INTRODUCTORY STATEMENTS

EU

These batteries are neither "substances" nor "preparations" in the sense of REACH Regulation (EC) 1907/2006, but are instead to be regarded as "products". The intentional release of substances during use is not foreseen. Consequently, there is no obligation to provide a safety data sheet conforming to Article 31 of the REACH Regulation.

USA

Preparation of safety data sheets (SDS) is a subrequirement of the Hazard Communication Standard 29 CFR, Section 1910.1200, of the Occupational Safety and Health Administration (OSHA). This standard does not apply to "articles". The OSHA standard defines an "article" as a manufactured item other than a fluid or particle:

1. which is formed to a specific shape or design during manufacture;
2. which has end use function(s) dependent in whole or in part upon its shape or design during end use; and
3. 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.

As all of our batteries are classified as "articles", they are exempted from the requirements of the Hazard Communication Standard.

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier: Lithium ion batteries, rechargeable

Trade name

No.	Lithium-Ion rechargeable battery Model designation	Nominal Voltage (V)	Rated Capacity (Ah)	Rated Energy (Wh)
1	M28BX	28 V	3.0 Ah	84 Wh
2	M28B5	28 V	5.0 Ah	140 Wh
3	C18B, M18B	18 V	1.5 Ah	27 Wh
4	M18B2	18 V	2.0 Ah	36 Wh
5	C18B, M18BX, MV18BX	18 V	3.0 Ah	54 Wh
6	M18HB3	18 V	3.0 Ah	54 Wh
7	M18B4	18 V	4.0 Ah	72 Wh
8	M18B5	18 V	5.0 Ah	90 Wh
9	M18HB5.5	18 V	5.5 Ah	99 Wh
10	M18B6	18 V	6.0 Ah	108 Wh
11	M18HB6	18 V	6.0 Ah	108 Wh

No.	Lithium-Ion rechargeable battery Model designation	Nominal Voltage (V)	Rated Capacity (Ah)	Rated Energy (Wh)
12	M18HB8	18 V	8.0 Ah	144 Wh
13	M18B9	18 V	9.0 Ah	162 Wh
14	M18HB12	18 V	12.0 Ah	216 Wh
15	C14B, M14B	14.4 V	1.5 Ah	22 Wh
16	C14BX, M14BX	14.4 V	3.0 Ah	44 Wh
17	C12B, M12B	12 V	1.5 Ah	18 Wh
18	M12B2	12 V	2.0 Ah	24 Wh
19	M12B3	12 V	3.0 Ah	36 Wh
20	C12BX, M12BX	12 V	3.0 Ah	36 Wh
21	M12B4	12 V	4.0 Ah	48 Wh
22	M12B6	12 V	6.0 Ah	72 Wh
23	M4B2	4 V	2.0 Ah	8 Wh
24	V4B	4 V	3.0 Ah	12 Wh
25	MXF CP203	72 V	3.0 Ah	216 Wh
26	MXF XC406	72 V	6.0 Ah	432 Wh
27	L4B2	4 V	2.5 Ah	10 Wh
28	L4B3	4 V	3.0 Ah	12 Wh
29	M18B5-CR	18 V	5.0 Ah	90 Wh
30	M12HB2.5	12 V	2.5 Ah	30 Wh
31	M12HB5	12 V	5.0 Ah	60 Wh
32	MXFXC608	72 V	8.0 Ah	576 Wh
33	MXFHD812	72 V	12.0 Ah	864 Wh
34	IR-PL250 (*)	3.7 V	0.7 Ah	2.6 Wh
35	IR-FL500 (*)	3.6 V	3.0 Ah	10.8 Wh
36	IR-HL450 (*)	3.7 V	0.7 Ah	2.6 Wh
37	M18FB6	18 V	6.0 Ah	108 Wh
38	M18FB8	18 V	8.0 Ah	144 Wh
39	M18FB12	18 V	12.0 Ah	216 Wh
40	IRPSUOP2500 (*)	102 V	24.5 Ah	2500 Wh
41	IRPSU3	12 V	3 Ah	36 Wh
42	IR-FFL(*)	3,8 V	3 Ah	11,4 Wh
43	IRPSUOP6000 (*)	102 V	58,8 Ah	6000 Wh

44	M18HB5	18 V	5 Ah	90 Wh
45	M18HB5-CR	18 V	5 Ah	90 Wh

* Product with integrated Lithium-Ion Cell.

1.2 Relevant identified use of the substance or mixture and uses advised against

Product category AC3 – Electrical batteries and accumulators

1.3 Details of the supplier of the safety data sheet

Techtronic Industries GmbH
Max-Eyth-Straße 10
71364 Winnenden, Germany
Phone: +49 7195 120
www.ttigroup.com

Person providing the information

Thomas Henkelmann
thomas.henkelmann@tti-emea.com

See Section 16

1.4 Emergency telephone number

24-hour service

Chemtrec International: +1 703-741-5970
Chemtrec United States only: 1-800-424-9300

2 HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Cells in lithium ion batteries are hermetically sealed and are harmless when used in compliance with the manufacturer's instructions for use and handling.

These devices are classified as products in accordance with REACH Article 3 (3) and are therefore not subject to the labelling requirements of hazardous substance legislation.

According to the CLP Regulation the product(s) is/are not classified as hazardous to health or the environment.

2.2 Label elements

According to EC Regulation No. 1272/2008, labelling of the product is not obligatory.

Hazard pictogram Not required

Signal word Not required

Hazard statements Not required

2.3 Other hazards

A pressure release vent opens in the event of improper use of the battery pack in combination with electrical load, fire or mechanical impact. If the product is damaged, the battery housing can rupture and allow the ingredients to be released.

Corrosive vapours can be released in the event of fire.

3 COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

Not applicable

3.2 Mixtures

Rechargeable lithium ion battery pack

Cathode: Li, Ni, Co & Mn oxides (active substances); phosphates
Polyvinyl difluoride/SBR (binder)
Carbon (conductive material), additives, aluminium foil

Anode: Carbon (active substance)
Silicone, polyvinyl difluoride/SBR (binder), additives, copper foil

Electrolyte: Organic solvent (non-aqueous liquid), lithium salt, additives

Chemical name	CAS no.	EC / List no.	Concentration [%]
Aluminium	7429-90-5	231-072-3	0.1 – 10
Biphenyl	92-52-4	202-163-5	0.1 – 0.3
Copper	7440-50-8	231-159-6	0.1 – 10
Chemical name	**CAS no.**	**EC / List no.**	**Concentration**
Linear and cyclic carbonate solutions	n/a	n/a	0 – 17
Carbon	7440-44-0	231-153-3	10 – 30
Metal oxide or other electrolyte (proprietary)	secret	secret	10 – 50
Lithium hexafluorophosphate (1-)	21324-40-3	244-334-7	0 – 5
Polyvinyl difluoride	24937-79-9	607-458-6	0.1 – 5
Styrene-butadiene rubber (SBR)	n/a	n/a	< 5
Aluminium, steel, nickel, and other inert materials	n/a	n/a	Rest

Contact with the ingredients is not possible under normal operating conditions.

4. FIRST AID MEASURES

4.1 Description of first aid measures

The lithium ion batteries contain an organic electrolyte. The following measures must be taken if the electrolyte has emerged and come in contact the skin and/or eyes:

Skin or eye contact with emerging substances (electrolyte)
In case of skin or eye contact, rinse the affected areas thoroughly with water for at least 15 minutes. In case of eye contact, always contact a doctor in addition to thorough rinsing.

Burns
Suitable treatment is necessary in the event of burns. It is strongly recommended to contact a doctor.

Respiratory tract
In case of intense smoke formation or release of gas, leave the room immediately. In case of relatively large amounts and irritation of the respiratory tract, seek medical attention. Provide adequate ventilation as much as possible.

Swallowing
Rinse mouth and surrounding areas with water. Seek medical attention immediately.

4.2 Essential acute and delayed symptoms and effects

No further relevant information available

4.3 Advice on immediate first aid treatment or special treatment

No further relevant information available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Always use water spray to fight fires with lithium ion batteries. No special extinguishing media are required. Conventional extinguishing media should be used to fight fires in the vicinity of the batteries. Battery fire cannot be considered separately from surrounding fire.

The cooling effect of water hampers propagation of the fire to battery cells which have not yet reached the critical temperature for ignition ("thermal runaway").

Reduce the fire burden by singling out large quantities and removing them from the hazard area.

5.2 Special hazards arising from the substance or mixture

In the event of a fire, gases can be formed which are harmful to health when inhaled.

5.3 Advice for firefighters

Ensure adequate respiratory protection. Use self-contained respiratory equipment.

Observe local regulations and ensure adequate ventilation.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment appropriate to the situation (protective gloves, protective clothing, face protection, respiratory protection).

Wear protective gloves to prevent direct skin contact. Rinse with copious amounts of water.

6.2 Environmental precautions

Avoid seepage into the sewer system and/or soil.

6.3 Methods and materials for containment and cleaning up

Electrolyte can emerge if the battery housing is damaged. Place batteries in an air-tight plastic bag and add dry sand, lime powder ($CaCO_3$) or vermiculite. Electrolyte traces can be soaked up with dry paper towels.

6.4 Reference to other sections

See Section 7 for more information on safe handling.

See Section 8 for more information on personal protective equipment.

See Section 13 for more information on disposal.

7. HANDLING AND STORAGE

7.1 Reference to other sections

Handle discharged batteries carefully
Discharged batteries are also a hazard source because they can still deliver very high short-circuit currents. Even when lithium ion batteries appear to be discharged, they must be handled just as carefully as when they are not discharged.

Avoid exposure to physical effects and/or blows
Blows and penetration of objects can damage the battery. That can lead to leaks, overheating, smoke formation, ignition or explosion of the battery.

Keep batteries away from other metallic objects
Including paper clips, coins, keys, screws, and other metallic objects which could cause shorting of the battery terminals. A short-circuit between the battery terminals can cause burns or fire.

Liquid can emerge from the battery if it is used improperly
Avoid contact with leaky batteries. In case of accidental contact, rinse with water. If the liquid comes in contact with the eyes, also seek medical attention. Emerging liquid can lead to skin irritation or burns.

Do not expose batteries to fire or high temperatures
If the batteries are thrown into a fire or exposed to temperatures above 85°C, the heat can lead to an explosion and/or fire and cause personal injuries. Do not incinerate batteries except in a waste incinerator approved for that purpose.

Do not dismantle batteries
Dismantling or altering the battery can degrade the protective measures. That can lead to overheating, smoke formation, ignition or explosion of the battery.

Do not immerse batteries in liquids, such as water or beverages
Contact with liquids can damage the battery. That can lead to overheating, smoke formation, ignition or explosion of the battery.

Recharge batteries only in battery chargers recommended by the manufacturer
There is a risk of fire if a charger is used with batteries other than those for which it is intended.

Use batteries only in the electrical tools and garden implements for which they are intended
Using other electrical tools or garden implements can lead to injuries or fire.

Do not use batteries which are damaged or in abnormal condition
Damaged batteries and batteries in abnormal condition can have unforeseeable properties which can lead to fire, explosion or personal injuries.

Do not use defective batteries
Stop using the battery immediately if it shows signs of abnormal properties, such as odour, heat, discolouration or deformation. Continued use of a defective battery can lead to overheating, smoke formation, ignition or explosion.

7.2 Conditions for safe charging with respect to incompatibilities

Always carefully observe the warning notices on the batteries and in the use instructions. Using only recommended battery types.

Lithium batteries should preferably be stored in a dry place at room temperature (max. 50°C). Large temperature variations should be avoided (do not store close to heaters, avoid long-term exposure to direct sunlight, etc.).

Consult local authorities and/or insurance companies with regard to the storage of relatively large quantities of lithium batteries.

7.3 Specific end uses

No further relevant information available

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Lithium ion batteries are products which do not release any substances under normal and reasonably foreseeable conditions of use. Exposure control and personal protective equipment are therefore not normally required.

8.2 Exposure controls

If substances are released from the battery cells, the following instructions for accident prevention when handling chemicals must be observed.

Personal protective equipment


Protective gloves with CE mark conforming to category III of EN 374.


Closed safety glasses or goggles


Protective clothing

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

General information

Form	Compact batteries with (plastic) enclosure and electrical terminals
Colour	Black
Odour	Odourless
Odour threshold	Not applicable
pH	Not applicable
Melting point / freezing point	Not applicable
Boiling point	Not applicable
Flash point	Not applicable
Flammability (solid, gas)	Not determined
Ignition temperature	Not determined
Decomposition temperature	Not determined
Spontaneous flammability	Not spontaneously flammable
Explosion hazard	No explosion hazard in normal and reasonably foreseeable use
Explosive limits (lower, upper)	Not determined
Vapour pressure	Not applicable
Density	Not determined
Solubility / miscibility in water	Insoluble
Partition coefficient	Not applicable
Viscosity	Not applicable
Solvent content	0.0%

9.2 Other information

No further relevant information available

10. STABILITY AND REACTIVITY

10.1 Reactivity

10.2 Chemical stability

No decomposition when used as intended

10.3 Possibility of hazardous reactions

No hazardous reactions known

10.4 Conditions to avoid

If the upper temperature limit (e.g. 130°C) is exceeded, there is a risk that the batteries may burst or that the pressure relief vent may open.

Storage temperatures above 60°C can lead to accelerated ageing and premature loss of functionality.

10.5 Incompatible materials

Strong oxidants, strong acids, electrically conductive materials

10.6 Hazardous decomposition products

Vapours harmful to health are released in the event of fire.

11. TOXOLOGICAL INFORMATION

11.1 Information about toxicological effects

Lithium batteries are products which do not release any substances under normal and reasonably foreseeable conditions of use. Organic electrolyte and other ingredients may be released if the product is damaged. Primary irritative effect:

On the skin

Irritating to the skin and mucous membranes.

On the eyes

Irritating

Additional toxicological information

According to the calculation procedure of the latest EC version of the General Classification Guideline, the product is not subject to labelling requirements.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No further relevant information available

12.2 Persistence and degradability

No further relevant information available

12.3 Bioaccumulative potential

No further relevant information available

12.4 Mobility in soil

No further relevant information available

12.5 Results of PBT and vPvB assessment

PBT: Not applicable

vPvB: Not applicable

12.6 Other adverse effects

General considerations

No adverse effects on the environment are to be expected under normal and reasonably foreseeable conditions of use. The batteries do not contain any heavy metals (lead, cadmium, mercury, etc.).

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Dispose of the battery pack in accordance with national regulations.

In the EU, used batteries may not be disposed of as household waste and may not be mixed with batteries of different types, in order to avoid difficulties with recycling and hazards to people and the environment.

Used batteries must be taken back (at no charge) by the sales point or handed in to a disposal facility (industrial or commercial).

In accordance with the European directive for batteries, lithium batteries are marked with the "symbol for sorted collection" (a waste bin with a strike-through line) as shown in the figure.



To prevent short circuits and resulting heat generation, lithium batteries may never be stored or transported unprotected in loose bulk. Suitable measures to prevent short circuits include:

- Placing the battery in the original package, in the original device or in a plastic bag
- Taping over the terminals
- Embedding in dry sand

European Waste Catalogue

16 06 05	Other batteries and accumulators
20 01 34	Batteries and accumulators other than those falling under 20 01 33

14. TRANSPORT INFORMATION

Commercial transport of lithium ion batteries is subject to the provisions of hazardous goods legislation. Transport preparation and transportation may only be performed by suitably trained persons and/or the process must be supervised by suitable experts or qualified firms.

Transport regulations

Lithium batteries are subject to the following hazardous goods regulations and related exceptions, in all cases in the latest applicable version:

14.1 UN numbers

UN 3480 / UN 3481

14.2 UN proper shipping name

UN 3480: LITHIUM ION BATTERIES
UN 3481: LITHIUM ION BATTERIES IN EQUIPMENT
(i.e. installed in the battery-operated device) or
LITHIUM ION BATTERIES PACKAGED WITH EQUIPMENT

(i.e. packaged together with the battery-operated device)

14.3 Transport hazard class(es)

Class 9

14.4 Packing group

ADR, RID
Special provision (≤ 100 Wh): 188, 230, 376, 377, 636b
Special provision (> 100 Wh): 230, 376, 377, 636b
Packing instructions: P903, P908, P909
Tunnel category E

IMDG code
Special provision (≤ 100 Wh): 188, 230b, 376, 377
Special provision (> 100 Wh): 230b, 376, 377
Packing instructions: P903, P908, P909
EmS: F-A, S-I
Stowage category A

ICAO, IATA-DGR
Special provision: A88, A99, A154, A164, A183
Packing instructions (≤ 100 Wh): 965 IB, 965 II, 966 II, 967 II
Packing instructions (> 100 Wh): 965 IA, 966 I, 967 I

14.5 Environmental hazards

None

14.6 Special precautions for user

None

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

All transport modes
Defective or damaged batteries are subject to more stringent regulations extending as far as a complete transport prohibition. A general transport prohibition applies to air transport (IATA Special Provision A154).

However, it must be pointed out that used but undamaged batteries are also subject to relevant special regulations. Air transport of waste batteries and batteries shipped to recycling or disposal facilities is prohibited (IATA Special Provision A183). Exceptions require the prior consent of the competent national authorities of the country of origin and the country of the aviation company.

14.8 State of Charge (SOC)

Max.30%

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations / legislation specific for the substance or mixture

National regulations

- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

- Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

- Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE)
- Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC

Classification according to the German Plant Safety Ordinance (BetrSichV)

None

Other regulations, restrictions or prohibitory ordinance

None

Substances of very high concern (SVHC) according to REACH Article 57

None

15.2 Substance safety assessment

None

Transport regulations according to IATA, ADR, IMDG, RID. See also Section 14.

16. OTHER INFORMATION

The information in this document is intended to provide assistance for compliance with statutory regulations but does not replace them. It is based on the current state of our knowledge.

The information in this document has been compiled to the best of our knowledge and ability.

It does not constitute a warranty of properties. Distributors and users of the product are directly responsible for determining and complying with applicable legislation and regulations.

Issued by

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Abbreviations and acronyms

RID	Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO	International Civil Aviation Organisation
ADR	Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG	International Maritime Code for Dangerous Goods
IATA	International Air Transport Association
CLP	Classification, labelling and packaging of substances and mixtures
CAS	Chemical Abstracts Service (division of the American Chemical Society)