

Comparing Cylindrical Cells with Prismatic Batteries and Pouch Cells

Here are some of the main pros and cons you should look for when thinking about cylindrical vs. pouch cells – but of course, the type of cell you ultimately choose will depend on the type of application you need it for.

1. Cylindrical cells, due to their widespread and standardized use, offer a more robust automation process and better manufacturing techniques (providing a more consistent product) than pouch cells.
2. Prismatic pouch cells are sensitive to deformation in high-pressure environments, whereas cylindrical cells handle high internal pressures much better and without deforming.
3. Cylindrical lithium battery electrodes are easier to weld when compared with lithium polymer pouch cells or prismatic cells.
4. Pouch cells, while lightweight, are vulnerable to damage stemming from humidity and high temperatures. This can reduce their lifespans and increasing their overall cost because they'll need to be replaced more often.
5. If a single cylindrical battery goes bad, the impact on the entire pack is relatively low. But with prismatic cells, if one battery goes bad, it can then compromise the entire pack.
6. Cylindrical cells are stable, inexpensive, standardized across industries and last a long time (thanks to a better cycling). Prismatic cells and pouch cells are not standardized across industries, which make them more expensive to produce. That said, their rectangular shapes utilize limited space better, and those with hard shells can be stacked. In most cases, softer pouch cells should not be stacked.
7. Cylindrical batteries radiate heat and control temperature more effectively when compared to prismatic batteries. Prismatic batteries die faster due to less effective thermal management.
8. The chemical activity at the edges and corners of prismatic batteries is rather poor. The less-than-optimal chemical activity of prismatic batteries means their performance decreases substantially after long-term use. Cylindrical batteries have a much longer lifespan compared to prismatic batteries.

Cylindrical cells, along with prismatic and pouch cells, all come with different advantages and disadvantages depending on their intended use. As battery packaging technologies change and continue to improve (e.g., removing rare and expensive cobalt from lithium-ion battery designs), these advantages and disadvantages will likely change as well.