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## New Innovation Hollow Design

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- / Front and rear 15° adjustment
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# Don't just sit there: pedelec batteries need special care

Following this year's poor sales season, there are a lot of pedelecs sitting on retailers' sales floors, and a lot of batteries sitting in manufacturers' warehouses.



All pedelec batteries require special care, especially if put in storage.

But unlike bicycles and regular components, batteries require attention, even if they are in storage or have never been used.

Retailers and manufacturers should know how to handle these products, which, after all, can be hazardous. And retailers also should know how much to discount a battery in storage. Just like a bicycle, a leftover battery is still last year's model.

In simple terms, pedelec batteries are rechargeable batteries. The battery generates energy through chemical processes that take place in a receptacle that is filled with metal compounds.

Like many chemical reactions, what happens in a battery depends on the temperature. In cold conditions, chemical reactions typically proceed very slowly or not at all, while in hot conditions they may be very fast or even get out of control.

Lithium-ion batteries are the current state of the art for many electronics, including pedelecs. In addition to their good energy-to-weight ratio, Li-ion batteries offer several other significant advantages. One is that they no longer have a "memory effect," so they do not lose capacity even when only partially charged.

Every time a battery is charged, however, it suffers a certain amount of wear. Therefore, even with sophisticated systems, manufacturers do not provide warranties that exceed more than 500 to 1,000 charging cycles.

This does not mean that a battery that has been charged more than 1,000 times is as dead as a doornail. But it has lost a certain

percentage of its capacity, which means it has a reduced range and requires recharging more frequently.

Running down a battery completely and then storing it indefinitely is fatal to its storage capacity. Every battery discharges slowly when not in use, eventually reaching a deep discharge state that can be harmful.

Even when stored in a charged condition, rechargeable batteries age. How fast depends significantly on conditions. Here is how bicycle retailers and manufacturers can minimize the wear and the risks of storing batteries:

- Store batteries in a dry room at a temperature between 5 and 20 degrees Celsius (41 to 68 degrees Fahrenheit). The optimal temperature is 10 degrees Celsius (50 degrees Fahrenheit).

- Do not keep batteries in a commonly used warehouse, and do not put them in between cardboard boxes holding bicycles and components. The ideal location is a dedicated room that is free of combustible materials. If you have only a small number of batteries to store, we recommend using a battery safe. Be sure to also discuss storage conditions with your insurance company.

- Batteries deteriorate most when they are either fully charged or fully discharged. The optimal state of charge during storage is between 40 percent and 60 percent of the battery's capacity. If the battery carries too full a charge, ride the pedelec until the charging indicator

falls to the desired capacity.

- Check the state of charge every two months. If necessary, recharge until the battery reaches 50 percent. The optimal (ambient) temperature for recharging a battery is around 20 degrees Celsius.

- Recharge batteries only during the day and only in dry rooms that are equipped with smoke and fire detectors. Place the battery on a large, non-flammable surface, such as ceramic or glass.

- Charge the battery only with the charger supplied by the manufacturer. Never use another manufacturer's charger, even if its connector matches the battery.

Follow these recommendations and you will satisfy your insurance company and, more important, sleep well in spite of having these hazardous items in stock.

Finally, make sure you show your customers how you handle rechargeable pedelecs batteries. An attractive and professionally equipped battery center builds up their confidence and underscores your competence as an e-mobility retailer. ■ DIRK ZEDLER



Dirk Zedler

Dirk Zedler, a mechanical engineer, has led his independent company Institut für Fahrradtechnik und -Sicherheit GmbH for more than 20 years. After founding the company in 1993, Zedler soon became one of the first officially appointed and sworn bicycle experts. Today his institute employs 15 and specializes in testing, writing user manuals and developing new test facilities for the ever-changing e-bike sector.