



SAFETY DATA SHEET

SECTION 1: IDENTIFICATION OF THE SUBSTANCE OR MIXTURE AND OF THE SUPPLIER

Product Name: Lithium-Ion Rechargeable Battery

Product Description: Battery Pack with Lithium-Ion Cells

Date of issue: February 3, 2016

Manufacturer/Distributor:
Robert Bosch Tool Corporation
1800 W. Central Road
Mt. Prospect, IL 60056

For More Information Call:
(Monday-Friday, 8:00 AM– 5:00 PM CST)
Bosch Customer Service
(877) 267-2499

In Case Of Emergency Call:
(24 Hours/Day, 7 Days/Week)
(877) 303-0891

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of Product

As a solid, manufactured article, exposure to hazardous ingredients is not expected with normal use. This battery is an article pursuant to 29 CFR 1910.1200 and, as such, is not subject to the OSHA Hazard Communication Standard requirement. The information contained in this Safety Data Sheet contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Route(s) of Entry

There is no hazard when the measures for handling and storage are followed.

Signs and Symptoms of Exposure

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

2.2 Other Hazards

Special hazards for human health and environment

There is no hazard when the measures for handling and storage are followed. In case of cell damage, possible release of dangerous substances and a flammable gas mixture.

- R10 Flammable.
- R20/22 Harmful by inhalation and if swallowed.
- R22 Harmful if swallowed.
- R34 Causes burns.
- R40 Limited evidence of a carcinogenic effect.
- R43 May cause sensitization by skin contact.
- R48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation.
- R49 May cause cancer by inhalation.
- R50 Very toxic to aquatic organisms.
- R53 May cause long-term adverse effects in the aquatic environment.



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SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

<u>CAS-No.</u>	<u>Chemical Name</u>	<u>Quantity</u>
1307-96-6	Cobalt oxide	< 30 %
1313-13-9	Manganese dioxide	< 30 %
1313-99-1	Nickel oxide	< 30 %
7440-44-0	Carbon	< 30 %
	Electrolyte (*)	< 20 %
24937-79-9	Polyvinylidene fluoride (PVdF)	< 10 %
7429-90-5	Aluminum foil	2 - 10 %
7440-50-8	Copper foil	2 - 10 %
	Aluminum and inert materials	5 - 10 %

Full text of each relevant R phrase can be found in heading 16.

Further Information

For information purposes:

(*) Main ingredients: Lithium hexafluorophosphate, organic carbonates.

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

During charge process, a lithium graphite intercalation phase is formed.

Mercury content: Hg < 0.1mg/kg

Cadmium content: Cd < 1mg/kg

Lead content: Pb < 10mg/kg

SECTION 4: FIRST AID MEASURES

4.1 General Information

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.

After Inhalation

Ensure of fresh air. Consult a physician.

After Contact with Skin

In case of contact with skin wash off immediately with plenty of water. Consult a physician.

After Contact with Eyes

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical treatment by eye specialist.

After Ingestion

Drink plenty of water. Call a physician immediately.

SECTION 5: FIREFIGHTING MEASURES

5.1 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.

5.2 Special Hazards Arising from the Chemical

May form hydrofluoric acid if electrolyte comes into contact with water. In case of fire, the formation of the following flue gases cannot be excluded: Hydrogen fluoride (HF), Carbon monoxide and carbon dioxide.



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5.3 Protective Equipment and Precautions for Firefighters

Wear self-contained breathing apparatus and protective suit.

5.4 Additional 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

6.1 Personal Precautions

Use personal protective clothing. Avoid contact with skin, eyes and clothing. Avoid breathing fume and gas.

6.2 Environmental Precautions

Do not discharge into the drains/surface waters/groundwater. Methods for cleaning up/taking up. Take up mechanically and send for disposal.

SECTION 7: HANDLING AND STORAGE

7.1 Handling

Advice on Safe Handling

Avoid short circuiting the cell. Avoid mechanical damage of the cell. Do not open or disassemble.

Advice on Protection Against Fire and Explosion

Keep away from open flames, hot surfaces and sources of ignition.

7.2 Storage

Requirements for storage rooms and vessels

Store at room temperature (approx. 20°C) at approx. 20~60% of the nominal capacity (OCV approx. 3.6 - 3.9 V/cell). Keep in closed original container.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredient	Risk Codes	Safety Description	Hazard	Exposure Controls/Personal Protection
Cobalt oxide	R22,R43, R50/53	S24,S37,S60,S61	Xn (Harmful) N (Dangerous for the environment)	0.1 mg/m3 (TWA)
Manganese (VI) oxide	R20/22	S25	Xn (Harmful)	Airborne Exposure Limits: - OSHA Permissible Exposure Limit (PEL): 5 mg/m3 Ceiling for manganese compounds as Mn - ACGIH Threshold Limit Value (TLV): 0.2 mg/m3 (TWA) for manganese, elemental and inorganic compounds as Mn
Nickel oxide	R43,R49, R53	S45,S53,S61	T (Toxic)	Airborne Exposure Limits: For Nickel, Metal and Insoluble Compounds, as Ni: - OSHA Permissible Exposure Limits (PEL) - 1 mg/m3 (TWA). For Nickel, Elemental / Metal: - ACGIH Threshold Limit Value (TLV) - 1.5 mg/m3 (TWA), A5 - Not suspected as a human



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Carbon	R36/37/38, R36/37 R20, R10	S22,S24/25	F (Highly Flammable) Xn (Harmful) Xi (Irritant)	carcinogen. For Nickel, Insoluble Compounds, as Ni: - ACGIH Threshold Limit Value (TLV) - 0.2 mg/m ³ (TWA), A1- confirmed human carcinogen Airborne Exposure Limits: - OSHA Permissible Exposure Limits (PELs): activated carbon (graphite, synthetic): Total particulate = 15 mg/m ³
Aluminium foil	R17,R15, R36/38, R10,R67, R65,R62, R51/53, R48/20, R38,R11,	S7/8,S43,S26,S62, S61,S36/37, S33,S29,S16,S9	F(Highly Flammable) Xn (Harmful) Xi (Irritant)	Airborne Exposure Limits: -OSHA Permissible Exposure Limit (PEL): 15 mg/m ³ (TWA) total dust and 5 mg/m ³ (TWA) repairable fraction for Aluminum metal as Al -ACGIH Threshold Limit Value (TLV): 10 mg/m ³ (TWA) Aluminum metal dusts Copper Dust and Mists, as Cu:
Copper foil	R11 R36 R37 R38	S5,S26,S16,S61, S36/37	F(Highly Flammable) N (Dangerous for the environment) Xn (Harmful) Xi (Irritant)	- OSHA Permissible Exposure Limit (PEL) - 1 mg/m ³ (TWA) - ACGIH Threshold Limit Value (TLV) - 1 mg/m ³ (TWA) Copper Fume: - OSHA Permissible Exposure Limit (PEL) - 0.1 mg/m ³ (TWA) - ACGIH Threshold Limit Value (TLV) - 0.2 mg/m ³ (TWA)
Polyvinylidene fluoride (PVdF)		S22,S24/25		

Additional Advice on Limit Values

During normal charging and discharging there is no release of product.

Occupational Exposure Controls

No specific precautions necessary.

Protective and Hygienic Measures

When using do not eat, drink or smoke. Wash hands before breaks and after work.

Respiratory Protection

No specific precautions necessary.

Hand Protection

No specific precautions necessary.

Eye Protection

No specific precautions necessary.

Skin Protection

No specific precautions necessary.



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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance

Form:	Solid
Color:	Various
Odor:	Odorless

9.2 Important health, safety and environmental information

Test method

pH Value:	N.A.
Flash point:	N.A.
Lower explosion limits:	N.A.
Vapor pressure:	N.A.
Density:	N.A.
Water solubility:	Insoluble
Ignition temperature:	N.A.

SECTION 10: STABILITY AND REACTIVITY

10.1 Stability

Stable.

10.2 Reactivity

Conditions to Avoid

Keep away from open flames, hot surfaces and sources of ignition. Do not puncture, crush or incinerate.

Materials to Avoid

No materials to be especially mentioned.

Hazardous Decomposition Products

In case of open cells, there is the possibility of hydrofluoric acid and carbon monoxide release.

Possibility of Hazardous Reactions

Will not occur.

10.3 Additional Information

No decomposition if stored and applied as directed.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Empirical Data on Effects on Humans

If appropriately handled and if in accordance with the general hygienic rules, no damages to health have become known.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Further information

Ecological injuries are not known or expected under normal use. Do not flush into surface water or sanitary sewer system.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Advice on Disposal

For recycling, consult manufacturer.



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13.2 Contaminated Packaging

Disposal in accordance with local regulations.

SECTION 14: TRANSPORT INFORMATION

The rechargeable Lithium-Ion battery pack as stated in Appendix are made in compliance to the requirements stated in the latest edition of the IATA Dangerous Goods Regulations Packing Instruction 965 section II such that they can be transported as a NOT RESTRICTED (non-hazardous/non-dangerous) goods. However, if those lithium-ion battery packs are pack with or contained in an equipment, then it is the responsibility of the shipper to ensure that the consignment are packed in compliance to the latest edition of the IATA Dangerous Goods Regulations section II of either Packing Instruction 966 or 967 in order for that consignment to be declared as NOT RESTRICTED (non-hazardous/non-Dangerous). With regard to transport, the following regulations are cited and considered:

- The International Civil Aviation Organization (ICAO) Technical Instructions, Packing Instruction 965, Section II (2013-2014 Edition),
- The International Air Transport Association (IATA) Dangerous Goods Regulations, Packing Instruction 965, Section II (55th Edition, 2014),
- The International Maritime Dangerous Goods (IMDG) Code (2012 Edition),
- US Harzardous Materials Regulations 49 CFR(Code of Federal Regulations) Sections 173-185 Lithium batterie and cells,
- The UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria 38.3 Lithium batteries, Rev.5, Amend.1
- UN No. 3480

Our products are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to all the applicable international and national governmental regulations, not limited to the above mentioned. We further certify that the enclosed products have been tested and fulfilled the requirements and conditions in accordance with UN Recommendations (T1 – T8) on the Transport of Dangerous Goods Model Regulations and the Manual of Testes and Criteria that can be treated as “Non-Dangerous Goods”.

Test results of the UN Recommendation on the Transport of Dangerous Goods

<u>Manual of Test and Criteria (38.3 Lithium Battery)</u>	<u>Test Results</u>	<u>Remark</u>	
<u>No.</u>	<u>Test item</u>		
T1	Altitude Simulation	Pass	
T2	Thermal Test	Pass	
T3	Vibration	Pass	
T4	Shock	Pass	
T5	External Short Circuit	Pass	
T6	Impact	Pass	
T7	Overcharge	Pass	For pack and single cell battery only
T8	Forced Discharge	Pass	

SECTION 15: REGULATORY INFORMATION

15.1 U.S. Regulations

National Inventory TSCA

All of the components are listed on the TSCA inventory.

SARA

To the best of our knowledge this product contains no toxic chemicals subject to the supplier notification requirements of Section 313 of the Superfund Amendments and Reauthorization Act (SARA/EPCRA) and the requirements of 40 CFR Part 372.



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15.2 Regulatory information EU

Labeling

Hazardous components which must be listed on the label

As an article the product does not need to be labeled in accordance with EC directives or respective national laws.

EU regulatory information

1999/13/EC (VOC): 0 %

SECTION 16: OTHER INFORMATION

Although Robert Bosch Tool Corporation has attempted to provide current and accurate information herein, Robert Bosch Tool Corporation makes no representations regarding the accuracy or completeness of the information and assumes no liability for any loss, damage, injury of any kind which may result from or arise out of the use of or reliance on the information by any person.

It shall be the responsibility of the customer purchasing this product to ensure that all employees/users of this product are familiar with and trained in the handling, use and hazards associated with this product as contained herein. This responsibility shall also extend directly to the user.