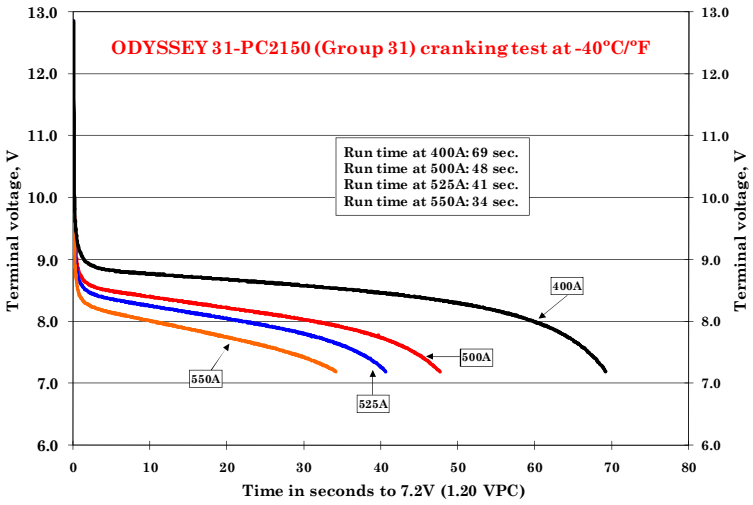
What characteristics do genset batteries need?

Batteries for generator starting applications must, at a minimum meet two key requirements. First, they should have high power density so that the least amount of real estate is taken up by batteries that have to crank the engines when necessary. Second, they must be able to last several years under continuous trickle charge and be ready to fire up the genset whenever necessary.

Combining these two key requirements it is easy to see why one needs a dual purpose battery – one that is strong enough to last many years and powerful enough in a compact package to start large diesel engines, even in very cold weather. Since these areas are exactly where thin plate pure lead (TPPL) ODYSSEY® batteries shine this paper will focus on these two key requirements to demonstrate how well suited these batteries are for this type of application. Other features that make the TPPL technology ideally suited for generator starting applications will also be briefly discussed.

Cranking capability in extreme cold weather



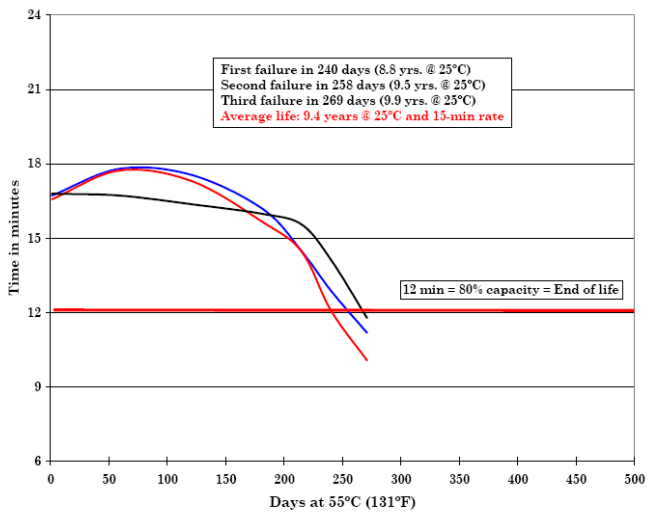
The cranking capability of the ODYSSEY® battery stands head and shoulders above any standard absorbed glass mat (AGM) lead acid batteries in the market today.

The graph on the left illustrates the cranking performance of the ODYSSEY® 31-PC2150 battery. While it has the physical size of a standard BCI Group 31 size battery, there is nothing standard about its cranking capability in extremely cold weather. As shown by the test data, the battery will support a 400A load for over a minute before its terminal voltage

drops to 7.2V at -40°C (-40°F); at 500A the terminal voltage does not drop to 7.2V for 34 seconds. That is exceptional electrical performance by any standard.

At room temperature (75°-80°F) the ODYSSEY® 31-PC2150 battery holds a load of 2,150 amps for almost 9 seconds before the voltage drops to 7.2V. In comparison, two separate models of standard AGM batteries of the same physical size (Group 31) from one of our competitors had their terminal voltages drop to 7.2V in less than 1 second.

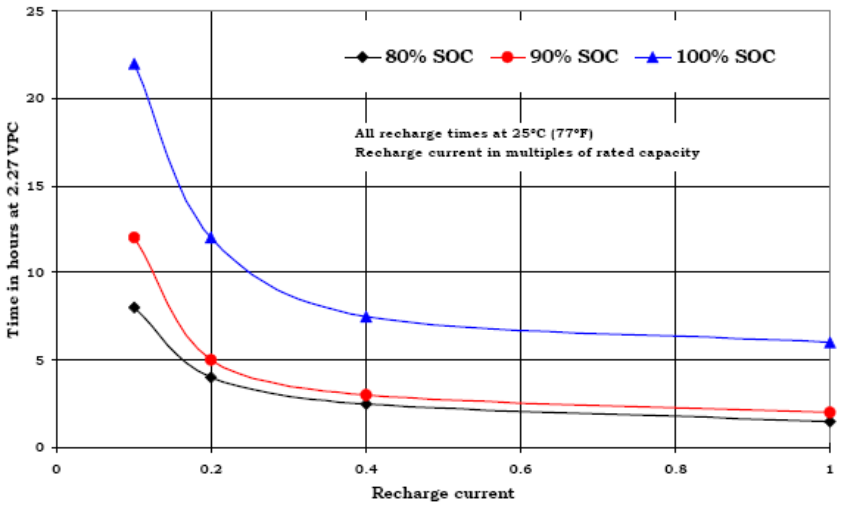
Battery longevity or how long will the battery last?



Genset starting batteries typically stay on continuous float or trickle charge for months or even years, and must be available to deliver the same cranking capability over its life. The TPPL battery is designed to last many years at room temperature when placed on continuous float charge and test data shown in the graph on the left demonstrate this capability.

In this test the batteries were soaked at 55°C (131°F) so that one day at this temperature is electrochemically equivalent to about 13½ days at 77°F or room temperature. The batteries were periodically discharged at the 15-minute rate and were considered to have reached end of life when it failed to support the load for at least 12 minutes or 80% of its rated capacity. The data show that TPPL batteries will last 8-10 years even when periodically subjected to high rate discharges. That is true staying power for generator starting batteries. And the icing on the cake? No periodic topping off with distilled water is required.

Quick recharge capability



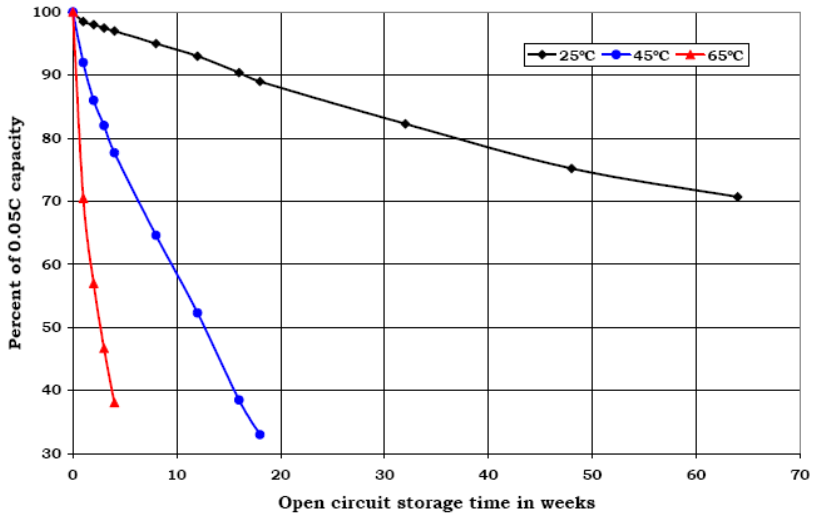
In some installations where frequent power outages are common the ability of the genset battery to quickly reach a very high state of charge becomes a critical consideration in the selection of the starter battery. In this area too the TPPL battery is superior to standard AGM or flooded lead acid batteries. As the graph to the left shows, the ODYSSEY® TPPL battery can get to 90% state of charge (SOC) in about 3 hours if the charge current is about 40% of the battery's capacity or 40A for a 100 amp-hour battery.

In fact, provided the charger is able to generate a high enough charge current the TPPL battery is capable of getting to an 80% SOC in well under 1 hour at room temperature. That is a feature no other lead acid battery can match.

	Time on charge at 14.4V (50A current limit)				
	2 hrs.	4 hrs.	6 hrs.	8 hrs.	16 hrs.
Percent charge returned after a 25A discharge to 10.5V	89.0	102.6	103.9	104.6	106.3

Some gensets have onboard alternators that put out 14.4V to charge starting batteries as long as the genset is running. It is therefore of interest to understand how quickly the ODYSSEY® TPPL battery will accept a recharge at 14.4V. The table above shows that a fully discharged 126 amp-hour ODYSSEY® will get to almost a 90% SOC in just 2 hours when charged by an alternator that generates 14.4V and is current limited to only 50A. A higher charge current will allow the battery to charge even faster. Thus, in as little as 1½ to 2 hours the ODYSSEY® battery is more than ready to crank the genset again, should that become necessary.

Low rate of self discharge



Batteries that can stay in the distribution channel for extended periods of time need to have a low self discharge rate. In contrast to standard AGM batteries that require a boost charge every 3 to 6 months, TPPL batteries can be stored for up to 2 years or 2.00 volts per cell (VPC), whichever occurs first. This means ODYSSEY® batteries can be stored on the shelf for up to 2 years at room temperature.

As the graph of storage time at three different temperatures shows, it takes about 35 weeks at 25ºC (77ºF) for a TPPL battery to self discharge to 80% of its rated capacity; at 45ºC (113ºF) it takes about 5 weeks to get to the same threshold.

Conclusion

The genset owner should answer three questions in order to choose the right starting battery for his application. First, is the battery designed for longevity under continuous trickle charge? Second, does the battery have excellent cranking capability even under extreme conditions, particularly at sub-zero temperatures? Finally, will the battery require periodic maintenance to make sure it will be ready to get the genset going when needed? A realistic evaluation of the answers to these three questions will quickly reveal the value of ODYSSEY® batteries in genset starting applications.