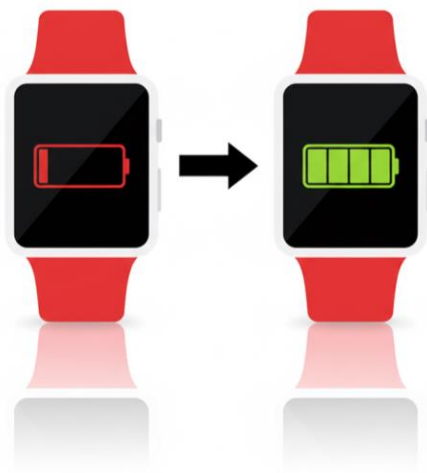# How to Improve **Battery Safety** and **Longevity** in Wearables
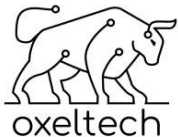

Swipe >

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Why **Battery Safety** Matters

- Wearables use lithium batteries.

- Unsafe use can cause swelling or fire.

- Safety depends on design controls.

- The next slides show the steps to achieve battery safety.

![oxeltech logo]

Step 1: Pick the Right Battery

- Always choose batteries that are UL-certified or tested to IEC standards.

- Don't rely *only* on CE/RoHS (these are EU market access marks, not proof of safety testing).

- Pick batteries with a Protection Circuit Module (PCM).

- Still add your own system-level protection.

CE IEC (UL)

Step 2: **Charge & Discharge Safely**

- Implement layered safety:
    1. PCM (on battery) +
    2. charge controllers (on PCB).

- Keep charge current within safe limits (cutoff higher currents)

- Avoid discharging below 3.0V (deep discharge harms cells).

- Add overvoltage protection for charging.

- Plan for external shorts → add a resettable fuse as secondary to PCM/protection ICs.
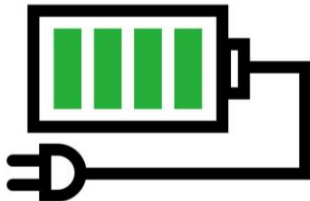
Step 3: **Design Enclosure for Protection**

- Allow space for battery swelling inside the case (otherwise pressure buildup can cause thermal events).

- Keep battery away from hot PCB areas.

Step 4: Add Voltage, Current & Temperature Monitoring on PCB

- Wearables need at least PCM + charge IC for shorts and overvoltage.

- Extra monitoring (charge, discharge, health, temperature) improves safety and life.

- Detects unsafe trends early: overheating, aging cells, abnormal currents.

- Enables smarter control → longer runtime and longer lifespan.

Recap: 4 Steps to Safer Wearable Batteries

1. **Pick the right battery** → Certified cells with PCM.

2. **Charge & discharge safely** → Limits, cutoffs, layered protection.

3. **Design the enclosure for safety** → Space for swelling, thermal separation.

4. **Add monitoring on PCB** → Voltage, current, temperature for smarter control.

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