

Proper laptop battery usage guide

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Memory Effect

First of all it's necessary to unfold a myth that persists in many peoples head.

The battery memory effect.

In lithium-based batteries this is in fact a myth, it only applies to older Nickle-based batteries. So fully discharging and charging the battery is completely useless and even harmful as we will see below.

The modern lithium battery can be charged regardless of its current percentage, given that it has absolutely no negative effect in its performance.

Should I remove the battery when A/C is plugged in?

Many laptop users have this question and we will answer it right now: The answer is: YES and NO, it depends on the situation.

Having a battery fully charged and the laptop plugged in is not harmful, because as soon as the charge level reaches 100% the battery stops receiving charging energy and this energy is bypassed directly to the power supply system of the laptop.

However there's a disadvantage in keeping the battery in its socket when the laptop is plugged in, but only if it's currently suffering from excessive heating caused by the laptop hardware.

So:

- In a normal usage, if the laptop doesn't get too hot (CPU and Hard Disk around 40°C to 50°C) the battery should remain in the laptop socket;
- In an intensive usage which leads to a large amount of heat produced (i.e. Games, temperatures above 60°C) the battery should be removed from the socket in order to prevent unwanted heating.

The heat, among the fact that it has 100% of charge, is the great enemy of the lithium battery and not the plug, as many might think so.

Battery discharges

Full battery discharges (until laptop power shutdown, 0%) should be avoided, because this stresses the battery a lot and can even damage it. It's recommended to perform partial discharges to capacity levels of 20~30% and frequent charges, instead of performing a full discharging followed by a full charging.

Laptop batteries contain a capacity gauge that allows us to know the exact amount of energy stored. However, due to the charging/discharging cycles, this sensor tends to be inaccurate overtime.

Some laptops include in their BIOS, tools to recalibrate this battery gauge, which is nothing more than a full discharge followed

by a full charge.

So to calibrate the gauge, it should be performed, in every 30 discharge cycles, a **full discharge** non-stop, followed by a also, non-stop, full charge.

An inaccurate gauge can lead to the fact that the the battery capacity values are wrong. The battery may report that it still has 10% of capacity when in fact it has a much lower value, and this causes the computer to shutdown unexpectedly.

Discharge (or charge) cycles consist of using all that battery charge (100%) but not necessarily all at once.

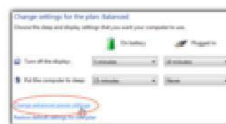
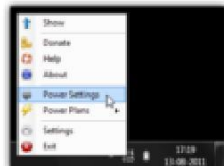
For example, you can use the laptop for some minutes in a day, using half its capacity e then fully charge it. If you did the same thing in the next day, it would be counted a discharge cycle and not two, so it may take several days until a full discharge cycle is completed.



How to perform a calibration (full discharge)?

The most adequate method to do a full discharge (100% to a minimum of 3%) consists of the following procedure:

1. Fully charge the battery to its maximum capacity (100%);
2. Let the battery "rest" fully charged for 2 hours or more in order to cool down from the charging process. You may use the computer normally within this period;
3. Unplug the power cord and set the computer to hibernate automatically at 5% as described by the image sequence below (click images to enlarge). If you cannot select 5%, then you should use the minimum value allowed, but never below 5%;



4. Leave the computer discharging, non-stop, until it hibernates itself. You may use the computer normally within this period;
5. When the computer shuts down completely, let it stay in the hibernation state for 5 hours or even more;
6. Plug the computer to the A/C power to perform a full charge non-stop until its maximum capacity (100%). You may use the computer normally within this period.

After the calibration process, the reported wear level is usually higher than before. This is natural, since it now reports the true current capacity that the battery has to hold charge. Lithium Ion batteries have a limit amount of discharge cycles (generally 200 to 300 cycles) and they will retain less capacity over time.

Many people tend to think "If calibrating gives higher wear level, then it's a bad thing". This is wrong, because like said, the calibration is meant to have your battery report the true capacity it can hold, and it's meant to avoid surprises like, for example, being in the middle of a presentation and suddenly the computer shuts down at 30% of charge.

Prolonged storage

To store a battery for long periods of time, its charge capacity should be around 40% and it should be stored in a place as fresh and dry as possible. A fridge can be used (0°C - 10°C), but only if the battery stays isolated from any humidity.

One must say again that the battery's worst enemy is the heat, so leaving the laptop in the car in a hot summer day is half way to kill the battery.

Purchasing a replacement battery

If you intend to purchase another battery, it's recommended that you do it only when the current battery is very degraded. If it's not the case, the non usage of a battery leads to its degradation.

If a spare battery is purchased and won't be used for a long time, the above storage method should be used. Besides that, when purchasing a battery you must pay attention to the manufacturing date.

Advantages in using BatteryCare

BatteryCare allows you to have the control over the discharge cycles number, and when this reaches 30 (or other configured

value), it notifies you that it's time to perform a full discharge in order to keep the battery gauge calibrated. Like this, it's guaranteed to always have the correct capacity values reported by the battery.

Besides, when using the battery, there's the possibility to suspend some Operating System features that help degrading the autonomy (only in Windows Vista or higher):

- Windows Aero, the theme that allows for visual effects like window transparency, requires graphics card acceleration, which obviously will help decreasing the battery lifetime;
- SuperFetch, ReadyBoost and SearchIndexer are three Windows Vista (and higher) services that, even in battery mode, are using the hard disk a lot and increase total power consumption, thus decreasing battery lifetime. Suspending these services has absolutely no negative impact on the performance or security of the system.

These features are resumed once the laptop is plugged in to A/C power.