Concerning the International Carriage of Dangerous Goods by Inland Waterway
RID	Regulations Concerning the International Carriage of Dangerous Goods by Rail
PBT	Persistent, Bioaccumulative and Toxic
vPvB	Very Persistent and Very Bioaccumulative
DNEL	Derived No Effect Level
PNEC	Predicted No Effect Concentration
LC50	Lethal Concentration 50
LD50	Lethal Dose 50
EC50	Effective Concentration 50
TWA	Time Weighted Average
STEL	Short Term Exposure Limit

#### Key literature references and sources for data

ECHA: <http://echa.europa.eu/>  
IFA GESTIS: [http://gestis-en.itrust.de/nxt/gateway.dll?f=templates\\$fn=default.htm\\$vid=gestiseng:sdbeng](http://gestis-en.itrust.de/nxt/gateway.dll?f=templates$fn=default.htm$vid=gestiseng:sdbeng)  
HSDB: <http://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>  
ICSC: <http://www.ilo.org/dyn/icsc/showcard.home>  
eChemPortal: [http://www.echemportal.org/echemportal/index?pageID=0&request\\_locale=en](http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en)  
NITE-CHRIP: [http://www.nite.go.jp/en/chem/chrip/chrip\\_search/srhInput](http://www.nite.go.jp/en/chem/chrip/chrip_search/srhInput)

SDS US (GHS HazCom 2012)

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product*