Frequently Asked Questions

Q. How do I maintain my Shorai LFX Battery?

LFX™ batteries should be **recharged whenever voltage drops to 13.1 volts, or sooner**. If you have a vintage, custom, or off-road vehicle which has NO draw on the battery when key is OFF, then you should only need to charge your LFX™ battery once a year. **However, most modern street bikes have a draw even when key is off, to support clock, computer, alarms, or other devices. This draw will eventually drain the battery, which is damaging and could void your warranty. So if you are not riding twice a month, then you should charge the battery every few weeks.** "Smart" lead-acid chargers with automatic cutoff may be used for periodic charging, but will NOT work as a tender/maintainer and should be disconnected immediately after charge has finished. **Older lead chargers without automatic shut-off should never be used.** Improper charging is dangerous and will void your warranty. A Shorai BMS Charger - with Store Mode - is highly recommended for anyone who rides less than twice a month. Alternatively, you may disconnect the negative cable from the battery for storage, and charge once per year in that case.

Q. What is the best way to facilitate long term storage?

A. Cool storage is good for any type of battery. You may remove the battery from vehicle for summer storage and place in a cool, dry location – with terminals taped to avoid short circuit (ideal is
about 34F/1C, so a refrigerator is great). Avoid storage at temperatures below 0F/-18C or above 90F/32C whenever possible. Any charging during storage should be performed at temperatures above freezing, for best results. If you want to keep the battery in the vehicle during storage, but are uncertain when you'll ride next, a Shorai BMS Charger connected in Store Mode is the best choice to maintain battery charge. An hour before riding, unplug the BMS charger and disconnect from wall power, then reconnect and start Charge Mode to fully charge and balance the battery.

Q. How does the LFX "PBeq AHr" capacity rating compare to lead-acid Ahr ratings?

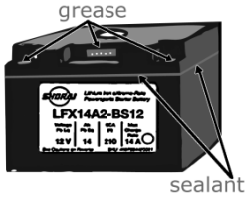
A. First, we need to understand that the primary job of a starter battery is to flow a large current (amperage) for a short time, in order to start a vehicle. In order to do that efficiently, the battery

must have low internal resistance. Holding all other considerations equal, the larger the battery is in capacity the lower the resistance, and the better able it is to crank a vehicle under high loads.

Lead-acid makers have therefore used AHr(capacity) ratings as shorthand to indicate cranking ability, rather than a real usable capacity. The lead-acid capacity rating itself is based on a complete discharge at a low discharge rate. Under actual cranking conditions they will deliver considerably less than spec capacity. And because lead-acid batteries begin sulfating when only a small percentage of the capacity has been used, and their internal resistance rises as they are discharged, the actual capacity which can be USED may be as little as 20% of the mfg. rating. Discharge in excess will not only damage the lead-acid battery, it may not allow proper starting as voltage sags.

Shorai LFX are based on a completely different chemistry. Not only do they have less than 1/3 the internal resistance per capacity than do lead-acid, they are also the ultimate "deep-cycle" battery. The internal "completely discharged" capacity of a Shorai LFX is 1/3 the rated "PBeq" capacity. For example, the LFX18 12V series have 6Ah cells internally. But the cells are capable of 80% discharge without damage and while retaining more cranking ability. As such, the USABLE capacity(or "reserve capacity") of an LFX18 12V battery is on or very near par with 18AHr-rated lead acid batteries, while providing superior cranking performance and a vast reduction in weight. The Shorai PBeq AHr (lead-acid equivalent) rating system therefore allows users to compare a very different technology from lead-acid, but on a close apples-to-apples basis when making a choice.

Q. Addressing Water and Corrosion?



A. WATER/CORROSION: Avoid high pressure power washing around the battery case, or constant exposure to water. If the battery may be occasionally submerged, we highly suggest application of sealant to **fill the horizontal seam between top and bottom of the battery case**,

and that the 5-pin port be fully packed with **dielectric grease**. (dielectric grease is a good idea in any case to insure no pin corrosion). Also, heavy grease should be liberally applied to terminals for wet environments

Q. How does the LFX "CCA" cold-cranking rating compare to lead-acid Ahr ratings?

A. CCA ratings another way that lead-acid makers have tried to convey starting power. Unfortunately, their typical spec is based on a "half-nominal-voltage" delivery. That is, at their CCA spec, you can expect 7.2V delivered, at best; and 7.2V isn't useful, as you won't start a vehicle with it...

In any case, CCA ratings aren't about actually drawing that much current from a battery. The typical vehicle which uses a 200A CCA-rated battery, for example, will only draw 45A~80A from the battery. What the CCA rating really intends to convey is how much voltage will be delivered. Higher CCA rated batteries will deliver more voltage at the same actual cranking current. Our LFX are CCA rated to deliver 9V for a 5-second crank at the CCA rated current. (in fact, our average voltage delivered will be even higher during a 30-second crank. But our CCA ratings are intended to indicate not only a measure of voltage at true cranking currents, but also proper usage, which lead-acid do not) At actual cranking currents - which are always well below CCA, LFX deliver up to two volts more than an equivalent-CCA-rated lead acid battery. Current alone won't start anything. It is the current multiplied by voltage that does the work (watts). In reality, this means that you can multiply the LFX CCA rating by 1.5x to compare to a Lead Acid battery CCA. For example, our 270A CCA LFX18 series provides about the same cranking voltage as a 405A-CCA-rated lead acid battery (from a quality lead-acid maker; some CCA specs we've tested on the cheapest lead acid seemed to be plucked from thin air).

Q. Can I use Lead-Acid battery chargers or charger/tenders?

No-Load Voltage (V)	No-Load Voltage (V)	Capacity Remaining
12V Eq LFX	6V Eq LFX	
14.340	7.170	100%
13.300	6.650	90%
13.270	6.635	80%
13.160	6.580	70%
13.130	6.565	60%
13.116	6.558	50%
13.104	6.552	40%
12.996	6.498	30%
12.866	6.433	20%
12.730	6.365	10%
9.200	4.600	0%
Do not allow resting voltage to fall below 12.86V for 12V LFX, or 6.43V for 6V LFX		

A. Yes. HOWEVER, you may NOT use a charger/tender if it has an automatic "desulfation mode", which cannot be turned off.

If you are storing your vehicle and want to check the remaining capacity, or you're a racer with a constant-loss system, you'll want to know how resting voltage (i.e. with no load or load under 200mA) maps to remaining capacity. LFX batteries should be maintained such that 20% capacity remains at minimum, as best practice. Use a good-quality voltmeter to check

remaining capacity, and consider recharge whenever the battery capacity falls to about 50% remaining. Of course, if you get the Shorai dedicated BMS01 charger, you can just hit the "Store Mode" button and leave it to do the work for you.

Q. What about Safety Precautions?

Starter batteries of any type contain a large amount of energy. During a short circuit, ALL that energy is released in a matter of seconds, creating an extremely hot arc welder, possibly causing fire or explosion. You MUST be very careful at all times to avoid short circuit of the positive and negative terminals. **Do NOT wear jewelry on wrist or neck while handling batteries.** INSURE that when installed the positive and negative terminals are properly covered and insulated from the vehicle. Do NOT use carbon fiber battery hold down units, as carbon is an electrical conductor.

Be CAREFUL!

Q. Cold Weather Performance Expectations?

A. Down to about 20 degrees Fahrenheit (-7C) most users find that they can start normally on first crank. If your headlight comes on at key-ON, it is good for the batteries to flow some current before cranking in cold weather. The suggested headlight-on time before cranking depends on the temperature. If starting at 40F/5C, 30 seconds will help wake the battery and increase cranking performance. If at 0F/-17C, leave the lights on for 4~5 minutes before cranking. The result will be a better first crank, and longer battery life. If the engine fails to start on first crank, that first crank has warmed the battery, and the second attempt will be much stronger. Other accessories that can be turned on before cranking can also be used for this purpose, such as heated gear, radio, etc... Insuring that the battery is fully charged after storage also improves first-start performance in cold weather.

Q. How can I verify Warranty Coverage?

You only need to visit **http://shoraipower.com** PRIOR TO INSTALLATION and use our year/make/model finder to verify that you have purchased the correct battery for your vehicle. **Use of an incorrect battery in your vehicle can be dangerous and will void any guarantee or warranty.** If your LFX™ battery is not recommended for your vehicle, contact your seller to exchange it for the proper battery. See the included User Manual for warranty details.