

Safety Data Sheet

Bosch 48V Battery

Compiled according to GB/T 16483, GB/T 17519
Issue date: 8/9/2021 Revision date: 8/9/2021 Version: 1.0

SECTION 1 Chemical product and company identification

Chemical English name : Bosch 48V Battery
Name of company : Bosch Automotive Systems (WUXI) Co., Ltd
Address : People's Republic of China, Ximei Rd 111, New District, Wuxi, Jiangsu
Recommended use of the chemical : batteries and accumulators

SECTION 2 Hazards identification

Emergency overview

Lithium ion batteries described in this MSDS are hermetically sealed and designed to withstand temperatures and pressures encountered during normal use. Under normal conditions of use, there is no physical danger of ignition, explosion or chemical danger of hazardous materials leakage. The materials contained in this battery may only represent a hazard if the integrity of the battery is compromised or if the battery is mechanically, thermally or electrically abused.

The following hazard identification descriptions are based on the leakage of battery materials:

Highly flammable liquid and vapour. Harmful if swallowed. Causes severe skin burns and eye damage. Fatal if inhaled. May cause cancer. Causes damage to organs through prolonged or repeated exposure. Harmful to aquatic life with long lasting effects.

GHS hazard classification

Not applicable

Label elements

Precautionary statements (GHS CN)

Prevention measures : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P210 - Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 - Keep container tightly closed.
P240 - Ground/bond container and receiving equipment.
P241 - Use explosion-proof electrical/ventilating/lighting equipment.
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P273 - Avoid release to the environment.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P284 - [In case of inadequate ventilation] wear respiratory protection.

Incident response : P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor.
P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

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| | |
|--------------|---|
| | P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. |
| | P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. |
| | 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. |
| | P314 - Get medical advice/attention if you feel unwell. |
| | P320 - Specific treatment is urgent (see supplemental first aid instruction on this label). |
| | P321 - Specific treatment (see supplemental first aid instruction on this label). |
| | P330 - Rinse mouth. |
| | P363 - Wash contaminated clothing before reuse. |
| | P370+P378 - In case of fire: Use media other than water to extinguish. |
| Safe storage | : P403+P233 - Store in a well-ventilated place. Keep container tightly closed. P403+P235 - Store in a well-ventilated place. Keep cool. P405 - Store locked up. |
| Disposal | : P501 - Dispose of contents/container to in accordance with local and national regulations. |

Physical and chemical hazards

In the case of electrolyte leakage, highly flammable liquid and vapor will be produced

Health hazards

In the case of electrolyte leakage, it will cause the following hazards:

Harmful if swallowed

Causes severe skin burns and eye damage

Fatal if inhaled

May cause cancer

Causes damage to organs through prolonged or repeated exposure

Environmental hazards

In the case of electrolyte leakage, it is harmful to aquatic life with long lasting effects

Other hazards

In case of cell damage, possible release of dangerous substances and a flammable gas mixture

SECTION 3 Composition/information on ingredients

| | |
|---------------------|-------------------------------|
| Product form | : Article. |
| Comments | : batteries and accumulators. |

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| Ingredient(s) | Concentration or concentration ranges (w/w %) | CAS No. |
|---|---|-------------|
| Cobalt lithium manganese nickel oxide | 5 - 40 | 182442-95-1 |
| Graphite | 7 - 25 | 7782-42-5 |
| 1,1-Difluorethylen-hexafluorpropenpolymer | 3 - 15 | 9011-17-0 |
| ethyl methyl carbonate | 0 - 15 | 623-53-0 |
| dimethyl carbonate | 0 - 15 | 616-38-6 |
| Ethylene carbonate | 0 - 15 | 96-49-1 |
| Copper | 10 - 12 | 7440-50-8 |
| Aluminium | 3 - 5 | 7429-90-5 |
| Phosphate(1-), hexafluoro-, lithium (1:1) | 0 - 5 | 21324-40-3 |
| Carbon black | 0 - 2 | 1333-86-4 |
| Additives | 0 - 2 | -- |

Comments : Because of the cell structure the dangerous ingredients will not be available if used properly.

SECTION 4 First-aid measures

Description of necessary first-aid measures

- First-aid measures general : The following first aid measures are required only in case of exposure to interior battery components after damage of the external battery casing.
Undamaged, closed cells do not represent a danger to the health
- First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing.
If experiencing respiratory symptoms: Call a poison center or a doctor
- First-aid measures after skin contact : After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water.
If skin irritation occurs: Get medical advice/attention.
- First-aid measures after eye contact : Wash immediately with plenty water (during 20 minutes), also under eyelids.
Call a physician immediately
- First-aid measures after ingestion : Do not induce vomiting.
Drink plenty of water.
Call a physician immediately

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Most important symptoms/effects

No additional information available

Advices for first aid responders

Do not attempt to take action without suitable protective equipment.

Notes for the doctor

Treatment : Treat symptomatically

SECTION 5 Fire-fighting measures

Extinguishing media

Suitable 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.
extinguishing powder
Foam
Carbon dioxide

Unsuitable extinguishing media : No additional information available

Specific hazards

Hazardous decomposition products in case of fire : During contact of electrolyte with water hydrofluoric acid can be formed

Reactivity in case of fire : Thermal decomposition generates :
Corrosive vapours

Advice for firefighters and protective measures

Firefighting instructions : No additional information available

Protection during firefighting : Do not attempt to take action without suitable protective equipment
Self-contained breathing apparatus
Complete protective clothing

Other information : If possible, remove cell(s) from fire fighting 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.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Heat and ignition sources : Keep away from heat and direct sunlight

General measures : Use personal protective clothing
Avoid contact with skin, eyes and clothing
In case of vapour formation use adequate respirator

Personal Precautions, Protective Equipment and Emergency Procedures : No additional information available

For non-emergency personnel

Emergency procedures : Avoid breathing dust/fume/gas/mist/vapours/spray.

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Environmental precautions

Avoid release to the environment

Methods and material for containment and cleaning up

Methods for cleaning : No additional information available

Methods and Equipment for Containment and Cleaning up : If the material inside the battery leaks, personnel should immediately evacuate from the leaking area until the smoke dissipates. Turn on the ventilation equipment to blow off dangerous gases. Wipe the test area with a rag and use an inert absorbent (such as sand, sawdust, all-purpose glue, silica gel) to remove the spilled liquid, put the leaking battery in a plastic bag, and then put it into a steel container.

For containment : No additional information available

Prevention measures for secondary accidents

Prevention Measures for Secondary Accidents : No additional information available

Other information : Information for disposal see section 13

SECTION 7 Handling and storage

Handling

Precautions for safe handling : Avoid short circuiting the cell. Avoid mechanical damage of the cell. Do not open or disassemble

Hygiene measures : No additional information available

Technical measures : When handling a battery pack exceeding 50V, the operator needs insulation protection.

Local and general ventilation : No additional information available

Additional hazards when processed : Keep away from open flames, hot surfaces and sources of ignition

Storage

Storage conditions : Store in a well-ventilated place.
Store tightly closed in a dry and cool place

Technical measures : During storage, the SOC value of the battery should not be less than 3%.

Material used in packaging/containers : No additional information available

Incompatible materials : Strong oxidizing agent. Protect from atmospheric moisture and water. alkalis.

Storage temperature : 0 - 35 ° C (Moisture ≤85%RH)

Heat and ignition sources : Keep away from heat and direct sunlight

Information on mixed storage : Keep away from food, drink and animal feeding stuffs

SECTION 8 Exposure controls / Personal protection equipment

Occupational exposure limits

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Graphite (7782-42-5)

China - Occupational Exposure Limits

| | |
|----------------------|---|
| Local name | Graphite dust |
| OEL PC-TWA | 4 mg/m ³ total dust 2 mg/m ³ respirable dust |
| Regulatory reference | GBZ 2.1-2007 |

Carbon black (1333-86-4)

China - Occupational Exposure Limits

| | |
|----------------------|--|
| Local name | Carbon black dust |
| OEL PC-TWA | 4 mg/m ³ total dust |
| Remark (CN) | G2B (possibly carcinogenic to humans)) |
| Regulatory reference | GBZ 2.1-2007 |

Copper (7440-50-8)

China - Occupational Exposure Limits

| | |
|----------------------|---------------------|
| Local name | Copper dust |
| OEL PC-TWA | 1 mg/m ³ |
| Regulatory reference | GBZ 2.1-2007 |

aluminium powder (stabilised) (7429-90-5)

China - Occupational Exposure Limits

| | |
|----------------------|------------------------------------|
| Local name | Aluminum dust: Metal & alloys dust |
| OEL PC-TWA | 3 mg/m ³ total dust |
| Regulatory reference | GBZ 2.1-2007 |

Biological limit values

No additional information available

Monitoring methods

No additional information available

Appropriate engineering controls

Appropriate engineering controls : Ensure good ventilation of the work station
Keep away from any flames or sparking source

Personal protective equipment

Personal protective equipment : In case of electrolyte leakage: Wear recommended personal protective equipment

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| | |
|--------------------------|---|
| Other information | : In case of electrolyte leakage: Avoid contact with skin, eyes and clothing Do not breathe gas/fumes Eliminate ignition sources |
| Hand protection | : In case of electrolyte leakage: protective gloves |
| Eye protection | : In case of electrolyte leakage: Tightly fitting goggles (EN 166) |
| Skin and body protection | : In case of electrolyte leakage: Acid-resistant clothing Rubber boots |
| Respiratory protection | : In case of electrolyte leakage: Put on breathing apparatus |

SECTION 9 Physical and chemical properties

| | |
|-----------------------------------|----------------------------|
| Physical state | : Liquid |
| Appearance | : No data available |
| Colour | : No information available |
| Odour | : odourless |
| pH | : No data available |
| Melting point | : Not applicable |
| Freezing point | : No data available |
| Boiling point | : No data available |
| Flash point | : Not applicable |
| Auto-ignition temperature | : Not applicable |
| Decomposition temperature | : No data available |
| Vapour pressure | : No data available |
| Relative vapour density at 20 ° C | : No data available |
| Relative density | : Not applicable |
| Density | : No data available |
| Solubility | : insoluble in water. |
| Log Pow | : No data available |
| Lower explosive limit (LEL) | : No data available |
| Upper explosive limit (UEL) | : No data available |
| Radioactive | : No |

SECTION 10 Stability and reactivity

| | |
|--------------------|---|
| Chemical stability | : Stable under normal conditions |
| Reactivity | : The product is non-reactive under normal conditions of use, storage and |

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| | |
|---|--|
| | transport |
| Possibility of hazardous reactions | : Electrolyte and electrodes may react with water or moisture |
| Conditions to avoid | : Heat above 85° C or incinerate. Deform. Mutilate. Crush. Disassemble. Overcharge. Short circuit. Expose over a long period to humid conditions. |
| Incompatible materials | : Oxidizing agent Strong alkalis Water |
| Hazardous decomposition products | : Thermal decomposition generates : Corrosive vapours |
| Other properties | : No additional information available |

SECTION 11 Toxicological information

Acute toxicity

| | |
|--|-----------------------|
| Bosch 48V Battery | |
| ATE CN (oral) | 1000 mg/kg bodyweight |
| ATE CN (dust,mist) | 0.125 mg/l/4h |
| Cobalt lithium manganese nickel oxide | |
| ATE CN (gases) | 100 ppmv/4h |
| ATE CN (vapours) | 0.5 mg/l/4h |
| ATE CN (dust,mist) | 0.05 mg/l/4h |
| Phosphate(1-), hexafluoro-, lithium (1:1) | |
| LD50 oral rat | 50 - 300 mg/kg |
| ATE CN (oral) | 100 mg/kg bodyweight |
| Ethylene carbonate | |
| LD50 oral rat | 10400 mg/kg |
| LD50 dermal rat | > 2000 mg/kg |
| ATE CN (oral) | 500 mg/kg bodyweight |
| aluminium powder (stabilised) | |
| LD50 oral rat | > 2000 mg/kg |
| Additives | |
| ATE CN (oral) | 100 mg/kg bodyweight |

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Skin corrosion/irritation

Skin corrosion/irritation : No data available

Serious eye damage/eye irritation

Serious eye damage/irritation : No data available

Respiratory or skin sensitisation

Respiratory or skin sensitisation : No data available

Germ cell mutagenicity

Germ cell mutagenicity : No data available

Carcinogenicity

Carcinogenicity : May cause cancer.

Reproductive toxicity

Reproductive toxicity : No data available

STOT - single exposure

STOT-single exposure : No data available

ethyl methyl carbonate

| | |
|----------------------|-------------------|
| STOT-single exposure | No data available |
|----------------------|-------------------|

STOT - repeated exposure

STOT-repeated exposure : Causes damage to organs through prolonged or repeated exposure.

Cobalt lithium manganese nickel oxide

| | |
|------------------------|---|
| STOT-repeated exposure | Causes damage to organs through prolonged or repeated exposure. |
|------------------------|---|

Phosphate(1-), hexafluoro-, lithium (1:1)

| | |
|------------------------|---|
| STOT-repeated exposure | Causes damage to organs through prolonged or repeated exposure. |
|------------------------|---|

Ethylene carbonate

| | |
|------------------------|--|
| STOT-repeated exposure | May cause damage to organs through prolonged or repeated exposure. |
|------------------------|--|

Additives

| | |
|------------------------|---|
| STOT-repeated exposure | Causes damage to organs through prolonged or repeated exposure. |
|------------------------|---|

Aspiration hazard

Aspiration hazard : No data available

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SECTION 12 Ecological information

Ecotoxicity

- Ecology - general : When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.
- Hazardous to the aquatic environment, short-term (acute) : No data available
- Hazardous to the aquatic environment, long-term (chronic) : No data available

| Phosphate(1-), hexafluoro-, lithium (1:1) | |
|--|----------------------|
| LC50 fish 1 | 42 mg/l |
| NOEC chronic crustacea | 2.55 mg/l (168hours) |
| Ethylene carbonate | |
| LC50 fish 1 | > 100 mg/l |

Persistence and degradability

| Phosphate(1-), hexafluoro-, lithium (1:1) | |
|--|-----|
| Not rapidly degradable | Yes |
| dimethyl carbonate | |
| Not rapidly degradable | Yes |
| Ethylene carbonate | |
| Not rapidly degradable | Yes |
| Copper | |
| Not rapidly degradable | Yes |
| aluminium powder (stabilised) | |
| Not rapidly degradable | Yes |

Bioaccumulative potential

No additional information available

Mobility in soil

No additional information available

Other adverse effects

Classification procedure (Ozone) : No data available

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SECTION 13 Disposal considerations

| | |
|---|--|
| Waste treatment methods | : Responsible by the battery owner. |
| Contaminated container and packaging | : No additional information available |
| Additional information | : No additional information available |
| Product/Packaging disposal recommendations | : Do not incinerate, or subject cells to temperature in excess of 85° C, Such abuse can result in loss of seal leakage, and/or cell explosion. |
| Regional legislation (waste) | : Disposal must be done according to official regulations |

SECTION 14 Transport information

| Overland transport (JT/T 617) | Transport by sea | Air transport |
|---|---|---|
| UN number | | |
| 3480 | 3480 | 3480 |
| Proper shipping name | | |
| LITHIUM ION BATTERIES | LITHIUM ION BATTERIES | Lithium ion batteries |
| Transport document description | | |
| UN 3480, LITHIUM ION BATTERIES, Class 9 | UN 3480 LITHIUM ION BATTERIES, 9 | UN 3480 Lithium ion batteries, 9A |
| Transport hazard class(es) | | |
| 9 | 9 | 9A |
|  |  |  |
| Packing group | | |
| Not applicable | Not applicable | Not applicable |
| Environmental hazards | | |
| Dangerous for the environment: No | Dangerous for the environment: No Marine pollutant: No | Dangerous for the environment: No |

Special transport precautions

Overland transport (JT/T 617)

| | |
|--------------------------------|--------------------------------------|
| Classification code (JT/T 617) | : M4. |
| Special provisions (JT/T 617) | : 188, 230, 310, 348, 376, 377, 636. |
| Limited quantities (JT/T 617) | : 0. |
| Excepted quantities (JT/T 617) | : E0. |

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Packing instructions (JT/T 617) : P903, P908, P909, LP903, LP904.
Transport category (JT/T 617) : 2.
Tunnel restriction code (JT/T 617) : E.

Transport by sea

Limited quantities (IMDG) : 0.
Excepted quantities (IMDG) : E0.
Packing instructions (IMDG) : P903, P908, P909, P910, P911, LP903, LP904, LP905, LP906.
Properties and observations (IMDG) : Electrical batteries containing lithium ion encased in a rigid metallic body.
Lithium ion batteries may also be shipped in, or packed with, equipment.
Electrical lithium batteries may cause fire due to an explosive rupture of the body caused by improper construction or reaction with contaminants.

Air transport

PCA Excepted quantities (IATA) : E0.
PCA Limited quantities (IATA) : Forbidden.
PCA limited quantity max net quantity (IATA) : Forbidden.
PCA packing instructions (IATA) : Forbidden.
PCA max net quantity (IATA) : Forbidden.
CAO packing instructions (IATA) : See 965.
CAO max net quantity (IATA) : See 965.
Special provisions (IATA) : A88, A99, A154, A164, A183, A201, A206, A213, A331, A334, A802.
ERG code (IATA) : 12FZ.

SECTION 15 Regulatory information

New Chemical Substance Environmental Management Registration Measures (MEE Order 12 of 2020)

Inventory of Existing Chemical Substances in China (IECSC) : Contains listed substance(s)
Graphite (CAS-No. 7782-42-5)
Cobalt lithium manganese nickel oxide (CAS-No. 182442-95-1)
Phosphate(1-), hexafluoro-, lithium (CAS-No. 21324-40-3)
Carbonic acid, ethyl methyl ester (CAS-No. 623-53-0)
Carbonic acid, dimethyl ester (CAS-No. 616-38-6)
Carbon black (CAS-No. 1333-86-4)
Copper (CAS-No. 7440-50-8)
Aluminium (CAS-No. 7429-90-5)
1,3-Dioxolan-2-one (CAS-No. 96-49-1)
Hexafluoropropylene-vinylidene fluoride copolymer 2641 (CAS-No. 9011-17-0)

Regulations on the Safe Management of Hazardous Chemicals (Decree 591 of the State Council)

Catalogue of Hazardous Chemicals (2015) : Contains Hazardous Chemical(s)
Cobalt lithium manganese nickel oxide

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Phosphate(1-), hexafluoro-, lithium (1:1)
ethyl methyl carbonate
Dimethyl carbonate (CAS-No. 616-38-6)
aluminium powder (stabilised) (CAS-No. 7429-90-5)
Ethylene carbonate
Additives
Considered as Hazardous Chemical(s)

**Catalogue of Explosive Precursor
Dangerous Chemicals** : Contains listed substance(s)
Aluminum powder (CAS-No. 7429-90-5)

Law of the People's Republic of China on the Prevention and Control of Occupational Diseases

**Catalogue for Classification of Hazardous
Factors of Occupational Diseases** : Contains listed substance(s)
Graphite dust (CAS-No. 7782-42-5)
Carbon black dust (CAS-No. 1333-86-4)
Aluminum dust (CAS-No. 7429-90-5)

Other domestic regulatory lists

Dangerous Goods List (GB 12268-2012) : Contains listed substance(s)
DIMETHYL CARBONATE (CAS-No. 616-38-6)
aluminium powder (stabilised) (CAS-No. 7429-90-5)

SECTION 16 Other information

Abbreviations and acronyms

| | |
|------|--|
| CAS | CAS (Chemical Abstracts Service) number |
| GHS | Globally Harmonized System of Classification, Labelling and Packaging of Chemicals |
| IATA | International Air Transport Association |
| IMDG | International Maritime Dangerous Goods |

Safety Data Sheet (SDS), China

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