SECTION I PRODUCT/COMPANY IDENTIFICATION

Legal Summary USA
Material Safety Data Sheets (MSDS) are a sub-requirement of the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard 29CFR 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; (1) which is formed to a specific shape or design during manufacture, (ii) which has end use function(s) dependent in whole or 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 exempt from the requirements of the Hazard Communication Standard.

Legal Summary (EU)
Regulation EC # 1907/2006 EC defines these batteries as “no substances” or “preparation” and the batteries are to be regarded as “articles”. No substances are intended to be released during handling. Therefore, pursuant to regulation (EC) 1907/2006, Article 31, there is no obligation to provide a MSDS/SDS.

PRODUCT IDENTIFICATION
Robert Bosch Battery Systems Lithium-Ion Battery Pack
Applicable Part Numbers: 1010517, 1010602, 1010717

<table>
<thead>
<tr>
<th>Item</th>
<th>Nominal Value</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Voltage</td>
<td>360 V</td>
<td></td>
</tr>
<tr>
<td>Nominal Capacity</td>
<td>63 Ah</td>
<td></td>
</tr>
<tr>
<td>Wh-capacity</td>
<td>22.2 kWh</td>
<td></td>
</tr>
</tbody>
</table>

MANUFACTURER
Robert Bosch Battery Systems, LLC
3740 Lapeer Road South
Orion, MI 48359
Phone number: (248) 620.5700
Fax: (248) 620-5702
CHEMTREC: (800) 424.9300 (24 hour)
International: (703) 527.3887
Issue Date: 11/26/2012
Revision Date: 1/8/2013

Robert Bosch Battery Systems, LLC
50 Ovonic Way
Springboro, Ohio 45066
Telephone: (937)-743-1001
Fax: (937)-743-1050
Hours of Operation: 8:00-5:00 Monday thru Friday
SECTION II - HAZARD IDENTIFICATION

The lithium ion batteries described within this MSDS/SDS are sealed units and when used according to our recommendations are not hazardous under normal conditions of use and are non-reactive provided battery integrity is maintained and seals remain intact. Risk of exposure is only the result of abuse (mechanical, thermal, or electrical), and can lead to potential exposure to electrolyte through leakage, electrode materials reaction with moisture/water, or battery vent/fire/explosion depending on circumstances and abuse.

WARNING

This is an electrical energy storage device. The device may cause electrical shock, fire or injury.

PRIMARY ROUTES OF ENTRY

Skin contact, Skin absorption, Eye contact, Inhalation, and Ingestion:

SYMPTOMS OF EXPOSURE

Skin irritation, irritant to ocular tissue, ingestion of electrolyte may cause tissue damage to throat and gastro/respiratory tract, and contents of a leaking or ruptured battery may cause respiratory tract, mucus, membrane irritation and edema.

SECTION III: COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Components

<table>
<thead>
<tr>
<th>Compound</th>
<th>EC-No.</th>
<th>CAS-No</th>
<th>Chemical Name</th>
<th>Quantity (Wt%)</th>
<th>Classification according to GHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Material - Positive Electrode</td>
<td>480-390-0</td>
<td>182442-95-1</td>
<td>Lithium Nickel Cobalt Manganese Oxide</td>
<td>10 - 30</td>
<td>STOT RE 2, H373; Aquatic Chronic 3, H412</td>
</tr>
<tr>
<td></td>
<td></td>
<td>207803-51-8</td>
<td>Lithium Nickel Cobalt Aluminum Oxide</td>
<td>0 - 30</td>
<td>Carc. 1B, H350i; Acute Tox. 2, H330; Skin Sens. 1, H317; Stot RE 1, H372; Aquatic Chronic 1, H410</td>
</tr>
<tr>
<td></td>
<td>266-340-9</td>
<td>12057-17-9</td>
<td>Lithium Manganese Oxide</td>
<td>0 - 30</td>
<td>Stot RE 1, H372</td>
</tr>
<tr>
<td></td>
<td>215-609-9</td>
<td>1333-86-4</td>
<td>Carbon Black (Conducting Agent)</td>
<td>&lt; 4</td>
<td>-</td>
</tr>
</tbody>
</table>
### SECTION IV: FIRST AID MEASURES

**INHALATION, EYE CONTACT, and SKIN CONTACT:** Not a health hazard.

**INGESTION:** If swallowed, obtain medical attention immediately. If exposure to internal materials within cell due to damaged outer casing, the following actions are recommended:

**INHALATION** - Leave area immediately and seek medical attention.

**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.

**INGESTION** - Drink milk/water and induce vomiting; seek medical attention.

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<table>
<thead>
<tr>
<th><strong>Active Material - Negative Electrode</strong></th>
<th><strong>231-955-3</strong></th>
<th><strong>7782-42-5</strong></th>
<th><strong>Graphite</strong></th>
<th><strong>0 - 20</strong></th>
<th><strong>-</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrolyte</strong></td>
<td><strong>202-510-0</strong></td>
<td><strong>96-49-1</strong></td>
<td><strong>Ethylene Carbonate (EC) as Solvent</strong></td>
<td><strong>5 - 20</strong></td>
<td><strong>Eye Dam. 1, H318</strong></td>
</tr>
<tr>
<td></td>
<td><strong>210-478-4</strong></td>
<td><strong>616-38-6</strong></td>
<td><strong>Dimethyl Carbonate (DMC) as Solvent</strong></td>
<td><strong>-</strong></td>
<td><strong>Flam. Liq. 2, H225</strong></td>
</tr>
<tr>
<td></td>
<td><strong>433-480-9</strong></td>
<td><strong>623-53-0</strong></td>
<td><strong>Ethyl Methyl Carbonate (EMC) as Solvent</strong></td>
<td><strong>-</strong></td>
<td><strong>Flam. Liq. 2, H226</strong></td>
</tr>
<tr>
<td></td>
<td><strong>244-334-7</strong></td>
<td><strong>21324-40-3</strong></td>
<td><strong>Lithium Hexafluorophosphate as Salt</strong></td>
<td><strong>&lt; 4</strong></td>
<td><strong>Skin Corr. 1B, H314; Acute Tox. 4, H302,H312, H332</strong></td>
</tr>
<tr>
<td><strong>Binder</strong></td>
<td>Polymer</td>
<td><strong>24937-79-9</strong></td>
<td><strong>Polyvinylidene Fluoride (PVdF)</strong></td>
<td><strong>&lt; 4</strong></td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>Plastic Parts</strong></td>
<td>Polymer</td>
<td><strong>9002-88-4</strong></td>
<td><strong>Polyethylene (PE)</strong></td>
<td><strong>&lt; 10</strong></td>
<td><strong>-</strong></td>
</tr>
<tr>
<td></td>
<td>Polymer</td>
<td><strong>68608-59-3</strong></td>
<td><strong>Polypropylene (PP)</strong></td>
<td><strong>&lt; 10</strong></td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>Metal Parts</strong></td>
<td><strong>231-072-3</strong></td>
<td><strong>7429-90-5</strong></td>
<td><strong>Aluminum (Al)</strong></td>
<td><strong>&lt; 10</strong></td>
<td><strong>-</strong></td>
</tr>
<tr>
<td></td>
<td><strong>231-159-6</strong></td>
<td><strong>7440-50-8</strong></td>
<td><strong>Copper (Cu)</strong></td>
<td><strong>&lt; 10</strong></td>
<td><strong>-</strong></td>
</tr>
</tbody>
</table>

Full text of each relevant H phrase can be found in chapter 16.
SECTION: FIRE FIGHTING MEASURES

GENERAL HAZARD
Cell is not flammable but internal organic material will burn if the cell is incinerated. Combustion products include, but are not limited to hydrogen fluoride, carbon monoxide and carbon dioxide.

EXTINGUISHING MEDIA
Use extinguishing media suitable for the materials that are burning.

SPECIAL FIREFIGHTING INSTRUCTIONS
If possible, remove cell(s) from fire fighting area. If heated above 125°C, cell(s) can explode/vent.

FIREFIGHTING EQUIPMENT
Use NIOSH/MSHA approved full-face self-contained breathing apparatus (SCBA) full protective gear.

SECTION VI: ACCIDENTAL RELEASE MEASURES

ON LAND
Place material into suitable containers and call local fire/police department.

IN WATER
If possible, remove from water and call local fire/police department.

SECTION VII: HANDLING AND STORAGE

HANDLING
No special protective clothing required for handling individual cells.

STORAGE
Store battery pack unit in a cool, dry place.

SECTION VIII: EXPOSURE CONTROL/PERSONAL PROTECTION

ENGINEERING CONTROLS
Keep away from heat and open flame. Store battery pack in a cool dry place.

PERSONAL PROTECTION
Respirator: Not required during normal operations. SCBA required in the event of a fire.
Eye/face protection: Not required beyond safety practices of employer.
Gloves: Not required for handling of cells.

Foot protection: Steel toed shoes recommended for large container handling.

### PHYSICAL PROPERTIES

<table>
<thead>
<tr>
<th>State</th>
<th>Solid</th>
<th>Odor</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH</td>
<td>N/A</td>
<td>Vapor pressure</td>
<td>N/A</td>
</tr>
<tr>
<td>Vapor density</td>
<td>N/A</td>
<td>Boiling point</td>
<td>N/A</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Insoluble</td>
<td>Specific gravity</td>
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</tr>
<tr>
<td>Density</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SECTION X: STABILITY AND REACTIVITY

**REACTION** - None

**INCOMPATIBILITIES** - None (during normal operation). Avoid exposure to heat, open flame, and corrosives.

**HAZARDOUS DECOMPOSITION PRODUCTS** - None (during normal operating conditions). If cells are opened, hydrogen fluoride and carbon monoxide may be released.

**CONDITIONS TO AVOID** - Avoid exposure to heat and open flame. Do not puncture, crush or incinerate.

### SECTION XI: TOXICOLOGY INFORMATION

This product does not elicit toxicological properties during routine handling and use.

<table>
<thead>
<tr>
<th>Sensitization: NO</th>
<th>Teratogenicity: NO</th>
<th>Reproductive toxicity: NO</th>
<th>Acute toxicity: NO</th>
</tr>
</thead>
</table>

This product does not contain any kinds of the following substances and halogen-type flame retardants including Chlorine and Bromide type harmful flame retardants which are listed in Appendix of TCO documents and relevant international ECO requirements:

- Polybromated Biphenyls (PBB)
- Polybromated Biphenyl Ethers (PBBE)
- Polybromated Biphenyl Oxides (PBBO)
- Polybromated Diphenylethers (PBDE)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Diphenylethers (PCDE)
- Tetrabromophosphol A (TBBPA)
- Asbestos, Antimonytrioxide, Dioxy...
None of the following substances will be exposed, leaked, or emitted during transport-ation, storage or any operation and any temperature condition:

- Chlorinated Fluorohydrocarbon (FCKW)
- Acrylonitrile
- Styrol Phenol Benzol
- Mercury of greater than 0.0001 wt% for alkaline battery
- Mercury of greater than 0.0005 wt% for other battery
- Lithium content of greater than 0.5g/cell, 1.5g/battery
- Cadmium, lead, and other harmful heavy metal

This product does not contain mercury, cadmium and lithium-metal.

SECTION XII: ECOLOGICAL INFORMATION

Some materials within the cell are bio-accumulative. Under normal conditions, these materials are contained and pose no risk to persons or the surrounding environment.

SECTION XIII: DISPOSAL CONSIDERATIONS

CALIFORNIA REGULATED DEBRIS

RCRA Waste Code: Non-regulated

Dispose of according to all federal, state, and local regulations.

SECTION XIV: TRANSPORTATION INFORMATION

The rechargeable Lithium-Ion battery pack as stated in Appendix is made in compliance to the requirements stated in THE UN MANUAL OF TESTS SECTION 38.3 and the latest edition of the IATA Dangerous Goods Regulations. It is the responsibility of the shipper to ensure that the consignment is packed in compliance to the latest edition of the IATA Dangerous Goods Regulations for Air transport or 49CFR for Hi-way.

With regard to transport of the product, the following regulations are cited and considered:

- The International Civil Aviation Organization (ICAO) Technical Instructions
- The International Air Transport Association (IATA) Dangerous Goods Regulations
The International Maritime Dangerous Goods (IMDG) Code

**US DOT 49 CFR 172.101**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper shipping name</td>
<td>Lithium-ion batteries</td>
</tr>
<tr>
<td>UN/ID Number:</td>
<td>UN3480</td>
</tr>
<tr>
<td>Hazard Class or Division:</td>
<td>9</td>
</tr>
<tr>
<td>Packing group:</td>
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</tr>
<tr>
<td>Label:</td>
<td>9</td>
</tr>
</tbody>
</table>

**Marine transport**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper shipping name</td>
<td>Lithium-ion batteries</td>
</tr>
<tr>
<td>UN/ID number:</td>
<td>UN3480</td>
</tr>
<tr>
<td>IMDG code/Hazard Class:</td>
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<tr>
<td>Marine pollutant:</td>
<td>No</td>
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<td>Hazard label:</td>
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<tr>
<td>Packing group:</td>
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</table>

**Air transport-Cargo Aircraft Only**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
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<td>Proper shipping name</td>
<td>Lithium-ion batteries</td>
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<tr>
<td>UN/ID number:</td>
<td>UN3480</td>
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<td>ICAO/IATA-DGR:</td>
<td>9</td>
</tr>
<tr>
<td>Hazard label:</td>
<td>9</td>
</tr>
<tr>
<td>Packing group:</td>
<td>II</td>
</tr>
</tbody>
</table>

**SECTION XIV: OTHER INFORMATION**
H225 Highly flammable liquid and vapor
H226 Flammable liquid and vapor
H314 Causes severe skin burns and eye damage
H317 May cause an allergic skin reaction
H318 Causes serious eye damage
H332 Harmful, if inhaled
H330 Fatal, if inhaled
H350 May cause cancer
H372 Causes damage to organs through prolonged and repeated exposure
H373 May cause damage to organs through prolonged and repeated exposure
H410 Very toxic to aquatic life with long lasting effects
H412 Harmful to aquatic life with long lasting effects

The data in this Material Safety Data Sheet relate to only specific material designated herein and do not relate to use in combination with any other material or in any process. The information set forth herein is based on technical data that Robert Bosch Battery Systems LLC believes are reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Robert Bosch Battery Systems LLC makes no warranties, expressed or implied, and assumes no liability in connection with any use of this information. Nothing herein is to be taken as a license to operate under or a recommendation to infringe any patents. Any use of this data or information must be determined by the user to be in accordance with federal, state, and local laws and regulations. Robert Bosch Battery Systems LLC assumes no responsibility and makes no warranty, expressed or implied, representation, promise or statement as to the completeness, accuracy, or currency of any data so provided.