

Panasonic

Panasonic Industrial Company
Division of Matsushita Electric
Corporation of America

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Secaucus, New Jersey 07094
201.348.7000
Fax: 201.392.4782

Battery Sales Group

January 1, 1998

To whom it may concern:

All Panasonic nickel metal hydride electric vehicle batteries are considered non-hazardous for purposes of transportation by the U.S. Department of Transportation (DOT), International Civil Aviation Administration (ICAO), the International Air Transport Association (IATA) and the International Maritime Dangerous Goods Regulations (IMDG). These batteries are classified as UN 2800, "Batteries, wet, non-spillable". They are considered non-hazardous by passing the Vibration Test and Pressure Differential Test as required by DOT in 49 CFR 173.159(d). They are also considered to be non-hazardous by both ICAO and IATA by exceeding the requirements of Special Provisions "A48" and "A67" as defined by both organizations in their 1998 Handbooks.

Our batteries are authorized for transportation on deck or under deck storage on either a passenger or cargo vessel by passing the Vibration and Pressure Differential tests described in the International Maritime Dangerous Goods Code (IMDG).

The only shipping requirements for the shipment of these batteries are that they be shipped in a condition that would protect them from short circuits and that they are securely packaged so as to withstand conditions normal to transportation.

All of our batteries and their outside packaging, manufactured after September 30, 1995 are labeled "NON-SPILLABLE" per 49 CFR 173.159(d). If you repackage our batteries you must label the outer package per 49 CFR 173.159(d).

As always, if you have any further questions, please call me direct at (201) 392-6464.

Sincerely,



Charles P. Monahan

Manager, Environmental and Regulatory Compliance

Nickel Metal Hydride Battery Specs

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

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To Chris Atkinson	From Shelley Loney
Dept./Agency WVA	Phone # 202-586-1573
Fax # 304-293-8823	Fax #

NSN 75-40 01-317-7368 5098-101 GENERAL SERVICES ADMINISTRATION

Performance in production package:

Specific Energy: 70 Watt-hours/Kg
 Energy Density: 165 Watt-hours/L
 Specific power: 250 Wats/Kg @ 50% SOC = 337A.
 220 Wats/Kg @ 20% SOC = 295A.

Production modules:

13.2 Volts nominal (16.0 Max charging, 11.0 Min discharging)
 1.25 Kilowatt hours
 17.8 Kg
 90 Ampere hours
 102 mm x 179 mm x 412 mm physical package (7.5 L)

Life:

> 600 cycles to 80% DOD

Operating Temperatures:

< 45°C to achieve maximum life
 < 55°C to obtain 80% of performance
 < 65°C to avoid damage
 Temperature variation in module strings: <8°C

Charging:

Normal charge from 20% to 100% SOC: <6 hours
 "Quick charge" from 40% to 80% SOC: 15 minutes (advanced algorithm req'd)

$$\underbrace{0.5 \text{ kWh} \quad 1.0 \text{ kWh}}_{0.5 \text{ kWh in 15 mins}} = 2.0 \text{ kWh in 1 hr.}$$

$$2000 \text{ Wh/hr}$$

$$2000 \text{ W} / 13.2 \text{ V} = 150 \text{ A}$$