



Rechargeable Battery Systems

DRAFT SPECIFICATION FOR VH AA1700H



DRAFT

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VH AA 1700 H
NS 1.011...

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Rechargeable Battery Systems

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CONTENTS

1. Scope
2. Ratings
3. General mechanical cell specification
4. Capacity
5. Charge recommendations
6. Cycle life
7. Cautions and warnings

VH AA 1700 H
NS 1.011...

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1.Scope

This specification applies to a Nickel-Metal Hydride cylindrical rechargeable single cell which SAFT designation is VHAA1700H. This cell has been designed for cycling applications requiring a high capacity and consumer cells for digital skill cameras.

2.Ratings

All the rated figure are based on new single cells (within one month after deliveries) performances. Tests carried out according International standard IEC 61951-2.

VH AA 1700 H
NS 1.011...

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Rechargeable Battery Systems

DRAFT SPECIFICATION FOR VH AA1700H

ITEM	SPECIFICATION	UNITS	NOTES
MAIN CHARACTERISTICS			
SAFT cell designation	VHAA1700H		
IEC cell designation	HR 15/21		
Nominal voltage	1.2	Volt	
Typical IEC capacity	1700	mAh	
Minimum IEC capacity	1600	mAh	
Typical impedance	<20	mOhms	
CHARGE CURRENT			
Standard	160	mA	
Quick*	Up to 500	mA	* Charge termination recommended. (5.2)
Fast*	Up to 1600	mA	
CHARGE DURATION			
Standard	16	hours	* Charge termination recommended. (5.2)
Quick	4-5	hours	
Fast	1-2	hours	
DISCHARGE CURRENT			
MAX continuous	5.1	A	max end of voltage 0.8V/cell
MAX PEAK (<1s)	10	A	max end of voltage 0.6V/cell
TEMPERATURE RANGE			
In slow/standard charge	0/40	°C	
In fast charge	0/35	°C	
In discharge	-10/40	°C	
In storage			See § 7
Recommended	5/25	°C	
TYPICAL WEIGHT			
	26	g	

VH AA 1700 H
NS 1.011...

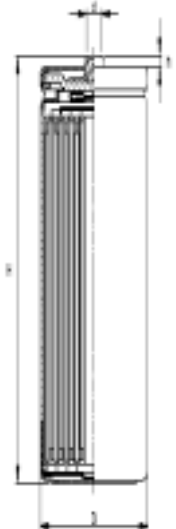
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DRAFT SPECIFICATION FOR VH AA1700H

General Mechanical cell specification

BARE CELL DRAWING	BARE CELL DIMENSIONS (mm)
	<p><u>Diameter</u>: $D = 13.9 \pm 0.10$</p> <p><u>Height</u>: $H = 49.9 \pm 0.3$</p> <p>Positive contact</p> <p><u>Flat area diameter</u>: $d = 4 \pm 0.2$</p> <p><u>Overstep</u>: $h = 1.7 \pm 0.2$</p>

VH AA 1700 H
NS 1.011...

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DRAFT SPECIFICATION FOR VH AA1700H

4.Capacity

IEC Capacity is defined as required in IEC 61951-1 (§4.1;4.2;6.1)

- ▼ Temperature : +20° +/- 2°C
- ▼ Charge current : 1600 mA constant current (C/10)
- ▼ Charge duration : 16 hours
- ▼ Period of rest : 1 hour
- ▼ Discharge current : 320 mA constant current (C/5)

MINIMUM CAPACITY : 1600 mAh

TYPICAL CAPACITY : 1700mAh

5 cycles are allowed to get the specified value.

5.Charge recommendations

▼ Charge control methods :

The VH AA1700H cell can be fast charged with a suitable cut-off charge systems .
The temperature range is 0°/+40°C. The recommended maximum charge current is 1600 mA.

A 55°C - thermal protection of the Ni-MH pack is needed.

VH AA 1700 H
NS 1.011...

Issue : **Draft**
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DRAFT SPECIFICATION FOR VH AA1700H

▼ Negative Delta V Detection

The fast charge must be stopped when voltage drops of 5/10 mV per cell. This cut-off system must be inhibited during the starting 2 minutes of the charge to avoid early detection.

▼ Derivative temperature versus time

The fast charge is stopped when battery temperature ratio ($\Delta\theta / \Delta t$) reaches a minimum gradient from 0.5° to 1°C per minute. This charging method depends on the battery configuration : assembly, number of cells, localisation of the sensor, nature of the plastic case, ambient temperature and so on.

A top of charge is recommended to complete a fast charge. After end of charge detection and cut-off we recommend to continue the charge with a low current 40 mA (C/40) during 8 hours.

A trickle charge can be used to maintain the optimum capacity in the battery. The recommended value for trickle charge, is 40 mA (C/40). within the temperature range -5° to +40°C. Nevertheless, for period shorter than 1 month, 65°C can be reached

▼ Standard charge :

The standard charge at 160 mA can be managed by a timer, 16 h stop of charge.



DRAFT SPECIFICATION FOR VH AA1700H

6.Cycle life

The cycle life of a rechargeable battery depends on various parameters such as charge rate, discharge rate, depth of discharge, overcharge, temperature, period of rest between charge and discharge and so on.

The rechargeable battery reaches its end of life when its capacity is 70% of the average capacity obtained in the first 10 cycles.

Typical values for a VH AA1700H cell are listed below :

TEMPERATURE: +20° +/- 5°C CAPACITY MEASURED AT 1,0 VOLT/CELL	EXPECTED CYCLE LIFE (NUMBER OF CYCLES)
Fast Charge C with (DT/Dt) cut-off; Discharge C	>500

7.Cautions and warnings

▼ Overcharge :

The VHAA1700H cell is not designed to be permanently overcharged. Repeated overcharging could cause leakage and deteriorates cell performances.

▼ Over discharging :

A deep discharge or "over discharge "damages the cell performance so it is recommended to switch off when discharging and to avoid to leave the cell / battery connected to the equipment for a long period.

VH AA 1700 H
NS 1.011...

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DRAFT SPECIFICATION FOR VH AA1700H

▼ Storage :

After a 28 days storage at $+20^{\circ} \pm 5^{\circ}\text{C}$, or 7 days storage at $+40^{\circ} \pm 5$ the AA1700H cell shall retain typically 80% (minimum 70%) of its initial capacity, the cell being initially fully charged.

In both cases, the VH AA1700H cell shall recover full initial capacity after a complete cycle.

In all cases, it is recommended to store cell/ battery in minimum charged state of (30/35%) and in open circuit.

- Normal conditions:

SAFT recommends to store the cell/battery within the temperature range $+5^{\circ}$ to $+25^{\circ}\text{C}$ in a $65 \pm 5\%$ relative humidity atmosphere and to avoid to store a cell discharged.

- After 4 months storage at RT or 1 months at 40°C , the VHAA1700H shall recover 100% of its minimum capacity (after a complete cycle).

An extended storage between $-20^{\circ}/+5^{\circ}\text{C}$ temperature range and $+5^{\circ}\text{C}/60^{\circ}\text{C}$ and 65% relative humidity is permitted no more than one month.

- Long term storage (up 4 months):

A long term storage leads to acceleration of battery self discharge and deactivation of chemical components. SAFT recommends to store for a long period at 5°C to 25°C .

In such case, it is recommended to partially recharge the (cells/battery), each 4 months. In addition, when using the batteries for the first time after 4 months storage, in order to restore the initial cell performances, it is recommended to full cycle the cell/battery (maximum 5 cycles).

In these conditions, the VH A1700H shall recover 95% of its initial capacity, even after 12 months storage.



Rechargeable Battery Systems

DRAFT SPECIFICATION FOR VH AA1700H

▼ Service life :

Normally, if (cell/battery) is used under proper conditions as described above, a battery should last 2 years (or 500 cycles). Failure in charging, discharging, storage or temperature range can reduce the service life and damage the cell performances.

▼ Battery assembly :

Consult SAFT for advises in battery assembly.

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