MATERIAL SAFETY DATA SHEET (MSDS)

LiFePO$_4$ Battery Packs – tHENERGY by Oyster (Series Bat)

Brand / Trade Name	tHENERGY by Oyster
Product Type	Rechargeable Lithium Iron Phosphate Battery Packs (LiFePO$_4$)
Models Covered	Bat PRO 105 / Bat PRO 150 / Bat PRO 315
Dangerous Goods Class	Class 9
Storage Class (TRGS 510)	LGK 11
UN 38.3 Transport Test	Passed / positive completed for all listed models
MSDS Version / Issue Date	1.0 / 06.06.2025

1. Product and Company Identification

Product Name: Bat (listed models) – tHENERGY by Oyster
Synonyms: Lithium Iron Phosphate Battery

Manufacturer: ten Haaft GmbH
Address: Neureutstraße 9 · D-75210 Keltern
Phone: +49 (0) 7231 58588-0
E-mail: info@ten-haaft.de

Emergency telephone number: +49 (0) 7231 58588-0
Product type: Starting-Lighting-Ignition (SLI)-Batterie
Recommended Use: Energy storage / auxiliary power supply.
Not Recommended: Opening cells, crushing, puncturing, incineration, misuse outside specs.

2. Hazards Identification

Hazard Item	Summary
Classification of Danger (See section 14)	See section 14.
Invasion Route	Inhalation, skin contact, eye contact and ingestion.
Fire and explosion risk	May occur fire or explode under high temperature or short circuit conditions.
Mordant risk	No information available.
Health hazard	Batteries are not hazardous when used according to the instruction of manufacturer under normal conditions. In the case of abuse, rupture, fire, heat, swelling, leakage risk, and may result in unexpected losses. Abuse includes but not limited to the following cases: charged for long time, short-circuited, put into fire, hit with hard object, punctured with acute object, crushed, and broken.
Environmental hazards	No information available.

3. Composition / Information on Ingredients

Classification of the substance or mixture: substance mixture
Hazardous ingredients are contained within sealed cells and not available during normal use.

Chemical Composition	Chemical Formula	CAS No.	Weight (%)
Ferrous Phosphate Lithium	$LiFePO_4$	15365-14-7	22.4–24.8
Aluminum	Al	7429-90-5	2–10
PVDF	$(C_2H_2F_2)_n$	24937-79-9	0–5
Graphite	C	7782-42-5	20–30
Copper	Cu	7440-50-8	5–10
Polyethylene	$(C_2H_4)_n$	9002-88-4	5–10
Polypropylene	$(C_3H_6)_n$	9003-07-0	5–10
Lithium hexafluorophosphate	$LiPF_6$	21324-40-3	10–20
Nickel	Ni	7440-02-0	0.5–5
Poly(vinyl chloride)	$[C_2H_3Cl]_n$	9002-86-2	2.0

4. First Aid Measures

General: If exposed to contents of a damaged cell, seek medical attention.

- Inhalation: Remove victim to fresh area. Administer artificial respiration if breathing is difficult. Seek medical attention.
- Skin Contact: Remove contaminated clothing and shoes. Immediately wash with water and soap and rinse thoroughly. Wash clothing and shoes before reuse. If irritation occurs, get medical attention.
- Eye Contact: Flush with water for 15 minutes. Seek immediate medical attention.
  Ingestion: Rinse mouth. Do not induce vomiting. Get medical help immediately.
- After swallowing Do not induce vomiting. Get medical attention.

5. Fire Fighting Measures

- Extinguishing agent: Use extinguishing agent suitable for local conditions and the surrounding environment. Such as dry powder , CO2, cold water, sand, earth. Don't use warm or hot water. Don' t use Halon type extinguishing material.
- Special hazards: Special hazards arising from the substance or mixture: Battery may burst and release hazardous decomposition products when exposed to a fire situation. Lithium batteries contain flammable electrolyte that may vent, ignite and produce sparks when subjected to high temperature (>150°C (302°F)), when damaged or abused (e.g. mechanical damage or electrical overcharging); may burn rapidly with flare-burning effect; may ignite other batteries in clothes proximity.
- Hazardous Combustion Products: Carbon monoxide, carbon dioxide, lithium oxide fumes.
- Protective measures: Wear self-contained respirator. Wear fully protective impervious suit.

6. Accidental Release Measures

- Homework personnel protective measures, protective equipment and emergency disposal procedures: Wear protective equipment. Keep unprotected persons away. Ensure adequate ventilation.
- Environmental precautions: Do not allow material to be released to the environment without proper governmental permits.
- Steps to be taken in case material is spilled or released and Waste disposal method: Remove ignition sources, evacuate area. Sweep up using a method that does not generate dust. Collect as much of the spilled material as possible, placed the spilled material into a suitable disposal container. Keep spilled material out of sewers, ditches and bodies of water. All waste must refer to the United Nations, the national and local regulations for disposal.
- To prevent the secondary disasters prevention measures: See Section 7 for information on safe handling. See Section 8 for information on personal protection equipment. See Section 13 for disposal information.

7. Handling and Storage

- Precautions for safe handling: Do not handle the batteries in a manner that allows terminals to short circuit
- Information about fire and explosion protection: Batteries may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.
- Conditions for safe storage, including any incompatibilities: Requirements to be met by storerooms and receptacles. Store in a cool, dry, well-ventilated place. Keep away from heat, avoiding the long time of sunlight.
- Storage class: LGK 11 per TRGS 510 applies to all variants.

8. Exposure Controls / Personal Protection

- Respiratory Protection: In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting cell cores. Respiratory Protection is not necessary under conditions of normal use.
- Personal Protection is recommended for damaged battery: Respiratory Protection, Protective Gloves, Protective Clothing and safety glass with side shields.

9. Physical and Chemical Properties

Property	Value
Appearance	Black
Form	Approximate cuboid
Odour	Odorless
Chemistry	$LiFePO_4$
Cell Nominal Voltage	3.2 V

Model-specific Electrical Data:

Model	Nominal Voltage	Cell Voltage	Capacity	Watt-hour
Bat 105	12.8 V	3.2 V	105Ah	1344Wh
Bat 150	12.8 V	3.2 V	150Ah	1920Wh
Bat 315	12.8 V	3.2 V	315Ah	4032Wh

10. Stability and Reactivity

- Chemical stability: Stable under normal conditions.
- Incompatibilities: Oxidant, acid, alkali
- Conditions to Avoid: Heat above 70°C or incinerate. Deform. Mutilate. Crush. Disassemble. Overcharge. Short circuit. Expose over a long period to humid conditions.
- Possibility of hazardous reactions: Data not available.
- Hazardous Combustible Products: Carbon monoxide, carbon dioxide, lithium oxide fumes

11. Toxicological Information

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

12. Ecological Information

Intact packs: no release expected.
Damaged packs: electrolyte/lithium salts hazardous to water. Avoid environmental release.

13. Disposal Information

- Waste treatment methods and Recommendation: Consult state, local or national regulations to ensure proper disposal.
- Attention for waste treatment: Deserted batteries couldn't be treated as ordinary trash. Couldn't be thrown into fire or placed in high temperature. Couldn't be dissected, pierced, crushed or treated similarly. Best way is recycling.

14. Transport Information

UN Number	UN3480
shipping name	Lithium Batteries
Lables for package	Class 9
Marine pollutant	No
Transport information	The dangerous goods regulations require that each lithium battery design has successfully passed the tests specified in Section 38.3 of the UN Manual of Tests and Criteria before being offered for transport.
	The goods are in compliance with the requirements of Packing Instruction PI965, Section IA, of the IATA Dangerous Goods Regulations (DGR), 66th Edition (2025).
	According to the IMDG (42-24) or the Recommendations on the transport of dangerous goods-model Regulations 23rd. The package is subjected to dangerous goods.
Transport Fashion	By air, by sea, by railway, by road.
More information concerning shipping, testing, marking and packaging can be obtained from Label master at http://www.labelmaster.com. Separate Lithium-ion batteries 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.	

UN 38.3 Statement: All models listed in this MSDS have successfully passed UN Manual of Tests and Criteria, Part III, subsection 38.3. UN 38.3 Test Report Date: 06.06.2025

15. Regulatory Information

Recommendations on the transport of dangerous goods - UN Model Regulations Rev. 23
IATA dangerous goods regulations (IATA-DGR) 66th Edition 2025
International maritime dangerous goods code (42-24)
European Agreement concerning the International Carriage of Dangerous Goods by Road
Technical Instructions for the Safe Transport of Dangerous Goods
Classification and code of dangerous goods
Occupational Safety and Health Act (OSHA)
Toxic Substance Control Act (TSCA)
Consumer Product Safety Act (CPSA)
Federal Environmental Pollution Control Act (FEPCA)
The Oil Pollution Act (OPA)
BattG; TRGS 510 LGK 11; ADR/RID/IMDG/IATA.
REGULATION (EU) 2023/1542

16. Other Information

This MSDS is based on current knowledge and applies to the listed models as a series document.
It does not represent a guarantee of product characteristics.