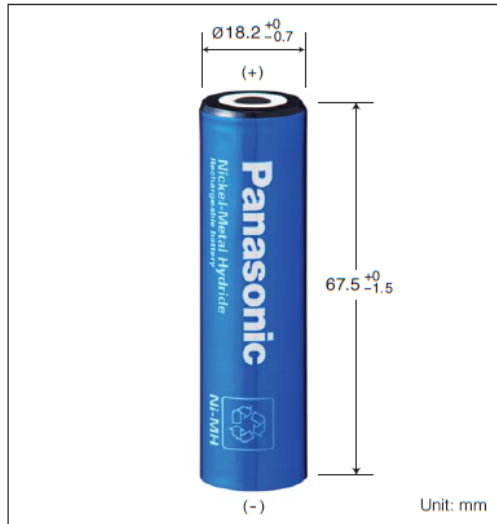


Battery Data Sheet

Panasonic

New BK450A LF6/A size	Old (HHR450A)	Standard type N type
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■ Dimensions (with tube)



■ Specifications

Diameter		18.2 +0 / -0.7 mm	
Height		67.5 +0 / -1.5 mm	
Approximate Weight		60 g	
Nominal Voltage		1.2 V	
Discharge Capacity	Average ^{*2}	4500 mAh	
	Rated (min.)	4200 mAh	
Approx. Internal impedance at 1000Hz at charged state.		25 mΩ	
Charge	Standard	420 mA X 16 hrs.	
	Rapid ^{*3}	2000 mA	
Ambient Temperature	Charge	Standard	0 °C to 45 °C
		Rapid	0 °C to 40 °C
	Discharge	-10 °C to 65 °C	
Storage	<1 year	-20 °C to 35 °C	
	<6 months	-20 °C to 45 °C	
	<1 month	-20 °C to 55 °C	
	<1 week	-20 °C to 65 °C	

*1 After charging at 0.1 It for 16 hours, discharging at 0.2 It.

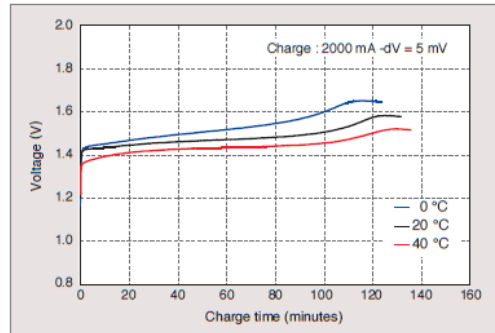
*2 For reference only.

*3 Need specially designed control system. Please contact Panasonic for details.

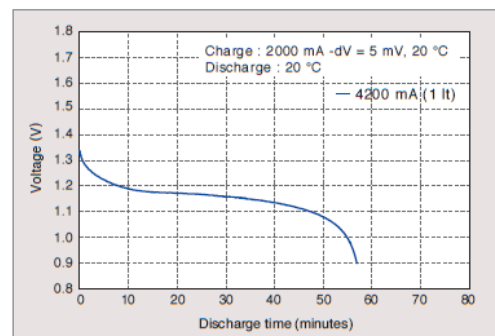
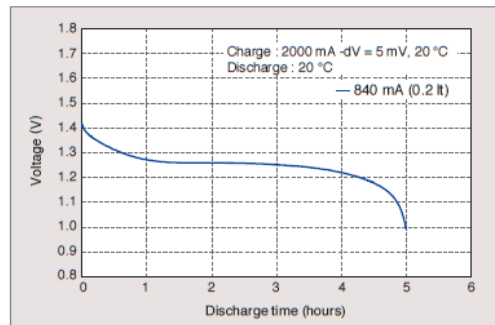
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge/discharge specs, warning label contents and unit design.

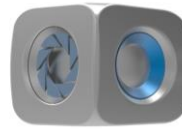
*The data in this document are for descriptive purposes only and are not intended to make or imply any guarantee or warranty.

■ Typical charge characteristics



■ Typical discharge characteristics





Battery MSDS

Product name; Nickel-metal Hydride Battery

Ref.No.PMH-PSDS13E2
Establishment/ Revision; December 20, 2013

Date of Submitted: January 21, 2014

This product is a consumer product which is used in a hermetically sealed state. So, it is not an object of the SDS system.

This document is provided to customers as reference information for the safe handling of the product. The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation.

Panasonic Corporation makes no warranty expressed or implied.

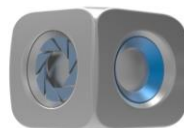
PRODUCT SAFETY DATA SHEET

1. Name of product and manufacture

Name of product	: Nickel-Metal Hydride Battery :(Model name) The models described such as HHR-***** or BK-*****
Name of Company	: Panasonic Corporation Automotive & Industrial Systems Company
Department	:Energy device Business Division, Product Engineering Group
Address	: 1-1, Matsushita-cho, Moriguchi, Osaka 570-8511 Japan
Telephone number	:+81-6-6994-4560

2. Hazardous and Toxicity Class

GHS Classification	: Not applicable
Toxicity	: When the leaked liquid adheres to the skin, it may cause the damage of the skin. When it is gotten in eye, it may cause the damage of eye such as losing sight.
Hazard	: There is the risk of abnormal heat generation and explosion if batteries are crushed, caused external short circuits, heated above 100 degree C and disposed in fire.



Product name: Nickel-metal Hydride Battery

Ref.No.PMH-PSDS13E2
Establishment/ Revision; December 20, 2013

3. Composition and ingredient information

Common Chemical name	CAS number	Concentration/ Percentage Range
Nickel Hydroxide	12054-48-7	15-25%
Cobalt Hydroxide	21041-93-0	1-5%
Hydrogen absorbing alloy	7440-02-0(Ni) 7440-48-4(Co) 7439-96-5(Mn) 7429-90-5(Al)	} 20-35%
Nickel	7440-02-0	3-10%
Iron	7439-89-6	10-25%
Potassium Hydroxide Sodium Hydroxide Lithium Hydroxide	1310-58-3 1310-73-2 1310-65-2	} 0-15%

4. First Aid Measures

In case of electrolyte leakage from the battery, necessary actions to be taken are described as follows.

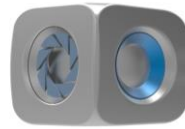
- Skin contact : Wash the contact skin area off immediately with plenty of clean water such as tap water using a mild soap, otherwise it might cause sore on the skin.
Get medical attention if irritation develops or persists.
- Eye contact : Flush the eyes with plenty of clean water such as tap water for more than 15 minutes without rubbing and immediately take a medical treatment.
If appropriate procedures are not taken, it may cause a loss of sight.
- Inhalation : Move the exposed person to fresh air area immediately.
And take a medical treatment immediately.

5. Fire Fighting Measures

1. Suitable fire extinguishing media are dry sand and chemical powder fire extinguisher.
2. When in firefighting, the air respiratory protection should be used because acrid or harmful gas might be generated when fire is extinguished.
3. Remove combustibles at once from a firefighting area.
4. Remove the batteries to safe area at once from firefighting place.

6. Accidental release measures (in case of electrolyte leakage from the battery)

- Personal precautions : Wear proper protective equipment.
- Environmental Precautions : Prevent spills from entering sewers, watercourses.
- Spill Clean-Up Procedures : Collect material to minimize dust generation ; use wet mop, damp sponge. Place collected material into a suitable container for disposal.



Product name; Nickel-metal Hydride Battery

**Ref.No.PMH-PSDS13E2
Establishment/ Revision; December 20, 2013**

7. Handling and Storage

Handling

- Technical measures : Not necessary under normal use.
Precaution : The terminals of the battery should be protected in the packing form to be able to prevent them from external short circuit.
They are packed by the material with enough strength to prevent them from destroyed by vibrates, impact, fall and accumulation, etc. while transporting them.

Storage

- Storage Condition : Keep batteries out of water and wet when in storage and transported.
Keep batteries out of fire and avoid the high temperature atmosphere
: when in storage and transported.
:An example of the high temperature: The high temperature storage like in the car exposed to blazing sun should be avoided.

Safe Packaging materials: Carton boxes, wooden boxes.

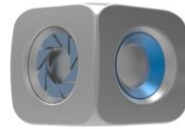
8. Exposure control

- Acceptable concentration : Not necessary under normal use .
Facilities : Nothing in particular.
Protective Equipments (in case of electrolyte leakage from the battery)
Respiratory Protection : Safety mask.
Hand Protection : Safety gloves.
Eye Protection : Safety glasses designed to protect against liquid splashes
Skin and Body Protection : To prevent any contact, wear impervious clothing such as boots or whole body suits as appropriate.

9. Physical and Chemical Properties

Physical Style

- Appearance : The nickel hydrogen battery is stored in the plastic resin case or tube.
Color : Depend on the design.
Odor : No odor
Voltage : The voltage value depends on the number of built-in batteries used in battery pack.
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Product name; Nickel-metal Hydride Battery

**Ref.No.PMH-PSDS13E2
Establishment/ Revision; December 20, 2013**

10. Stability and Reactivity

Reactivity	: Stable under normal use.
Chemical Stability	: Stable under normal use.
Conditions to be avoided	: External Short, crushed and heated or disposed in fire cause abnormal heat generation, leakage or explosion.
Hazardous decomposition products	: Acrid or harmful fume is emitted during fire

11. Toxicological information

There is no data available on the product itself.

12. Ecological Information

Persistence/degradability

In case of the worn out battery was disposed in land, the battery case may be corroded, and leak electrolyte. But, we have no ecological information.

Heavy metal quantity in a cell

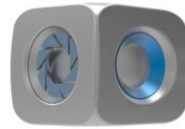
Mercury (Hg), Cadmium (Cd) and Lead (Pb) are not used in cell.

13. Disposal Considerations

When the battery is worn out, dispose of it under the regulations of each local government or the law issued by relating government.

14. Transport Information

- IATA Dangerous Goods Regulations 55th Edition (2014)
- ICAO Technical Instructions for the safe transport of dangerous goods by air
- The product is handled as Non-Dangerous Goods by based on IATA (A123) for air shipment .
- The product is handled as following by basted on UN3496 (SP963) for sea shipment.
 1. Nickel-metal hydride button cell or nickel-metal hydride cells or batteries packed with or contained in equipment are Non-Dangerous Goods.
 2. All other nickel-metal hydride cells or batteries shall be securely packed and protected from short circuit. They are Non-Dangerous Goods provided they are loaded in a cargo transport unit in a total quantity of less than 100Kg gross mass.
 3. When loaded in cargo transport unit in a total quantity of 100kg gross mass or more, they are Dangerous Goods (Class 9).



Product name; Nickel-metal Hydride Battery

**Ref.No.PMH-PSDS13E2
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Prior to transportation,

1. During the transportation of a large amount of batteries by ship, trailer or railway, do not leave them in the places of high temperatures and do not allow them to be exposed to dew condensation.
2. Avoid transportation with the possibility of the collapse of cargo piles and the packing damage.
3. Protect the terminals of batteries and prevent them from short circuit so as not to cause dangerous heat generation.

15. Regulatory Information

Commission Directive 2006/66/EU (EU)

16. Others

Note for this document : This PSDS is provided to customers as reference information in order to handle batteries safely.
It is necessary for the customer to take appropriate measures depending on the actual situation such as the individual handling based on this information.

References

1. The Globally Harmonized System of Classification and Labeling of Chemicals) (GHS)
ST/SG/AC.10/30 Rev.4,2011
 2. Chemical substances information: Japan Advanced Information center of Safety and Health
 3. Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulations
Volume 1. 17th revised edition.
 4. IATA Dangerous Goods Regulations 55th Edition (2014)
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