



Technical Data Bulletin

#169 (May 2005) Maintenance and Care of Nickel Metal Hydride Batteries

Background

Nickel metal hydride (NiMH) chemistry has developed into an attractive alternative to battery chemistries that use more toxic and less stable materials. 3M currently offers this technology in two of our Powered Air Purifying Respirator (PAPR) systems: the 3M™ Adflo™ High Efficiency System 15-1101-00, and the 3M™ Breathe Easy™ Belt-Mounted Powered Air Purifying Respirator (PAPR).

Component	Part Number
3M™ Adflo™ Battery	15-1099-07
3M™ Adflo™ Battery Smart Charger	15-0099-08
3M™ Battery Pack	BP-15
3M™ Smart Battery Charger	BC-210

Nickel Metal Hydride Chemistry

Advantages

- Higher capacity than nickel cadmium and less prone to memory
- Transport is not subject to regulatory control
- More environmentally friendly
- NiMH offers up to 40% higher energy density compared to nickel-cadmium

Limitations

- Batteries stored for prolonged durations, greater than one year, may lose capacity to hold a full charge.
- Storage should be in dry conditions (less than 85% relative humidity). Recommended storage temperatures for the battery are -4° to 115° F (-20° to 45° C). Storage of the battery outside of this range will shorten the usable life of the battery.
- New batteries require three charge/discharge cycles prior to attaining full capacity

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Maintenance and Care

To maximize battery life, follow these guidelines:

- 3M NiMH batteries may be charged any time during the discharge cycle. Battery memory (also known as voltage depression) is not a significant factor.
- NiMH chemistry is sensitive to overcharging especially in cold or hot temperatures. Overcharging is simply pushing more current into the battery than it can tolerate. To address this, smart chargers will not charge batteries in temperatures that place battery cells at risk of damage.
- 3M™ Battery Pack BP-15 may remain connected to the chargers for an extended period of time. This is the recommended storage method for maximum battery performance. The 3M™ Smart Battery Charger BC-210 will sense when the battery pack BP-15 reaches full charge and stop charging the battery. Periodically it will shift into a trickle charge to ‘top off’ the battery.
- DO NOT leave 3M™ Adflo™ Batteries on charge for extended periods of time. Unlike the smart battery charger BC-210, the Adflo battery smart charger does stop charging and will trickle charge a battery as long as the battery remains on the charger. It is recommended that Adflo batteries NOT be left on their charger for more than a couple of days. Doing so may decrease service life.
- 3M NiMH batteries provide up to 400 charge/discharge cycles. The life of 3M batteries will be significantly reduced when they are exposed to high heat over an extended period of time. At 5 charge/discharge cycles per week (1 per shift), this equals an estimated life expectancy of approximately two (2) years.
- Storing batteries in hot temperatures (>120°F) (49°C) will decrease the life of the battery cells.
- Do not allow water to enter the battery housing. Water will damage the battery assembly. Batteries can be cleaned with a damp cloth and mild detergents. Solvents and strong detergents may damage the battery case.
- Always charge NiMH batteries at a temperature between 50° F (10° C) and 90° F (32° C). Beyond this range, the battery may not accept a full charge. If a battery feels hot, let it cool for 1/2 hour before charging. Do not stack batteries together or on top of charger during charging. Do not charge in an enclosed cabinet. Heat from chargers and batteries must be allowed to dissipate. If the chargers sense the batteries are too hot they will go into a standby mode until the battery has cooled.

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- NiMH batteries stored at room temperature lose approximately 2% of their charge per day after charging. The rate of self-discharge will increase as storage temperature increases. Infrequently used batteries that are not left on a charger over time should be fully charged, initially, then fully charged once every month to maintain charge. Allowing a battery to self-discharge during extended storage (less than one year) will not harm the battery. Batteries subjected to prolonged storage (longer than one year) may lose their capacity to hold a full charge. You can check battery capacity by running the PAPR motor/blower unit with the airflow indicator installed and recording the time until the airflow falls below six cubic feet per minute.

Disposal

Damaged or worn-out batteries should be disposed of in accordance with local, state and federal regulations at an approved hazardous waste recycling or disposal facility. 3M participates in the RBRC program which provides for 3M™ Powered Air Purifying Respirator (PAPR) batteries to be dropped off (free of charge) at participating recycling collection sites. Please dispose of batteries according to federal, state and local regulations. Please contact the Battery Recycling Information Hotline at 1-800-822-8837 for proper disposal instructions.

Contacting 3M

For more information about 3M respirator systems, visit the 3M Occupational Health and Environmental Safety Division web site at: www.3M.com/occsafety or contact a Technical Service Representative:

- In the United States, call 1-800-243-4630
- In Canada, call 1-800-267-4414

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