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## 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 and products with lithium-ion cells

**Date of issue:** May 12, 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

Lithium ion batteries have a gas-tight seal and are safe as long as they are used and handled in accordance with the manufacturer's specifications.

#### **2.1 Handling and Operational Safety**

##### **Handle discharged batteries carefully:**

Batteries still represent a source of danger as they may deliver a very high short-circuit current. Even if assumed to be discharged, lithium ion batteries may - as other batteries- never totally discharge.

##### **Avoid impact to the battery:**

Impact and penetration may damage the battery. This may cause the battery to leak, generate heat, smoke, catch fire, or explode.

##### **Keep batteries away from other metal objects:**

Keep away from objects like paperclips, coins, keys, nails, screws or other small metal objects that can make a connection from one terminal to another. Shorting the battery terminals together may cause burns or a fire.

##### **Under abusive conditions, liquid may be ejected from the battery:**

Avoid contact. If contact accidentally occurs, flush with water. If liquid contacts eyes, additionally seek medical help. Liquid ejected from the battery may cause irritation or burns.

##### **Do not expose a battery to fire or excessive temperature:**

Exposure to fire or temperature above 130 °C may cause explosion.

##### **Do not disassemble the battery:**

Disassembly or modification of the battery may damage the protection circuit. This may cause the battery to generate heat, smoke, catch fire, or explode.

##### **Do not immerse the battery in liquid such as water, beverages, or other fluids:**

Exposure to liquid may damage the battery. As a result, the battery may generate heat, smoke, catch fire, or explode.



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**Recharge batteries only with the charger specified by the manufacturer:**

A charger that is suitable for one type of batteries may create a risk of fire when used with another battery.

**Use batteries only with specifically designated tools:**

Use of any other tools may create a risk of injury and fire.

**Do not use a battery that is damaged or modified:**

Damaged or modified batteries may exhibit unpredictable behavior resulting in fire, explosion or risk of injury.

**Do not use abnormal batteries:**

Immediately stop using the battery if there are noticeable abnormalities, such as smell, heat, discoloration, or deformity. The battery may be defective and could generate heat, smoke, catch fire, or explode with continued use.

Excessively high charging voltages and overcharge must be avoided at all costs. They cannot only lead directly to critical situations, but also have a negative effect on the battery's life.

### SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

#### **3.1 Characterizations**

The battery pack contains cells with lithium metal oxide cathode.

**Important note:**

The battery may not be opened, heated up to temperatures above 120°C or burned, as exposure to its contents can be dangerous under certain conditions. The product contains neither metallic lithium nor lithium alloys.

**Composition:**

Lithium metal oxide in the form of  $\text{LiMO}_2$  (M=Co, Ni, Mn, Al), blends of the metals are possible.

Cathode:	Lithium metal phosphate in the form of $\text{LiMPO}_4$ (M=Fe, Y, Co, Mn) Lithium manganese spinel in the form of $\text{LiMn}_2\text{O}_4$ Polyvinylidene fluoride (binder) Graphite (conductive material)
Anode:	Carbon (active material) Polyvinylidene fluoride (binder)
Electrolyte:	Organic solvents (non-aqueous liquids) Lithium salt

The product does not contain metallic lithium or lithium alloys.

### SECTION 4: FIRST AID MEASURES

**Eye contact:**

Rinse eyes with water for 15 minutes and seek medical attention.

**Skin contact:**

Wash area thoroughly with soap and water and seek medical attention.

**Burns:**

If burns are caused, treat them accordingly and seek medical attention.



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### **Respiratory tract:**

In case of intensive smoke generation and gas release or bad smell leave the room and initiate an alarm and firefighting action, if required. Seek medical attention if there are large quantities and irritation of the airways. Ensure sufficient ventilation.

### **Swallowing:**

Rinse out the mouth and around the mouth with water. Immediately seek medical attention

### **SECTION 5: FIREFIGHTING MEASURES**

Fires from lithium batteries in use can in principle be fought with water. No additional or special extinguishing agents need be used, since the batteries are protected accordingly. Fire surrounding the batteries is to be fought with conventional extinguishing agents. The fire of a battery cannot be considered separately from the surrounding fire. The cooling effect of water effectively impedes fire from spreading to battery cells which still have not reached the critical ignition temperature ("thermal runaway"). The fire load can be reduced by separating high quantities and by transport out of the dangerous zone.

As with any fire, the gases produced can be a health hazard if inhaled. For this reason, sufficient ventilation should be ensured.

### **SECTION 6: ACCIDENTAL RELEASE MEASURES**

If the battery housing gets damaged, electrolyte can leak out. Seal batteries in an airtight plastic bag, add dry sand, chalk powder (CaCO<sub>3</sub>) or vermiculite. Traces of electrolyte can be soaked up with dry paper towels. When doing so, prevent direct contact with skin by wearing safety gloves. Thoroughly rinse with water.

Use personal safety equipment appropriate for the situation (safety gloves, protective clothing, safety mask, breathing protection).

### **SECTION 7: HANDLING AND STORAGE**

#### **7.1 Handling**

No special protective clothing required for handling individual batteries.

#### **7.2 Storage**

In each case, carefully observe the warnings on batteries and the operating instructions. Use only the recommended battery types.

Lithium batteries must be stored at regular temperatures and in a dry location (max. 50°C); large temperature fluctuations are to be avoided. (For example, do not store close to heating elements, do not expose to sunshine for long periods).

When storing large quantities of lithium batteries, consult local authorities and insurers.

### **SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

Lithium ion batteries are products, from which no substance is released under normal and reasonably foreseeable conditions of use.

### **SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

Compact batteries with (plastic) housing, terminals.



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### SECTION 10: STABILITY AND REACTIVITY

If an upper temperature limit of (e.g. 130°C) is exceeded, the batteries are in danger of bursting.

When storing the battery above a temperature (e.g. 60°C), the battery may age faster and may lose its function early.

### SECTION 11: TOXICOLOGICAL INFORMATION

When handled appropriately, and when general hygiene and safety regulations are followed, there are no known injuries. If batteries are opened through misuses or damage, discard immediately. Internal components of cell are irritants and sensitizers or maybe toxic.

### SECTION 12: ECOLOGICAL INFORMATION

When handled appropriately, there are no expected negative impacts to the environment.

### SECTION 13: DISPOSAL CONSIDERATIONS

#### **Advice on Disposal:**

For recycling, consult manufacturer.

#### **Contaminated Packaging:**

Disposal in accordance with local regulations.

### SECTION 14: TRANSPORT INFORMATION

Commercial transport of lithium ion batteries is subject to dangerous goods regulations. Transport preparations and transport are exclusively to be carried out by appropriately trained personnel and/or the process has to be accompanied by experts with suitable knowledge or qualified companies.

#### **Transport regulations:**

Lithium batteries are subject to the following dangerous goods regulations and exemptions based on the respective valid revision:

Class 9

UN 3480: LITHIUM ION BATTERIES

UN 3481: LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT,  
(i.e. inserted in battery operated product) or  
LITHIUM ION BATTERIES PACKED WITH EQUIPMENT  
(i.e. packed together with battery operated product)

#### **ADR, RID**

Special provisions: 188, 230, 310, 376, 377, 636

Packing instructions: P903, P908, P909, LP903, LP904

Tunnel category E

#### **IMDG Code**

Special provisions: 188, 230, 310, 348, 360, 376, 377

Packing instructions: P903, P908, P909, LP903, LP904

EmS: F-A, S-I

Stowage category A



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### ICAO, IATA-DGR

Special provisions: A88, A99, A154, A164, A181, A182, A183, A185, A201

Packing instructions: 965, 966, 967

### All transport modes:

[Test methods and requirements

In accordance with the dangerous goods regulations for lithium batteries, each new type of cell or battery must have passed all tests listed in the UN Manual of Tests and Criteria, Part III, Section 38.3. This particularly applies also if multiple cells or batteries have been assembled into new batteries (battery packs or battery assemblies). Therefore it should be confirmed here that batteries as distributed by the manufacturer/supplier have passed the respective tests.

These requirements also apply to used batteries. Used batteries that are intact and undamaged can usually be transported under the regulations for unused batteries]

Defective or damaged batteries are subject to more stringent regulations. These regulations may prohibit the transport completely. A general ban applies to air transport (IATA DGR - special provision A154).

For transport of used - but not damaged - batteries please refer to the respective special provisions.

Waste batteries and batteries which are sent for recycling or disposal are prohibited from air transport (IATA Special provision A 183).

Exemptions need to be approved in advance by the competent authority of the country of origin and the respective country of the airline.

### SECTION 15: REGULATORY INFORMATION

Regardless of shape, volume, weight and application, batteries, in the EU are subject to the respective national implementation of the European Battery Directive (2006/66/EC). It includes but is not limited to regulations regarding placing on the market, collection, treatment and recycling of batteries.

Transport regulations are according to IATA, ADR, IMDG, RID. Refer to section 14.

### 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.

### Legal Remark:

#### EC

These batteries are no "substances" or "preparations" according to Regulation 1907/2006 EC. Instead they have to be regarded as "articles", no substances are intended to be released during handling. Therefore there is no obligation to supply a MSDS according to Regulation (EC) 1907/2006, Article 31.



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### US

Material Safety Data Sheets (MSDS) are a sub-requirement of the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR Subpart 1910.1200. This Hazard Communication Standard does not apply to various subcategories including anything defined by OSHA as an "article". OSHA has defined "article" as a manufactured item other than a fluid or particle;

- (i) which is formed to a specific shape or design during manufacture;
- (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and
- (iii) which under normal conditions of use does not release more than very small quantities, e.g. minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

Because all of our batteries are defined as "articles", they are exempted from the requirements of the Hazard Communication Standard.