

Tadiran:

The **smartest** choice for **reliable** metering applications



A typical smart metering application is an electronic gas meter with electrical valve for prepayment functions and low power radio for bi-directional communications. The preferred power source for such long life requirements are 3.6 Volt lithium thionyl chloride batteries. But these batteries differ a lot, and predicting the expected operating life merely from the cell's nominal capacity can be misleading as the cell's available capacity is also affected by the internal self-discharge rate, impedance growth during discharge and the specific load profile.

For a reliable life time calculation, Tadiran utilises a real-time database with various load profiles. This real-time database is continuously maintained for various cell types, including the XOL type suitable for a 25-year operating life. Additionally, Tadiran considers the effects of low temperature in its lifetime calculations.

High quality materials, fully automated manufacturing processes and an ISO-9001:2000 certified quality system guarantee outstanding consistency for Tadiran's products. As a result, Tadiran lithium thionyl chloride batteries are a powerful energy supply choice for smart metering devices.

For power capability Tadiran combines its primary battery with a special pulse load supporting capacitor, the so-called Hybrid Layer Capacitor (HLC) that was introduced more than 15 years ago. It is based on electrodes comprising lithium intercalation compounds. Major properties of the HLC, especially developed to provide an excess of 25 years of operation in conjunction with a primary lithium battery, include:

- improved sealing system (LASER welding, glass-to-metal feed through)
- improved temperature behaviour (-40°C to +85°C)

Furthermore, the main advantages of an HLC in comparison to a customary super capacitor are:

- 10 times less leakage current
- proven lifetime at 10 years + with no capacity loss
- no balancing needed
- compact and shock resistant construction

Tadiran's real-time database covers PulsePlus applications. It is continuously verified by extensive application tests. One of these tests has been running for 15 years, applying a current profile typical for metering applications. Even after such a long time the cell with parallel connection to an HLC is able to deliver the peaks with only marginal voltage drops.

Considering the high quality standards, continuously maintained real-time database and recurring application tests, Tadiran's PulsePlus batteries (i.e. a D-cell of type SL-2880 and an HLC-1020L) are a smart choice for reliable metering applications with long life time demands.

In Figure 1 a LTC cell was discharged with 150 mA pulses and 50 μ A background current at room temperature almost to the end of its life. Even under these extreme

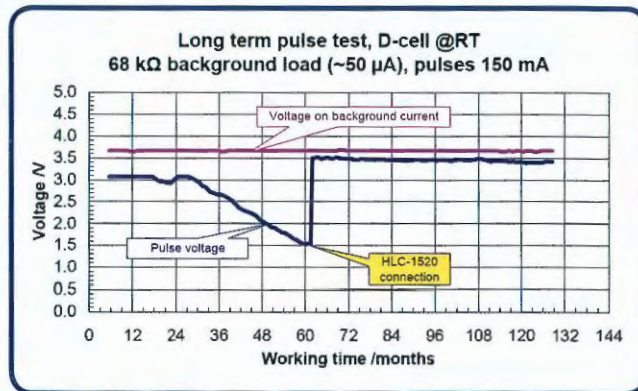


Figure 1: LTC cell discharge and HLC connected recovery testing

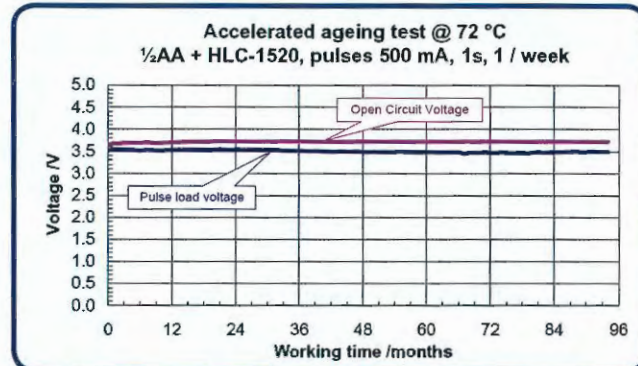


Figure 2: An accelerated aging test at 72°C shows a high degree of voltage stability for a vast time period

conditions the connection of an HLC recovered the pulse voltage immediately and sustainably.

In Figure 2 an accelerated aging test at 72°C shows a high degree of voltage stability for a vast time period. Assuming Arrhenius' equation, the simulated lifetime at room temperature is far beyond 25 years. ■

ABOUT THE AUTHOR

Marc Henn studied mechatronics engineering near Frankfurt/Main and holds a master's degree in business administration. He joined Tadiran as manager of application engineering in 2016.

ABOUT THE COMPANY

Tadiran Batteries is a leader in the development of lithium batteries for industrial use. Tadiran Batteries are suitable where utility meters require a single long term stand-alone power source even if it has to supply high pulse currents for a GSM module.

