

# TECH • INFO

Nr. 1

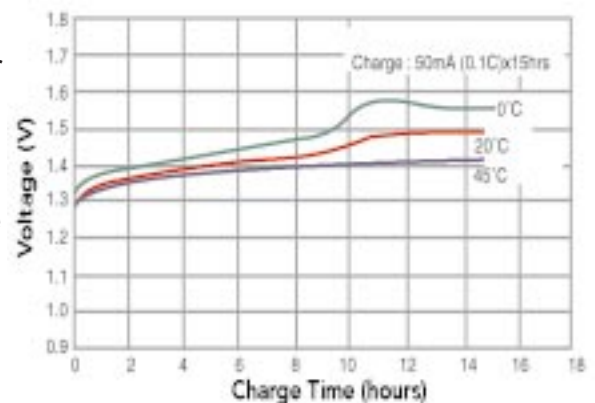
## A733 addWAVE batteries

Like all the Adcon RTUs the new A733 addWAVE also comes with a pack of **NiCd batteries**. Since we have been asked several times why we still use NiCd technology instead of more recent developments like NiMh or Lilon we would like to tell you a little bit about battery technology, the life time you can expect from your battery pack and why we deliver the A733 addWAVE with its battery pack uncharged.

While NiCd batteries seem a bit old in terms of technology they are still the work-horse for many applications for the following reasons:

- they can be used and charged at a **wide range of temperatures**, even sub-zero
- they have a **long service life**
- they are **more tolerant to abuse** than other batteries
- they have an acceptably **low self-discharge** rate
- they can be **charged quicker** than NiMh batteries
- they offer an **excellent price-performance** ratio

Yes, NiMh and Li-Ion batteries offer higher capacities as NiCd and are less prone to the memory effect. But they are very sensitive to high and low temperatures, not only in terms of supplying power to the user, but especially in terms of charging. The diagram to the right shows the charging cycle of a NiCd battery. Watch the green line at 0°C!



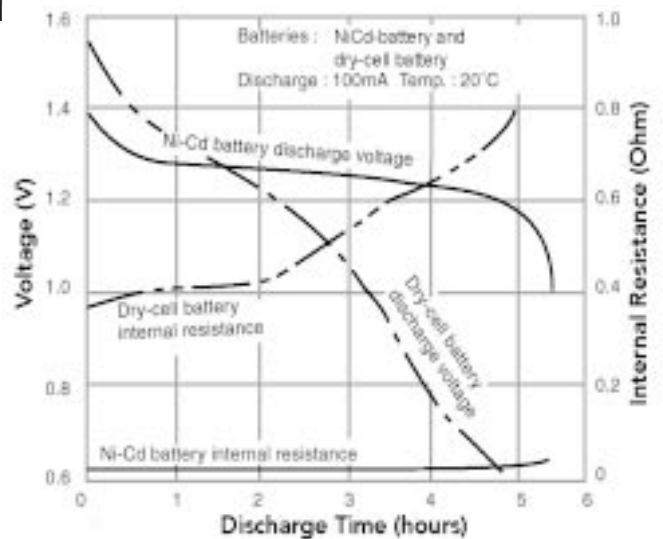
To avoid memory effect all Adcon stations employ a sophisticated charging circuit. As soon as a certain voltage level (upper threshold) is reached the solar panel switches from „full-charge“ mode to „trickle-charge“ mode. This mode very much extends the charge – discharge cycle time and thus extends battery lifetime. Once the voltage drops below the lower threshold the solar panel will charge with full power. To additionally monitor the battery packs condition an integrated sensor supervises the addWAVES internal temperature.

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As with all types of batteries so are NiCd batteries limited in life time. You can expect about 500 to 1000 cycles of charging-discharging respectively an average lifetime of 3 years. This not only depends on the weather on the site where your station is located, but also on the load attached to the station. The more sensors you use the faster the batteries are discharged and thus the life time is shorter.

As the diagram to the left shows NiCd batteries also feature very stable discharge characteristics. They supply the nominal voltage for the major part of the discharge cycle before dropping down to the cut-off voltage of 1.0V. Please keep in mind that a determining factor for battery lifetime, charge and discharge characteristics is temperature! While you might be happy about those 35°C out there and the great sun tan you get, your battery is not. Self-discharge is increased and so is charging time, thus more charging cycles are accumulated. Expect shorter lifetime of your batteries in hot climates.



Charging a NiCd battery for the first time or „formatting“ it starts the life cycle of the battery. Thus an unformatted NiCd battery has almost unlimited storage capacity (put them in your fridge!). Since complete discharges significantly reduce lifetime of the batteries, and even more so when stored in an ambient temperature well above 20°C **we deliver the A733 addWAVE with its batteries unformatted.** Once connected to the solar panel it will take about 10 – 15 minutes under sunny conditions until the station „comes to life“. During the first two nights, depending on the charging state, data drop-outs can occur until the battery has been fully charged. Should this not be acceptable to you we suggest you to charge your A733 one or two days prior to installation by connecting it to the solar panel for several hours or by using the A733 external power supply (item # 200.720.522).

Any questions concerning this issue? Please send an email to [support@adcon.at](mailto:support@adcon.at).

Best regards,  
your Adcon Support Team