Instruction Manual for Transport System

PyroBubbles® - XXL-Box E

of Packing Group I

for lithium-ion and lithium-metal cells and batteries

Read these instructions carefully before using the system,
and retain for future reference.

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1 Product Description

1.1 Technical data

		XXL-Box E
External dimensions of container (L x W x H)		2572 x 1556 x 1108
Internal dimensions of container (L x W x H)		2376 x 1360 x 839
Maximum gross mass in kg		1738
Packaging code		UN 50A/X/..../D/BAM 15724-GENIUS1/4000/1738
Container material		Stainless steel
Sealing material		Ethylene-propylene-diene rubber (EPDM)
Safety valves	Quantity	4
	Bolted joint diameter in cm (inches)	5.08 (2”)
	Opening pressure in kPa	7 (0.07 bar, 1 psi)
Filler material		PyroBubbles® bulk

1.2 Components

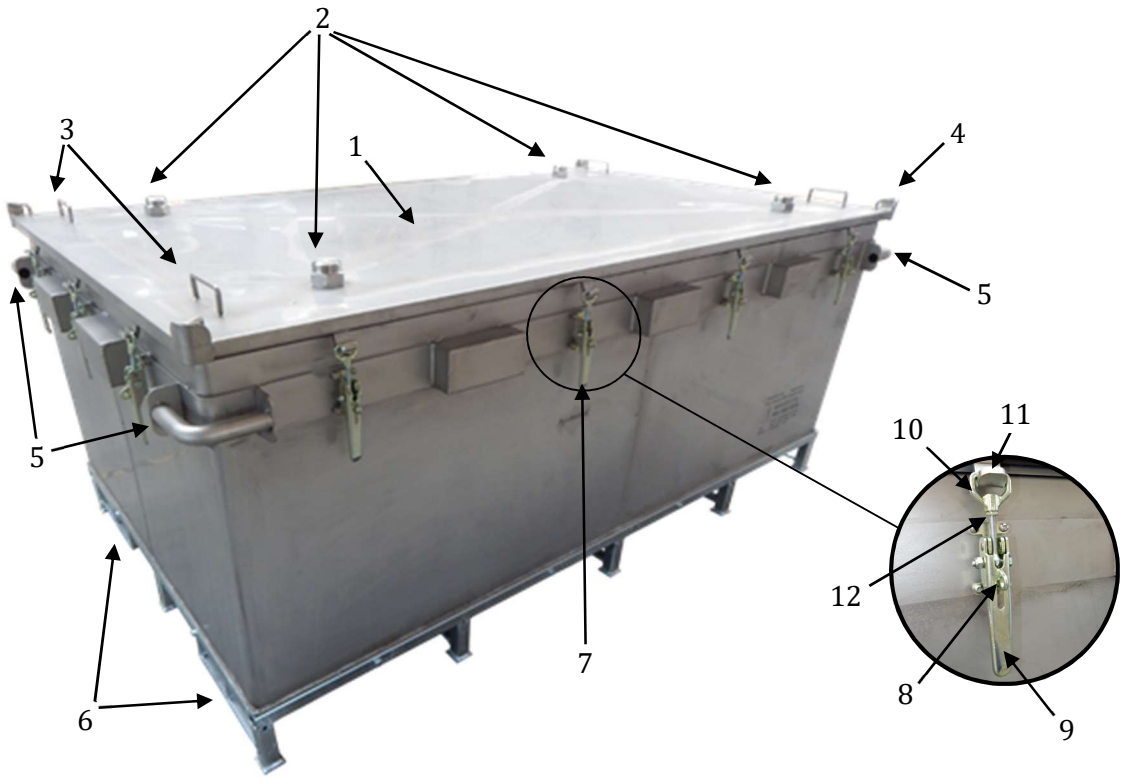


Fig. 1: XXL-Box, closed

1	Cover	7	Toggle catch
2	Safety valve	8	Locking bolt
3	Handle	9	Locking lever
4	Lifting eyelet for the cover	10	Locking eyelet
5	Collision guard	11	Locking hook
6	Guide	12	Locknut

2 Safety Instructions

2.1 Intended use

The transport container is used for transporting lithium-ion and lithium-metal cells and batteries. The transport container shall be used only in an undamaged and unmodified condition. The integrity of the transport container shall be checked before each use.

2.2 Information about PyroBubbles®

PyroBubbles® are multi-cellular hollow glass spheres, which are not dangerous (dust is not respirable) in their solid form (delivery condition). If PyroBubbles® are ground or pulverized mechanically, continuous contact with high concentrations of respirable dust can impair lung functioning. The general dust limits of 1.25 mg/m^3 for respirable (A dust) and 10 mg/m^3 for inhalable (I dust) fractions must be observed. An individual time-weighted average must not exceed the value of 3 mg/m^3 for the A-dust fraction. For details, refer to TRGS 900 (or respective nationally applicable technical rules for hazardous substances). If the dust concentration at the place of work exceeds the specified occupational exposure limit values, approved and suitable respiratory protection must be used (filter type P2).

It is recommended to wear eye protection in the case of dust formation, and to wear gloves in the case of skin contact.

PyroBubbles® that no longer correspond to their condition at the time of delivery, must be disposed of in accordance with the disposal instructions (see section 6) and shall not be used further, because they no longer meet the requirements with respect to sorption capacity and thermal insulation.

3 Application

Attention

Before each use, check the integrity of the container and the other components such as the rubber seal, the toggle catches and the safety valves.

3.1 Storage

3.1.1 Safety instructions

Warning

Risk of injury from falling parts

Injuries ranging from severe to fatal

When moving transport containers, use only suitable lifting gear attached to the designated lifting points. No person must be allowed to linger within the working area of the of the lifting gear.

3.1.2 Storage instructions

PyroBubbles® must be stored in a dry location.

The transport container should be stored at temperatures between +5°C and +25°C, protected from direct solar radiation and in a dry area, to maintain the sealing properties of the rubber seal in accordance with DIN 7716 standard (Rubber products: Requirements for storage, cleaning and maintenance).

3.2 Transport

3.2.1 Safety instructions

Danger
Danger of poisoning due to toxic, partially odourless gases
Injuries ranging from severe to fatal
In the event that the cell or battery suffers a thermal runaway, leave the danger zone as quickly as possible.

Danger
Risk of explosion due to explosive gases
Injuries ranging from severe to fatal
In the event that the cell or battery suffers a thermal runaway, avoid ignition sources. If possible, provide sufficient ventilation.

Warning
Risk of injury from falling parts
Injuries ranging from severe to fatal
When moving transport containers, use only suitable lifting gear attached to the designated lifting points. No person must be allowed to linger within the working area of the of the lifting gear.

3.2.2 Transport instructions

During transport, observe the relevant legal regulations. This also applies to any additional markings or labels.

Make sure that all the locking eyelets of the toggle catches are properly hooked onto the locking hooks, and that all toggle catches are closed.

Lift the transport container only by means of the guides provided, and use only appropriate lifting gear. A pallet truck can be generally used for moving.

When transporting dangerous goods, the space above the container must be kept free, so that in the event of a thermal runaway the reaction gases have adequate space to vent via the safety valves.

To increase static friction, non-slip mats must be placed beneath the feet of the transport container. The load is secured by lashing it down with tensioning straps, which are strapped across the cover.

3.3 Opening the transport container

3.3.1 Work procedure

1. The transport container is delivered in a closed condition, locked by means of the toggle catches.

Caution

There is a risk of squeezing or jamming fingers/hands in the toggle catches
Slight injuries to fingers and hands
Wear work gloves Do not insert your fingers or hands between the locking bolt and the locking lever.

2. Press the locking bolt of the toggle catch downwards, and at the same time move the locking lever upwards.

3. Remove the locking eyelet from the locking hook.

4. Push the locking lever back downwards until the locking bolt engages by itself.

5. Repeat steps 2 through 4 for all toggle catches.

6. Attach the hoisting tackle to all 4 crane brackets of the cover.

Warning
Risk of injury from falling parts
Injuries ranging from severe to fatal
When moving the cover, use only suitable lifting gear attached to the designated lifting points. No person must be allowed to linger within the working area of the of the lifting gear.

7. Use suitable lifting gear to lift off the cover (forklift, crane).

3.4 Packaging the hazardous material

3.4.1 Safety Instructions

Warning
Risk of poisoning due to toxic substances leaking from the battery
Injuries ranging from severe to fatal
Use protective equipment suitable for the hazardous material involved.

Warning
Hazards due to electric voltage
Injuries ranging from severe to fatal
Cover the terminals of the battery with electrically insulating materials. Wear adequately electrically insulating protective equipment.

Attention
Respiratory protection (filter type P2) is recommended, to prevent damage to the respiratory organs by the dust that may be formed.

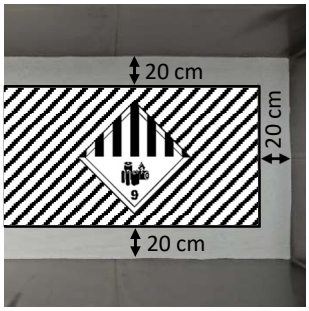
3.4.2 Packing instructions

The distances between the battery and the walls of the container depends on the respective battery (design, energy content, condition, etc.). If the minimum distances have not been specified in the transport requirements, a minimum distance of 20 cm to the container walls as well as to the bottom and the cover is recommended.

3.4.3 Work procedure

1. Open the transport container (see section 3.3.1).

2. Fill a minimum layer of 20 cm (or distance according to transport specifications) of PyroBubbles® into the transport container.



3. Place the hazardous material into the container in such a way that a minimum distance of 20 cm (or distance according to the transport specifications) is ensured to all sides of the container walls, including the container cover.

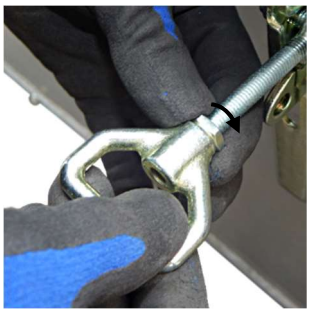
4. Fill PyroBubbles® into the transport container, up to the top edge. The PyroBubbles® fill should be compacted during filling by repeatedly tapping on all 4 side walls with a rubber mallet. Pay particular attention to ensure that the transport container is completely filled up to the top edge and in the corners.

Attention
Only when the transport container is completely filled with PyroBubbles® is an adequate level of protection ensured.

5. Close the transport container (see section 3.5.2).

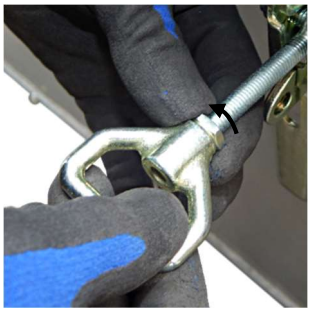
3.5 Sealing the transport container

3.5.1 Changing the clamping stroke of the the toggle catches



1. Loosen the locknut.

2. Turn the locking eyelet counterclockwise to reduce the clamping stroke. Turn the locking eyelet clockwise to increase the clamping stroke.



3. Now tighten the locknut.

3.5.2 Work procedure

1. Throw the locking eyelets in such a way, that they form a right angle with the container wall.

2. Attach the hoisting tackle to all 4 crane brackets of the lid. (see also 3.3.1, section 5)

Warning
Risk of injury from falling parts
Injuries ranging from severe to fatal
When moving the lid, use only suitable lifting gear attached to the designated lifting points. No person must be allowed to linger within the working area of the of the lifting gear.

3. Use suitable lifting gear (forklift, crane) to place the cover centrally on the transport container.

Caution

There is a risk of squeezing or jamming fingers/hands in the toggle catches

Slight injuries to fingers and hands

Wear work gloves Do not insert your fingers or hands between the locking bolt and the locking lever.

4. Press the locking bolt of the toggle catch downwards, and at the same time move the locking lever upwards.

5. Place the locking eyelet over the locking hook.

6. In the unclamped condition, the locking lever should be at an angle of approximately 45° to the container wall. It may be necessary to alter the clamping stroke of the toggle catch (see section 3.5.1).

7. Repeat steps 3 through 5 for all toggle catches.

8. Push the locking levers of all toggle catches downwards until the locking bolt engages by itself.

3.6 Removing the hazardous material

3.6.1 Safety Instructions

If the transport container shows any signs of deposits, discoloration or a piercing smell, you must assume that the electrolyte has leaked or there has been a thermal runaway in the battery.

Danger
Danger of poisoning due to toxic, partially odourless gases and toxic substances
Injuries ranging from severe to fatal
In the event of electrolyte leaking from the cell or battery, or a thermal runaway, the transport container must be opened only by personnel wearing protective equipment appropriate to the type of hazardous substance involved.

Danger
Danger of poisoning by inhalation of contaminated dust
Injuries ranging from severe to fatal
In the event of electrolyte leaking from the cell or battery, or a thermal runaway, the transport container must be opened only by personnel wearing protective equipment appropriate to the type of hazardous substance involved.

Warning
Risk of explosion due to explosive gases
Injuries ranging from severe to fatal
In the event that the cell or battery suffers a thermal runaway, avoid ignition sources. If possible, provide sufficient ventilation.

Warning
Hazards due to electric voltage
Injuries ranging from severe to fatal
Cover the terminals of the battery with electrically insulating materials. Wear adequately electrically insulating protective equipment.

3.6.2 Work procedure

Variant 1

1. Open the transport container (see section 3.3.1).
2. Remove the PyroBubbles® by skimming or vacuuming them off until the battery is visible.
3. Remove the batteries.

Variant 2

1. Open the transport container (see section 3.3.1).
2. Use a forklift truck equipped with a fork rotator to lift the container between its guides and hold it over a grating.
3. Slowly rotate the transport container until the battery slides up against the walls of the container.

   Attention
   If the container is rotated too quickly, the battery could slam against the wall of the container and damage it severely.
4. Continue rotating the transport container to a total of 180°. The battery will fall out on to the top of the grating, while the PyroBubbles® will fall through the grating.

   Attention
   The mechanical stress to which the battery is subjected in this way could cause a thermal runaway.

4 Maintenance and Repair

4.1 Maintenance

4.1.1 Safety instructions

Warning
Risk of poisoning due to toxic substances that have leaked from the battery
Injuries ranging from severe to fatal
In the event of contamination due to substances leaking from the cells or battery, wear protective equipment appropriate to the hazardous substances involved.

4.1.2 Maintenance instructions

Contamination by substances leaking from the battery on to the transport containers must be

removed. For this purpose, use only cleaning materials that do not attack the material of the transport container (stainless steel) or the sealing rubber (EPDM).

PyroBubbles® can generally be reused, provided that they show no visual changes and the granules are odor-neutral.

The service life of the sealing rubber is approximately 8 years.

4.2 Repairs

Do not use damaged transport containers; they no longer meet the requirements of the approved type. Repairs shall be made exclusively by the manufacturer or by a specialist authorized by the manufacturer.

5 Troubleshooting

Even though the cover is mounted centrally, the locking eyelets cannot be engaged on the locking hooks.

Rotate the cover horizontally by 180°. If the locking eyelets still cannot be engaged on the locking hooks, it may be that the locking hooks are damaged.

6 Waste Disposal/Environmental Protection

The materials used in manufacturing the transport container are recyclable and can be recycled through commonly available recycling programs.

Uncontaminated PyroBubbles® can forwarded to commonly available recycling programs.

Danger
Danger of poisoning by inhalation of contaminated dust
Injuries ranging from severe to fatal
Use protective equipment suitable for the type of contamination involved.

Contaminated PyroBubbles® must be properly disposed of in accordance with the applicable national regulations and in accordance with their respective contamination.

7 Contact Information

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