

Material Safety Data Sheet Lithium Primary Cells and Batteries (LFS Series)

Section I – Information of Manufacturer

Manufacturer's Name: DYNAMIS Batterien GmbH Address: Brühlstr. 15 D-78465 Dettingen / Konstanz

Tel. +49 7533 93669-0 Date 2013-03-04

Section II - Hazardous Information

Hazardous Components:

Description:	CAS#	wt-%
1. Lithium	7439-93-2	see below
2. Aluminum	7429-90-5	approx 4 %
3. Iron	7439-89-6	35-40 %
4. Nickel	7440-02-0	0.6 %
5. Carbon	7440-44-0	0.9 %
6. Titanium Dioxide	13462-67-7	8-10.0 %
7. Iron Disulphide	12068-85-8	21-26 %
8. Propylene Carbonate	108-32-7	10-12 %
9. Ethyleneglycol Dimet	hyether 110-71-4	1.0%

Lithium Content per Cell

Product	Capacity in [mAh]	Content of met. Lithium in [g]	
LFS 10445	1200	< 0.5	
LFS 14505	3000	< 1.0	

Section III - Physical / Chemical Characteristics

Boiling Point: N/A

Vapour Pressure (mm Hg): N/A Vapour Density (AIR=1): N/A Solubility in Water: N/A

Appearance and Odour: Cylindrical Shape, Odourless (in sealed condition)

Specific Gravity (H2O=1): N/A

Melting Point: N/A

Evaporation Rate (Butyl Acetate): N/A

Use properties: Primary (one-off) power supply, nominal voltage 1.5 V, cylindrical sealed cell



Section IV – Hazard Classification

Classification: N/A

All chemicals are sealed into the cell can. Risk of exposure only possible if the cell can is mechanically or electrically damaged (by abuse). In these cases contact of Lithium or liquids with skin or eyes shall be avoided.

A ruptured or shorted battery can cause thermal or chemical burns upon contact with skin. This may be a reproductive hazard.

Section V - Reactivity Data

Stability: Stable Status

Conditions to Avoid: Fire/Heating above specified range, short circuiting solvents, mechanical/electrical

abuse

Incompatibility (Materials to Avoid): Acids, Water, any material causing corrosion to cell can

Hazardous Decomposition of By-products: N/A Hazardous Polymerization: Will not occur

In case of leakages: Lithium metal will react with oxidizing agents, storage of damaged batteries not being hot or buring in sealed containers is recommended. Spilled material is to be vacuumed or swept clean and placed in a sealed box or similar. Prevent material from contaminating soil, sewers or waterways.

Section VI - Health Hazard Data

Routes of Entry Inhalation: N/A Skin: N/A Ingestion: N/A

Health Hazard (Acute and Chronic) / Toxicological information:

In case of leakage, contact with electrolyte can cause severe irritation and chemical burns. Inhalation of fumes or electrolyte vapours may cause irritation of the upper respiratory tract and lungs. Metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness and chest pain may occur. Inhalation of metal fumes may cause severe irritation of upper respiratory tract with coughing, burns, breathing difficulty and possible coma.

Section VII - First Aid Measures

First Aid Procedures (in case of leakages):

Eyes:

Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eye lids. See to medical aid.

Skin:

Remove contaminated clothes and rinse skin with plenty of water or shower immediately and continue for 15 minutes. See to medical aid.

Inhalation:

Remove from exposure and move to fresh air, oxygen if available. Seek medical attention if respiratory irritation develops. Ventilate the contaminated area. Do not use mouth-to-mouth resuscitation if victim has ingested or inhaled fumes or substances – give artficial respiration.

Ingestion:

Call for medical assistance.



Section VIII - Fire and Explosion Hazard Data

Flash Point (Method Used): N/A

Ignition Temp.: N/A Flammable Limits: N/A

LEL: N/A UEL: N/A

Extinguishing Media: Carbon Dioxide, Dry Chemical

Use of water may not extinguish fire but act as cooling agent. Anyhow, the use of water may generate Hydrogen gas and form an explosive atmosphere under certain conditions.

LITH-X (powdered graphite) or copper powder fire extinguishers, sand, dry ground dolomite or soda ash may also be used.

Special Fire Fighting Procedures: Self-contained breathing apparatus required Unusual Fire and Explosion Hazards: Cell may vent if exposed to excessive heat

Do not dispose of battery in fire – may explode. Do not short – circuit battery – may cause burns.

Hazardous combustion products: CO, CO₂, Li metal/Oxide fumes, Organic decomposed products, HF

Section IX - Accidental Release or Spillage

Steps to Be Taken in Case Material is Released or Spilled:

If the battery material is released, remove personnel from area until fumes dissipate. Provide maximum ventilation to clear out hazardous gases. Wipe it up with a cloth, and dispose of it in a plastic bag and put into a steel can. The preferred response is to leave the area and allow the battery to cool and vapors to dissipate while maximum ventilation is provided. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.

Batteries that are leaking should be handled with rubber gloves.

Avoid direct contact with electrolyte.

Wear protective clothing and a positive pressure Self – Contained Breathing Apparatus (SCBA).

Waste Disposal:

It is recommended to discharge the battery to the end, handing in the abandoned batteries to related department unified, dispose of the batteries in accordance with approved local, state, and federal requirements.

Section X - Handling and Storage

Safe handling and storage advice:

The battery must not be opened, destroyed or incinerated, since they may leak or rupture and release to the environment the ingredients that they contain in the hermetically sealed container.

Do not short circuit terminals, or over charge the battery, forced over-discharge, throw to fire. Do not crush or puncture the battery, or immerse in liquids.

Precautions to be taken in Handling and Storing

Avoid mechanical or electrical abuse. Storage preferably in cool, dry and ventilated area, which is subject to little temperature change. Storage at high temperatures should be avoided. Do not place the battery near heating equipment, nor expose to direct sunlight for long periods.

Other Precautions



The battery may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures.

Do not short or install with incorrect polarity.

Keep away from water and other possible liquids which may cause short-circuits.

Recommended storage conditions are:

Cool and dry conditions, well ventilated areas. Ideal storage temperature is 15 to 21 °C.

Section XI - Exposure Controls / Person Protection

Respiratory Protection (Specify Type): In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting cells. Respiratory protection is not necessary during normal (specified)

Ventilation: N/A during specified use Local Exhausts: N/A during spec. use.

Special: N/A

Mechanical (General): N/A

Special: N/A Other: N/A

Eye Protection: N/A

Protective Gloves: N/A during specified use Other Protective Clothing or Equipment: N/A

Work / Hygienic Practices: N/A

Section XII – Ecological Information

When properly used or disposed of the battery does not present an environmental hazard. When disposed avoid water, rain and snowy conditions for long-term storage.

Section XIII - Disposal Method

General: Dispose of batteries according to government regulations.

If batteries are still fully charged or only partially discharged, they can be considered a reactive hazardous waste because of significant amount of unconsumed Lithium remaining in the spent battery. The battery must be neutralized through an approved secondary treatment facility prior to disposal as a hazardous waste (or discharged appropriately). Recycling of battery can be done in authorized facility, by a licensed waste carrier.

Section XIV – Transportation Information

According to PACKING INSTRUCTION 968 ~ 970 of IATA DGR 54th (2013) Edition for transportation, or the special provision 188 of IMDG.

More information concerning shipping, testing, marking and packaging can be obtained from Label master at http://www.labelmaster.com, further http://iata.org/whatwedo/cargo/dgr/Pages/lithium-battery-change.aspx

Separate battery when shipping to prevent short-circuiting. They should be packed in strong packaging for support during transport. Take in a cargo of them without falling, dropping, and breakage. Prevent collapse of cargo piles and wet by rain.

Transport Fashion: By air, by sea.

Packaging Information: Packaging paper + Plastic tray.



Section XV - Regulatory Information

Risk Phrases:

R20/22	Harmful by inhalation and if swallowed (ruptured cases only)
R40	Limited evidence of a carcinogenic effect (ruptured cases only)
R43	May cause sensitization by skin contact (ruptured cases only)
R52/53	Harmful to aquatic organisms, may cuase long-term adverse effects
	in the aquatic environment (ruptured cases only)

Safety Phrases:

S16	Keep away from sources of ignition
S24	Avoid contact with eyes
S26	In case of contact with eyes, rinse immediately with plenaty of water and seek medical advice
S45	In case of accident or if you feel unwell, seel medical advice immediately
S60	This material and its container must be disposed of as hazardous waste
S61	Avoid release to the environment

Canada

Components of this product are listed on Canada's DSL / NDSL list

US Federal

Components of this product are listed on the TSCA Inventory

Section XVI - Other Information

The above information is based on the data of which we are aware and is believed to be correct as of the data hereof. Since this information may be applied under conditions beyond our control and with which may be unfamiliar and since data made available subsequent to the data hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

ACGIH American Conference of Governmental Industrial Hygienists

CAS Chemical Abstracts Service

DSL Domestic Substances List of Canada

IARC International Agency for Research on Cancer

IATA, IMDG, ADR, RID, LD50,

NDSL non-domestic Substances List of Canada

NIOSH US National Institute for Occupational Safety and Health

NTP, OSHA, RTECS, TDG and TSCA