

# Rechargeable high temperature lithium-ion battery

## VL 32600-125

Cylindrical, D-sized spiral cell  
 Reusable up to 200 times  
 in demanding >100°C environments.  
 More than 1000 typical oil drilling surveys up to 125°C.

**Saft always supplies VL cells in assemblies or as customized battery system constructions**



### Benefits

- More than 1 month life duration in operation: floating, pulse discharge at 125°C
- Ability to perform safely and reliably with severe vibration/shock constraints
- Attractive cycle life
- Easy integration within multi-cell tubular cylindrical packs
- High savings on operation costs

### Key features

- Sturdy and pressure resistant stainless steel envelope
- Hermetic and corrosion-proof glass-to-metal sealing
- Redundant safety features
- Withstanding very high level of vibrations and shocks
- Non-restricted for transport/ Non-assigned to Class 9 according to the UN Recommendations on the transport of dangerous goods - Model Regulations

### Main applications

- Oil drilling and all downhole high temperature environments
- Measure While Drilling (MWD)
- Oil and gas well monitoring
- Heat sterilizable applications

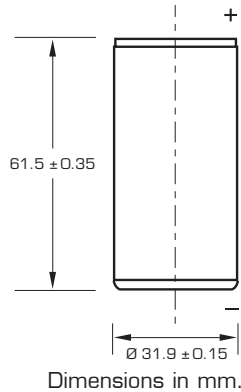
| Cell size references  | R20 - D  |
|---|--|
| <b>Electrical characteristics</b>   |  |
| Nominal voltage (0.9 A rate at 125°C)   | 3.6 V  |
| Nominal capacity<br><i>(under 0.9 A at +125°C with 2.5 V cut-off. The capacity restored by the cell varies according to current drain, temperature and cut-off)</i> | 4.5 Ah   |
| Nominal energy  | 16.2 Wh  |
| Cycle life (C/5 rate, between 2.5 and 4.1 V) - (100 % DOD)<br>70 % original capacity still restored after:  | 30 cycles at 125°C<br>45 cycles at 115°C<br>300 cycles at 80°C |
| <i>(Cycle life depends on the using conditions, consult Saft)</i>   |  |
| Cycle life with partial DOD (C/5 rate, below 4 V) - (25 % DOD)<br>70 % original capacity still restored after:  | 200 cycles at 125°C  |
| <b>Physical characteristics (unsleeved cells)</b>   |  |
| Diameter (max)  | 32.05 mm (1.262 in)  |
| Height (max)  | 61.85 mm (2.435 in)  |
| Typical weight  | 139 g (4.90 oz)  |
| Lithium equivalent content  | approx. 1.35 g   |
| <b>Operating conditions</b>   |  |
| Charge method   | Constant Current/Constant Voltage                              |
| Maximum charge voltage  | 4.10 +/- 0.05 V  |
| Recommended charge voltage range at 125°C   | 3.8 V to 4.0 V   |
| Maximum recommended charge current  | 0.9 A (C/5 rate) at 20°C to 125°C                              |
| Charge temperature range  | 0/125°C  |
| Maximum continuous discharge current  | 2.3 A (C/2 rate)   |
| Pulse discharge current   | up to 3.4 A for 2 seconds                                      |
| Discharge temperature range   | 0/125°C  |
| <i>Consult Saft for available and customized battery packs</i>  |  |



# VL 32600-125

## Battery assembly

In order to operate properly, individual Li-ion cells are mechanically and electrically integrated in battery assemblies specific to each application. The battery assembly incorporates electronics for performance, thermal and safety management.



## Shocks and vibrations

- Ability to withstand in the entire operating temperature range 750 G peak/0.5 msec repetitive shocks on axial and radial axes *(undischarged and partially discharged cells)*
- Ability to withstand in the entire operating temperature range 20 G<sub>RMS</sub> random vibrations 2 to 4 hours along X, Y and Z axis
  - < 30 Hz @ ≥ 6 dB/octave
  - 30-80 Hz @ 3 dB/octave
  - 80-300 Hz @ 0 dB/octave
  - 300-1000 Hz @ -3 dB/octave
- Ability to withstand in the entire operating temperature range 1 hour of linear sine sweep at 30 G peak, from 30 to 2000 Hz along X, Y and Z axis

## Storage

- It is recommended to maintain the storage area clean, ventilated and preferably not exceeding 30°C

## Warning

- Fire, explosion and burn hazard
- Do not short circuit, crush, disassemble, heat above 140°C (284°F), incinerate, or expose contents to water

## Saft

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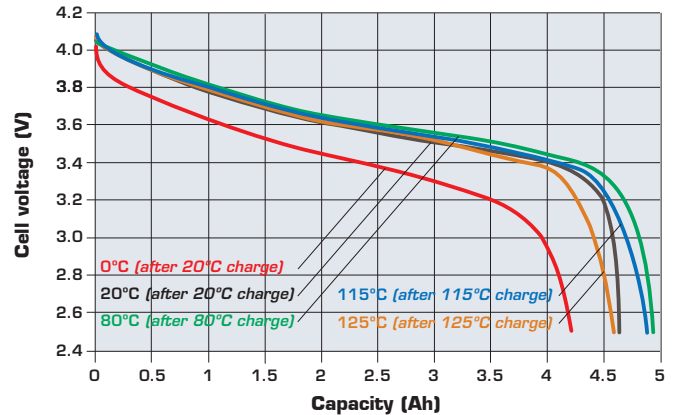
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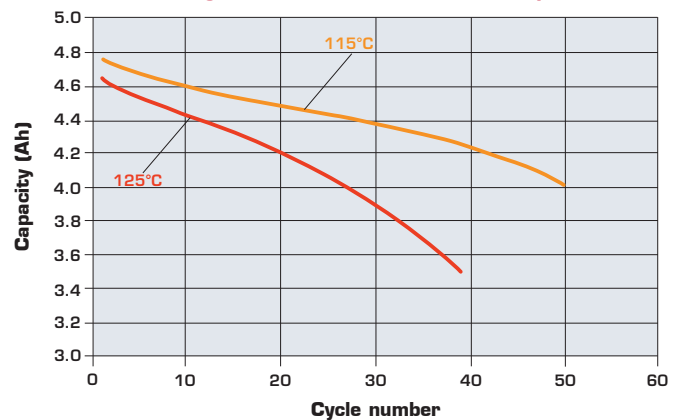
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Produced by Arthur Associates Limited.

Typical discharge curve under C/5 rate (900 mA)

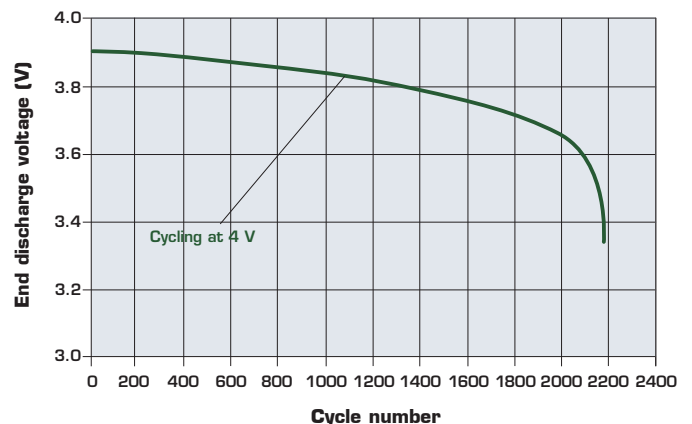


Restored capacities during cycling 2.5/4.1 V discharge 960 mA (C/5 rate) versus temperature



Down-hole mission profile: end discharge voltage versus cycle number

20 min charge at 4.00 V  
Discharge (250 mA / 10.5 s + 1.25 A / 1.5 s) during 6 min + 250 mA / 2 min



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