

Article Safety Data Sheet

Battery Pack for Type 9170B

Revision: 30.06.2022

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1. Product identification**1.1. Product identifier**

Product name: Lithium-ion Polymer Battery Pack
 Product code: 55189660
 Nominal Voltage: 3.7 V
 Chemical System: Lithium - Graphite - Cobalt oxide

1.2. Details of the supplier of the article data sheet

Name: Kistler Instrumente AG
 Address: Eulachstrasse 22
 District and Country: 8408 Winterthur, Switzerland

 Contact: +41 52 224 11 11
 info@kistler.com, www.kistler.com

1.3. Emergency telephone

National 24h phone number: 145
 Swiss Tox Center: +41 44 251 51 51 (from abroad)

2. Hazardous ingredients**2.1. Classification of the substance or mixture**

IMPORTANT NOTE: The battery should not be opened or exposed to heat because exposure of the following ingredients contained within could be harmful under some circumstances.

Chemical Name	CAS-No.	Content % of total weight
LiCoO ₂	12190-79-3	29.36 – 35.88
Carbon black	1333-86-4	15.26 – 18.66
Aluminium	7429-90-5	13.14 – 16.06
Copper	7440-50-8	7.08 – 8.66
Ethylene carbonate	96-49-1	4.55 – 5.57
Nylon		3.47 – 4.24
Ethyl methyl carbonate	623-53-0	3.45 – 4.21

Battery-Pack-for-9170B_003-0609e-07.22

Chemical Name	CAS-No.	Content % of total weight
Diethyl carbonate	105-58-8	3.36 – 4.10
Polyethylene	9002-88-4	3.26 – 3.98
Polypropylene	9003-07-0	2.40 – 2.94
Poly(vinyliden difluoride)	24937-79-9	2.11 – 2.57
Lithium hexafluorophosphate	21324-40-3	1.64 – 2.00
Nickel	7440-02-0	0.54 – 0.66
Polyester		0.13 – 0.15
Polyimide		0.09 – 0.11
Activated carbon	7440-44-0	0.08 – 0.10
Acrylic		0.05 – 0.07
Oxalic acid	144-62-7	0.04 – 0.06

Based on the definition of the term 'article' in the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR Subpart 1910.1200, there is no requirement for a Material Safety Data Sheet (MSDS) for Lithium Ion Polymer Batteries. Notification is not required because these products are articles that do not release a covered toxic chemical under the normal conditions of processing or use.

3. Possible Hazards

Cells or Batteries may explode when placed in a fire, when exposed to excessive heat, when opened or during inappropriate use; which could release hydrogen fluoride gas and smoke.
Use only suitable extinguishing media.

The chemicals mentioned in Section 2 are contained in a sealed can. A risk of exposure occurs only if the battery is mechanically or electrically abused (see Safety precautions in Section 7).

The most likely risk is acute exposure when a cell vents or opened, which can cause irritation when inhaled.

Carcinogenicity – NTP: NO

Carcinogenicity – IARC: NO

Carcinogenicity – OSHA: NO

Contact with electrolyte with skin and eyes should be avoided.

3.1. Risk and Safety sentences

Nature of special risks:

- R14 Reacts with water
- R21 Harmful in contact with skin
- R22 Harmful if swallowed
- R41 Risk of serious damage to the eye
- R42/43 May cause sensitization by inhalation and skin contact
- R43 May cause sensitization by skin contact

Safety advices:

- S2 Keep out of reach from children
- S8 Keep away from moisture

Battery-Pack-for-9170B_003-0609e-07.22

S22 Do not breathe dust
S24 Avoid contact with skin
S26 In case of contact with eyes, rinse immediately with plenty of water and get medical advice / attention
S36 Wear suitable protective clothing
S37 Wear suitable gloves

3.2. EU-GHS Classification

Hazard statements:	H302 Harmful if swallowed H312 Harmful in contact with skin H315 Causes skin irritation H318 Causes serious eye damage H332 Harmful if inhaled
Precautionary statements:	P102 Keep out of reach of children P223 Keep away from any possible contact with water, because of violent reaction and possible flash fire P232 Protect from moisture P260 Do not breathe dust/fume/gas/mist/vapors/spray P262 Do not get in eyes, on skin, or on clothing P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing P280 Wear protective gloves/protective clothing/eye protection/face protection

4. First aid measures

4.1. Description of first aid measures

None unless internal material exposure.

Explanation Carcinogenicity:	Not relevant.
Inhalation:	Do not inhale leaked material. Provide fresh air immediately. If irritation persists, get medical help.
Skin contact:	Skin contact with contents of an opened battery can cause irritation. Wash immediately with soap and water. Remove contaminated clothing. If irritation persists, get medical help.
Eye contact:	Contents of an opened battery can cause severe irritation. Immediately flush thoroughly with copious amounts of water for at least 15 minutes. Seek medical attention.
Ingestion:	Call medical practitioner immediately.

Battery-Pack-for-9170B_003-0609e-07.22

5. Firefighting measures

5.1. Fire and explosion hazard

The battery can leak and/or spout vaporized or decomposed and combustible electrolyte fumes in case of exposure above 70°C resulting from inappropriate use or the environment.

Cells or batteries may flame or leak potentially hazardous organic vapors if exposed to excessive heat or fire.

Fire, excessive heat, or over voltage conditions may produce hazardous decomposition products.

Damaged or opened cells or batteries can result in rapid heating and the release of flammable vapors.

Vapors may be heavier than air and may travel along the ground or be moved by ventilation to an ignition source and flash back fire, excessive heat, or over voltage conditions may produce hazardous decomposition products.

During water application, caution is advised as burning pieces of flammable particles may be ejected from the fire.

5.2. Extinguishing media

Suitable extinguishing media: CO₂, dry chemical or foam extinguishers.

Not to be used: Type D extinguishers.

5.3. Special hazards arising from the substance or mixture

Hazards caused by exposure in the event of fire:

None specified by manufacturer. Do not breathe combustion products.

5.4. Advice for firefighters

General information: As with any fire, wear self-contained breathing apparatus to avoid inhalation of hazardous decomposition products.

Special protective equipment: Wear NIOSH approved SCBA & full protective equipment.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Spontaneous fire and/or explosion can occur when material is released or spilled. Only use appropriate fire extinction equipment.

Steps to be taken in case material is released or spilled:

Wear appropriate personal protective equipment.

Isolate hazard area.

Keep unnecessary and unprotected personnel from entering.

6.2. Methods and material for containment and cleaning up

Carefully recover spillages with appropriate ladle and/or clothe and transfer to a suitably labelled, sealable container for safe disposal. Wash the spillage area, neutralize with calcium hydroxide. Wear suitable personal protection during removal of spillages.

7. Handling and storage

When used correctly, Lithium-ion polymer battery pack (rechargeable single cell battery) provides a safe and dependable source of power. However, if they are misused or abused, leakage, venting, or in extreme cases explosion and/or fire may result.

7.1. Precautions for safe handling

Do not insert batteries in reverse. Observe the polarity markings on battery and equipment. Do not short-circuit batteries. Do not overcharge batteries. Do not force discharge batteries. Do not mix batteries. Do not overheat batteries by exposure to high temperatures and direct sunlight. Do not weld or solder directly to batteries. Do not dismantle batteries. Do not deform batteries. Do not dispose of batteries in fire. A battery with a damaged pouch should not be exposed to water. Do not allow children to replace batteries without adult supervision. Keep batteries out of the reach of children. In case of ingestion of a cell or battery, the person involved should seek medical assistance promptly. Equipment intended for use by children should have battery compartments which are tamper-proof. Do not encapsulate and/or modify batteries. Exhausted batteries should be immediately removed from equipment and disposed of (see section 13). When discarding batteries with solder tags, insulate the tags by wrapping them with tape, foil, etc.

7.2. Conditions for safe storage, including any incompatibilities

Store unused batteries in their original packaging and keep them away from metal objects which may short-circuit them. Storing unpackaged cells together could result in cell shorting and heat build-up. Store and display batteries in their original packaging in well ventilated, dry and cool conditions. Avoid storing or display batteries in direct sun or in places where they get exposed to rain. The normal storage of lithium-ion polymer battery pack is made at temperature between +10°C and +25°C, never exceeding +30°C. In this way the maximum shelf-life (i.e. max. retention of cell performances after storage periods) of lithium-ion polymer battery pack is achieved. Storage temperatures above room temperature will increase the rate of self-discharge, reducing the available capacity of the cell. Humidity above 95% R.H. and below 40% R.H. should also be avoided for sustained periods, as these extremes are detrimental to batteries. Storing the cells at low temperature is also suggested, but attention must be paid when transferring the cells to warmer environments, because of the possibility of having water condensing on to the cells (risk of short-circuits). Do not stack battery cartons on top of each other exceeding a specified height. The height is clearly dependent on the strength of the packaging. As for general rule this height should not exceed 1.5m for cardboard packages or 3m for wooden cases. The above recommendations are equally valid for storage conditions during prolonged transit. Thus, batteries should be stored away from ship engines and not left for long periods in unventilated metal box cars (containers) during summer.

8. Exposure controls/personal protection

8.1. Exposure controls

Engineering controls

Ventilation: Not necessary under conditions of normal use (see section 6)

Personal protection

When choosing personal protective equipment, ask your chemical substance supplier for advice.
Personal protective equipment must be CE marked, showing that it complies with applicable standards.

Provide an emergency shower with face and eye wash station.

Hand protection:	Not necessary under conditions of normal use (see section 6)
Eye protection:	Not necessary under conditions of normal use (see section 6)
Skin protection:	Waterproof clothing. Choose a type of physical protection according to the amount and concentration of hazardous substances at the workplace.
Respiratory protection:	Not necessary under conditions of normal use (see section 6)
Other protective clothing or equipment:	Not necessary under conditions of normal use (see section 6)

9. Physical and chemical properties

The chemicals mentioned in Section 2 are contained in a sealed pouch. Under conditions of normal use, the chemicals will not be released.

10. Stability and reactivity

10.1. Reactivity

Lithium-ion polymer battery pack (rechargeable single cell battery) are stable, no chemical release under conditions of normal use.

10.2. Chemical stability

Lithium-ion polymer battery pack (rechargeable single cell battery) are stable, no chemical release under conditions of normal use.

10.3. Possibility of hazardous reactions

Lithium-ion polymer battery pack (rechargeable single cell battery) are stable, no chemical release under conditions of normal use.

10.4. Conditions to avoid

See Sections 7 and 8.

11. Toxicological Information

In case electrolyte is spilled and exposed to air, HF could be released. May include hydrogen fluoride and carbon oxides gas. May cause skin and eye irritation when contacted.

12. Ecological information

The chemicals mentioned in Section 2 are contained in a sealed pouch. Under conditions of normal use, the chemicals will not be released. It does not pose a physical or health risk to users. See section 13 for disposal.

13. Disposal considerations

13.1. Waste treatment methods

Be sure to comply with your federal, state and local regulation disposal of used batteries. Dispose in accordance with appropriate national and international regulations, below some references:

European Community: According to Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE), Annex II, batteries have to be removed from any separately collected WEEE. The removed batteries have to be treated according to the Battery directive 2006/66/EC

US: Lithium batteries are neither specifically listed nor exempted from the Federal Environmental Protection Agency (US EPA) hazardous waste regulations. The only material of possible concern due to its reactivity is lithium metal.

Use a professional disposal firm for disposal of mass quantities of undischarged lithium batteries.

Open cells should be treated as hazardous waste.

DO NOT INCINERATE or subject battery cells to temperatures in excess of 100°C. Such treatment can cause cell rupture.

14. Transport information

Lithium Ion Batteries are classified as Dangerous goods under Class 9 per the United Nations. This battery pack is in compliance of the United Nation Transport Recommendations and meets all the requirements of UN Manual of Test and Criteria (IATA DGR 3.9.2.6).

For transporting the battery pack, depending on the shipping method used, the dangerous goods regulations and/or rules are fulfilled and must be followed in case of further transportation.

The battery pack is packed and shipped under compliance of IEC 60086-1. Our original packaging is adequate to avoid mechanical damages during the transport, handling and stacking. The materials used prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of moisture, shock and vibration are kept to a minimum.

For the transport, handling and storage the boxes must be handled with care – cartons should not be thrown off trucks, slammed into position or piled so high as to overload battery containers below. Protection from inclement weather should be provided – See Section 7.

14.1. UN number

ADR/RID:	UN 3480
IMDG:	UN 3480
IATA:	UN 3480

14.2. UN proper shipping name

ADR/RID:	Lithium Ion Batteries (including lithium polymer batteries)
IMDG:	Lithium Ion Batteries (including lithium polymer batteries)
IATA:	Lithium Ion Batteries (including lithium polymer batteries)

14.3. Transport hazard class(es)

ADR:	9
IMDG:	9
IATA:	9

14.4. Special precautions for user

ADR/RID:	
Special provision:	188

IMDG:	
Special provision:	188

IATA (Cargo):	
Packaging instructions:	965, Section IB Applies for shipments with 1 or more packages. Each carton do not have to exceed more than 10 kg total net weight. (No limitation in the number of packaging per shipment) Shipper's Declaration (DGD) is required.

IATA (Passenger):	Forbidden for transport aboard passenger aircraft
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USA (DOT/HMR):	
Parts:	170-180

Summary of Transport Packing Instructions and Special Provisions of above mentioned Technical Guidelines:

1. This lithium ion polymer battery pack is fully and successfully tested to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3 – (IATA DGR 3.9.2.6).
2. The battery pack is safe for transport when build-in equipment¹ (IATA - PI 967) or packed with equipment² (IATA - PI 966) shipped under UN 3481. Proper shipper name vary, see below:

UN No.	IATA DGR - Proper Shipper Name IATA	DGR - Packaging Instruction
1 UN3481	Lithium ion batteries contained in equipment	967
2 UN3481	Lithium ion batteries packed with equipment	966

Important: assembly of the cells and batteries is the responsibility of the customer and may make new safety tests related to devices necessary.

The UN38.3 Test report can be requested.

3. Packing, marking, labelling and weight limitations must be observed as per technical guidelines of the respective transport mode.

4. We hereby declare, that the state of charge (SoC) of the battery pack does not exceed a Rate of 30%.

Note I:	Example of Lithium ion polymer Battery Mark, see Annex I Example of Cargo Aircraft Only Label, see Annex II Example of Dangerous Goods Class 9 Label, see Annex III
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Battery-Pack-for-9170B_003-0609e-07.22

15. Regulatory information

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

US: This MSDS meets/exceeds OSHA requirements

International: this MSDS conforms to European Union (UN), the International Standards Organisation (ISO) and the International Labor Organization (ILO) and as documental in ANSI (American National Standards Institute) Standard Z400.1-1993.

Dangerous Good Regulations:

Air: ICAO TI 2021-2022 related to: IATA Dangerous Goods Regulations 2022 (63rd Edition)

Road and Rail Europe: ADR / RID 2021

Marine: IMDG Code, 2020 Edition (Amdt. 40-20) comes into force on 01-Jun-2022 and may be applied voluntarily as from 01-Jan-2021

USA: DOT/ HMR; 49 C.F.R.

16. Other information

Compliance: In accordance with the RoHS Directive 2002/95/EC, and its amendment directives

Test Method: With reference to IEC 62321, Ed.1 111/54/CDV

Procedures for the Determination of Levels of Regulated Substances in Electrotechnical Products.

(1) Determination of Cadmium by ICP-AES.

(2) Determination of Lead by ICP-AES

(3) Determination of Mercury by ICP-AES

(4) Determination of Hexavalent Chromium for non-metallic samples by UVA/vis Spectrometry

(5) Determination of PBB and PBDE by GC'MS

Test Item(s)	Method	Result	MDL
Cadmium (Cd)	(1)	n.d.	2
Lead (Pb)		n.d.	2
Mercury (Hg)	(3)	n.d.	2
Hexavalent Chromium CR(VI) by alkaline extraction	(4)	n.d.	2

Battery-Pack-for-9170B_003-0609e-07.22

Test Item(s)	Method	Result	MDL
Sum of PBBs Monobromobiphenyl Dibromobiphenyl	(5)	n.d. n.d. n.d.	5 5
Tribromobiphenyl Tetrabromobiphenyl		n.d. n.d.	5 5
Pentabromobiphenyl Hexabromobiphenyl		n.d. n.d.	5 5
Heptabromobiphenyl		n.d.	5
Octabromobiphenyl Nonabromobiphenyl		n.d. n.d.	5 5
Decabromobiphenyl Sum of PBDEs (Mono to Nona) (Note 4)		n.d. n.d.	5 -
Monobromobiphenyl ether Dibromobiphenyl ether		n.d. n.d.	5 5
Tribromobiphenyl ether		n.d.	5
Tetrabromobiphenyl ether Pentabromobiphenyl ether		n.d. n.d.	5 5
Hexabromobiphenyl ether Heptabromobiphenyl ether		n.d. n.d.	5 5
Octabromobiphenyl ether		n.d.	5
Nonabromobiphenyl ether Decabromobiphenyl ether		n.d. n.d.	5 5
Sum of PBDEs (Mono to Deca)		n.d.	5

Legend

ADR	European Agreement concerning the carriage of Dangerous goods by Road
CAS-no.	Chemical Abstracts Service
CLP	EC Regulation 1272/2008
GHS	Globally Harmonized System of classification and labeling of chemicals
IATA	International Air Transport Association Dangerous Goods Regulation
IMDG	International Maritime Code for dangerous goods
REACH	EC Regulation 1907/2006
RID	Regulation concerning the international transport of dangerous goods by train

The batteries are exempt articles and are not subject to hazard Communication Standard Requirement. This sheet is provided as technical information only. The information contained in the present sheet are based on our own knowledge on the date of the last version. Users must verify the suitability and thoroughness of provided information according to each specific use of the product.

This document must not be regarded as a guarantee on any specific product property.

The use of this product is not subject to our direct control; therefore, users must, under their own responsibility, comply with the current health and safety laws and regulations. The producer is relieved from any liability arising from improper uses.

Provide appointed staff with adequate training on how to use chemical products.

ANNEX I

Lithium Battery Mark Label

For further Information consult the IATA DGR, 63rd Edition, Figure 7.1.C Lithium Battery Mark 7.1.5.5



ANNEX II

For further Information consult the IATA DGR, 63rd Edition (Section 7.4.2 Cargo Aircraft Only Figure 7.4.B)



Battery-Pack-for-9170B_003-0609e-07.22

ANNEX III

Class 9 – Miscellaneous Dangerous Goods - Lithium Batteries

For further Information consult the IATA DGR, 63rd Edition (Section 7.3.18.2 – Figure 7.3.X)

