GARMIN LITHIUM IRON PHOSPHATE BATTERY INFORMATION

GARMIN LTD. OR ITS SUBSIDIARIES
C/O GARMIN INTERNATIONAL
1200 E. 151ST STREET
OLATHE, KS 66062 USA

GARMIN LITHIUM IRON PHOSPHATE BATTERY

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This data sheet is applicable to Lithium Iron Phosphate batteries contained in Garmin Products: GBB 54

I. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Lithium Iron Phosphate Batteries located within the above products.

Company Name: Garmin International, Inc. 1200 E. 151st Street, Olathe, KS 66062

Product Category: Article

CHEMTREC® 24 hr Emergency: US 800-424-9300

CHEMTREC® 24 hr Emergency: AUS 61-290372994, Toll-Free: 1-800-262-8200

CHEMTREC® 24 hr Emergency: International 703-527-3887

II. HAZARD(S) IDENTIFICATION

Emergency overview:

Not dangerous with normal use. The materials within the battery may only represent a hazard if the structural integrity of the battery is compromised. Do not expose the batteries to fire or open flame. Do not mix batteries of varying sizes, chemistries, or types. Do not short circuit, puncture, incinerate, crush, over-charge, over discharge, or expose the batteries to temperatures above or below the declared limit. Damage to the batteries may result in the risk of fire or explosion, which could release dangerous hydrogen fluoride gas and exposure to the ingredients contained within or their combustion products could be harmful.

Potential Health Effects: Acute (Short Term):

- See Section 8 for Exposure Controls and Personal Protection. In the event of disassembly or rupture/ the electrolyte contained in the cell is corrosive and may cause burns to skin and eyes.

Potential Health Effects: Inhalation

- Inhalation of material from a sealed battery is not an expected route of exposure. Vapors or mists from a ruptured battery may cause respiratory irritation.

Potential Health Effects: Ingestion

- Swallowing of material from a sealed battery is not an expected route of exposure. Swallowing mists from a ruptured

battery may cause respiratory irritation/ chemical burns of the mouth and gastrointestinal tract irritation.

Potential Health Effects: Eyes

- Eye contact with the contents of a ruptured battery can cause severe irritation to the eye.

HMIS Ratings: Health: 0 Fire: 0 HMIS Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 =Serious 4 = Severe * = Chronic hazard

III. COMPOSITION/INFORMATION ON INGREDIENTS

Substance	Concentration (%)	C.A.S. Number
Lithium Iron Phosphate (LiFeP04)	25-35	15365-14-7
Carbon, as Graphite	12-18	7440-44-0
Aluminum Metal	3-7	7429-90-5
Copper Metal	5-9	7440-50-8
Electrolyte:		
Ethylene carbonate	3-5	96-49-1
Dimethyl carbonate	3-5	616-38-6
Ethyl methyl carbonate	1-3	623-53-0
Lithium Hexafluorophosphate	2-3	21324-40-3
Polypropylene	18-22	9003-07-0
Mild steel can & cap	25-35	Not applicable

IV. FIRST-AID MEASURES

- **Skin Contact:** Contact with internal contents may cause burns. If skin contact with internal contents occurs, remove affected articles of clothing. Wash affects area with lukewarm water for at least 30 minutes. If irritation or pain persists, seek medical attention. Decontaminate affected articles of clothing before reuse or discard.
- **Eye Contact**: Contact with internal contents may cause burns. If eye contact with internal content occurs, wash out affected eye with gentle flowing lukewarm water while holding eyelids open for at least 30 minutes. Rinse with neutral saline solution if possible. Use caution not to rinse contaminated water into the unaffected eye, nose, mouth, or onto the face. Seek medical attention.
- **Inhalation:** If internal contents are inhaled, move victim to fresh air and remove source of contamination from area. Seek medical advice.
- **Ingestion**: If ingestion of internal contents occurs, rinse mouth thoroughly with water. DO NOT INCLUDE VOMITING. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration and continue to rinse mouth with water. Seek medical attention immediately.

- **Caution**: In all cases evacuate the contaminated area. If irritation persists, seek medical assistance at once.

V. FIRE-FIGHTING MEASURES

- **Suitable Extinguishing Media**: Water, carbon dioxide, dry chemical powder and foam are most effective means to extinguish a battery fire.
- **Unsuitable Extinguishing Media**: Not Applicable
- **Fire Fighting Procedure**: Wear fully protective gear, including self-contaminated positive pressure breathing apparatus, goggles, fireproofing jacket and gloves. Caution is advised during application of water because burning particles may be ejected from the fire.
- **Unusual Fire & Explosion Hazards**: Exposing battery cell to excessive heat, fire or over voltage condition may cause a leak, fire, hazardous vapors and hazardous decomposition products. Damaged or opened cells or batteries can result in rapid heating and the release of flammable vapors and potentially dangerous gases that may be heavier than air and could travel along the ground or be moved by ventilation to an ignition source.

VI. ACCIDENTAL RELEASE MEASURES

- **Personal Precautions:** Hazardous material contained within the battery's cells will only be expected if the battery is damaged or abused. If an accidental release occurs, personnel in the immediate vicinity should ensure containment measures and evacuation procedures are performed rapidly before any clean up. All non-required personnel for containment and clean up should observe the evacuation procedures.
- **Evacuation Procedures:** If an accidental release occurs, evacuate the area, except for required containment and clean up personnel. Maintain a minimum clearance of 25 meters (75 feet) in all directions. Stay upwind of the release, keep out of low areas, and ventilate closed areas before re-entering.
- **Environmental Precautions:** Prevent released material from contaminating soil or entering sewers or waterways by capping drains or placing up barriers.
- **Containment Procedures:** Stop the release if safe to do so. Contain any spilled liquid with dry sand, earth, or vermiculite. Move the damaged object to an isolated area, containment chamber, or cover with a fireproof containment blanket if safe to do so. Clean up spills immediately.
- **Clean Up Procedures:** Wear adequate personal protective equipment as indicated in Section 8. Absorb spilled liquid material with an inert absorbent (dry sand, earth, or vermiculite) material. Collect all debris and contaminated absorbent into an acceptable waste container and dispose of according to directions in Section 13. Scrub the spill area with detergent and water; collect all contaminated wash water for proper disposal.

VII. HANDLING AND STORAGE

- **Handling Precautions**: Do not expose battery or cell to extreme temperatures or fire. Do not disassemble, crush or puncture battery. Do not overcharge or over discharge the battery. Do not mix batteries of varying types or sizes. Do not connect (short circuit) positive and negative terminals or place the batteries on conductive metal.
- **Safe Storage Recommendations**: Insulate positive and negative terminals, when not in use, to avoid short circuit. Ensure sufficient clearance between batteries and other surfaces. Store in a dry, cool (25°C +/-5°C, 10-50% RH) and well-ventilated area. Elevated temperatures can result in reduced battery life and venting of flammable liquid gases. Keep batteries away from strong oxidizers and acids. Keep out of reach of children.

VIII. EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal Protection:

- **Respiratory Protection**: Not necessary under normal use. In case of battery or cell rupture, use a self-contained full-face respiratory mask.
- **Skin protection**: Not necessary under normal use. Wear rubber apron and Viton rubber gloves if handling a ruptured or leaking battery cell.
- **Eye protection**: Not necessary under normal use. Wear safety goggles if handling a ruptured or leaking battery cell.
- **Engineering Controls**: Use local exhaust ventilation or other engineering control sources of dust, mist, fume and vapor.
- **Exposure limits**: Exposures to hazardous substances are not expected when product is used for its intended purpose. In the event of rupture or disassembly the following exposure limits apply.

IX. PHYSICAL AND CHEMICAL PROPERTIES

- **Appearance**: Cell Battery
- **Physical State**: Solid
- **Color:** Not Applicable
- **pH:** Not Applicable
- **Odor Type**: Odorless
- **Odor Threshold:** Not Applicable
- **Freezing Point:** Not Applicable
- **Melting Point**: Not Applicable
- **Boiling Point:** Not Applicable
- **Boiling Range**: Not Applicable
- **Flash Point and Method (CO):** Not Applicable
- **Evaporative Rate:** (n-Butyl Acetate = 1) N/A
- **Flammability**: Not Applicable
- **Flammability/Explosive Limits (%):** Not Applicable

- **Oxidizing Properties:** Not Applicable
- **Viscosity:** Not Applicable
- **Relative Density:** Not Applicable
- **Auto Ignition Temperature (CO):** Not Applicable
- **Solubility in Water**: Insoluble
- **Vapor Pressure**: (mm Hg @ 20 CO) Not Applicable
- **Water/ Oil Dist Coefficient**: Not Applicable
- **Vapor Density**: (Air = 1) Not Applicable
- **Decomposition Temperature**: Not Applicable

X. STABILITY AND REACTIVITY

- **Reactivity:** Not Available
- **Chemical Stability**: Stable under normal use.
- **Other:** Possibility of Hazardous Hydrogen fluoride gas may be produced in reaction with water.
- **Reactions:**
- **Conditions to Avoid:** Avoid exposing to high temperatures. Do not incinerate, deform, mutilate, crush, pierce, short or disassemble.
- **Incompatible Materials**: Not Applicable
- **Hazardous Decomposition:** Combustible vapors may be released if exposed to fire.
- **Products**: Not Applicable

XI. TOXICOLOGICAL INFORMATION

Short and Long Term Exposure Effect Information:

- **Inhalation:** Toxicity data and effects of inhalation exposure are not available. Not a likely route of exposure.
- **Ingestion:** Toxicity data and effects of ingestion exposure are not available. Not a likely route of exposure under normal use.
- **Skin Contact:** Toxicity data and effects of skin contact exposure are not available. Not a likely route of exposure under normal use.
- **Eye Contact:** Toxicity data and effects of eye contact exposure are not available. Not a likely route of exposure under normal use.

Other Toxicity and Effect Information:

- **Irritation:** Risk of irritation only occurs if battery cells are mechanically, thermally or electrically damaged and the enclosure is compromised. If this occurs, irritation to the skin, eyes, and respiratory tract may occur.
- **Neurological Effects:** No information is available at this time.
- **Sensitization**: Nervous system and organs may be sensitized by exposure to compromised battery cell enclosure.
- **Teratogenicity:** No information is available at this time.
- **Reproductive Toxicity:** No information is available at this time.
- **Mutagenicity (Genetic Effects):** No information is available at this time.
- **Toxicologically Synergistic:** No information is available at this time.
- **Carcinogenicity:** Normal use will not result in exposure to substances that are considered human carcinogens by IARC (International Agency for Research on Cancer), ACGIH (American Conference of Governmental Industrial Hygienists), OSHA or NTP (National Toxicology Program).

XII. ECOLOGICAL INFORMATION

- **Bioaccumulative potential**: Not available.
- **Persistence and degradability**: Not available.
- **Mobility:** Not available.
- **Ecotoxicity**: Not available.
- **Other Adverse Effects**: Not available.

XIII. DISPOSAL CONSIDERATIONS (NON-MANDATORY)

Waste Disposal Method: Recycling is encouraged. Do NOT dump into sewage or water bodies. Dispose of in accordance with local, state and federal laws and regulations.

Special Precautions: Discharge batteries fully and cap terminals before disposal. Handle according to Section 7 and Section 8 to minimize exposure.

Regional Regulations:

- **USA**: Dispose of in accordance with local, state and federal laws and regulations.
- **Canada:** Dispose of in accordance with local, state and federal laws and regulations.
- **EC:** Dispose of in accordance with relevant EC Directive and national, regional, or local regulations. Use appropriate code from European Waste Catalogue (Ewe) for disposal within the EC
- **Other**: Dispose in accordance with local, state and federal laws and regulations.

XIV. TRANSPORT INFORMATION (NON-MANDATORY)

K2 Energy Cells listed in Section 1 are designed to comply with standard international shipping regulations including the UN Recommendations on the Transport of Dangerous Good; the lATA Dangerous Goods Regulations; the International Maritime Dangerous Goods Code; and the US DOT Regulations for the safe transportation of lithium batteries. As required by the regulation directives, the cells have passed the UN Manual of Test and Criteria Part III, Subsection 38.3.

ICAO Classification: (International Civil Aviation Organization)

- **UN Number:** UN3480
- **UN Proper Shipping Name:** LITHIUM-ION BATTERIES
- **Transport Hazard Class:** Class 9
- **Packing Group Number:** Packing Group II
- **Notes and Exceptions**: Packaging, markings, and documentation requirements are defined in the International Air Transport Association (IATA) Dangerous Goods Regulations (DGR) Packing Instructions 965. In some cases, excepted cells and batteries are allowed to be transported internationally without Class 9 packaging in some circumstances but must conform to requirements stipulated in Packing Instructions 965 of the IATA DGR.

IMDG Classification: {International Maritime Dangerous Goods}

- **UN Number**: UN3480
- **UN Proper Shipping Name**: LITHIUM-ION BATTERIES
- **Transport Hazard Class**: Class 9
- **Packing Group Number**: Packing Group II

- **Notes and Exceptions:** Packaging, markings, and documentation requirements are defined in the IMDG code Packing Instructions P903. In some cases, excepted cells and batteries are allowed to be transported internationally without Class 9 packaging and in some circumstances markings but must conform to Special Provision 188 under the IMDG code.

U.S. HMR Classification: {United States Hazardous Materials Regulations}

- **UN Number**: UN3090
- **UN Proper Shipping Name**: LITHIUM BATTERY
- **Transport Hazard Class**: Class 9
- **Packing Group Number:** Packing Group II
- **Notes and Exceptions:** Packaging, markings, and documentation requirements are defined in Title 49 of the Code of Federal Regulations (CFR), Section 173.185. of the U.S. HMR. In some cases, excepted cells and batteries are allowed to be transported within the US without Class 9 packaging and markings but must conform to other requirements as stipulated in Special Provisions 188 and 189 in the 49 CFR Section 173.185 of the U.S. HMR.

XV. REGULATORY INFORMATION (NON-MANDATORY)

USA

- **OSHA HCS:** This SDS complies with requirements of the Hazard Communication Standard {HCS} 29 CFR 1910.1200{g} and Appendix D
- **EPA TSCA Status:** All ingredients in the product are listed on the TSCA inventory.
- **EPA SARA Title III:**
  - Sec. 302/304: None
  - Sec. 311/312: None
  - Sec. 313: None
- **EPA CERCLA RQ**: None
- **California Prop 65**: This product does not contain chemicals known to the State of California to cause cancer or reproductive toxicity.

Canada

- This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.
- **WHMIS Classification**: Not Controlled

- **New Substance Notification Regulations:** All ingredients in the product are listed, as required, on Canada's Domestic Substance List.
- **NPRI Substances**: This product does not contain any NPRI chemicals.

EC

- **Classification / Symbol**: This product is not classified as hazardous according to Regulation (EC) 1272/2008.
- **Risk Phrases:** None
- **Safety Phrases**: Keep out of the reach of children.

XVI. OTHER INFORMATION

This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein.