DAIMLER TRUCK

130 YEARS OF FORWARD

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Electric trucks in ADR transport with focus on the HV battery

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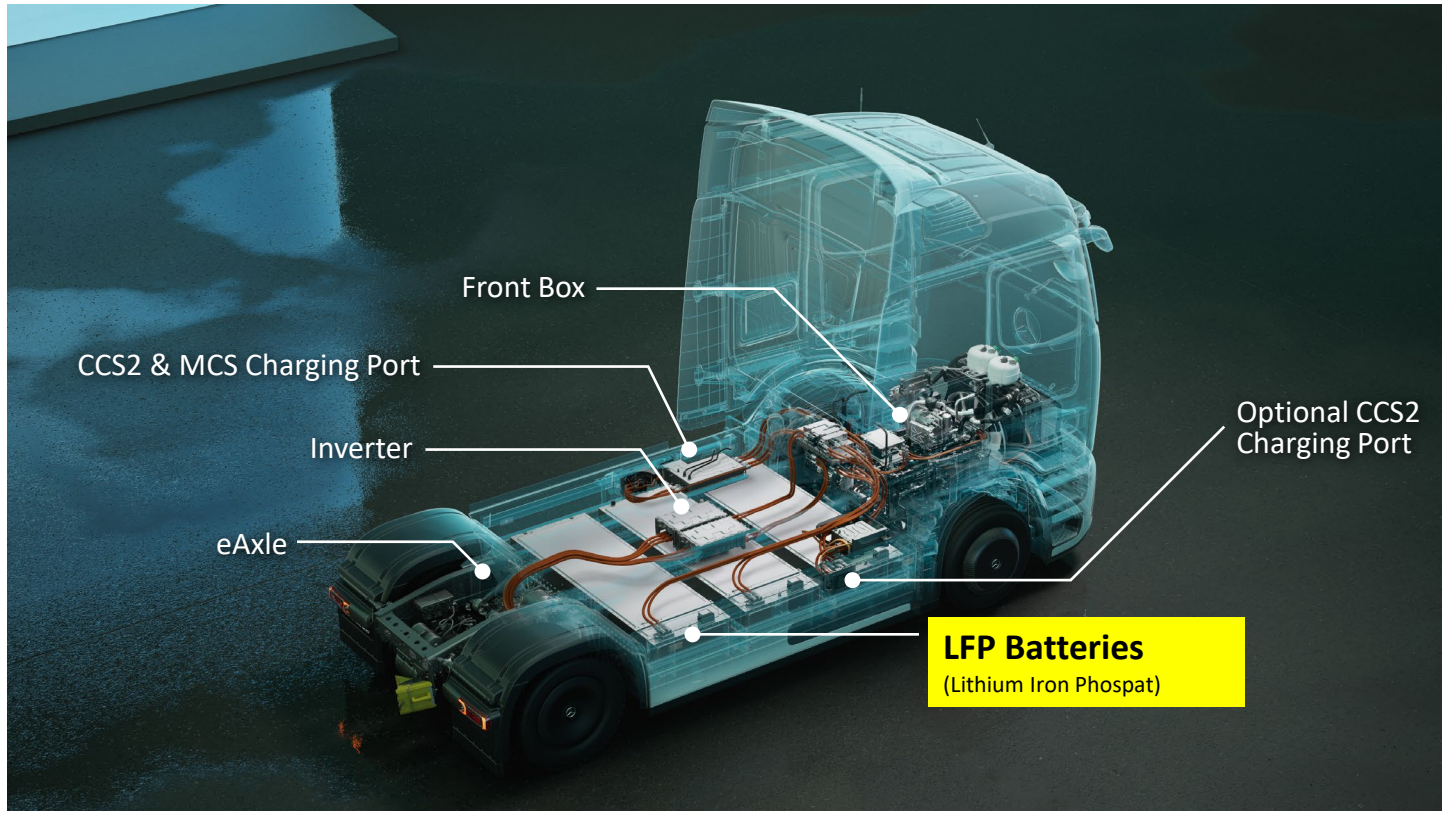
01 The HV battery is the central new component of the electric truck



LFP batteries

The new core component: mounted in the chassis frame, between the axles.

Charging

CCS2 & MCS charging port (≈1MW) optional additional CCS2 port.

Electric drivetrain

eAxle, inverter and front box complete the electric drive system.

The LFP battery is the new core component – together with charging ports, inverter, eAxle and front box it forms the electric powertrain.

02 ADR 2025: BEV trucks now permitted for AT and FL

Requirements for electric powertrain vehicles

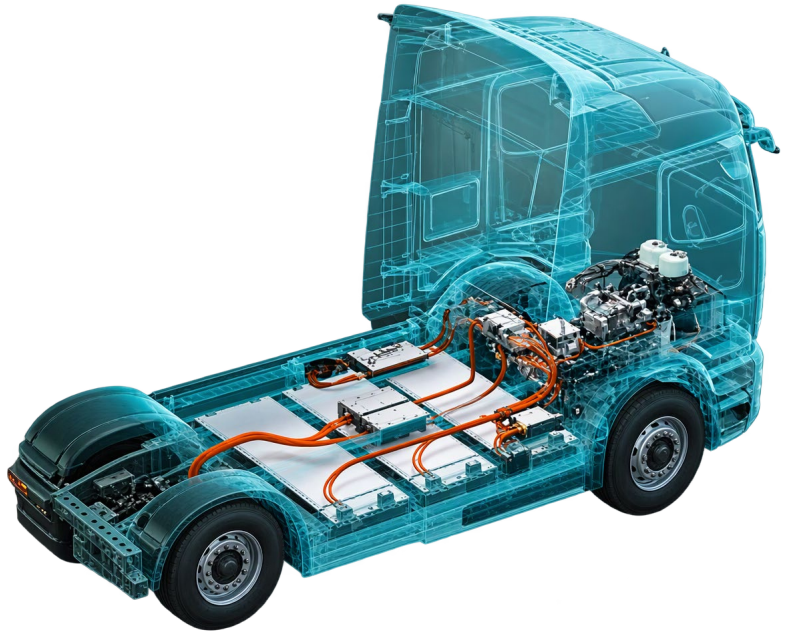
UN Regulation No. 100
Electric powertrain meets UN R100, at least the 03 series of amendments

Isolation resistance monitoring
Vehicles with an electric powertrain are equipped with a monitoring system

REESS risk evaluation
The battery system must be designed per ISO 6469-1:2019/Amd 1:2022 incl. malfunctions and reasonably foreseeable accidental situations

Measures against thermal propagation (only FL)
If containment is not guaranteed, measures must mitigate danger to the load

Review by technical service
Risk evaluation and validation evidence is reviewed by third party



Battery-specific requirements

03 Battery safety is built across several system levels

Battery system

01 Cell & chemistry



- Intrinsic stability & safety
- High quality & control

02 Battery pack



- Protection against external impacts
- High-voltage safety concept
- Thermal insulation & separation

03 BMS
(Battery management system)



- Continuous monitoring
- Failure detection & reporting
- Isolation & disconnection

Vehicle

04 Vehicle integration



- Crash protection
- Robust interfaces
- Operation strategy

A robust cell chemistry and thorough quality control are the baseline. A holistic system design approach from cell over battery pack to vehicle integration ensures safe operation.

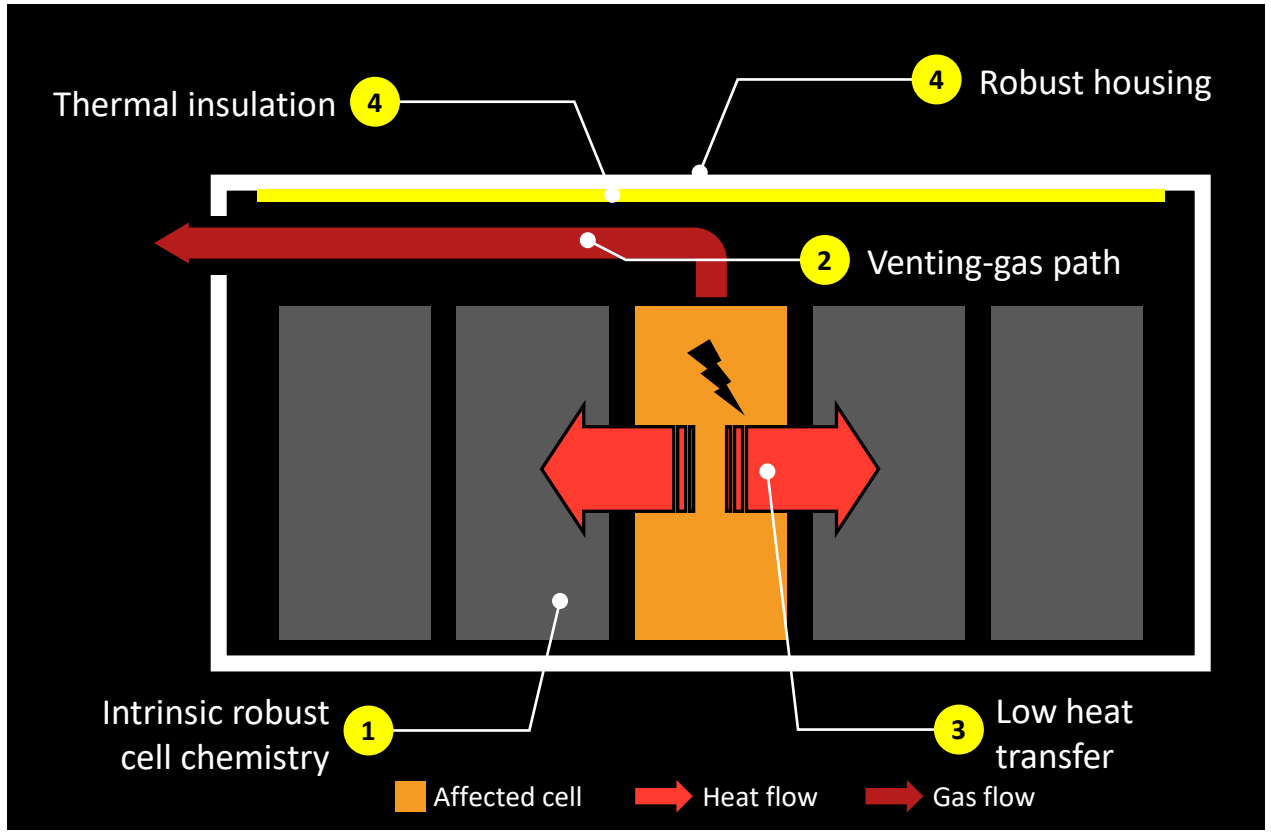
04 The battery is designed and tested for the risks of daily truck operation

	Hazard category	Load case
	**Mechanical**	High shock loads Mechanical intrusion Extreme vibration
	**Environment**	Water immersion High & low temperature Corrosion
	**External heat**	External fire Operational overtemperature
	**Electrical**	Short circuit Overcharge Overdischarge

Protection goal (all hazards)
No cell failure
No venting
No fire
No isolation faults

No critical cell failure is expected even under foreseeable malfunctions and accident scenarios. Proven by extensive testing and reviewed by the technical service during ADR certification.

05 LFP battery contains a single cell failure within the pack



Cell level: LFP chemistry 1

- Higher thermal runaway threshold
- Slow heat release
- Minimal oxygen release

Pack level: design features

2 Proper venting gas management

3 Limit cell to cell heat transfer

4 Limit outside surface heating

Several design features contain a thermal runaway of a single cell inside the battery pack. Only venting gas is released. Extensive propagation to the outside is prevented.

06 Summarized view on the battery in ADR Trucks

1	The ADR 2025 allows for the first time electric trucks for transport of goods in the category AT and FL.
2	Safety originates from different protection layers and a holistic system design from cell to vehicle.
3	Extensive battery pack validation and review ensure a safe system in operation and accidental situations.
4	Even very unlikely cell failures are considered and contained within the battery itself.

A holistic approach ensures safe electric truck operation.

Proper system design and validation of cell, pack and battery control is key.