

## NICKEL-CADMIUM Battery Advantages

**W**hat justifies higher cost nickel-cadmium batteries used in Philips Bodine fluorescent emergency ballasts versus less expensive sealed lead-acid batteries? To answer this question let's look at some of the advantages nicad batteries offer:

### **Operational within a wide temperature range.**

The ballast channel of fluorescent fixtures typically reaches 50 degrees Celsius. Philips Bodine uses only high-temperature nicad batteries that are rated for continuous duty at up to 70 degrees Celsius. Specially designed electrodes, electrolyte and separator are used that maintain long service life at high temperatures. No comparable high-temperature lead-acid battery is available.

### **Completely sealed construction.**

Electrolyte leakage is prevented, and the battery is maintenance free and can be mounted in any orientation. Unlike most "sealed" lead-acid batteries equipped with vent caps, nicad batteries do not vent hydrogen and oxygen in the standby charging condition.

### **Long storage life and long service life.**

Unlike sealed lead-acid batteries, nicad batteries can be stored for long time periods and in a fully discharged condition without deterioration. They can last over 500 charge/discharge cycles. The nickel-cadmium cell is a system in which the electrodes change in oxidation state without changing physical state. The active materials are insoluble in the alkaline electrolyte. In a lead-acid system, material transfers from one electrode to the other and the active materials are consumed during operation and storage.

### **Ability to withstand overcharge and overdischarge.**

Our products use a low parts-count, extremely reliable, constant-current charger; lead-acid batteries require a multi-rate charger with a current-limited mode followed by temperature-compensated float voltage control. Other-wise, the electrolyte is converted to explosive gases that escape. Lead-acid batteries need a low-voltage disconnect circuit to protect against deterioration from deep discharge. No protection against deep discharge is needed with nicads because the metals are inert in the electrolyte.

### **Low internal resistance and constant discharge voltage.**

Low internal resistance enable high-rate discharge and high discharge efficiency. Constant discharge voltage means that emergency illumination remains relatively constant over the entire emergency runtime. Lead battery Ampere-hour ratings are usually based on 10-hour or 20-hour rates. Because of lower discharge efficiency, they do not produce rated Ampere-hour capacity when discharged quicker as in emergency lighting applications.

### **Metal casing which ensures ruggedness.**

The nicad's steel cylindrical can resist internal pressure and external damage better than the plastic rectangular enclosure of lead acid batteries.