Safety Data Sheet

Lithium-Ion Battery Packs

INTRODUCTORY STATEMENTS

EU
Li-Ion 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 sub requirement 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.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Lithium Ion Batteries, rechargeable

Trade Name: **FLEX**

No	Model Designation	Nominal Voltage	Rated Capacity	Rated Energy
1	AP 10.8/2.5	10.8 V	2.5 Ah	27 Wh
2	AP 10.8/4.0	10.8 V	4.0 Ah	43.2 Wh
3	AP 10.8/6.0	10.8 V	6.0 Ah	64.8 Wh
4	AP 12/2.5	12 V	2.5 Ah	30 Wh
5	AP 12/5.0	12 V	5.0 Ah	60 Wh
6	AP 18.0/2.5	18 V	2.5 Ah	45 Wh
7	AP 18.0/5.0	18 V	5.0 Ah	90 Wh
8	AP 18.0/8.0	18 V	8.0 Ah	144 Wh
9	ADM 30 smart (internal battery)	3.7 V	0.2 Ah	0.74 Wh
10	SD 5-300 4.0 (internal battery)	3.7 V	2.0 Ah	7.4 Wh
11	DWL 2500 10.8/18.0 (internal battery) DWL 2500 12/18 (internal battery)	3.7 V	2.0 Ah	7.4 Wh
12	ALC 2/1-G (internal battery)	3.7 V	1.2 Ah	4.4 Wh
13	ALC 3/1-G (internal battery)	3.7 V	2.0 Ah	7.4 Wh

Details of the Manufacturer / Supplier

Company Name:	FLEX Elektrowerkzeuge GmbH
Street:	Bahnhofstr. 15
Place:	D-71711 Steinheim an der Murr
Telephone:	+49 7144 8280
E-mail:	info@flex-tools.com
Internet:	www.flex-tools.com
E-mail (for the safety data sheet):	productcompliance@flex-tools.com

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Cells in lithium-ion batteries are gas-tight and harmless, provided the manufacturer's instructions are followed when using and handling them.

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.

SECTION 3: Composition/information on ingredients

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

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

SECTION 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. Most important symptoms and effects, both acute and delayed

NWO Further relevant information available

4.3. Indication of any immediate medical attention and special treatment needed

No further relevant information available

SECTION 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.

SECTION 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 material 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

Safe handling: see section 7
Personal protection equipment: see section 8
Disposal: see section 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Handling and occupational safety

Handle discharged batteries carefully
Batteries are still a source of danger because they can cause a very high short-circuit current. Even if lithium-ion batteries appear to be in a discharged state, they - like other batteries - never discharge completely.

Avoid physical impacts
Impacts and the penetration of objects can damage the battery. This can lead to leaks, heat generation, smoke, ignition or explosion of the battery.

Keep batteries away from other metal objects
such as paper clips, coins, keys, screws or other small metal objects that could cause a bridge between the connection contacts. A short circuit between the battery contacts can result in burns or fire.

If used incorrectly, liquid can leak from the battery
Avoid contact with it. In case of accidental contact, rinse with water. If the liquid gets into your eyes, seek medical attention as well. Leaking battery fluid can cause skin irritation or burns.

Do not expose batteries to fire or high temperatures
Fire or temperatures above 130 °C can cause explosions.

Do not disassemble the battery
Disassembling or modifying the battery can damage the protective measures. This can lead to the battery developing heat, smoke, igniting or exploding.

Do not immerse the battery in liquids such as water or drinks
Contact with liquids can damage the battery. This can lead to the battery developing heat, smoke, igniting or exploding.

Only charge batteries in chargers recommended by the manufacturer

A charger designed for one type of battery may cause fire if used with other batteries.

Use batteries only with tools designed for this purpose

Using any other tool may cause injury or fire.

Do not use damaged or modified batteries

Damaged or modified batteries may exhibit unpredictable properties that may result in fire, explosion or injury.

Do not use faulty batteries

Use of a battery must be stopped immediately if it exhibits abnormal properties such as odor, heat, discoloration or deformation. If continued use occurs, the battery may generate heat and smoke, ignite or explode.

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.).

7.3 Specific end uses

No further relevant information available

SECTION 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

SECTION 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

9.2. Other information

No further relevant information available

SECTION 10: Stability and Reactivity

10.1. Reactivity

No dangerous reactivity under regular conditions.

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

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in GB CLP Regulation

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.

SECTION 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
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.).

SECTION 13: Disposal considerations

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

SECTION 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

Environmental hazards
None

14.5 Special precautions for user
None

14.6 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.

SECTION 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.

SECTION 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.