Product Information Sheet

May be used to comply with OSHA's Hazard Communication Standard 29 CFR 1910.1200.
This standard must be consulted for specific requirements.

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product Name: Lithium-ion Batteries - Rechargeable **Drawing Number:** 58-97-0500

SECTION 2: HAZARDS IDENTIFICATION

Health	Environmental	Physical
Eye Irritation: No classified hazards	**Acute Toxicity:** No classified hazards	**Flammable liquid**: No classified hazards
Skin Irritation: No classified hazards	**Chronic Toxicity:** No classified hazards	
Acute Toxicity, Oral: No classified hazards		
Acute Toxicity, Inhalation: No classified hazards		

GHS Label
No applicable labeling

Hazard Statements	Precautionary Statements
No exposure during routine handling of product	

CLASSIFIED HAZARDS

This material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200. This SDS contains valuable information for the safe handling and proper use of this product. Save this SDS for future reference.

OTHER HAZARDS

Flammable:

Organic components will burn if cell is incinerated. Combustion of cell contents may cause evolution of Hydrogen Fluoride.

Potential Health Effects:

Fluoride interferes with nerve impulse conduction causing severe pain or absence of sensations

WARNING:

No exposure during routine handling of product. Hydrofluoric Acid exposure during firefighting: This information is given for the use of professional fire fighters responding to a warehouse fire where fire from other materials may incinerate batteries. This section is provided solely in case of exposure, during firefighting, to the combustion by-products.

SECTION 3: COMPOSITION /INFORMATION OF INGREDIENTS

Chemical Name	CAS #	Concentration
Aluminum Foil	7429-90-5	0.1 - 10
Biphenyl (BP)	92-52-4	0.1 - 0.3
Copper Foil	7440-50-8	0.1 - 10
Linear & Cyclic Carbonate solvents	N/A	0 - 17
Graphite Powder/Carbon	7440-44-0	10 - 30
Metal Oxide or other Electrolyte (proprietary)	Confidential	10 - 50
Lithium Hexaflurophosphate ($LiPF_6$)	21324-40-3	0 - 5
Polyvinylidene Flouride (PVDF)	24937-79-9	0.1 - 5
Styrene Butadiene Rubber (SBR)	N/A	<5
Aluminum, Steel, Nickel and other inert materials	N/A	Remainder

SECTION 4: FIRST AID MEASURES

No exposure during routine handling of product. Risk of exposure occurs only if the battery is mechanically or electrically abused.

No effect under routine handling and use to eyes, skin or if inhaled. Ingestion is not likely, given the physical size and state of the cell. If swallowed, seek medical attention immediately.

If exposure to internal materials within cell due to damaged outer casing the following actions are recommended:

EYE CONTACT:

Flush with water for 15 minutes without rubbing and immediately seek medical attention.

SKIN CONTACT:

Wash area immediately with soap and water. If irritation continues see medical attention.

INHALATION:

Leave area immediately and move to fresh air and seek medical attention.

INGESTION:

If swallowed, contact POISON CONTROL CENTER immediately.

SECTION 5: FIRE FIGHTING MEASURES

NFPA 704 Hazard Class

HMIS

0 (Minimal)
1 (Slight)
2 (Moderate)
3 (Serious)
4 (Severe)

SUITABLE EXTINGUISHING MEDIA:

Water spray, carbon dioxide, dry chemical powder or appropriate foam. Use agent appropriate for surrounding materials.

UNSUITABLE EXTINGUISHING MEDIA:

None.

PRODUCTS OF COMBUSTION:

Organic components will burn if incinerated. Combustion of cell contents may cause evolution of Hydrogen Fluoride. In case of fire in an adjacent area, use water, CO2, or dry chemical extinguishers if cells are packed in their original containers since the fuel of the fire is basically paper products.

PROTECTION OF FIREFIGHTERS:

Hydrofluoric Acid exposure during firefighting: This information is given for the use of professional fire fighters responding to a warehouse fire where fire from other materials may incinerate batteries. This section is provided solely in case of exposure, during firefighting, to the combustion by-products.

SECTION 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

Use standard industrial clothing in normal use. If handling large containers of cells wear steel-toed footwear.

ENVIRONMENTAL PRECAUTIONS:

No special precautions necessary.

METHODS FOR CONTAINMENT:

Transport container outdoors. Hold burned cells and fire cleanup solids for disposal as potential hazardous waste. Unburned cells are not hazardous waste. A fire with over 100 kg of cells burnt will likely require reporting to environmental officials. Always consult and obey all international, federal and local environmental laws.

METHODS FOR CLEAN-UP:

No data available

OTHER INFORMATION:

No data available

SECTION 7: HANDLING AND STORAGE

HANDLING:

Use only approved charging equipment. Do not disassemble battery or battery pack. Do not puncture, crush or dispose of in fire.

STORAGE:

Store in a cool, dry place away from sparks and flame. Keep below 125°C. Keep above -60°C. Charge between 0°C and 45°C.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	OSHA PEL	ACGIH TLV	California Prop 65 Reg. Y/N	IARC/NTP Y/N
Aluminum Foil	TWA 5mg/m^3*	TWA 5mg/m^3*	N	N
Biphenyl (BP)	NA	NA	N	N
Copper Foil	NA	NA	N	N
Linear & Cyclic Carbonate solvents	NA	NA	N	N
Graphite Powder/Carbon	NA	NA	N	N
Metal Oxide or other Electrolyte (proprietary)	NA	NA	N	N
Lithium Hexaflurophosphate ($LiPF_6$)	NA	NA	N	N

Polyvinylidene Flouride (PVDF)	NA	NA	N	N
Styrene Butadiene Rubber (SBR)	NA	NA	N	N
Aluminum, Steel, Nickel and other inert materials	NA	NA	N	N

EYE PROTECTION:

Not necessary under conditions of normal use

SKIN PROTECTION:

Not necessary under conditions of normal use

RESPIRATORY PROTECTION:

Not necessary under conditions of normal use

ENGINEERING CONTROLS:

Not necessary under conditions of normal use

GENERAL HYGIENE CONSIDERATIONS:

Not necessary under conditions of normal use

EXPOSURE GUIDELINES:

Not necessary under conditions of normal use

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Data represent typical values and are not intended to be specifications. NA=Not Applicable; ND=Not Determined

Physical state:..... Solid
Colour: ..... NA
Odor: ..... Odorless
Odor Threshold: ..... NA
pH: ..... NA
Melting/Freezing Point: ..... NA
VOC Content:..... NA
Boiling Point: ..... NA
Flash Point: ..... NA
Evaporation Rate:..... NA
Specific Gravity: ..... NA

Viscosity:..... NA
Upper Explosive Limits (vol % in air): ..... NA
Lower Explosive Limits (vol % in air):..... NA
Vapor pressure: ..... NA
Vapor density: ..... NA
Relative density:..... NA
Solubility:..... NA
Partition Coefficient:..... NA
Auto-ignition Temperature:..... NA
Decomposition Temperature:..... NA
Flammability (solid, gas): ..... Organic components will burn if cell is incinerated

SECTION 10: STABILITY AND REACTIVITY

INCOMPATIBLE MATERIALS:

Water, heat and strong acids.

DECOMPOSITION PRODUCTS MAY INCLUDE:

Hydrogen Fluoride, Phosphorus Oxides, Carbon Monoxide, Carbon Dioxide, Lithium Hydroxide, Manganese Oxides, Aluminum Oxide, possible fluoro-compounds, Carbon soot.

CONDITIONS TO AVOID:

Do not crush, puncture, incinerate, immerse in water or heat over 212°F (100°C). Steel casing slowly dissolves in strong mineral acids.

POLYMERIZATION:

Hazardous polymerization will not occur. Spontaneous decomposition will not occur at normal temperature.

CHEMICAL STABILITY:

This product is stable.

REACTIVITY:

Hazardous polymerization will not occur. Spontaneous decomposition will not occur at normal temperature.

SECTION 11: TOXICOLOGY INFORMATION

LIKELY ROUTES OF EXPOSURE: Inhalation, Eye and Skin contact

Eye contact, skin contact, skin absorption, inhalation only if burned. Hydrofluoric acid is extremely corrosive. Contact with hydrogen fluoride fumes is to be avoided. Permissible exposure limit is 3ppm. In case of contact with hydrogen fluoride fumes, immediately leave the area and seek first aid **and** emergency medical attention. Symptoms may have delayed onset. Fluoride ions penetrate skin readily causing destruction of deep tissue layers even bone. Fluoride interferes with nerve impulse conduction causing severe pain or absence of sensations. Immediately flush eyes or skin with water for at least 20 minutes to neutralize the acidity and remove some fluoride. Remove and destroy all contaminated clothing and permeable personal possessions. Before re-use, impermeable possessions should be soaked in benzalkonium chloride after washing. Following flushing of the affected areas, an iced aqueous solution of benzalkonium chloride or 2.5% calcium gluconate gel should be applied to react with the fluoride ion. Compresses and wraps may be used for areas where immersion is not practical. Medicated dressing should be changed every 2 minutes. Exposure to hydrofluoric acid fumes sufficient to cause pain requires immediate hospitalization for monitoring for pulmonary edema.

ACUTE SYMPTOMS AND EFFECTS:

Inhalation: No further toxicological data known
Eye contact: No further toxicological data known
Skin contact: No further toxicological data known
Ingestion: No further toxicological data known

OTHER:

No further data known.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:

None in routine handling of product.

TOXICITY:

No data available

PERSISTENCE AND DEGRADABILITY (BIOPERSISTENCY & BIODEGRADABILITY):

None in routine handling of product.

POTENTIAL OF BIOACCUMULATION:

None in routine handling of product.

MOBILITY IN SOIL:

None in routine handling of product.

OTHER ADVERSE EFFECTS:

No data available

SECTION 13: DISPOSAL CONSIDERATIONS

DISPOSAL:

Dispose in accordance with appropriate regulations. Always consult and obey all international, federal, provincial/state and local hazardous waste disposal laws. Some jurisdictions require recycling of this spent product. Battery recycling is encouraged. Lithium ion batteries are safe for disposal in the normal municipal waste stream since they are not defined by the federal government as hazardous waste. However, Lithium ion batteries are recyclable.

This product does not contain mercury, cadmium or Lithium (metal).

DO NOT INCINERATE or subject battery cells to temperatures in excess of 212°F (100°C).

SECTION 14: TRANSPORTATION INFORMATION

U.S. DOT HAZARDOUS MATERIAL REGULATIONS (RE: GROUND TRANSPORT)

Proper Shipping Description:

UN3480 Lithium-ion batteries; UN3481 Lithium-ion batteries packed with or contained in equipment; Class 9.

Milwaukee Lithium-ion batteries are to be shipped in compliance with relevant requirements of HMR "49 CFR173.185".

CANADA TRANSPORT DANGEROUS GOODS (RE: GROUND TRANSPORT)

Proper Shipping Description:

UN3480 Lithium-ion batteries; UN3481 Lithium-ion batteries packed with or contained in equipment; Class 9.

Milwaukee Lithium-ion batteries are to be shipped in compliance with relevant requirements of TDG "Part 2" (Section 2.43), or TDG "Schedule 2" (Special Provision 34), as applicable.

INTERNATIONAL DANGEROUS GOODS REGULATIONS (RE: AIR, SEA, GROUND TRANSPORT)

Proper Shipping Description:

UN3480 Lithium-ion batteries; UN3481 Lithium-ion batteries packed with or contained in equipment; Class 9.

Milwaukee Lithium-ion batteries are to be shipped in compliance with relevant requirements of the following DG Regulations:

- ICAO Technical Instructions or IATA Dangerous Goods Regulations (57th Edition): Packing Instructions 965; 966; 967 (Section I, or Section II, as applicable).
- IMDG Code: Packing Instruction P903, or Special Provision 188, as applicable.
- UN Model Regulations on the Transport of Dangerous Goods: Packing Instruction P903, or Special Provision 188, as applicable.
- UN European Agreements (ADR/RID/ADN): Packing Instruction P903, or Special Provision 188, as applicable.
- Australian Dangerous Goods (ADG): Packing Instruction P903, or Special Provision 188, as applicable.

IMPORTANT: The proper classification, packaging, labeling, marking, and documentation requirements for shipping Lithium-ion batteries is dependent upon whether the particular batteries are:

a.) Rated at 100 Watt-hours (Wh) or less; or
b.) Rated at greater than 100Wh.

Generally, Lithium-ion batteries rated 100Wh or less are "excepted" from certain Class 9 DG requirements. Always check compliance of Lithium-ion battery consignments against the current regulations governing the chosen mode of transport. When in doubt, contact the carrier or other trained Dangerous Goods professional to confirm acceptability.

UN 38.3 BATTERY TRANSPORTATION TESTING:

Milwaukee rechargeable Lithium-ion batteries listed in Section 1 have passed the relevant transportation test requirements as described in the UN *Manual of Tests and Criteria*, Part III, section 38.3.

UN 38.3 Test Reports are maintained on file at the corporate headquarters of Milwaukee Electric Tool Corporation located at 13135 W. Lisbon Rd., Brookfield, WI, USA 53005.

SECTION 15: REGULATORY INFORMATION

GLOBAL INVENTORIES

TSCA: United States	See Sec. 14. Compliant with, relevant transportation test requirements as described in the UN Manual of Tests & Criteria, Part III, Sub-section 38.3.
DSL: Canada	See Sec. 14. Compliant with, relevant transportation test requirements as described in the UN Manual of Tests & Criteria, Part III, Sub-section 38.3.
ECL: Korea	Compliant with, relevant transportation test requirements as described in the UN Manual of Tests & Criteria, Part III, Sub-section 38.3.
PICCS: Philippines	Compliant with, relevant transportation test requirements as described in the UN Manual of Tests & Criteria, Part III, Sub-section 38.3.
ENCS: Japan	Compliant with, relevant transportation test requirements as described in the UN Manual of Tests & Criteria, Part III, Sub-section 38.3.
AICS: Australia	Compliant with, relevant transportation test requirements as described in the UN Manual of Tests & Criteria, Part III, Sub-section 38.3.
IECS: China	Compliant with, relevant transportation test requirements as described in the UN Manual of Tests & Criteria, Part III, Sub-section 38.3.
EINECS: European Union	Compliant with, relevant transportation test requirements as described in the UN Manual of Tests & Criteria, Part III, Sub-section 38.3.

SARA 313 Information:

SARA Title III Section 313: This product does not contain regulated levels of any toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40 CFR part 372.

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)

This product does not contain regulated levels of any toxic chemical subject to the reporting requirements of California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)

WHMIS: Canadian Workplace

This product does not contain regulated levels of any toxic chemical subject to the reporting requirements

SECTION 16: OTHER INFORMATION

ABBREVIATIONS:

TSCA ..... Toxic Substance Control Act
ICAO ..... International Civil Aviation Organization
IMDG ..... International Maritime Dangerous
OSHA ..... Occupational Safety and Health
IARC/NTP ..... International Agency for Research on Cancer/National Toxicology Program
SARA ..... Superfund Amendments and Reauthorization Act of 1986
ACGIH ..... American Conference of Governmental Industrial Hygienists

NIOSH/MSHA..... National Institute for Occupational Safety Health/
Mine Safety and Health Administration
WHMIS..... Workplace Hazardous Materials Information System

Prepared by: Milwaukee Electric Tool Corporation

The batteries referenced herein are considered exempt articles and are not subject to the OSHA Hazard Communication Standard; therefore a SDS is not required. This sheet is being provided as a service to our customers.

The information and recommendations set forth are made in good faith and believed to be accurate as of the date of preparation. ***MILWAUKEE ELECTRIC TOOL CORPORATION*** makes no warranty, expressed or implied, regarding the accuracy of this data or the results to be obtained from the use thereto.

Milwaukee® Launches M12™ FUEL Drills

MILWAUKEE, WI – Milwaukee Tool continues to revolutionize cordless power tools with the introduction of the new M12™ FUEL Driver (2402-20/22), M12™ FUEL ½" Drill/Driver (2403-20/22) and M12™ FUEL ½" Hammer Drill/Driver (2404-20/22); tools that integrate three ground-breaking cordless technologies to deliver up to 10X longer life, 2X more power and 4X more run-time for the professional tradesman. The Drill/Driver and Hammer Drill/Driver are also the first sub-compact tools in the industry to offer a ½" chuck.

As the clear leader in cordless tool development, Milwaukee has combined their exclusive POWERSTATE™ brushless motor, REDLITHIUM™ battery pack, and REDLINK PLUS™ intelligence to deliver 12V drills that will out run many compact 18V tools on the market today.

The new POWERSTATE™ brushless motor works harder, lives longer, and converts energy into power and torque more efficiently than leading competitors. The POWERSTATE™ motor is completely designed, engineered and built by Milwaukee Tool, providing up to 350 in-lbs of torque and up to 1,700 RPM, putting the M12™ FUEL™ Drills in a class of their own. The POWERSTATE™ motors also reduce noise and cools more rapidly, delivering years of maintenance-free performance.

The new Milwaukee REDLITHIUM™ 2.0 & XC4.0 batteries provide up to 4X more run-time, 20% more power and 2X more recharges than standard Lithium-Ion batteries. REDLITHIUM™ 2.0 & XC4.0 also delivers best-in-class performance in extreme job-site conditions. With Milwaukee® durability built into each pack, the REDLITHIUM™ 2.0 & XC4.0 battery operates cooler and performs in climates below 0°F/-18°C with fade free power.

REDLINK PLUS™ Intelligence delivers a high-efficiency commutation for longer run time. This hardware and software is the world's most advanced system of cordless power tool electronics that will maximize performance and protect the user's investment. REDLINK PLUS™ Intelligence is a best-in-class system that integrates full-circle communication between tool, battery and charger, and constantly monitors this internal network to maintain ideal conditions.

Specifications

M12 FUEL™ Driver Kit (2402-22)
Volts: 12V
Torque: 325 in-lbs
RPM: 0-1,700 RPM
Chuck Type: Quick-Change ¼" Chuck
Tool Length: 6.6"
Tool Weight (w/ battery):2.3 lbs
2402 M12™ FUEL Driver, (2) REDLITHIUM™ 2.0 Batteries, M12 Charger, Belt Clip and Carrying Case

M12 FUEL™ Driver Kit (2402-20)
Volts: 12V
Torque: 325 in-lbs
RPM: 0-1,700 RPM
Chuck Type: Quick-Change ¼" Chuck
Tool Length: 6.6"
Tool Weight :2.0 lbs
2402 M12™ FUEL Driver

M12 FUEL™ ½" Drill/Driver Kit (2403-22)
Volts: 12V
Torque: 350 in-lbs
RPM: 0-1,700 RPM
Chuck Type: ½" Metal Ratcheting Chuck
Tool Length: 7.6"
Tool Weight (w/ battery):2.9 lbs
2403 M12™ FUEL ½" Drill/Driver, (1) REDLITHIUM™ 2.0 Batteries, (1) REDLITHIUM™ XC4.0 Battery, M12 Charger, Belt Clip and Carrying Case

M12 FUEL™ ½" Drill/Driver Kit (2403-20)
Volts: 12V
Torque: 350 in-lbs
RPM: 0-1,700 RPM
Chuck Type: ½" Metal Ratcheting Chuck
Tool Length: 7.6"
Tool Weight :2.5 lbs
2403 M12™ FUEL ½" Drill/Driver

M12 FUEL™ ½" Hammer Drill/Driver Kit (2404-22)
Volts: 12V
Torque: 350 in-lbs
RPM: 0-1,700 RPM
Chuck Type: ½" Metal Ratcheting Chuck
Tool Length: 7.6"
Tool Weight (w/ battery):2.9 lbs
2404 M12™ FUEL ½" Hammer Drill/Driver, (1) REDLITHIUM™ 2.0 Batteries, (1) REDLITHIUM™ XC4.0 Battery, M12 Charger, Belt Clip and Carrying Case

M12 FUEL™ ½" Hammer Drill/Driver Kit (2404-20)
Volts: 12V
Torque: 350 in-lbs
RPM: 0-1,700 RPM
Chuck Type: ½" Metal Ratcheting Chuck
Tool Length: 7.6"
Tool Weight :2.5 lbs
M12 FUEL™ ½" Hammer Drill/Driver Kit (2404-20)

Milwaukee® Introduces World's First Sub-Compact Rotary Hammer – M12™ Cordless ½" SDS Plus Rotary Hammer

MILWAUKEE, WI – Milwaukee Tool expands its M12™ LITHIUM-ION line with the introduction of the M12™ Cordless ½" SDS Plus Rotary Hammer. At only 3.9-pounds and 9-inches in length, it is up to 65 percent lighter, making it ideal for drilling in tight spaces and all-day use for trades including, electricians, MROs and commercial remodelers.

We continue to innovate in the Rotary Hammer category to provide new solutions for our core users based on what they need to accomplish everyday," said Rick Gambaccini, Group Product Manager, Milwaukee Tool. "This is the world's first sub-compact rotary hammer for the professional trades, bringing users a cordless tool in what used to only be available in corded."

The M12™ Cordless ½" SDS Plus Rotary Hammer delivers 0-800 RPM, 0-5,350 BPM and up to 4X faster drilling speed than competitors, drilling over 55 holes per charge. The Electro Pneumatic Design allows for drilling of up to ½" holes in concrete and masonry. For maximum versatility, regardless of application or orientation, the tool features 2-Mode Operation, Rotary Hammer and Hammer-only. REDLINK™ Intelligence technology integrates full-circle communication between tool, battery and charger.

Powered by revolutionary M12™ REDLITHIUM™ Battery technology*, the M12™ Cordless ½" SDS Plus Rotary Hammer can deliver up to 75 percent more run-time and is compatible with the entire M12™ System, now offering over 40 cordless Lithium-Ion products. The M12™ platform is the largest sub-compact system in the industry, offering innovative solutions in power, productivity and portability.

M12™ Cordless ½" SDS Plus Rotary Hammer (2412-22XC)
- 0-800 RPM
- 0-5,350 BPM
- ½" Max Capacity
- 9" long
- 3.9 pounds

Includes 2412-20 M12™ Cordless ½" SDS Plus Rotary Hammer, (2) RED LITHIUM™ M12™ XC Batteries, Charger & Carrying Case

M12™ Cordless ½" SDS Plus Rotary Hammer (2420-20)
- 0-800 RPM
- 0-5,350 BPM
- ½" Max Capacity
- 9" long
- 3.0 pounds

Includes 2412-20 M12™ Cordless ½" SDS Plus Rotary Hammer

***REDLITHIUM™ Battery Technology**

Milwaukee's new REDLITHIUM™ batteries provide up to 40% more run-time, 20% more power and 50% more recharges than other Lithium products on the market. The new technology will also operate in extreme temperatures as low as 0°F/-18°C and will run 20% cooler, with fade free power and no memory effect.

Check out the collection of batteries and chargers we offer.