

Many original e-bike battery manufacturers insist in their operating instructions and warranty notices that "your batteries" should only be charged with their own chargers.

In this context, however, they refrain from using formulations such as "voiding of any warranty claims", as used, for example, on the subject of "opening the battery by the customer".

How is this to be classified from a technical point of view?

All EPACs ("Electrically Power Assisted Cycles") sold in the EU require an EU Declaration of Conformity. EPACs as defined in DIN EN 15194:2018-11, i.e. the most widespread class of e-bikes in Europe, are covered by the EC Machinery Directive (Directive 2006/42/EC).

Conformity with this applicable European directive is signalled by the affixing of the CE mark by the manufacturer and documented by the issuing of an accompanying manufacturer's declaration, the so-called EC or EU declaration of conformity.

Compliance with the directive or the respective national transposition act such as the German Machinery Ordinance is mandatory, whereas conformity with the standard is not. However, guaranteeing conformity with the standard is unquestionably the easiest way for the manufacturer to achieve the desired legal conformity in the case of the applicability of a harmonised standard, because it also triggers the so-called presumption of conformity or presumption effect. If he does not apply it, there is a "reversal of the burden of proof" to his disadvantage, because he must then practically prove that the product he manufactures is just as safe as a comparable competitor's product that was manufactured according to the applicable harmonised standard. Another advantage in the case of the application of harmonised standards in the case of e-bikes is that the harmonised standard EN 15194 establishes the connection with the EC Machinery Directive and thus enormously simplifies the preparation of the risk assessment required by machinery law.

The EN 15194 standard is therefore of central importance for EPAC.

Requirements for batteries are formulated under "4.2.3 Batteries", e.g. "Safety and compatibility of the battery/charger combination shall be ensured in accordance with the manufacturer's specifications".

ONgineer as the manufacturer of the universal charger LiON ensures this - based among other things on extensive tests - by complying with the Low Voltage Directive and the EMC Directive.

and "Care shall be taken to ensure that the batteries are protected against overcharging. A suitable protective device against overheating and short circuit shall be fitted."

Independent of any existing protective circuits in the approved batteries, the ONgineer LiON has its own suitable protective devices against overcharging, short circuit and overheating.

In this context, testing the battery e.g. according to EN 62133-2 (Secondary cells... Part 2: Lithium systems) or EN50604-1 is considered sufficient testing to meet these requirements.

In particular, the danger of excessive charging voltages is emphasised in EN 62133. For example, Annex A requires, among other things: "Consequently, a lithium-ion secondary battery should never be charged at a voltage higher than the recommended highest charging voltage. Because of the possibility of failure of the charger's charging control, a suitable protective device must also be provided".

Manufacturers who refer to EN 62133 for their battery cannot rely on their charger; they must install an independent protective device. Accordingly, the requirement for the unconditional use of the

original charger as the supposedly sole safe component can be classified as of little relevance. After all, the battery must have a separate protective device.

So - even if a charger would be supposedly "unsafe", a suitable protective device must be provided on the battery side according to the standard, so that the system is safe in any case.

In Annex B of EN 62133, equipment manufacturers and battery assemblers are RECOMMENDED (Annex B is informative!): "An associated charger should be provided for each device." This is NOT a requirement to exclude alternative compliant equipment from use.

Annex C (informative) recommends, among other things, that end-users do not use chargers other than those "specifically intended for use with the equipment".

Since the LiON is intended for use with a variety of specially approved batteries, it therefore falls under this recommendation - just like the corresponding OEM chargers - and its use is therefore unproblematic.

In addition, Annex C recommends, among other things, that the correct charger should always be used and that the manufacturer's instructions or the equipment manual for correct charging should always be followed.

The LiON, which - complying with the Low Voltage Directive and the EMC Directive and approved for the use of authorised batteries on the basis of extensive compatibility tests - can be classified as a charger in compliance with the regulations, therefore falls under this recommendation!

Battery manufacturers who realise their products in compliance with the EN 50604-1 standard ("Lithium secondary batteries for applications in light electric vehicles - Part 1: General safety requirements and test methods") must fulfil similar criteria with regard to their battery systems. With regard to the subsystem "protective devices", this standard requires, among other things, that a control of the charging/discharging process avoiding overcharging/overdischarging as well as the detection of internal short circuits and compliance with temperature limits is present. According to the standard, this device may be integrated into the power supply unit or into the battery pack/system.

The LiON has corresponding protective devices, it monitors charging voltage, charging current, charging time and temperature and reacts accordingly to the measured values. For example, the charging current is reduced in the event of increased temperatures, and the charging process is aborted when the upper charging voltage limit is reached or a short circuit is detected. Electrical parameters are recorded redundantly in analogue and digital form, so that the LiON offers double safety independent of the battery pack. Thus, the LiON fulfils the system requirement of this standard even for battery systems that have outsourced parts of their protection systems.

With regard to the "voltage conversion unit" used, the standard EN 50604-1 requires conformity with the standards IEC 60335-1 ("Safety of household and similar electrical appliances; Part 1: General requirements") and IEC 60335-2-29 ("Safety of household and similar electrical appliances; Part 2-29: Particular requirements for battery chargers").

This is fulfilled by the LiON!

It is also required that the "voltage transformer unit" and battery pack/system are built in such a way that they can clearly identify each other (mechanically, electrically or electronically).

The LiON also scores here. For all approved battery systems, there are cable sets that are adapted on the battery side and electronically coded on the charger side so that the LiON reliably identifies the respective connected battery system and charges it accordingly.

The latest draft text of this standard requires, among other things, the presence of an internal switch in the DC circuit of the battery pack/system, which is controlled by the battery management system, in order to be able to interrupt the entire current flow and establish safety. This switch may only be closed after a successful compatibility test.

Thus, the release of this switch can be interpreted as a positively completed compatibility test. A battery system that has such a switch and allows the connected LiON to be charged by closing the switch has in fact confirmed the compatibility of the LiON with the battery system.

Conclusion:

From a technical point of view, there is nothing to prevent the use of the LiON as a high-quality, compliant alternative to existing OEM chargers for all correspondingly approved batteries; there is no need to fear a loss of warranty for corresponding batteries.

The LiON with its redundant protective circuitry naturally meets all relevant safety standards and is therefore fully compatible with all approved systems. This means that the 'non-excluded risk of fire' reported by some manufacturers is just as unlikely when using the LiON as it is when using chargers supplied by the manufacturer.

In addition, it puts all other systems in the shade with its app-controlled programming options with gentle charging, battery care or hibernation mode - in terms of the expected battery life and user comfort!

How should this be viewed from a legal perspective?

1. The warranty cannot be excluded by the battery manufacturer simply because a customer charges his battery with the LiON Smart Charger. For the warranty, it always depends on whether a defect exists at the time of the transfer of risk. 2.

2 Whether a warranty that goes beyond the statutory warranty can be excluded depends in particular on whether it is obtained against additional payment or whether it is a gratuitous service. A gratuitous guarantee is presumably not subject to a review of its content under the law on general terms and conditions!

Conclusion:

"The customer's warranty claims against the manufacturer are not affected by the use of the LiON Smart Charger.

The LiON Smart Charger ensures a gentle charging process for the approved battery packs in accordance with the respective manufacturer's instructions!" RA Henze, Arnsberg Germany