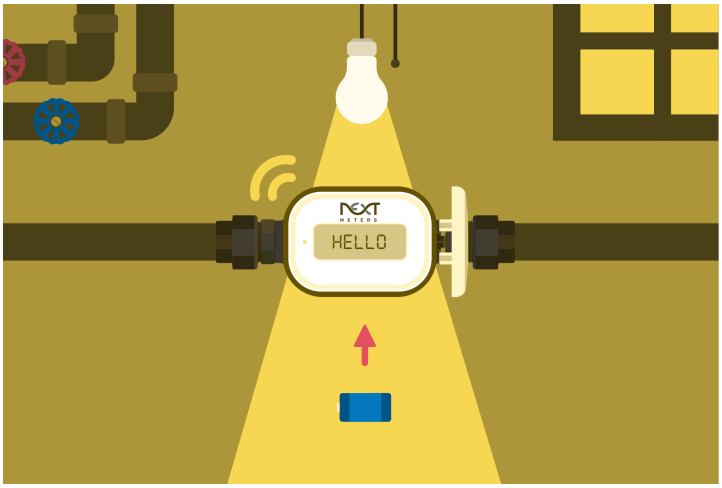
NEXT METERS

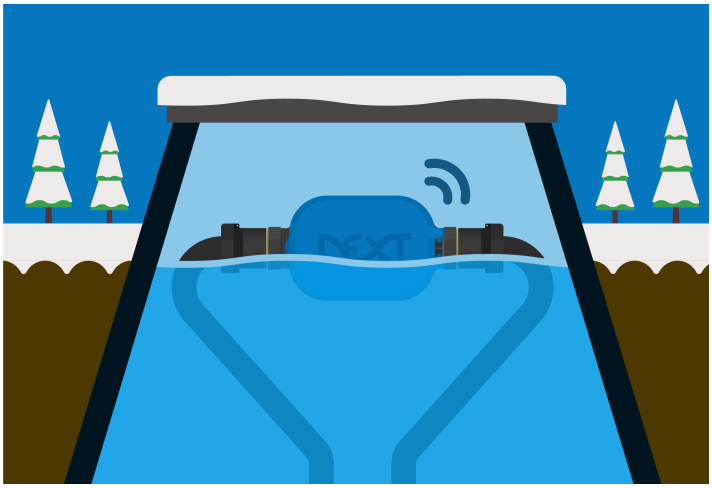
Battery Lifespan

An Educational White Paper

www.nextmeters.com

White Paper: Battery Lifespan





Introduction

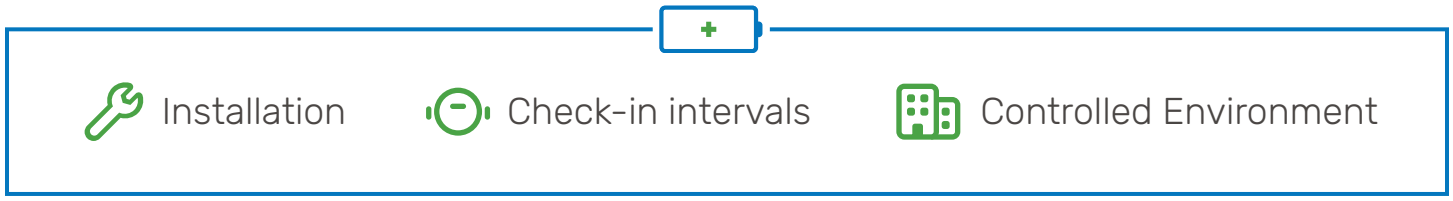
Next Meters devices are designed to deliver reliable, long-term performance. We've worked to make our devices as efficient as possible, enabling 10+ years of battery life in equipment with field-replaceable batteries. For our outdoor products, which don't have field-replaceable batteries due to strict weatherproofing standards, the batteries last for 20+ years.

However, battery lifespan in the field can vary due to a range of environmental and operational factors. This white paper explains the most important influences on battery life, why these effects occur, and what steps can be taken to help your devices reach their full potential.

Understanding Battery Lifespan

The stated battery life for Next Meters devices is based on certain expected conditions: appropriate installation and setup, typical check-in intervals, and a controlled environment.

While we've worked to provide the best battery experience possible, it's important to understand the inherent limits in battery technology. In real-world installations, battery life can be shorter due to one or several of the many factors that affect battery performance.



Factors That Affect Battery Life

Signal Quality and Retransmissions

One of the most significant factors influencing battery life is the quality of the wireless signal at the installation site. Devices that experience poor signal strength, whether due to distance from the Gateway, physical obstructions, or interference, are forced to retransmit data more frequently. Each retransmission consumes additional power, and over time, this can reduce the expected lifespan of the battery. Our battery life calculations include retries, helping us take poor signal quality into account. However, it's still recommended to maximize your installation's signal strength where possible.

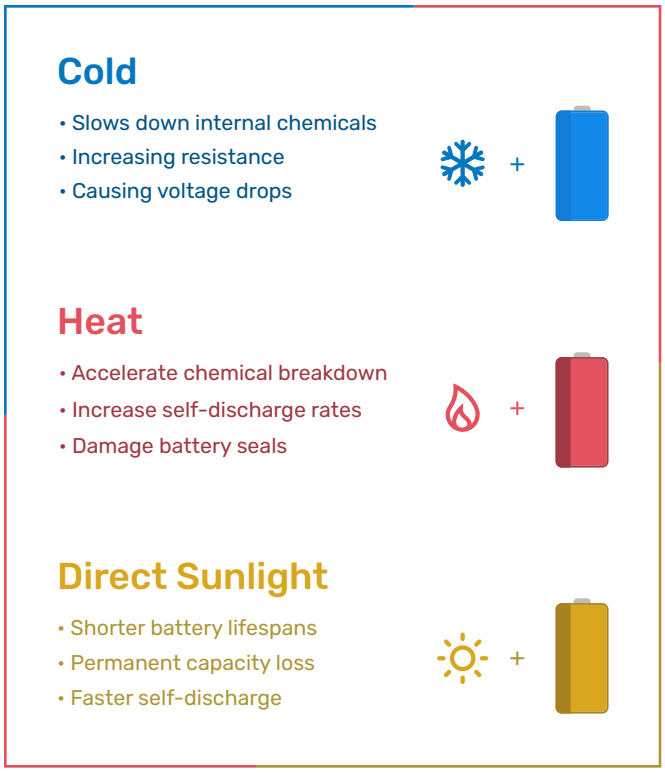
To mitigate signal quality issues, install network devices in locations where a strong, reliable signal is available. Avoiding basements, areas behind metal objects, or locations with heavy wireless interference can help ensure optimal performance.

Of course, there may be instances where devices need to be installed in suboptimal locations out of necessity or practicality. In these situations, Repeaters can be added to extend coverage and strengthen the network.

Temperature Extremes *– Indoor Devices Only*

Temperature plays a critical role in battery chemistry. For devices designed to be used indoors, exposure to extremely cold temperatures slows down the internal chemical reactions within the battery, increasing resistance and causing voltage drops. This can lead to premature low-battery warnings or even device resets. Conversely, extremely high temperatures accelerate chemical breakdown, increase self-discharge rates, and can damage battery seals, reducing overall capacity.

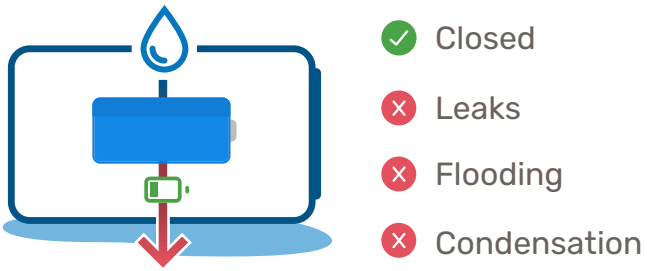
Indoor devices that are exposed to direct sunlight, installed on uninsulated exterior walls, or placed in unheated or uncooled spaces may experience shorter battery lifespans.



Humidity and Moisture Ingress *– Indoor Devices Only*

Moisture is another cause of premature battery depletion. If an indoor device is exposed to excess humidity or water, it may experience corrosion on its battery terminals and circuit boards. Corrosion increases resistance, causes voltage drops, and can trigger more system retries or resets, all of which drain the battery faster. In addition to faster battery drain, water damage can cause significant damage to other components of the device's electronics, which can lead to device failure.

Ensuring that device covers are properly closed and installing indoor devices in locations that are not prone to leaks, flooding, or persistent condensation are important steps in preserving battery life and overall device health.



Natural Self-Discharge and Long-Term Storage

All batteries lose capacity over time, even when not in use. As a result, a device that has been stored for a long time before installation may already have lost a portion of its battery capacity. Natural self-discharge is accelerated by temperature extremes in the locations where the batteries are stored.

The vast majority of the batteries in our devices utilize a technology that ensures their self-discharge remains low, especially when stored at room temperature or in slightly cooler environments.

When you need to store Next Meters devices, be sure to store them in a cool, dry place that won't expose the devices to extremely hot or cold conditions. This maximizes their field battery life once installed.

Humidity

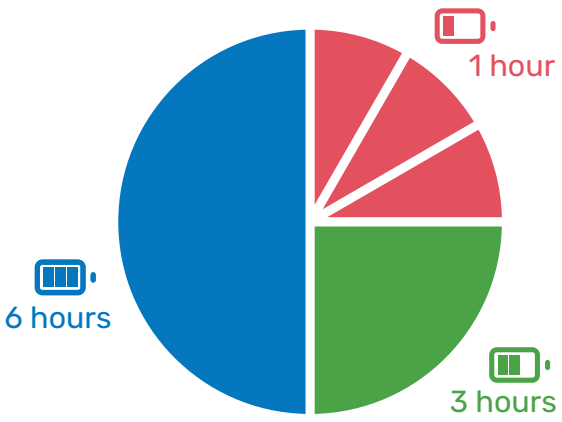
Temperature

Time

Device Configuration and Usage Patterns

The way a device is configured and used also has a direct impact on battery life. Devices set to check in more frequently, such as every hour instead of every six or twelve hours, will naturally consume more power. Additionally, some meter types or configurations draw more current than others.

We suggest using the default or recommended check-in intervals unless more frequent reporting is absolutely necessary. On our latest devices, the default configuration provides hourly read data.



Best Practices for Maximizing Battery Life

To help your devices achieve their maximum possible battery lifespan, several best practices should be followed.

- Choose installation locations that offer good wireless signal and moderate, stable temperatures.
- Always ensure that enclosures are closed and devices are installed in dry environments to prevent moisture ingress.
- Use the recommended check-in intervals and avoid unnecessary configuration changes.
- When battery replacement is necessary, use only approved models and follow the correct reset procedure in the app to ensure accurate battery level reporting.

You can view battery levels of your devices in our web portal or mobile app.

Understanding Battery Level Readings

Battery level readings are calculated based on both voltage and usage history. We do the work to keep track of and calculate the battery level for each device, which you can view on a per-device basis or in a report that includes many devices at once in our web portal.

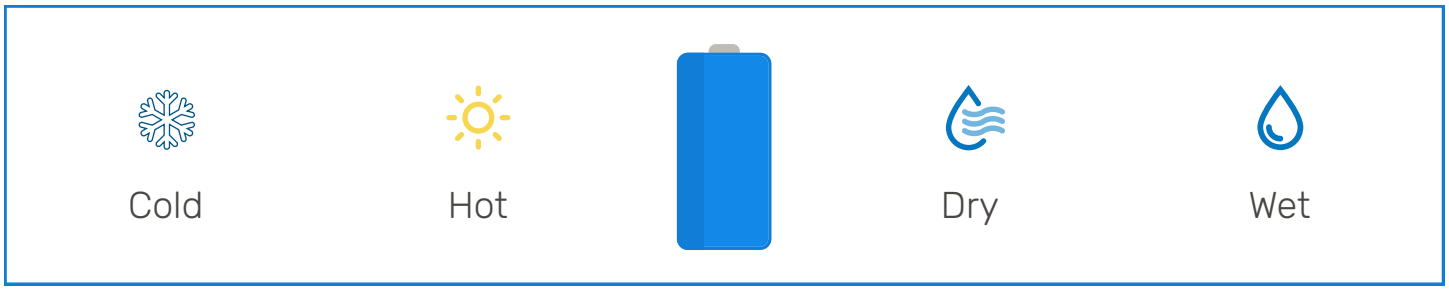
We've built intelligent alerts into our devices to let you know when a battery is getting low. For devices with field-replaceable batteries, we offer easy-to-use battery replacement kits to make the process as simple as possible.

If you notice unexpectedly low battery levels soon after installation, contact our support team for help.

Summary Table: Key Impacts and Actions

To help your devices achieve their maximum possible battery lifespan, several best practices should be followed.

Factor	Impact on Battery Life	Recommended Action
Poor Signal	Increased retransmissions, faster drain	Install in areas with strong signal
Temperature Extremes	Faster degradation or resets	Avoid temperature extremes
High Humidity	Corrosion, leakage, resets	Avoid humid/wet installation locations
Self-Discharge in Long-Term Storage	Reduced initial capacity, resets	Store in proper environments, use promptly
Frequent Check-Ins	Higher daily power use	Use default intervals



Conclusion

Next Meters devices are engineered for long battery life, but real-world conditions can significantly affect performance. By understanding and managing the factors described in this paper, you can help ensure that your devices last as long as possible and avoid unexpected battery issues.

For more troubleshooting help, please refer to our support site or reach out to our support team.