

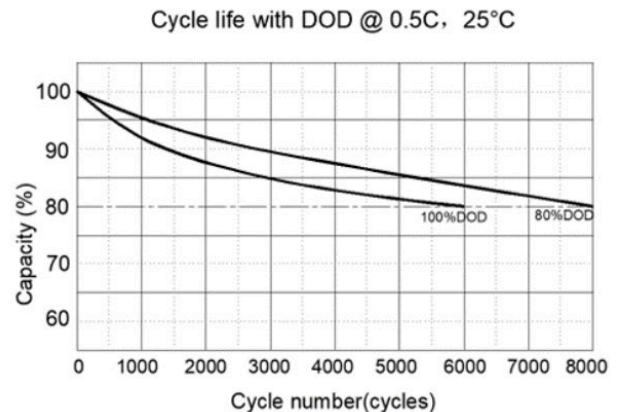


SoH, DoD and Round-trip Efficiency Explained 14.3kWh-280Ah-51.2V LiFePO₄ Battery

State of Health (SoH) and Depth of Discharge (DoD) are the crucial parameters that influence the performance and life of EG4 batteries. SoH refers to the current condition of the battery compared to its ideal new condition; while DoD is the percentage of the battery capacity discharged relative to its total capacity. A battery's SoH can be impacted by its DoD.

Batteries that are frequently discharged to a higher DoD will experience a rapid decline in SoH, than those that experience a shallower discharge. In other words, an 80% DoD on a battery will have a significantly longer SoH and life compared to a 90% DoD. The charge current also influences the SoH to an extent. The battery charging at 1C (1-hour charge) will have a lower SoH than 0.5C (2-hour charge). In other words, slower charging will have increased SoH.

With an advanced and smart BMS that monitors both the SoH and DoD (among other parameters), the EG4 battery will retain **80% capacity** after **8000 cycles** when it operates at **80% DoD 0.5C**. In other words, a 14.3kWh WallMount battery will have a capacity of 11.44kWh (80% of 14.3kWh) at 80% DoD when its charged 0.5C (280/2=140A charging current). Extrapolating the 100% DoD line on the graphic to the right, the EG4 battery will retain approximately **75%** capacity when it operates at **100% DoD 0.5C**, after **8000 cycles**.



With an average of 2 cycles per day, the 8000 cycles relate to **10+ years** of battery life, or **20+ years** of battery life with an average of 1 cycle per day. The graph above shows the battery capacity over the number of cycles.

Round trip efficiency of a battery measures the energy losses within the battery while charging and discharging. It is measured as the ratio of the energy input to a battery when charging, to the energy that the battery releases during discharge.

$$\text{Roundtrip efficiency (\%)} = \frac{\text{Energy discharged}}{\text{Energy charged}} \times 100$$

Several factors influence the round-trip efficiency of a battery, mainly the battery chemistry, electrolytic properties and the BMS. With its advanced BMS, and sophisticated chemical properties, the EG4-LL batteries have a round-trip efficiency of **94.5%**, meaning for every 14.3kWh of electricity you put into the battery, you can retrieve all the way up to 13.51kWh.