

Cylindrical Cells Vs Prismatic Cells | What You Need For Mobile Setups

When researching to find the best solar batteries for going off-grid in your RV, Van, or Skoolie you will quickly find there is a wide range of battery banks, especially when it comes to cost. But why would two batteries that seem to be identical in specs be hundreds and even thousands of dollars different in price? 99% of the time it boils down to the form factor, or simply put, the shape of the cells, Cylindrical or Prismatic. See why such a seemingly simple thing can make all the difference in your battery build, budget, and mobile needs.

Form Factor (Shape)

Cylindrical cells contents are wound tightly and rolled into a cylindrical-shaped metal can. They are the first and most popular cell form used due to being inexpensive to produce, safe, and reliable. The round shape attributes to the mechanic stability of the cell as it allows for even distribution of electrolytes and internal pressure, greatly reducing the chance of cell deformity and electrolyte leaks.

Cylindrical Cell



Prismatic Cell



Prismatic cells contents are sandwiched together and pressed into layers creating a prismatic shape. The main benefit of this is to save space though it creates quite a few drawbacks. The corners of the cells often experience more stress causing irregular distribution of electrolyte leading to cell deformation and bloat.

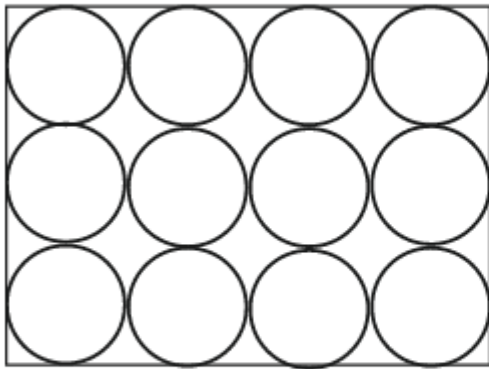
Build

Since the prismatic cell shape allows for tight stacking prismatic batteries are usually smaller, but at the cost of airflow and thermal regulation. With no way for air to circulate around or between the cells the battery is easily damaged in hot temperatures.

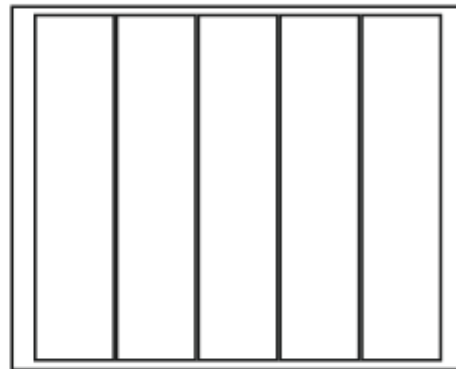
The Cylindrical cell shape leaves gaps when stacked. This creates space for air to circulate and heat to dissipate allowing the battery to maintain safe parameters and optimal performance in hot temperatures

Cell Shape When Stacked

Cylindrical Cell



Prismatic Cell



Cylindrical cell shape leaves gaps when stacked. Better airflow allows the battery to maintain safe parameters and optimal performance in hot temperatures

LIT
BATTERIES

For large solar batteries, like 12V and 48V battery banks, multiple cells will be added together either in series, parallel, or both.

PRO TIP

Series adds volts

Parallel adds capacity


Prismatic cells are large and have a much higher capacity than cylindrical cells. For this reason they are usually ran in series only. For example a 48V 100Ah Battery built with 3.2V 100Ah prismatic cells is made with 16 cells connected in series. The downside here is that the battery is only good as its weakest cell; so one cell going bad will take out the entire battery.

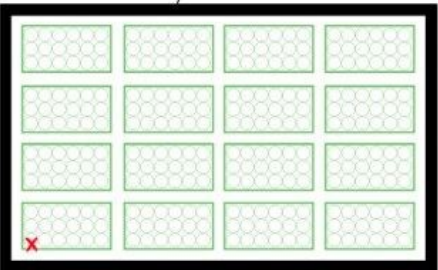
Cylindrical cells are the same voltage as Prismatic Cells but are smaller and have a lower capacity. Batteries built with Cylindrical cells are connected together in series and parallel. Cells are grouped in parallel to raise capacity and then those groups are connected in series to get to the desired voltage. The complex configuration creates the greatest advantage for large battery packs since

See next page.

LIT BATTERIES **LIFEP04 BATTERY BUILD WITH**

CYLINDRICAL CELLS


○ 1 cylindrical cell= 3.2V 6ah
connected in parallel (adds amp hours) in groups of 18
=  3.2V at 108ah
16 groups then connected in series (adds Volts)
= 48V 108AH Battery



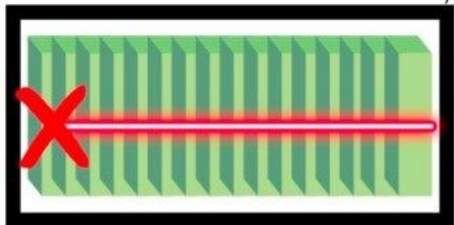
✘ 1 bad cell = 0V 6ah lost

The batteries capacity is dependent on the lowest groups capacity. So one cell has minimal effect on the battery as a whole. If you lost one out of each pack it would have the same effect as losing only one cell.

PRISMATIC CELLS

1 prismatic cell= 3.2V 100ah 

16 cells connected in series = 48V 100Ah Battery



If one cells goes bad in a battery built with Prismatic Cells it will most likely take out the entire battery

LIT BATTERIES only uses cylindrical cells

Life Cycles

Prismatic cells boasts high life cycles but at low c rating (max current draw in an hour) and DoD (Depth of Discharge or how low you can discharge the battery). You can find this information on any battery spec or details page. For example here is an image taken from a leading prismatic battery on Amazon

Features & details

- 180 Ah (Nominal Capacity)
- 3.2 Volt (Nominal Voltage)
- 0.6 Internal Impedance (1khz AC)
- 3.6 Charging Cut-off Voltage (CCCV Model, V)
- 2000 Life Cycle (0.3C Charging-Discharging, 80% DDC)

You will see the highlighted prismatic battery boasts 2000 Life Cycles but with limited use (0.3C Charging/Discharging, 80% DDC). This means to achieve up to 2000 life cycles from this prismatic cell no more than 30% of the capacity can be drawn or charged within an hour (0.3C Charging-discharging) and no more than 80% of battery can in total (80% Depth of Discharge).

Quick Tip on C Rating

Higher C-rated batteries deliver more energy and suffer less from voltage drops under load.

Cylindrical cells fare much better than prismatic cells when it comes to life cycles. Since they are not limited by DoD and can be fully discharged with no harm to the battery many Cylindrical cell built batteries far outlast their labeled life cycles. Here is an image of a Cylindrical Cell built battery pack and its advertised life cycles.



getlitbatteries.com



Perfect for your Van Conversion, RV, or Off-Grid Cabin these Heavy Duty Battery Bank are made Specifically for your Off-Grid Adventure.

48V LiFePO4 Battery

108 AHs

Usable Power 5.53Kwh

Life Cycles 3000 – 5000

(1C Charging/Discharging, 100% DoD)

10+ Years Total Life

This 48V battery, [found here](#), can be fully charged/discharged and still achieve its expected life cycles. No DoD limits or sluggish C-Ratings. One of the ways you can spot Cylindrical Vs Prismatic.

Cost

Another way to spot the difference in Cylindrical or Prismatic batteries is cost. If one battery is priced much lower than other batteries being compared, you may want to dig in and find out if it is Prismatic or Cylindrical.

While prismatic may seem cheaper up front it can cost thousands more over time. Prismatic built batteries are best for applications where only 20% - 50% capacity is ever drained and charging can happen slowly. While this can be achieved in many situations (even mobile) any bad day will cost your battery months or even years of use. Batteries built with cylindrical cells can take heavy use daily and still achieve its given lifespan.

Many people new to solar have ruined new batteries their first month of owning them. If you are at the start of your solar journey cylindrical builds can handle the abuse until you figure out your system.

Prismatic built batteries are also highly susceptible to short circuits, overheating, uneven electrolyte distribution, bloating and deformity where cylindrical cells are much more stable. Considering these factors you are much more likely to replace prismatic batteries every few years vs every 10 years plus with cylindrical.

Cylindrical Is Best for RV, Van, Bus and other Mobile Solar Batteries

As you can see from the info above, cell form factor can make a big difference in life expectancy, safety, and budget. Even more so when you are considering a battery for mobile applications such as an RV, Motorhome, or Van. Intense vibrations, bumps, and hot storage compartments are basic conditions a mobile battery must be capable of handling.

Lit Batteries uses LifePo4 Cylindrical Cells for mobile solar builds because they provide the best thermal and chemical stability. The LiFePo4 Cylindrical cells are ideal for RVs, Motorhomes, and Vans since they demand a constant high-power rating, exceptional cycle life, and superior safety against abusive conditions and extreme operating temperatures.

See next page.

CYLINDRICAL CELLS

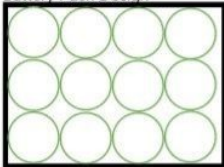
VS

PRISMATIC CELLS

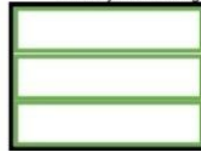


Shape

Battery Pack Design

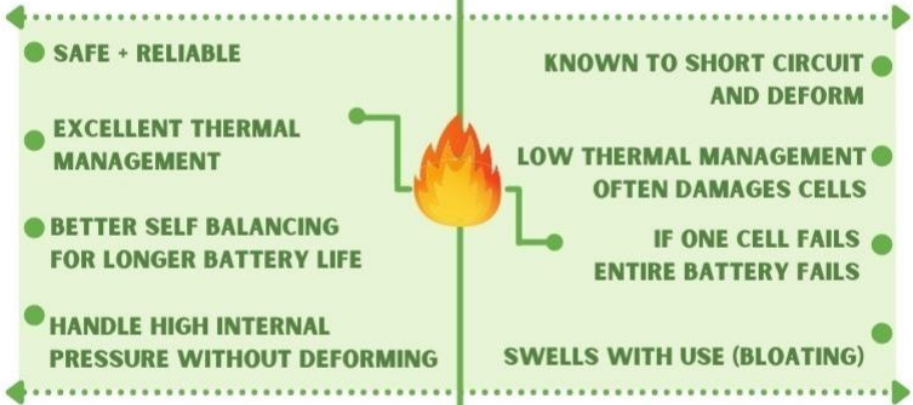


Battery Pack Design



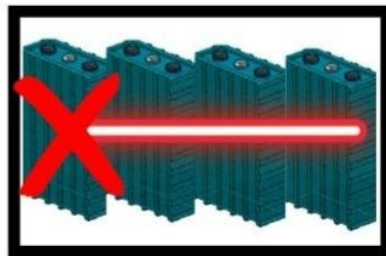
LARGE BATTERY DESIGN IS BIGGEST DOWNSIDE

SPACE SAVING AT THE EXPENSE OF SAFETY + EFFICIENCY



Cylindrical

Prismatic



If one cells goes bad in a battery built with Cylindrical Cells the effect is small where as Prismatic Batteries will be left unusable in most cases