

PyroBubbles® - LionGuard – Packaging Group II

Solutions for collection, storage and transport of lithium-ion batteries

The safety system *PyroBubbles®* - LionGuard is tuned on the safe handling of lithium-ion batteries. Our special containers of packing group II with the extinguishing agent *PyroBubbles®* is adapted to the transport of damaged or defective batteries (SV 376, P 908 ADR) as well as not damaged and non-defective batteries for disposal or recycling (SV 377, P 909 ADR). The safety through this system is given regardless of the inner packaging of the batteries.

Since the *PyroBubbles®* are an extinguishing agent and non-combustible heat insulation material, they are an ideal filling material to protect the lithium-ion batteries. Possibly leaked electrolyte is adsorbed by the *PyroBubbles®* (BAM tested). In addition, *PyroBubbles®* ensure fixed batteries and protect them from vibration.

	Outside L x B x H (mm)	Inner L x B x H (mm)	Volume (l)	Tare mass (kg)	max. Gross mass PG II (kg)
S-Box 1	600 x 400 x 295	556 x 356 x 277	56	3.4	45
S-Box 2	600 x 400 x 441	556 x 356 x 422	84	4.7	45
M-Box	1230 x 1030 x 835	1106 x 906 x 600	600	58	456

- Boxes made of plastic (polypropylene, PP)
- Filling hole = box cross section
- Standard sizes for easy logistics
- M-box: easy handling by pallet jack and fork lift truck
- ADR approved boxes with UN approval
- Permanent reusability of the overall system
- Ideal handling



S-Box 1 securely closed



M-Box securely closed



M-Box open, steel basket for easy filling and emptying

Packaging methods

The necessary safety (thickness *PyroBubbles®*) depends on cell chemistry, mass, and condition of the batteries. Filling and emptying process are designed for ease of use. We offer three different packaging concepts for our containment boxes:

	Container	Basket	Bulk material	Cushions
Basic	✓	-	-	✓
Advanced	✓	✓	✓	-
Premium	✓	✓	-	✓

The powder-coated steel basket (**Advanced** and **Premium**) ensures the minimum safety distances of the batteries to the outside of the container as well as bottom of the container that an optimal level of safety is given any time. It is permeable to the possibly leaking electrolyte. In the variant **Advanced**, the batteries can be simply removed with the basket; although *PyroBubbles®* remain inside the box.

An easy handling is ensured by using cushions in the alternatives **Basic** and **Premium**. These cushions are surrounded by thin, needled polyethylene-(PE)-foil and filled with *PyroBubbles®*. In case of need, the foil dissolves and the extinguishing agent *PyroBubbles®* unfolds its full effect way. All alternatives achieve a premium protection for the transportation of defective lithium-ion batteries.

	inside L x B x H (mm)	Volume (l)	Basket mass	
			Advanced (kg)	Premium (kg)
S-Basket 1	492 x 292 x 196	28	3.4	5.7
S-Basket 2	492 x 292 x 341	49	4.3	8.5
M-Basket	888 x 688 x 405	247	22	-



Basic: Battery packed into cushions



Advanced: Basket and *PyroBubbles®* bulk material



Premium: Basket surrounded with *PyroBubbles®* bulk material and battery packed into cushions