



## SuperBattery

**Charged in 60 seconds**, bridging the gap between supercapacitors and batteries

SuperBattery is the first non-supercapacitor product for Skeleton, and fills the technology gap in the energy storage market, delivering peak power within seconds while excelling in up to 30 minutes applications.

SuperBattery is based on Skeleton's patented Curved Graphene material and is an innovative technology combining the characteristics of supercapacitors and batteries.

### Li-ion Batteries

Use a chemical reaction to store energy



- Limited power density (0.5 kW/kg)
- High energy density (205 Wh/kg)
- Limited cycle life (<6000)
- Slow charge rate (1.5 C)
- Safety concerns
- Utilizes critical raw materials (Li, Graphite, Co)

### SuperBatteries

Based on supercapacitor technology



- High power density (10 kW/kg)
- Increased energy density (65 Wh/kg)
- Long cycle life (50,000)
- Fast charge rate (20 C continuous, 100 C peak)
- High inherent safety
- High recyclability and sustainability
- No Graphite, no Co, <5% Li

Skeleton's products provide high-power energy storage for applications with up to 15-minute cycle durations

Lower cost compared to Li-ion batteries in this application space

Supercapacitors  
<1s to 60s



SuperBatteries



Li-ion batteries



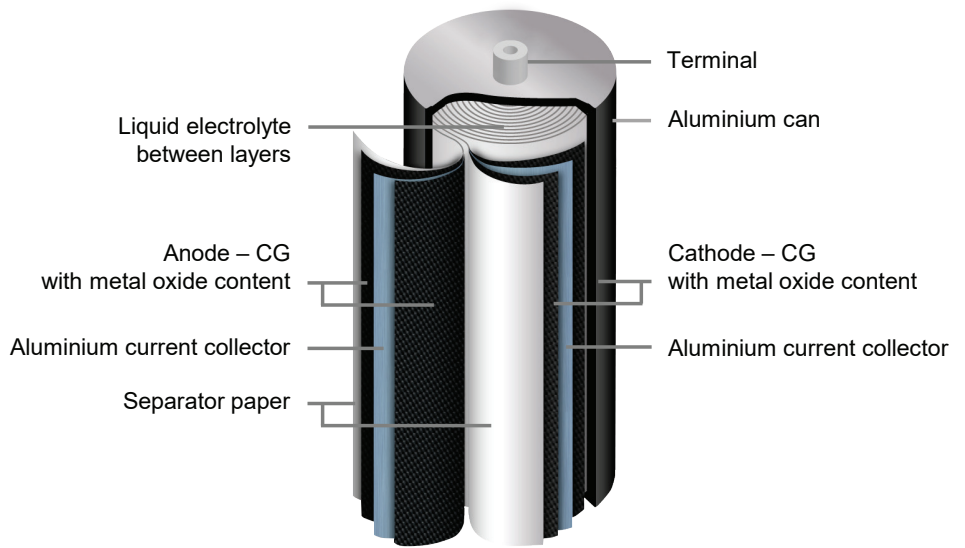
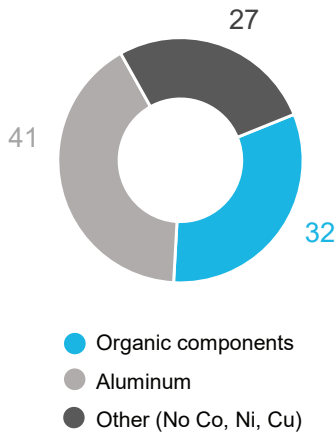
Application time

1 - 15 minutes

>15 minutes

# SuperBattery - Sustainable and Safe

SuperBattery technology has several advantages over Li-Ion batteries from materials to cell design.



- Narrow range of materials & low number of components
- Aqueous coating for both Anode and Cathode
- No cobalt, no copper, no graphite, <5% lithium
- Aqueous processing for recycling possible
- No risk of fire or explosion upon disassembly



## SuperBattery Cells

### General Specifications

	Value	Unit
<b>Electrical</b>		
Maximum voltage	3.0	V
Nominal voltage	2.25	V
Minimum voltage	1.0	V
Maximum voltage in voltage hold	2.8	V
Rated capacity	23.0	Ah
<b>Safety</b>		
Short circuit current, typical	2.0	kA
<b>Energy</b>		
Stored energy (1C)	51.8	Wh
Specific energy	64.7	Wh/kg
Energy density	132.7	Wh/L
<b>Fast charging/discharging</b>		
Continuous cycling C-rate	20.0	C
10s max. power	4.0	kW
1s max. power	8.0	kW
<b>Standards and certifications</b>		
Vibration specification	ISO 16750-3, Table 14, Table 12	
Certifications	RoHS	

	Value	Unit
<b>Temperature ranges</b>		
Storage	-30...50	°C
Operating	-30...50	°C
<b>Physical</b>		
Mass, typical (±6g)	0.800	kg
Volume	0.390	L
Diameter (±0.2mm, including label), D1	60.2	mm
Length (±0.3mm), L1	138.0	mm
Terminal diameter, D2	12.0	mm
Terminal length, L2	3.2	mm

