

## 1.1 Cycle life test (Endurance in Discharge – Charge Cycles)

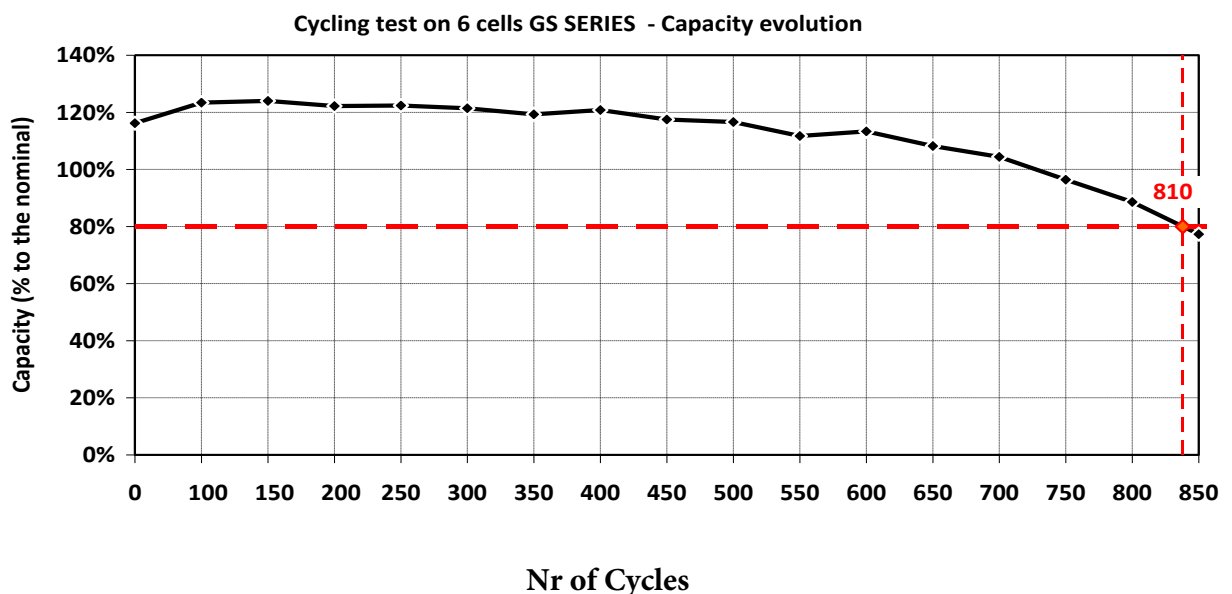
The purpose of the test is to measure the endurance in discharge-charge cycles for applications where frequent discharges of the battery are to be encountered due either to a deliberate choice of operational or to frequent power-line outages.

Instruction: IEC 60254 & IEC61427  
 Test items: 6pcs, 12V – GS120 & GS145  
 Test Result: **800 cycles to reach 80% C10**



Test procedure: The test was performed under the following profile:

- Capacity test settings: 20h rate at 10.80V/c according DIN capacity and current values (C20, I20). Capacity is implemented after an equalizing charge
- Discharge cycling settings: Discharge with  $2.0 \times I_{10}$  for 3 hours. This current corresponds to ~4h discharge DIN rate. The 3h discharge out of 4h nominal yields 80% DoD for each cycle.
- Recharge the battery for 21h at  $2.40 \pm 0.01$  V/cell
- Nominal electrolyte density is  $1.240 \pm 0.010$  gr/ml at 20°C
- Nominal single cell voltage deviation is -50 to +100mV from the average battery voltage
- During test, the electrolyte temperature is  $25 \pm 5$  °C



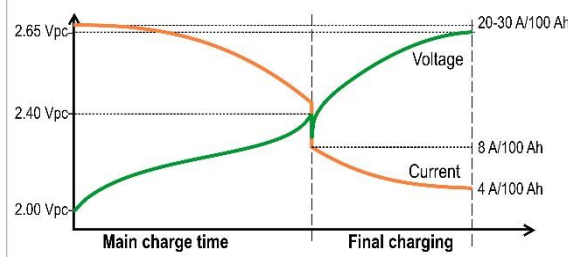
## Performance characteristics:

BATTERY DISCHARGE PERFORMANCE AT 25°C							
Discharge rate	C <sub>5</sub> (5 h)	C <sub>20</sub> (20 h)	C <sub>100</sub> (100 h)	Capacity at 25 A			
End of discharge voltage	10.20 V	10.50 V	10.80 V	10.50 V			
Discharge capacity	90 Ah	110 Ah	115 Ah	220 min / 92 Ah			
Temperature correction factor of discharge C <sub>20</sub> (20 h) capacity							
Temperature	-10 °C	0 °C	10 °C	15 °C	20 °C	30 °C	40 °C
Correction factor	0.83	0.87	0.92	0.94	0.97	1.03	1.09

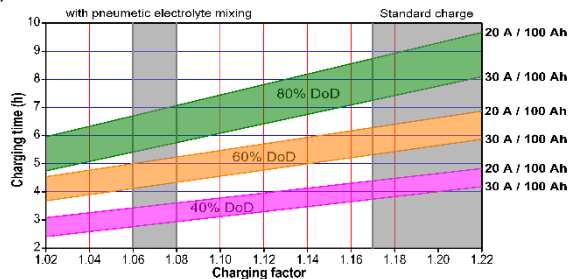
## BATTERY CHARGE CONDITIONS

### Charging profiles: WaW0 and IU1a Charging factor: 1.10 – 1.20

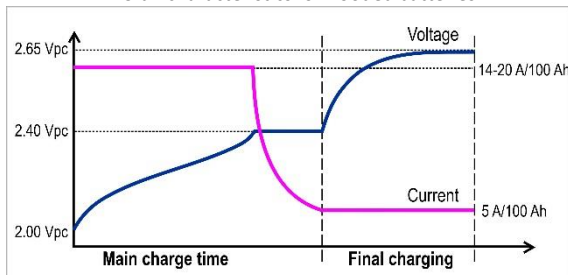
WaW0 – (double slope taper) characteristics for flooded batteries)



Charging times with WaW0-characteristics in hours



IU1a –characteristics for flooded batteries



Charging times with IU1a-characteristics in hours

