3M

PAPR Battery Charging – Updated November 2003

Occupational Health and Environmental Safety Division

As the 3M™ Breathe Easy™ and Airmate™ High Efficiency Particulate Air (HEPA) Manuals are updated, the time required for a "smart charger" to charge a fully used battery will be reduced to 8 hours. Therefore, the charging instructions will be as follows (changes in red):

"Smart" Chargers (520-03-73 Single Unit, 520-03-72 Five Unit or 520-01-61 Ten Unit)

- Fully exhausted battery needs to charge about 8 hours.
- Plug charger into wall outlet and light comes on. Connect battery and light goes off. After fully charged, light comes back on indicating "trickle rate."
- Do not leave battery on charge longer than 30 days.

"Cube" Chargers (GVP-112 or 521-02-02R01)

- Charge batteries for roughly twice as long as they were used or a minimum of 16 hours for a new battery.
- Light on charger only indicates connected circuit, not an indication of charge status.
- Do not leave battery on charger for more than a week.

Special Instructions for Intermittent Users

The following may be communicated to customers who only use their Powered Air Purifying Respirators (PAPRs) on an infrequent basis (e.g. first responders, hospitals).

Maintaining NiCd batteries that are only used intermittently is not well understood, even by the battery manufacturers. On one hand, leaving them on the charger continuously will increase the temperature which will shorten the long term life of the battery. On the other hand, Technical Data Bulletin #151 http://www.mmm.com/occsafety/html/techdata.html describes how NiCd batteries will self-discharge about 1% per day at room temperature. Non-rechargeable lithium batteries are probably better for intermittent use. The 520-04-57R01 lithium batteries are approved with the Breathe Easy 7 and 10 systems with FR-40/57 cartridges, have a ten year shelf life and can be used for up to 12 hours. However, they are not rechargeable.

If the customer chooses to intermittently use NiCd batteries, the following may apply. Note the limitations above regarding leaving the battery on the charger and self-discharge when the battery is not connected to the charger. Periodically running the PAPR and checking airflow on the hour is a fairly easy way for an end user to check the performance of the battery. If the PAPR will be used for an 8-hour shift, its performance should be verified hourly over an eight hour run time. Like all rechargeable batteries, NiCds will eventually lose their ability to hold a charge. This is usually a function of storage and use temperature, how many times they've been discharged and charged, and if they've ever been deep discharged. (Deep discharging is when the battery is completely discharged. When this happens, some of the cells can reverse polarity. Therefore, deep discharging should be avoided.)

It is important that intermittent users consider how they plan to use and maintain their batteries. The choice of lithium vs. NiCd should be made depending on the required length and frequency of use, and if the lithium battery is approved with their PAPR. If NiCd batteries are chosen, a charging schedule should be adopted that will not damage the battery. In addition to the monthly instantaneous flow checks required by OSHA for emergency use equipment, the performance of the PAPR over the intended use length (e.g. 4 hour 8 hours) should be evaluated on a routine basis (e.g. every 6 or 12 months). Please also see Technical Data Bulletin #151 referenced above.

If you have any questions on the above, please feel free to contact Mike Cowell (575-5579) or Erik Johnson (575-5573).

Erik Johnson
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