

# TADIRAN:

## The better choice for smart metering requirements

Automated processes lead to increasing efficiency of time, work and money. In the emerged field of smart metering, automation brings additional benefits such as prevention of inaccurate reading and improved customer service through continuous monitoring of customer demand and usage patterns.

thionyl chloride batteries. But those 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

operation in conjunction with a primary lithium battery, such as:

- improved sealing system (LASER welding, glass-to-metal feed through)
- improved temperature behaviour (-40 °C to +85 °C)
- decreased leakage current (approximately 10 times less than lithium ion batteries or super caps)

Gas meter with low power radio module		
<b>Current profile</b>		
Base current	Quiescent current	40 µA
	Sensor	10 mA for 10 ms every 2 s
Peak current	Valve	35 mA for 3 s once per month
	Low power radio	35 mA for 1 s once per hour
Calculation	Average current	100 µA
	Consumption	876 mAh per year
<b>Requirements</b>		
	End voltage	2.9 V
	Temperature	-20 °C ... +55 °C (avg. +18 °C)
<b>Application Proposal*</b>		
Suitable solution	Battery type	SL-2880 (D) + HLC-1020L
	Nominal capacity	19 Ah
	Nominal voltage	3.6 V
Lifetime calculation	Self-discharge (avg.)	12.1 µA (D-cell) + 1.1 µA (HLC)
	Calculated battery life	17.1 years

▲ **Table 1: Typical application data of an electronic gas meter with low power radio module**

Efficient automation in the smart metering sector presumes a sustainable solution of the energy supply problem in order to avoid expensive battery replacements. Utility meters with an expected service life of more than 20 years will allow for respectable savings. The comparison of a device characterized by a lifetime of 7–10 years with a device with 20 years of service life brings an exciting result: assuming a battery replacement cost of €30, a supply company with e. g. 5,000 house connections will be able to realize savings of €150,000 within 10 years. No doubt about it: Expanding battery life time is of large significance for the industry.

A typical smart metering application is an electronic gas meter with electrical valve for prepayment functions and low power radio for bi-directional communications. Table 1 shows the battery relevant data of such an application.

The preferred power source for such long life requirements are 3.6 Volt lithium

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 25 years' operating life. Additionally, Tadiran considers low temperature effects in its lifetime calculations.

As a result, Tadiran lithium thionyl chloride batteries are a powerful energy supply choice for smart metering

devices. High quality materials, fully automated manufacturing processes and an ISO-9001:2000 certified quality system guarantee an outstanding consistency for Tadiran's products.

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 are especially developed for even 25+ years of

Further the HLC features low internal impedance throughout the whole battery life, which is suitable for reliable lifetime prediction.

One of the so-called PulsesPlus batteries is composed of a D-cell type SL-2880 and an HLC-1020L. This battery would power the gas meter application described in Table 1 for a minimum of 17 years, as predicted by Tadiran's proprietary lifetime calculation. This fulfils the 15 years' requirement of such application with a comfortable safety margin.

Besides the real-time database, Tadiran conducts recurring application tests to verify the calculated lifetime.

One of these tests is running for 15 years applying a current profile similar to the profile defined in Table 1 (100 µA continuous discharge with 30 mA pulses). The cell with parallel connection of an HLC is able to compensate the voltage drop during the 30 mA phase, whereas the conventional cell drops below 2.5 Volts with corresponding performance losses.

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

#### ABOUT THE AUTHOR

Carsten Jähne studied Physics in Dresden and Heidelberg. In 2014 he joined Tadiran Batteries as Manager of Applications Engineering.

#### 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.

[www.tadiranbatteries.de](http://www.tadiranbatteries.de)

