

## Screening Procedures of NiCd Cells for Low Earth Orbit Satellites

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SaTReC successfully launched two microsatellites named KITSAT-1 and 2 in 1992 and 1993 respectively. Those two scientific experimental satellites contain rechargeable NiCd cells as their power source for eclipse periods. For such small experimental spacecraft missions as KITSAT series, commercial grade cells may be desirable due to low cost. Differences between space quality and commercial grade cells range from physical construction to the level of quality control in manufacturing. These differences are reflected in both greater cost and increased lead time for space quality cells. In this paper, we describe the cell screening procedures for KITSAT NiCd battery cells and in-orbit performance of the battery cells. In order to use commercial grade cells in space, candidate cells must be thoroughly tested and quality controlled. We have developed our own commercial grade NiCd cell screening procedure for micro and small spacecraft power systems. The procedures consist of vibration, overcharge characteristics, capacity, high-rate discharge, and charge retention. We need to consider the orbit, maximum depth of discharge(DOD), operating temperature and characteristics of battery charge control in the screening procedure. Instead of using a capacity matching method as cell selection criteria which is widely used for GEO application, we use a matching scheme of charge-voltage characteristics for LEO applications with very low DOD. In-orbit operation results for last 3 years have shown that our screening procedures are effective.

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