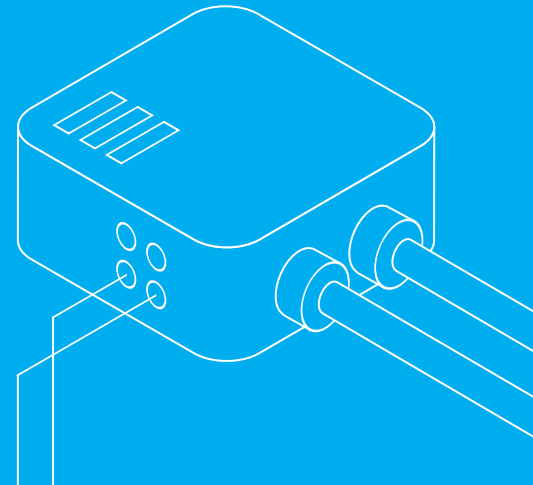


Example SmartValve Battery Calculations

A guide to understanding and calculating power and battery performance for the SmartValve



Power Consumption

The cThings[®] SmartValve (Battery Powered) is optimised to operate in standard operating conditions (SOCs) for many years. It achieves this by operating in a state of deep sleep for 99.9% of its lifetime, waking periodically to communicate and actuate a connected valve.

STANDARD OPERATING CONDITIONS

- settings unchanged from factory default
- good LoRaWAN connectivity and signal quality (SF7)
- installed in a standard indoor environment
- installed according to the installation manual and supplier recommendations

The following table outlines the expected power consumption per hour (as an average) for SOCs and for when the SmartValve is configured to communicate once every hour (non-standard).

	Power Ratio	Consumption (µAh)
STANDARD		
Communication	12.2%	1.53
Operation	65.5%	8.21
Valve* **	22.4%	2.81
Total	-	12.54

HOURLY COMMUNICATION

Communication	33.2%	5.48
Operation	49.8%	8.22
Valve* **	17.0%	2.81
Total	-	16.51

i IMPORTANT

* The valve is assumed to be operated (inclusive of scheduled cycling) twice every 28 days. One operation is opening and closing the valve

** Different valves used in various conditions will impact consumption. Calculations based on a standard 5V valve under controlled conditions



Battery Pack

As standard the SmartValve is supplied with a replaceable alkaline battery pack.

STANDARD BATTERYPACK SPECIFICATIONS

- 4x alkaline C-Cells providing a total voltage of 3.2 V
- Capacity of circa. 15,000 mAh
- Self-discharge rate of circa. 3% per year

Indicative Battery Life Calculations

The following provides guidance for estimating possible battery life for the SmartValve by combining the “Hourly Communication” Power Consumption data with the standard Battery Pack information. This estimation otherwise assumes the SmartValve is operated according to SOCs.

The SmartValve has an in-built safety mechanism to ensure sufficient power is available within the battery to safely operate the valve. This results in only a part of the battery capacity being available to the SmartValve for operation in conjunction with a valve. For a standard 5V valve this usable battery capacity has been estimated as 32.5%. The usable battery capacity will be variable depending on the valve used.

STORAGE

Whilst in storage the battery will decrease by 450 mAh per year.

OPERATION

Whilst in operation the battery will decrease by 595 mAh per year.

i IMPORTANT

Batteries should always be stored in a cool dry place. Failure to do so may lead to reduced battery performance. Battery life can also be impacted by environmental conditions and mechanical wear.