High Temperature Cell

Lithium Battery Professional
1987–1991

1987.10 Establishment Teckraf Co., Ltd. (at present Vitzrocell)
1988.05 Technical Adoption of Cell with Wilson Greatbatch USA
1990.04 Registration as a Supplier of Ministry of National Defence
1990.05 Establishment Factory Line in hap-duk
1991.05 Establishment of R&D Center

1992–2000

1993.10 Nominated as a Sole Manufacturer for Korean Military
1996.01 UL Approval
1998.01 Establishment Factory Line in Ye-san
1998.08 Acquired ISO 9001 Quality Certification
2000.05 Unification of CI and declaration of Vitzro Group

2001–2010

2002.06 Changed Company Name to Vitzrocell from Teckraf
2004.06 Designated as Technology Company from KIBD
2004.11 Granted USD 10Million Exportation Prize
2005.05 Awarded “Advance Technology and R&D Center(ATC)” (MKE)
2006.03 Acquired Environment System Certification (ISO 14001)
2007.11 Acquired Defence Quality Management System Certification from DTaQ
2009.05 Grand Prix Prize of Excellent Corporate Management in Chungnam Province
2009.10 VITZROCELL Listed on KOSDAQ(Go Public)
2009.11 “The Technology Fast 500” by Deloitte
2010.07 Awarded “Excellent labor-management company” by Ministry of Labor
2010.11 Awarded a Prize of 20Million Export
2010.12 NEP Approval (Ministry of Knowledge & Economy)
2011.11 Awarded “Excellent Create Employment Company” by Chungnam Province
2012.05 Awarded “World Class 300 Company” (Ministry of Knowledge & Economy)
2012.08 Acquisition of Exium Technologies, Inc.
2012.10 Establishment of 2nd factory and the expansion of 1st factory
2013.07 Awarded “Excellent Labor-Management Company” by Ministry of Labor
2013.10 Awarded “Global Specialized Company” by Ministry of Trade Industry and Energy
2013.11 Awarded a prize of USD 30Million export (July, 2012 – June, 2013)
2014 Awarded a prize of USD 50Million export (July, 2013 – June, 2014)
Oil & Gas - MWD

Application

- Power Source of MWD (Measurement While Drilling) & LWD (Logging While Drilling)

Main Products

- DD-HR-150(G)
- DD-HR-150(A)
- DD-MR-165
- CC-MR-165(G) Series (21/25/26mm)

Main Characteristics

- 3.6V Li/SOCl₂
- High Capacity
- Extreme Shock & Vibration Resistance
- 150°C/185°C Operational Temperature
- High Rate Capability

Summary of Product Line-up

<table>
<thead>
<tr>
<th>Model</th>
<th>Size(mm)</th>
<th>Capacity</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD-HR-150(G)</td>
<td>Φ 31.9 × h 127</td>
<td>26Ah ~ 28Ah</td>
<td>-40°C ~ 150°C</td>
</tr>
<tr>
<td>DD-HR-150(A)</td>
<td>Φ 31.9 × h 127</td>
<td>27Ah ~ 29Ah</td>
<td>-40°C ~ 150°C</td>
</tr>
<tr>
<td>DD-MR-165</td>
<td>Φ 31.9 × h 127</td>
<td>26Ah ~ 29Ah</td>
<td>-40°C ~ 185°C</td>
</tr>
<tr>
<td>CC-MR-165(21/25/26mm)</td>
<td>Φ 21.0 × h 102, Φ 25.0 × h 102, Φ 25.0 × h 102</td>
<td>7Ah ~ 8Ah, 11Ah ~ 13Ah, 13Ah ~ 14Ah</td>
<td>-40°C ~ 185°C</td>
</tr>
</tbody>
</table>

Oil & Gas Exploration (MWD, LWD)

Vitzrocell's high temperature batteries are used in devices that require high power demands under harsh usage conditions (high shock and vibration). These cells are typically used in extreme oil and gas extraction conditions where power cannot be interrupted. The continuous addition of new high temperature battery to the company Product Lineup will help propel Vitzrocell into the industry leader within the next few years.

Our Business

Oil & Gas Exploration (MWD, LWD)

Vitzrocell’s high temperature batteries are used in devices that require high power demands under harsh usage conditions (high shock and vibration). These cells are typically used in extreme oil and gas extraction conditions where power cannot be interrupted. The continuous addition of new high temperature battery to the company Product Lineup will help propel Vitzrocell into the industry leader within the next few years.

Pipeline Inspection Gauge (PIG)

Vitzrocell’s high temperature battery, especially Li/SOCl₂ (3.9V) batteries are widely used in PIG market. Vitzrocell’s Li/SOCl₂ (3.9V) batteries are very competitive for its higher capacity (more than 20%) and low temperature performance comparing it’s competitor. We are proud of its outstanding performance overwhelmed the competitor’s.

Ocean Equipments

In today’s market, batteries for ocean equipment operate in a variety of high current-pulse applications that require low background currents and short periods of high current pulses over an extended period of time. Vitzrocell’s Li/SOCl₂ battery pack, Hybrid type, and High temperature battery (3.9V) are currently used in subsea monitoring, subsea navigation, underwater surveillance systems, hydrographical survey equipment, acoustic release, mini beacons, ice flow monitors and current meters.

Vitzrocell’s Li/SOCl₂ (3.9V) batteries are very competitive for its higher capacity (more than 20%) and low temperature performance comparing it’s competitor. We are proud of its outstanding performance overwhelmed the competitor’s.
**Key Features**
- 304L stainless steel structure
- Non bulge design
- Hermetic glass to metal seal engineered for leak free operation
- Integral safety fuse and parallel diode to protect from short circuits and guarantee continued pack operation
- Reduced Electrode Surface Area, high rate capability & lower self-discharge.

**Benefits**
- Industry leading capacity
- High rate capability for high constant current and pulse applications
- Gallium based electrolyte providing excellent start up and minimal passivation
- Automated assembly for uniform performance
- Ceramic shock and vibration testing to ensure trouble free operation under severe drilling conditions
- Very competitive price

**Technical Support**
- We pledge our full support to provide you with the service you deserve
  - Application Analysis
  - Testing and Test Reports
  - Analysis of field problems and reports
  - Engineering support for custom applications

**Safety and Transport Certifications**
- UN/DOT Certified: Class 9 Transport, UN3090 Lithium Metal Batteries
- Shock Testing: 1000G 0.5 ms 10 shocks each axis at 150°C
- Vibration Test: 30G Sine & 20G random vibration at 150°C (Full report available)
- Hermetic glass-to-metal seal engineered for leak free operation
- Integral safety fuse and parallel diode to protect from short circuits and guarantee continued pack operation

**External Dimensions**
- **Nominal Capacity**: 26Ah/25Ah
- **Open Circuit Voltage**: 3.66V
- **Nominal Closed Circuit Voltage**: 3.3V
- **Discharge Temperature vs. Nominal Capacity**: 500mA Discharge 25°C
- **Fuse**: 5.0A
- **Parallel Diode**: 3.0A
- **Current (Amps)**: 0, 5, 10, 15, 20, 25, 30
- **Temperature °C**: 0, 25, 50, 75, 100, 125, 150
- **Capacity (AH)**: 1.5, 3, 4.5, 6, 7.5, 9, 10.5, 12, 13.5, 15

**Performance Discharge Comparison**
- **High Rate DD Performance Comparison Discharge at 135°C**
- **High Rate DD Performance Comparison Discharge at 125°C**
- **High Rate DD Performance Comparison Discharge at 115°C**
- **High Rate DD Performance Comparison Discharge at 105°C**

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Email: overseas@vitzrocell.com
Web: www.vitzrocellcorp.com

**Model: DD-HR-150G**

**Packed in a cool (-30°C) and dry location**

**Warning**
- Fires, explosion, and burn hazards
- Contents of this hermetically sealed cell are water reactive and will produce flammable and toxic gases if exposed to water or not recharge, expose to frame, short circuit, crush, disassemble, or incinerate
- Do not expose to cells in excess of the maximum operating temperatures, 150°C

**MW D Lithium Battery**

**Model: DD-HR-150G**

**Performance Discharge Comparison**
- **High Rate DD Performance Comparison Discharge at 150°C**
- **Capacity (AH)**: 15, 30, 45, 60, 75, 90, 105, 120
- **Current (Amps)**: 0, 5, 10, 15, 20, 25, 30

**VITZROCELL Co., Ltd.**

**VITZROCELL Co., Ltd.**
MWDLithium Battery

**MODEL:** DD-HR-150A  **PN:** 32126H150A

**Key Features**
- 304L stainless steel structure
- Non-bulge design
- Non-magnetic fo metal seal engineered for leak free operation
- Integral safety fuse and parallel diode to protect from short circuits and guarantee continued pack operation
- Reduced Electrode Surface Area, high rate capability & lower self-discharge.

**Benefits**
- Industry leading capacity
- High rate capability for high current constant and pulse applications
- Aluminum based electrolyte providing lower cost and very low self-discharge
- Automated assembly for uniform performance
- Extreme shock and vibration testing to ensure trouble free operation under severe drilling conditions
- Very competitive price

**Technical Support**
- We pledge our full support to provide you with the service you deserve
- Application Analysis
- Testing and Test Reports
- Analysis of field problems and reports
- Engineering support for custom applications

**Abuse and Transport Certifications**
- UN/DOT Certified: Class 9 Transport, UN3090 Lithium Metal Batteries
- Shock Testing: 1000G 0.5 ms 10 shocks each axis at 150°C
- Vibration Testing: 30G Sine & 20G random vibration at 150°C (full report available)

**Cell Characteristics**
- **Nominal Capacity:** 27Ah-29Ah
  - Based on 500mA discharge at temperatures of 25, 50, 75, 100, 125, and 150°C to a 2.0V cutoff
- **Open Circuit Voltage:** 3.6V
- **Nominal Closed Circuit Voltage:** 3.3V
  - Based on stable CCV produced at 25°C under a 500mA load
- **Pulse Discharge Capability:** 4A
  - 4 Amp pulse discharge of 0.1 sec. at 75°C will maintain > 3.0V. Contact Exium to determine the effect of higher currents, longer duration pulses, or lower temperatures. In some cases a capacitor may be required to maintain the desired voltage.
- **Constant Current Discharge:**
  - 60Ah (max capacity) 130Ah (reduced capacity)
- **Storage Conditions:**
  - 30°C (86°F) Max
  - Operational Temperature Range: 40°C to 150°C

**Physical Characteristics**
- **Diameter:** 31.30mm (1.26in)
- **Height:** 127.0mm max (5.0in)
- **Weight:** 230g
- **Lithium Metal Content:** 8.02g

**External Dimensions**

**Warning**
- Fire, explosion, and burn hazard
- Contents of this hermetically sealed cell are water reactive and will produce flammable and toxic gases if exposed to water
- Do not recharge, expose to flame, short circuit, crush, disassemble, or incinerate
- Do not expose cell to temperatures in excess of the maximum operating temperature, 150°C

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2014.06.02
**MWD Lithium Battery**

**MODEL: DD-MR-165**

**Key Features**
- 384L stainless steel structure
- Non-bulge design
- Hermetic glass-to-metal seal engineered for leak free operation
- Integral Parallel diode
- Reduced Electrode Surface Area

**Benefits**
- Industry leading capacity in Non-Bulge Design
- Moderate Rate Capability for constant current and pulse applications
- Gallium based electrolyte providing excellent start up and minimal passivation
- Automated assembly for uniform performance
- Extreme shock and vibration resistant design, trouble free operations under severe drilling conditions
- Very competitive price

**Technical Support**
- We pledge our full support to provide you with the service you deserve
- Application Analysis
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- Analysis of field problems and reports
- Engineering support for custom applications

**Abuse and Transport Certifications**
- UN/DOT Certified : Class 9 Transport, UN3090 Lithium Metal Batteries
- Shock Testing : 1000G 0.5 ms 10 shocks each axis (90 total) at 165°C
- Vibration Testing : 300 Sin & 20G random vibration at 165°C, 13th total
- Shock : 1000G 0.1 ms shocks all 3 axes (11,000 total)
- Full Report Available

**Cell Characteristics**

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>Nominal Capacity (Ah)</th>
<th>Pulse Discharge Capability (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25°C</td>
<td>30.50-29Ah</td>
<td>2A</td>
</tr>
<tr>
<td>75°C</td>
<td>26.1Ah</td>
<td></td>
</tr>
<tr>
<td>100°C</td>
<td>24.0Ah</td>
<td></td>
</tr>
<tr>
<td>125°C</td>
<td>22.2Ah</td>
<td></td>
</tr>
<tr>
<td>150°C</td>
<td>20.1Ah</td>
<td></td>
</tr>
<tr>
<td>165°C</td>
<td>18.0Ah</td>
<td></td>
</tr>
</tbody>
</table>

**Open Circuit Voltage**
- 3.6V DD-Size Lithium Thionyl Chloride Cell (Li-SOCl₂), Gallium Electrolyte
- 165°C Operational Temperature
- Extreme Shock and Vibration
- Moderate Rate Capability
- High Capacity
- Extreme Shock and Vibration Resistance
- 185°C Operational Temperature

**Storage**
- Store cells in a cool (< 30°C) and dry location

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- Web : www.vitzrocell.com

**Performance Discharge Comparison**

**Non-Bulge DD-MR-165 Comparison 300mA**

- Nominal Capacity 26.5Ah-29Ah
- Open Circuit Voltage 3.66V
- Constant Current Discharge 300mA (max capacity)
- Nominal Closed Circuit Voltage 3.4V
- Pulse Discharge Capability 2A

**Exium**

- Constant Current Discharge 300mA (max capacity)
- Nominal Closed Circuit Voltage 3.4V
- Pulse Discharge Capability 2A

**Competitor 1**

- Constant Current Discharge 28.0Ah
- Nominal Closed Circuit Voltage 3.3V
- Pulse Discharge Capability 2A

**Competitor 2**

- Constant Current Discharge 26.1Ah
- Nominal Closed Circuit Voltage 3.4V
- Pulse Discharge Capability 2A
Lithium Thionyl Chloride Cell

**CC-MR 165°C Series**

**Key Features**
- 304L stainless steel structure
- Non-bulge design
- Hermetic glass-to-metal seal engineered for leak-free operation
- Integral Parallel diode
- Reduced Electrolyte Surface Area

**Benefits**
- Industry leading capacity in Non-bulge design
- Moderate Cost/Price: Superior battery to cost ratio
- Gallium-based electrolytes providing excellent start up and minimal passivation
- Automated assembly for uniform performance
- Extreme shock and vibration resistant design, trouble free operation under severe driving conditions
- Competitive price

**Technical Support**
- Our engineers are available to help you optimize your design.

**Abuse and Transport Certifications**
- UN/DOT Certified: Class 9 Transport, UN3090 Lithium Metal Batteries
- Shock Testing: To be determined
- Vibration Testing: To be determined

**Cell Characteristics**

<table>
<thead>
<tr>
<th>Size</th>
<th>CC-MR 21mm</th>
<th>CC-MR 25mm</th>
<th>CC-MR 26mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Capacity</td>
<td>7.25Ah</td>
<td>8.75Ah</td>
<td>11.6Ah</td>
</tr>
<tr>
<td>Open Circuit Voltage</td>
<td>3.65V</td>
<td>3.65V</td>
<td>3.65V</td>
</tr>
<tr>
<td>Nominal Closed Circuit Voltage</td>
<td>3.3V</td>
<td>3.3V</td>
<td>3.3V</td>
</tr>
<tr>
<td>Pulse Discharge Capability</td>
<td>700mA</td>
<td>924mA</td>
<td>924mA</td>
</tr>
<tr>
<td>Continuous Discharge</td>
<td>120mA</td>
<td>250mA</td>
<td>300mA</td>
</tr>
<tr>
<td>Maximum Constant Current Rate</td>
<td>225mA/12.8Ah</td>
<td>225mA/13.4Ah</td>
<td>225mA/20.0Ah</td>
</tr>
<tr>
<td>Storage Conditions</td>
<td>30°C</td>
<td>30°C</td>
<td>30°C</td>
</tr>
<tr>
<td>Operational Temperature Range</td>
<td>-30°C - 165°C</td>
<td>-30°C - 165°C</td>
<td>-30°C - 165°C</td>
</tr>
</tbody>
</table>

**Continuous Discharge at 165°C**

<table>
<thead>
<tr>
<th>Time (hr)</th>
<th>0  25  75  100  125  150  165</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity (Ah)</td>
<td>2.0  1.5  1.0  0.5  0.0</td>
</tr>
</tbody>
</table>

**Note**
- Note: All cells in a coin (21mm) cell are similar.

**Warning**
- Contents of this hermetically sealed cell are water reactive and will produce flammable and toxic gases if exposed to water. Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat, above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

**Application Analysis**
- Industry leading capacity in Non-bulge design
- Moderate Rate Capability for constant current and pulse applications
- Gallium-based electrolytes providing excellent start up and minimal passivation
- Automated assembly for uniform performance
- Extreme shock and vibration resistant design, trouble free operation under severe driving conditions
- Competitive price

**Continuous Discharge at 165°C**

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**Abuse and Transport Certifications**
- UN/DOT Certified: Class 9 Transport, UN3090 Lithium Metal Batteries
- Shock Testing: To be determined
- Vibration Testing: To be determined

**Cell Characteristics**

<table>
<thead>
<tr>
<th>Size</th>
<th>CC-MR 21mm</th>
<th>CC-MR 25mm</th>
<th>CC-MR 26mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Capacity</td>
<td>7.25Ah</td>
<td>8.75Ah</td>
<td>11.6Ah</td>
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<tr>
<td>Open Circuit Voltage</td>
<td>3.65V</td>
<td>3.65V</td>
<td>3.65V</td>
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<tr>
<td>Nominal Closed Circuit Voltage</td>
<td>3.3V</td>
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<td>700mA</td>
<td>924mA</td>
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<tr>
<td>Continuous Discharge</td>
<td>120mA</td>
<td>250mA</td>
<td>300mA</td>
</tr>
<tr>
<td>Maximum Constant Current Rate</td>
<td>225mA/12.8Ah</td>
<td>225mA/13.4Ah</td>
<td>225mA/20.0Ah</td>
</tr>
<tr>
<td>Storage Conditions</td>
<td>30°C</td>
<td>30°C</td>
<td>30°C</td>
</tr>
<tr>
<td>Operational Temperature Range</td>
<td>-30°C - 165°C</td>
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</table>

**Note**
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**Warning**
- Contents of this hermetically sealed cell are water reactive and will produce flammable and toxic gases if exposed to water. Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat, above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly.

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- Extreme shock and vibration resistant design, trouble free operation under severe driving conditions
- Competitive price
Oil & Gas – PIG / Oceanographic Equipments

Application
• PIG (Pipe Line Inspection Gauge) for Oil & Gas transport
• Oceanographic Equipments (Tsunami detector, Seismic search, etc)

Main Products
• PIG-DD
• PIG-D
• PIG-C
• SW-D03

Main Characteristics
• 3.9V Li/SOCl₂
• High Capacity
• 100°C Operational Temperature
• High Rate Capability

Summary of Product Line-up

<table>
<thead>
<tr>
<th>Model</th>
<th>Part No</th>
<th>Cell Weight (Kg)</th>
<th>Packing Qty per C/T</th>
<th>Net Weight per C/T(Kg)</th>
<th>Gross Weight per C/T(Kg)</th>
<th>C/T Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD HR 150(G)</td>
<td>SWH-DD01</td>
<td>0.230</td>
<td>40</td>
<td>9.20</td>
<td>10.20</td>
<td></td>
</tr>
<tr>
<td>DD MR 165</td>
<td>SMH-DD11</td>
<td>0.225</td>
<td>40</td>
<td>9.00</td>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td>PIG DD</td>
<td>SC-DD01</td>
<td>0.213</td>
<td>40</td>
<td>8.52</td>
<td>9.52</td>
<td></td>
</tr>
<tr>
<td>PIG D</td>
<td>SC-D01</td>
<td>0.125</td>
<td>80</td>
<td>10.00</td>
<td>11.00</td>
<td></td>
</tr>
<tr>
<td>PIG C</td>
<td>SC-C01</td>
<td>0.059</td>
<td>150</td>
<td>8.85</td>
<td>9.85</td>
<td></td>
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<tr>
<td>CC MR 165 21mm</td>
<td>SMH-CC21</td>
<td>0.080</td>
<td>50</td>
<td>4.00</td>
<td>5.00</td>
<td>450mm x 250mm x 230mm</td>
</tr>
<tr>
<td>CC MR 165 25mm</td>
<td>SMH-CC25</td>
<td>0.115</td>
<td>50</td>
<td>5.75</td>
<td>6.75</td>
<td>450mm x 250mm x 230mm</td>
</tr>
<tr>
<td>CC MR 165 26mm</td>
<td>SMH-CC26</td>
<td>0.120</td>
<td>50</td>
<td>6.00</td>
<td>7.00</td>
<td></td>
</tr>
</tbody>
</table>

Packing Information for High Temperature Battery

<table>
<thead>
<tr>
<th>Model</th>
<th>Part No</th>
<th>Cell Weight (Kg)</th>
<th>Packing Qty per C/T</th>
<th>Net Weight per C/T(Kg)</th>
<th>Gross Weight per C/T(Kg)</th>
<th>C/T Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD HR 150(G)</td>
<td>SWH-DD01</td>
<td>0.230</td>
<td>40</td>
<td>9.20</td>
<td>10.20</td>
<td></td>
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<tr>
<td>DD MR 165</td>
<td>SMH-DD11</td>
<td>0.225</td>
<td>40</td>
<td>9.00</td>
<td>10.00</td>
<td></td>
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<tr>
<td>PIG DD</td>
<td>SC-DD01</td>
<td>0.213</td>
<td>40</td>
<td>8.52</td>
<td>9.52</td>
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<tr>
<td>PIG D</td>
<td>SC-D01</td>
<td>0.125</td>
<td>80</td>
<td>10.00</td>
<td>11.00</td>
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<tr>
<td>PIG C</td>
<td>SC-C01</td>
<td>0.059</td>
<td>150</td>
<td>8.85</td>
<td>9.85</td>
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<tr>
<td>CC MR 165 21mm</td>
<td>SMH-CC21</td>
<td>0.080</td>
<td>50</td>
<td>4.00</td>
<td>5.00</td>
<td>450mm x 250mm x 230mm</td>
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<tr>
<td>CC MR 165 25mm</td>
<td>SMH-CC25</td>
<td>0.115</td>
<td>50</td>
<td>5.75</td>
<td>6.75</td>
<td>450mm x 250mm x 230mm</td>
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<tr>
<td>CC MR 165 26mm</td>
<td>SMH-CC26</td>
<td>0.120</td>
<td>50</td>
<td>6.00</td>
<td>7.00</td>
<td></td>
</tr>
</tbody>
</table>

Model | Size(mm) | Capacity | Temperature |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SC-DD01</td>
<td>φ33.5 × h120</td>
<td>27Ah ~ 30Ah</td>
<td>-20°C ~ 100°C</td>
</tr>
<tr>
<td>SC-D01</td>
<td>φ33.5 × h60</td>
<td>12Ah ~ 15Ah</td>
<td>-20°C ~ 100°C</td>
</tr>
<tr>
<td>SC-C01</td>
<td>φ22.5 × h50</td>
<td>4.0Ah ~ 7.0Ah</td>
<td>-20°C ~ 100°C</td>
</tr>
<tr>
<td>SW-D03</td>
<td>φ33.8 × h60</td>
<td>12Ah ~ 14Ah</td>
<td>-40°C ~ 85°C</td>
</tr>
</tbody>
</table>
Lithium Sulfuryl Chloride Cell

MODEL: SC-DD01
PN: 34-111-H100

Key Features
- 304L stainless steel structure
- Non-badge design
- Hermetic-glass-to-metal seal engineered for leak free operation
- Integral safety fuse and parallel diode to protect from short circuits and guarantee continued pack operation
- Electrode Surface Area, high rate capability & lower self-discharge
- Gallium Based Electrolyte for improved performance

Benefits
- 30% Higher Wh capacity than competitive product
- High rate capability for high constant current and pulse applications
- Automated assembly for uniform performance
- Certified shock and vibration testing to ensure trouble free operation under severe conditions in process
- Competitive price

Technical Support
- We pledge our full support to provide you with the service you deserve

Application Analysis
- Testing and Test Reports
- Analysis of field problems and reports
- Engineering support for custom applications

Abuse and Transport Certifications
- UN/DOT Certified: Class 9 Transport, UN3090 Lithium Metal Batteries
- Shock Testing: To be determined
- Vibration Testing: To be determined
- Certified shock and vibration testing to ensure trouble free operation under severe conditions in process

Packing Information
- Hermetic glass-to-metal seal engineered for leak free operation
- Non-bulge design

Engineering support for custom applications

Testing and Test Reports
- Analysis of field problems and reports
- Certification testing to ensure trouble free operation under severe conditions in process

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Web: www.vitzrocell.com

Dispose of used batteries promptly.

Any information given here is for reference only.
Information is also dependent on actual conditions of use and does not guarantee future performance.
And subject to change.

Pulse Discharge Capability
6A
A Pulse discharge of 6A for 1 minute, at a constant, average, 2 minute, at 70°C cell maintained > 2.0V. Current Gear to determine the threshold of higher currents, longer duration pulses, or lower temperatures. In some cases a capacitor may be required to maintain the desired voltage.

Constant Current Discharge
1000mA (max capacity)

Maximum Constant Current Rate
4000mA (reduced capacity)

Storage Conditions
30°C (86°F) Max

Operational Temperature Range
-20°C to 100°C
Note: full capacity is obtained at temperatures of 20°C and above. Below 20°C both the rate capability and the capacity of the cell are reduced.

Fuse
7.6A

Parallel Diode
8.0A

Physical Characteristics
Diameter
33.50mm (1.32")
Height
111.39mm (4.40")
Weight
213.3 g
Lithium Metal Content
9.6 g

Capacity vs. Temperature Exium PIG Cell

Capacity (Ah)

Temperature (°C)

30°C Discharge 0.025A

Exium 34-111-H100 PIG Cell Lot 12311

Capacity (Ah)

Temperature (°C)

Voltage (V)

Capacity (Ah)

Voltage (V)

20°C Discharge 0.025A

80°C Discharge 0.025A

Storage
Store cells in a cool (<30°C) and dry location

Warning
Contents of this hermetically sealed cell are water reactive and will produce flammable and toxic gases if exposed to water. Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat, above 212°F (100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use.

Glasses of used batteries promptly.

Note
Any information given here is for reference only.
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And subject to change.
Lithium Sulfuryl Chloride Cell

**MODEL: SC-D01**

**Key Features**

- 304L stainless steel structure
- Non-bulge design
- Hermetic glass-to-metal seal engineered for leak-free operation
- Integral safety fuse and parallel diode to protect from short circuits and guarantee continued pack operation
- Dynamic shock and vibration testing to ensure trouble-free operation under severe conditions in process
- 100°C Operational Temperature
- High Capacity
- High Rate Capability
- 3.9V “D” Size Lithium Sulfuryl

**Cell Characteristics**

- Nominal Capacity: 12Ah / 15Ah
- Open Circuit Voltage Nominal: 3.91V
- Nominal Closed Circuit Voltage: 3.5V
- Pulse Discharge Capability: 2A
- CCV will also increase with operational temperature.
- Nominal Capacity is obtained at temperatures of 25°C and above. Below 25°C both the rate capability and the capacity of the cell are reduced.
- Operational Temperature Range: -20°C to 100°C
- Maximum Pulsed Current Rate: 150mA (reduced capacity)
- Parallel Diode: 8.0A
- Physical Characteristics:
  - Diameter: 33.50mm (1.32")
  - Height: 59.90mm max. (2.36")
  - Weight: 132g nominal, 125g max
- Lithium Metal Content: 4.7g
- Packing Information:
  - Packing Density per C/T: 8D
  - Net Weight per C/T (kg): 10.0
  - Gross Weight per C/T (kg): 11.0
  - C/T Size: 450mm × 250mm × 230mm

**Technical Support**

- We pledge our full support to provide you with the service you deserve
- Application Analysis
- Testing and Test Reports
- Analysis of field problems and reports
- Engineering support for custom applications

**Abuse and Transport Certifications**

- UN/DOT Certified: Class 9 Transport, UN3090 Lithium Metal Batteries
- Shock Testing: To be determined
- Vibration Testing: To be determined

**Capacity vs. Temperature**

**Example Discharge Curves**

- "D" PIG Cell 300mA @ 0°C Discharge
- "D" PIG Cell 300mA @ 25°C Discharge

**External Dimensions**

**P/N: 34-59-H100G**

**Chloride Cell (Li-SO₂Cl₂)**

- 3.9V "D" Size Lithium Sulfuryl Chloride Cell (Li-SO₂Cl₂)
- High Rate Capability
- High Capacity
- 100°C Operational Temperature
Lithium Sulfuryl Chloride Cell

**MODEL: SC-C01**

**PN: 26-49-H100G**

### Key Features
- 304L stainless steel structure
- Non-bulge design
- Hermetic glass-to-metal seal engineered for leak-free operation
- Integral safety fuse and parallel diode to protect from short circuits and ensure continued pack operation
- Voltmeter and Ammeter to measure the discharge rate
- Certified shock and vibration testing to ensure trouble-free operation under severe conditions in process
- Competitive price

### Benefits
- Competitive capacity
- High rate capability for high constant current and pulse applications
- Automated assembly for uniform performance
- Certified shock and vibration testing to ensure trouble-free operation under severe conditions in process
- Competitive price

### Technical Support
- We pledge our full support to provide you with the service you deserve

### Key Features
- 304L stainless steel structure
- Non-bulge design
- Hermetic glass-to-metal seal engineered for leak-free operation
- Integral safety fuse and parallel diode to protect from short circuits and ensure continued pack operation
- Electrode Surface Area, high rate capability & lower self-discharge
- Gallium Based Electrolyte for improved performance

### Technical Support
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### Application Analysis
- Testing and Test Reports
- Analysis of field problems and reports
- Engineering support for custom applications

### Abuse and Transport Certifications
- UN/DOT Certified: Class 9 Transport, UN3090 Lithium Metal Batteries
- Shock Testing: To be determined
- Vibration Testing: To be determined

### Cell Characteristics
- **Nominal Capacity:** 4.0Ah-7.0Ah
- **Temperature Range:** -20°C - 100°C
- **Open Circuit Voltage Nominal:** 3.91V
- **Nominal Closed Circuit Voltage:** 3.5V
- **Capacity(Ah)**
  - **-20°C:** 2.81Ah
  - **0°C:** 3.71Ah
  - **1°C:** 4.61Ah
  - **2°C:** 5.51Ah
  - **3°C:** 6.41Ah
  - **4°C:** 7.31Ah
  - **5°C:** 8.21Ah
  - **6°C:** 9.11Ah

### Packing Information
- **Packaging Qty per C/T:** 100
- **Net Weight per C/T(Kg):** 8.5lbs
- **Gross Weight per C/T(Kg):** 9.5lbs
- **C/T Size:** 450mm x 884mm x 230mm

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Web: www.vitzrocell.com

---

**Warning**
- Contents of this hermetically sealed cell are water reactive and will produce flammable and toxic gases if exposed to water.
- Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat, above 212°F(100°C), incinerate, short circuit or expose contents to water. Keep battery out of reach of children and in original package until ready to use.

---

**Storage**
- Store cells in a cool (<30°C) and dry location

---

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**Application Analysis**
- Testing and Test Reports
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**Abuse and Transport Certifications**
- UN/DOT Certified: Class 9 Transport, UN3090 Lithium Metal Batteries
- Shock Testing: To be determined
- Vibration Testing: To be determined

---

**Cell Characteristics**
- **Nominal Capacity:** 4.0Ah-7.0Ah
- **Temperature Range:** -20°C - 100°C
- **Open Circuit Voltage Nominal:** 3.91V
- **Nominal Closed Circuit Voltage:** 3.5V
- **Maximum Constant Current Rate:** 600mA (Reduced capacity)
- **Storage Conditions:** 30°C (86°F) Max
- **Operational Temperature Range:** -20°C to 100°C
- **Fuse:** 2.0A
- **Parallel Diode:** 3.0A

---

**Physical Characteristics**
- **Diameter:** 25.9mm (1.00in)
- **Height:** 48.8mm (1.90in)
- **Weight:** 59g nominal
- **Lithium Metal Content:** Approx. 2.4g

---

**Packing Information**
- **Packaging Qty per C/T:** 100
- **Net Weight per C/T(Kg):** 8.5lbs
- **Gross Weight per C/T(Kg):** 9.5lbs
- **C/T Size:** 450mm x 884mm x 230mm

---

**Warning**
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Lithium Thionyl Chloride Cell

**MODEL: SW-D03**

**Key Characteristics**

- High Shock Resistance (900G/50Cycles)
- High and stable operating voltage
- Low self-discharge rate
- Superior pulse capability
- Spiral type (with safety vent)
- Non-flammable inorganic electrolyte
- Hermetic glass-to-metal sealing
- RoHS Compliance

**Specifications**

- Nominal Voltage: 3.6V
- Nominal capacity (at 20mA, 20°C, 2.0V cut off): 14.0Ah
- Maximum recommended continuous current: 1980mA
- Max. pulse discharge current: 3000mA
- Cell Weight: 102g
- Operating temperature range: -40°C ~ 85°C

**Capacity vs. Current**

<table>
<thead>
<tr>
<th>Current (mA)</th>
<th>Capacity (Ah)</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>11.8</td>
</tr>
<tr>
<td>500</td>
<td>11.0</td>
</tr>
<tr>
<td>1000</td>
<td>8.8</td>
</tr>
<tr>
<td>2000</td>
<td>7.3</td>
</tr>
<tr>
<td>3000</td>
<td>5.0</td>
</tr>
</tbody>
</table>

**Discharge Current vs. Duration Time**

- **Continuous Discharge at 20°C**
- **Discharged every 2 minutes**
- **Temperature range**
  - +20°C
  - +70°C

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**Note**
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High Temperature Cell
Lithium Battery Professional