

How to test general purpose Alkaline batteries?

Introduction

Testing the performance of general purpose batteries in a correct way is a complex exercise since the real-life use needs to be simulated. Sometimes, however, news and consumer organisations conduct battery testing to compare various brands and draw conclusions based on the performance of these batteries. Often, however, these tests are done by simply putting the batteries in an appliance and leaving it running constantly and the results can be seriously flawed and misleading.

With respect to general purpose alkaline batteries, the correct test methods and performance are officially described in standard (IEC 60086) which sets out a variety of discharge tests. These application tests simulate their common electrical usage by a regular consumer and are updated frequently to be in line with recent trends.

There are a couple of key-principles which are essential to be taken into account in the testing process:

- Multiple batteries (8) of the same brand and type need to be tested
- Intermittent testing *i.e.* not continuous running of an appliance
- The batteries should be tested in multiple application tests
- The actual conditions of the testing environment are important

Intermittent testing of batteries

It is important to know that all application tests have an intermittent and not a continuous drain profile which is in line with the common usage pattern of batteries by consumers. This difference is very important since an intermittent drain allows the battery to recover and increase its discharge efficiency and corresponding capacity. The efficiency of recovery is based on several items but also the battery recipe itself and significant differences can be measured between battery brands and grades.

Multiple application tests

Furthermore, testing one drain profile gives a very selective view of the total battery discharge performance. For one battery type, up to six different application tests are currently included in the official testing requirements. This simulates the use of batteries in low, middle and high energy demanding appliances. Very good performing batteries in low drain do not automatically perform well in high drain usage and vice versa.

Standard conditions during discharge testing

Storage before discharge testing and the actual discharge test should be carried out under well-defined conditions.

In particular, temperature is of great importance for high drain application tests. Small temperature fluctuations of 2°C can already have a significant impact on the battery performance. The relative humidity control is important to avoid condensation effects on the battery itself.

Finally, the age of the battery also has to be taken into account since this can have quite an impact on testing results.