

# Cell and Module Test Chamber (CMT) for lithium-ion energy storage devices

## Additional information to KB / MK / MKF operating manuals

### 1. Intended use

The chamber is suitable for exact conditioning of harmless materials.


- With equipment "Package A" aging tests of cells and modules can be carried out. In this case, the exposure to different temperatures of cells and modules, which are not supplied with current, is acceptable to test the lifetime.
- With the extended equipment "Package P" aging and performance tests of cells and modules can be carried out. In this case, the exposure to different temperatures of cells and modules, which are not supplied or alternatingly supplied and not supplied with current, is acceptable to test the lifetime and determine the performance.




So-called abuse tests, destructive tests as well as the generation of short circuits in the cells and modules are generally NOT permitted.


ONLY lithium-ion accumulators are permitted. Other battery types, e.g. lead batteries, must NOT be introduced into the chamber. Only individual cells and modules are allowed to be introduced into the chamber, NO complete batteries; i.e. any cells and modules must not be interconnected.


A mixture of any component of the charging material must NOT be explosive. The inner chamber temperature must lie below the flash point or below the sublimation point of the charging material. Any component of the charging material must NOT be able to release toxic gases.

**Other applications are not approved.**

	Observing the instructions in the operating manual and conducting regular maintenance work is part of the intended use.
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	 <b>DANGER</b>
	<p><b>Explosion or implosion hazard.</b></p> <p><b>Danger of poisoning.</b></p> <p><b>Danger of death.</b></p> <ul style="list-style-type: none"> <li>∅ Do NOT introduce any substance combustible or explosive at working temperature into the chamber.</li> <li>∅ Do NOT introduce any explosive dust or air-solvent mixture into the chamber.</li> <li>∅ Do NOT introduce any complete batteries, i.e. do NOT introduce any interconnected cells and modules into the chamber.</li> <li>∅ Do NOT introduce any substance which could lead to release of toxic gases.</li> </ul>

	The introduced material shall not contain any corrosive ingredients that may damage the machine components made of stainless steel, aluminum, and copper. Such ingredients include in particular acids and halides. Any corrosive damage caused by such ingredients is excluded from liability by BINDER GmbH.
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	The customer must ensure with his own safety measures that the cells and modules cannot exceed 90 °C.
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## 2. Chamber equipment

The additional equipment “Package A” and “Package P” is available for chamber models KB, MK, and MKF.

### 2.1. Package A

The chamber is provided with the following safety equipment:

- Nominal temperature limited to 120 °C with an additional temperature limiter (temperature safety device class 2 acc. to DIN 12880:2007)

This equipment is suitable for aging tests of cells and modules, which are not supplied with current.

### 2.2. Package P

The chamber is provided with the following safety equipment:

- Nominal temperature limited to 120 °C with an additional temperature limiter (temperature safety device class 2 acc. to DIN 12880:2007)
- Excess pressure relief valve
- Door protection
- Inert gas connection

This equipment is suitable for aging tests and performance tests of cells and modules, which are not supplied or alternatingly supplied and not supplied with current.

### 3. Safety measures

#### 3.1. Nominal temperature limited to 120 °C with an additional temperature limiter (temperature safety device class 2)

The nominal temperature of the CMT chamber is limited in the chamber controller to 120 °C.

A temperature limiter class 2 acc. to DIN 12880:2007 offers additional safety for the event of an error. The limiter's setting is fixed to 120 °C.

When this temperature is reached, the chamber is switched off at all poles.

Resetting via a reset button which is not accessible to the user always will be carried out by BINDER service.

The temperature safety devices class 3.1 (KB), class 2 (MK/MKF) or class 3.3 (optional for KB) coming with the regular chamber are still functional.

#### 3.2. Excess pressure relief valve

Chambers from size 115 l on are equipped with an excess pressure relief valve with a diameter of 150 mm. It is equipped with a 250 mm hose connection enabling the connection to an exhaust air system.

The excess pressure relief valve is heated. It is located centrally on the top of the chamber.



#### 3.3. Door protection

Two closing brackets are located on the closing side of the chamber. They serve to prevent uncontrolled opening of the doors during pressure reduction in the event of a fault.

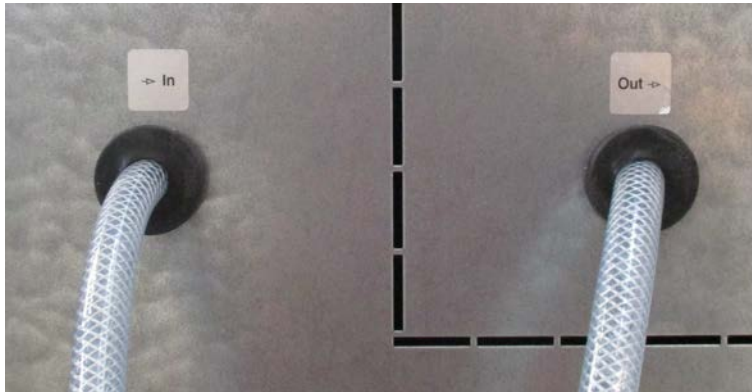
With two-door chambers the closing brackets are located in the middle between the doors; with single-door chambers they are mounted on the side of the chamber.



### 3.4. Inert gas connection

The chamber is equipped with two connections for inert gas (nitrogen or noble gases).

The connections are located on the chamber rear. They are labelled “In” and “Out”. The hoses (length 1,5 m) are already connected.



The gas enters the chamber next to the fan and then flows around the heating inside the pre-heating chamber between the inner and outer chamber. Afterwards it flows into the inner chamber. The outlet is located on the inner chamber bottom.

#### Connection

Observe the legal requirements and relevant standards and regulations for the safe handling of gas cylinders and inert gases.



General information for safe handling of gas cylinders:

- Store and use gas cylinders only in well ventilated areas.
- Open gas cylinder valves slowly to avoid pressure surges.
- Secure gas cylinders during storage and use against falling (by chaining).
- Transport gas cylinders with a cylinder cart; do not carry, roll, or throw them.
- Always close the valves after use, even with apparently empty cylinders; screw on the cap when not in use. Return gas cylinders with the valve closed.
- Do not open gas cylinders by force. Mark them when damaged.
- Observe relevant regulations for dealing with gas cylinders.

After establishing the connection and opening the gas cylinder there is a constant gas flow.





After connecting the gas cylinder, check all gas connections for leaks (e.g. with leak spray or diluted soap solution).


Use a pressure reducer and make sure to avoid any excessive outlet pressure when connecting the gas hose to the chamber.



The chamber is not gas-tight. Inert gases from inside the chamber can escape into the surrounding atmosphere.

Inert gases in high concentrations are hazardous to health. They are colorless and almost odorless and therefore practically imperceptible. Inhalation of inert gases can cause drowsiness up to respiratory arrest. When the O<sub>2</sub> content of the air decreases below 18%, there is risk of death from lack of oxygen. Any gas that might escape has to be led out via good room ventilation or a suitable exhaust system.

	 <b>WARNING</b>
	<p><b>High concentration of inert gas.</b> <b>Risk of death by suffocation.</b></p> <ul style="list-style-type: none"><li>∅ Do NOT set up the chamber in non-ventilated recesses.</li><li>➤ Ensure technical ventilation measures.</li><li>➤ Respect the relevant regulations for handling these gases.</li><li>➤ When decommissioning the chamber, turn off the inert gas supply.</li></ul>

	Inert gases, which are heavier than air, may accumulate in low-lying areas of the installation site.
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**Setting (sample values):**

If you want to flush the chamber with an air exchange rate of 1 per hour, set the flow rate on the pressure reducer according to the interior volume:

- Chamber with 115 l internal volume: The flow rate corresponding to 115 l / h is 1.9 l / min.
- Chamber with 240 l internal volume: The flow rate corresponding to 240 l / h is 4.0 l / min
- Chamber with 400 l internal volume: The flow rate corresponding to 400 l / h is 6.7 l / min
- Chamber with 720 l internal volume: The flow rate corresponding to 720 l / h is 12.0 l / min