

Battery Care for Surface Devices

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Battery health

All rechargeable batteries wear out eventually. Here's how to get the longest life from your battery:

- Several times a week, let your battery drain below 50% before charging it.
- Avoid draining the battery to very low levels i.e., below 20%.
- Avoid having your Surface plugged in 24/7.
- Store your Surface in a cool, dry room when you're not using it.

Caring for your Surface battery

Lithium-ion batteries are the most common type of battery used in today's portable devices. These batteries charge quickly, discharge deeply at a steady rate, and have high energy density that allows for small cell sizes. This makes them ideal for Surface devices designed for the longest possible battery life in the smallest possible form factor.

Surface devices are engineered to maximize battery life and longevity. By understanding a little about lithium-ion batteries you'll be able to help maximize the life and longevity of the battery in your Surface device:

- It is common for the capacity of lithium-ion cells to diminish after a certain number of charge/discharge cycles. This will result in shorter intervals between charging and lower battery capacity.
- When using your device, make sure the battery drains below 50 percent regularly. This will help minimize deterioration of the battery cells.
- Surface devices have features to reduce battery deterioration. Keeping your device current with the latest driver and firmware updates is the best way to help preserve battery reliability and longevity.

How to maximize battery health

Like all batteries, lithium-ion cells are consumables that age and deteriorate over time and with usage. The best way to extend battery life and performance is to drain the battery below 50 percent several times a week before recharging rather than discharging it on frequent short and shallow discharge cycles. Avoid draining the battery below 20 percent.

As you use your battery, there are some conditions you should avoid as they can lead to faster battery deterioration and aging:

- Avoid using or charging at extreme high temperatures: Devices that are charged or operated at high temperatures will cause accelerated deterioration of the lithium-ion battery and permanent loss of battery charging capacity. Surface devices are designed to work between 32°F and 95°F (0°C-35°C) so keep your Surface out of the sun and don't leave it in a hot car.
- Keeping or storing at a high state of charge: Batteries maintained at a high charge state will lose capacity faster. You can help prevent this accelerated deterioration by not leaving your device connected to AC power for extended periods. Rather, try to ensure the device is regularly discharged below 50% before charging again. If you have a scenario where you need to keep the device plugged in continuously, we recommend using the Battery Limit Mode to limit the battery state of charge. If you need to store your device for a long period of time, it's best to reduce the charge level to 50% before storing and to regularly check the battery to ensure it has not drained to very low levels.

When batteries experience excessive deterioration, you may see severe battery life reductions or advanced expansion of the lithium-ion cells. Under normal conditions, Surface devices are designed with a mechanical enclosure to contain battery expansion. Under extreme conditions the battery may expand beyond the mechanical limits of the device and result in deformation.

Battery expansion from deterioration does not present a safety concern and is most often caused by the formation of non-flammable carbon dioxide (CO₂) gas. If you have a device where the battery has expanded visibly beyond the mechanical enclosure, we recommend you stop using the device. You should handle the device with caution to prevent putting pressure on or risk puncturing the battery cell. If you need assistance, contact support@neuroptimal.com

Surface features to optimize your battery longevity

Surface is continually working to help get you the most from the battery in your device and regularly releases fixes designed to improve battery reliability and longevity. The following features are already available on select model of devices to help deliver optimal battery performance and slow down battery deterioration:

- **Battery Smart Charging** – Battery Smart Charging is a feature that helps protect your battery from the effects of charging patterns and high temperatures that may accelerate battery deterioration or lead to expansion. Battery Smart Charging is always active and engages automatically to limit battery charging capacity when it detects your device is plugged in for prolonged periods and/or used at elevated temperatures. Battery smart charging is automatically deactivated when the battery is discharged below 20%.
- **Battery Limit Mode** - Battery Limit Mode is a feature available for users who need to keep devices plugged in for extended periods of time. Plugging in the device for extended periods of time can cause batteries to prematurely age and deteriorate. When enabled this feature limits battery charging capacity to 50%, which slows the aging process and prolongs battery longevity.

To get the most from these features, it is important to keep your device current with the latest driver and firmware updates.

***Important: Third-party Battery Chargers**

Some third-party charging devices may be incompatible with your device or are potentially counterfeit, so we strongly recommend that you purchase and use original Microsoft or Microsoft-licensed devices or accessories only. Use of incompatible or counterfeit accessories, batteries, and charging devices could result in damage to your device and pose a possible risk of fire, explosion, or battery failure leading to serious injuries, or other serious hazards. Damage caused by use with charging devices not manufactured, licensed, or supplied by Microsoft is not covered under the hardware warranty.