



Altech Batteries
Limited

UPS BATTERIES For Explosive (EX & ATEX) Environments



AREAS OF USE

UPS BATTERIES

- Uninterruptable power to critical systems
- Safety equipment remains operational
- Emergency Lighting
- Fire and Gas Detection Systems
- Emergency Valves Dampers
- Critical Control Systems
- Instrumentation & Communication



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WHAT MAKES A GOOD UPS BATTERY

- Fire Proof and Safe
- Ability to Provide Back Up Power at All Times
- No Start Up Lag or Capacity Loss
- Can Stay Charged without Deterioration (Float Life)
- Least Amount of Checks and Maintenance
- Long Service Life - Replacement Costs Minimized
- No Cooling or Housing Required



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EX ZONES ATEX ZONES

EXPLOSIVE ENVIRONMENTS

- Explosive Atmosphere or Ex Zones
- ATEX Zones – European Union Directives
- Hazardous Locations
- Flammable Gases, Combustible Dusts
- Oil & Gas, Petrochemicals, Refineries, Chemicals Plants
- Food, Pharmaceuticals, Grain, Wood Processing



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AVAILABLE TODAY

UPS **BATTERIES** OPTIONS

LITHIUM-ION BATTERIES

NICKEL **CADMIUM** BATTERIES

LEAD ACID BATTERIES

SODIUM NICKEL CHLORIDE (**SNC**) BATTERIES

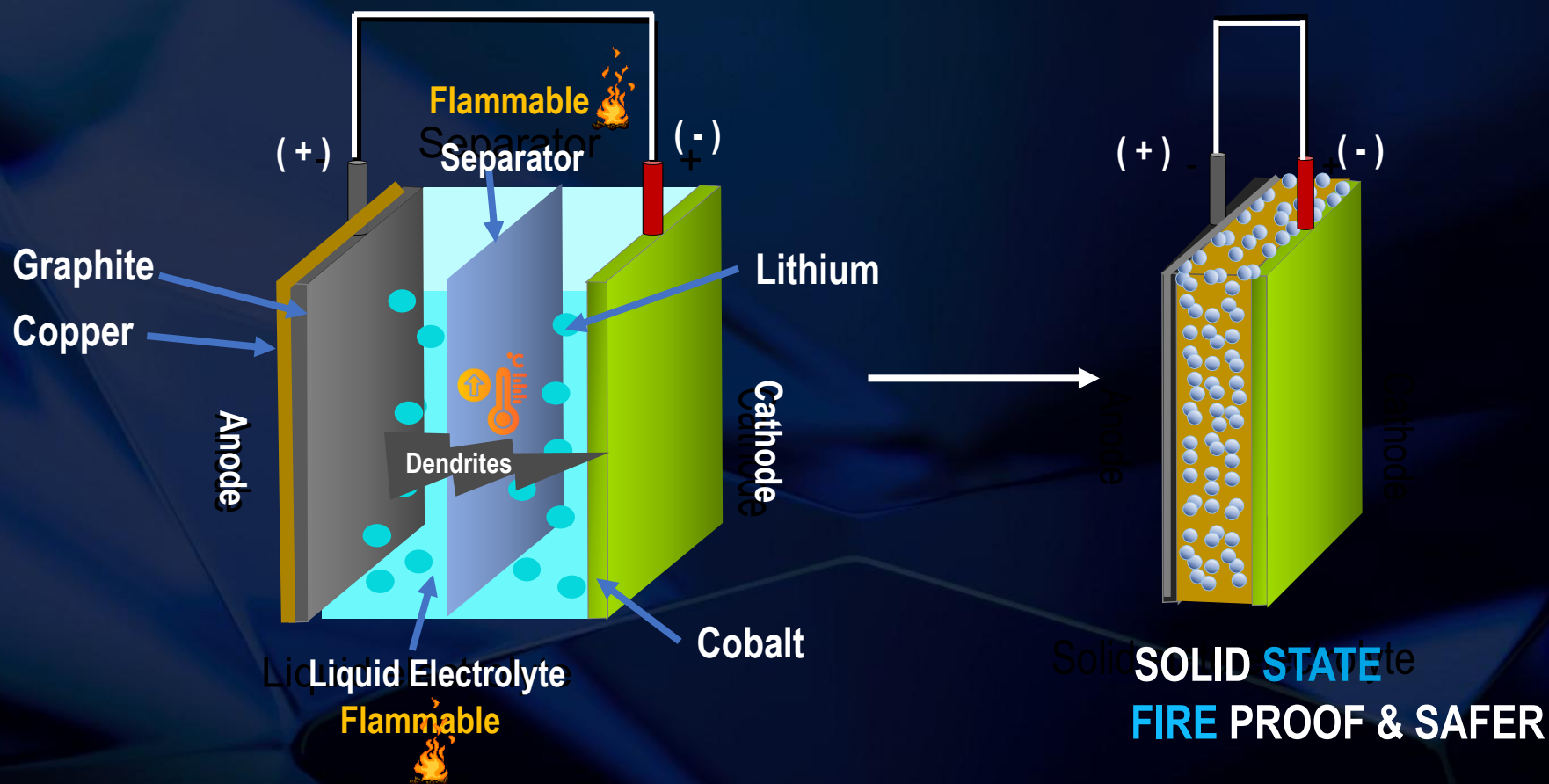


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LITHIUM-ION BATTERIES

THERMAL RUNAWAY





Altech Batteries
GmbH

LITHIUM-ION BATTERIES

FIRE RISKS & INSURANCE COSTS



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LITHIUM-ION BATTERIES

NOT SUITED – EX & ATEX ZONES

- Thermal Runaway produces Sparks and Flames
- Cells vent flammable gases during failure
- Li-Ion Batteries **Banned** in these Areas
- Insurance Costs – Too Prohibitive
- Inner Cell Short-Circuit – Stops Whole Battery



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NICKEL CADMIUM BATTERIES

LEAD ACID BATTERIES

SODIUM NICKEL CHLORIDE (SNC) BATTERIES



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NICKEL CADMIUM BATTERIES UPS DISADVANTAGES

- H₂ emission especially on “Boost Charge”
- High Upfront Cost (Eg 2.5 x compared to Lead Acid)
- Toxic Materials – Less Green Credentials
- Regular Checks and Maintenance
- Large Footprint Limits Compact Installations
- Dedicated Housing, Cooling needed for Safe Storage



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Ni-Cd

AVAILABLE TODAY

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SODIUM NICKEL CHLORIDE (SNC) BATTERIES



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LEAD ACID BATTERIES UPS DISADVANTAGES

- Lower Energy Capacity - 35–55 Wh/kg
- 1/3 to 1/5 energy per kg
- Sudden death of Cell – String Fails
- Large Foot Print – Housing Costs
- H₂ emission at over temperature
- Requires Housing, Cooling and Ventilation
- Constant Checks and Maintenance
- Float (Fully Charge) Life Limited



AVAILABLE TODAY

UPS BATTERIES OPTIONS

LITHIUM-ION BATTERIES ❌

NICKEL CADMIUM BATTERIES ❌

LEAD ACID BATTERIES ❌

SODIUM NICKEL CHLORIDE (SNC) BATTERIES



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FIREPROOF TECHNOLOGY

ALTECH SNC BATTERIES

- Inherently Safe Chemistry – No Thermal Runaway
- Eliminates Explosion Risk, Non-flammable, Non-Explosive
- No Hydrogen Outgassing
- Sealed Pressure Tight Unit
- Simplified Ex-zone Safety Certification
- No Explosion Proof Housing Required – Less CAPEX
- Less Insurance Costs



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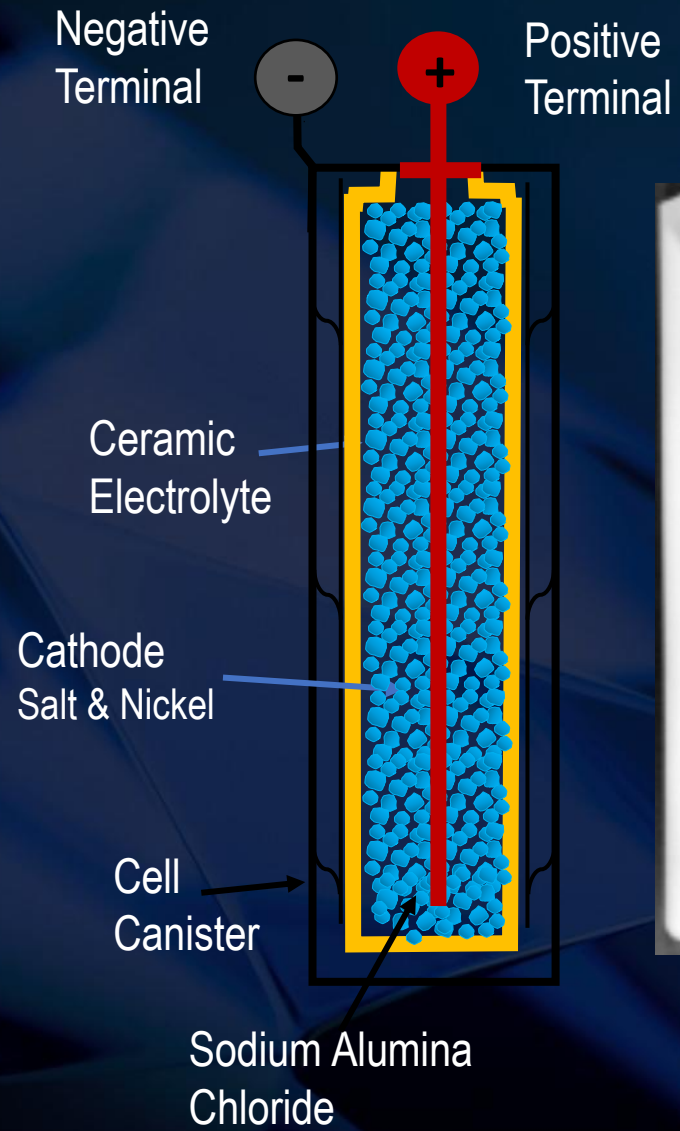


EX ATEX ZONE BATTERIES

BATTERY COMPARISON



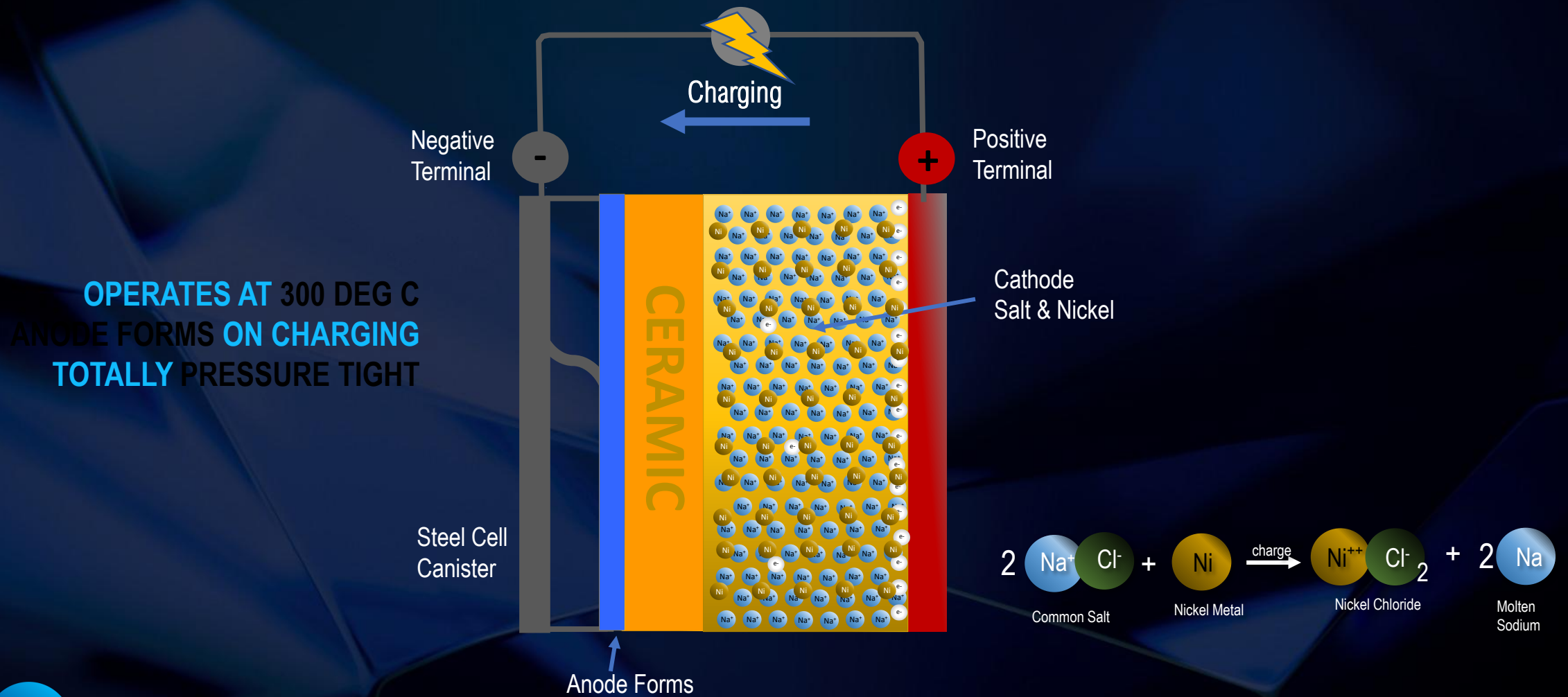
Parameter	Ni-Cd	Lead-Acid	Sodium-Nickel-Chloride (SNC)
Energy Density (Wh/kg)	40–60	30–50	90–120 ✓
Volumetric Density (Wh/L)	~50–150	60–110	150–250 ✓
Float Life	15–20 years (with maintenance)	≤12 years (VRLA/AGM: 3–10; Flooded: 15+)	15–20 years (stationary use) ✓
Cycle Life	2,000–3,000	500–1,500	3,500–5,000 ✓
Operating Temp. Range	–20 °C to +50 °C	0 °C to +40 °C	–20 °C to +60 °C ✓
Maintenance	High (topping, equalization)	Medium (flooded need topping; VRLA lower)	Low (sealed, maintenance-free) ✓
Safety	Toxic Cd, risk of venting	Acid spills, gassing risk	Inherently safe, sealed ✓
Environmental Issues	Cadmium toxic, costly disposal	Lead toxic, regulated disposal	Salt + nickel, less hazardous recycling ✓
Capital Cost (\$/kWh)	High (~\$600–800)	Low (~\$150–300) ✓	Medium (~\$300–500)
Efficiency	70–80%	70–85%	80–90% ✓
Self-Discharge	Moderate (10–20%/month)	Low (3–5%/month)	Very low (<1%/month) ✓
Best Applications	Aviation, rail, emergency backup	Starter, UPS, backup storage	Grid-scale ESS, UPS, renewables



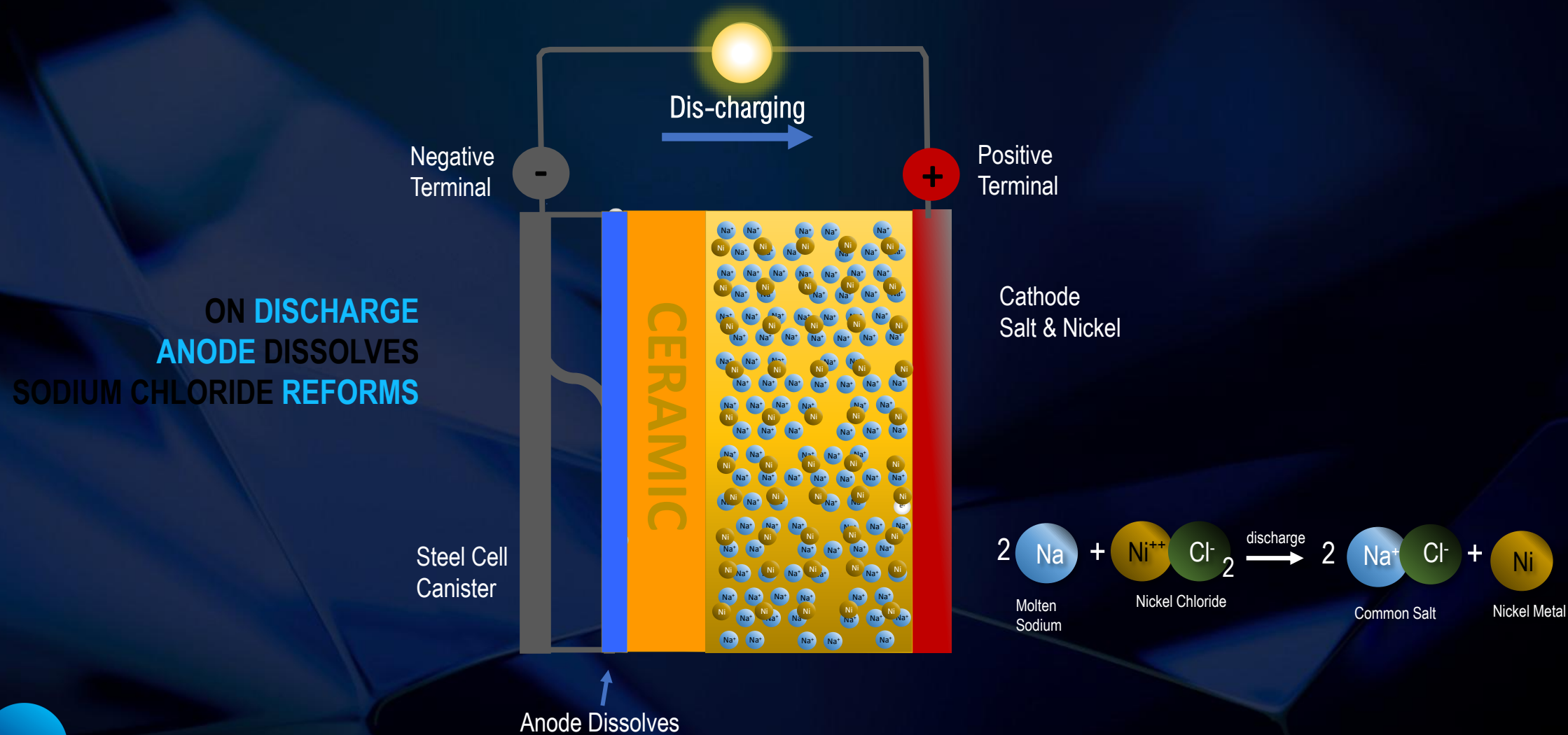
SOLID STATE BATTERY
NO FLAMABLE MATERIALS
THERMAL RUNAWAY NOT POSSIBLE



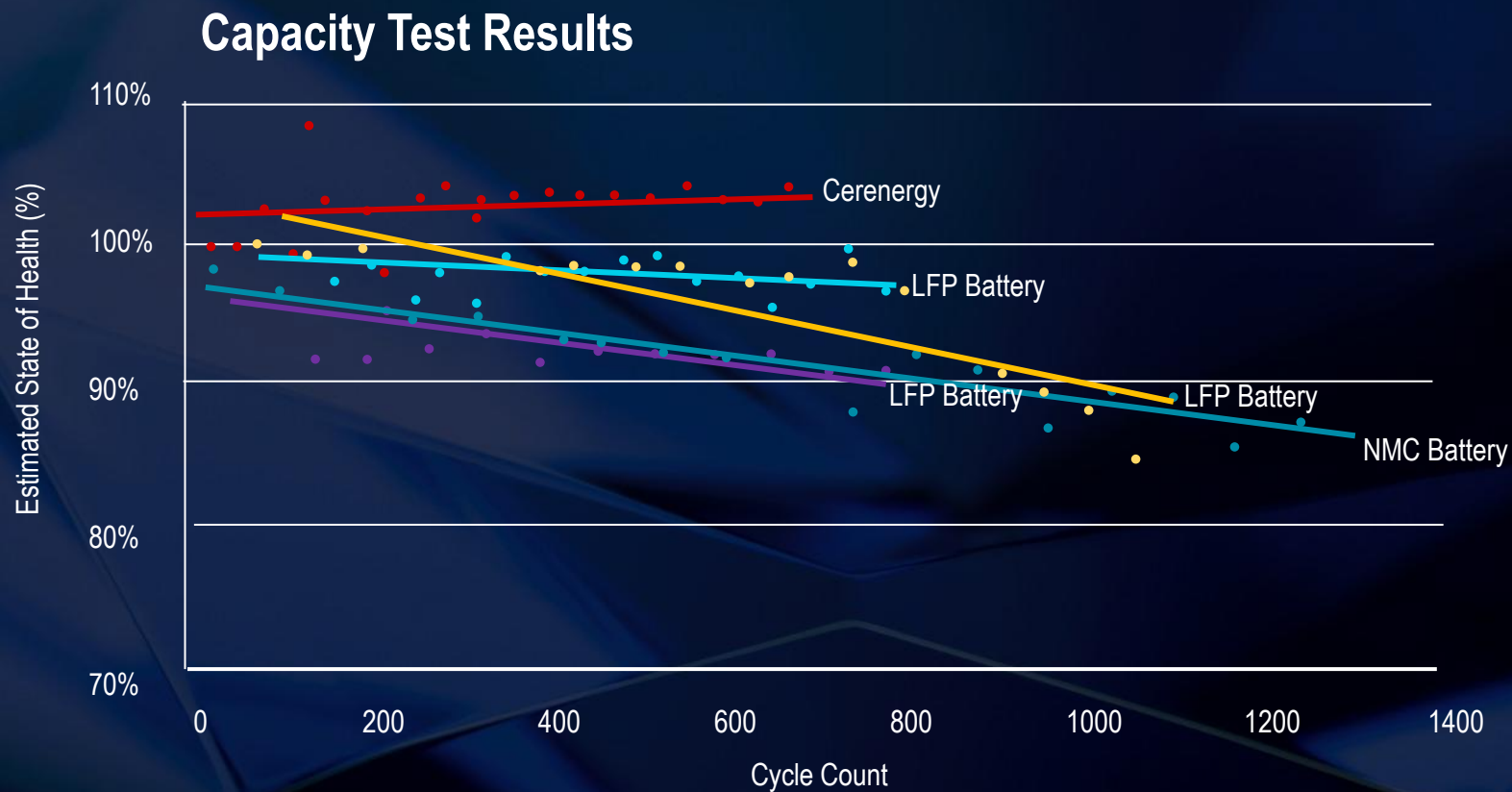
SODIUM NICKEL CHLORIDE BATTERIES



SODIUM NICKEL CHLORIDE BATTERIES



BATTERY LIFE COMPARISON

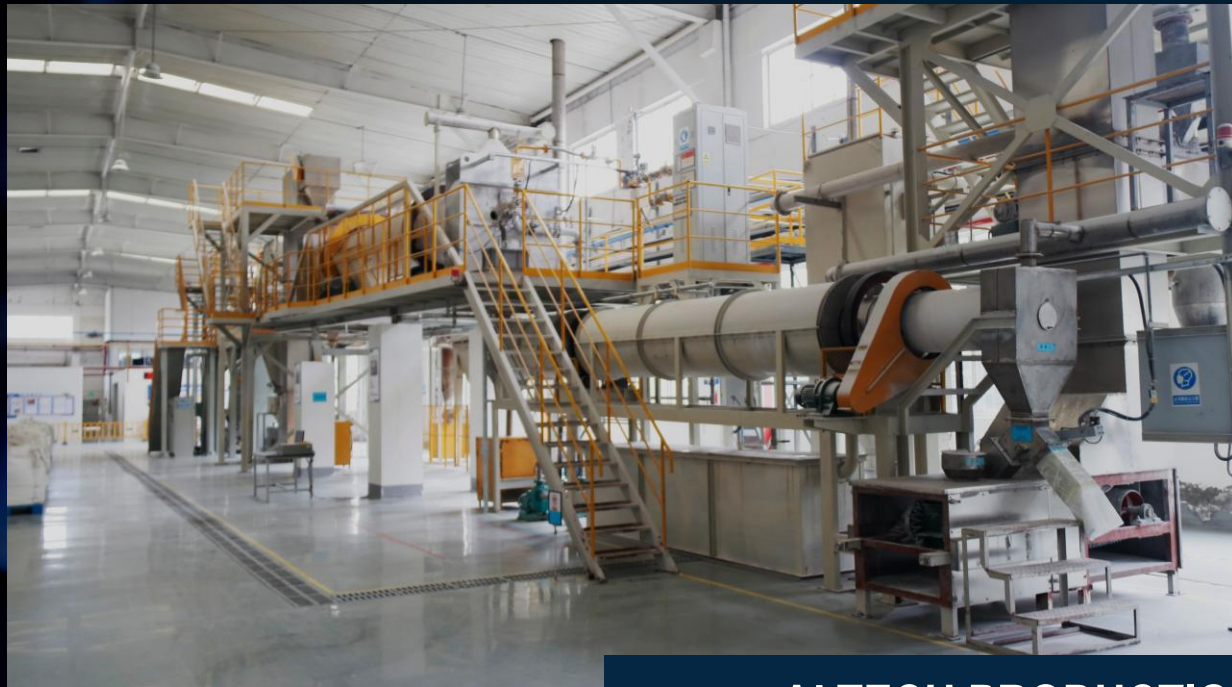


Source: ITP Renewables Public Report 11 Lithium Battery Testing Sept 2021

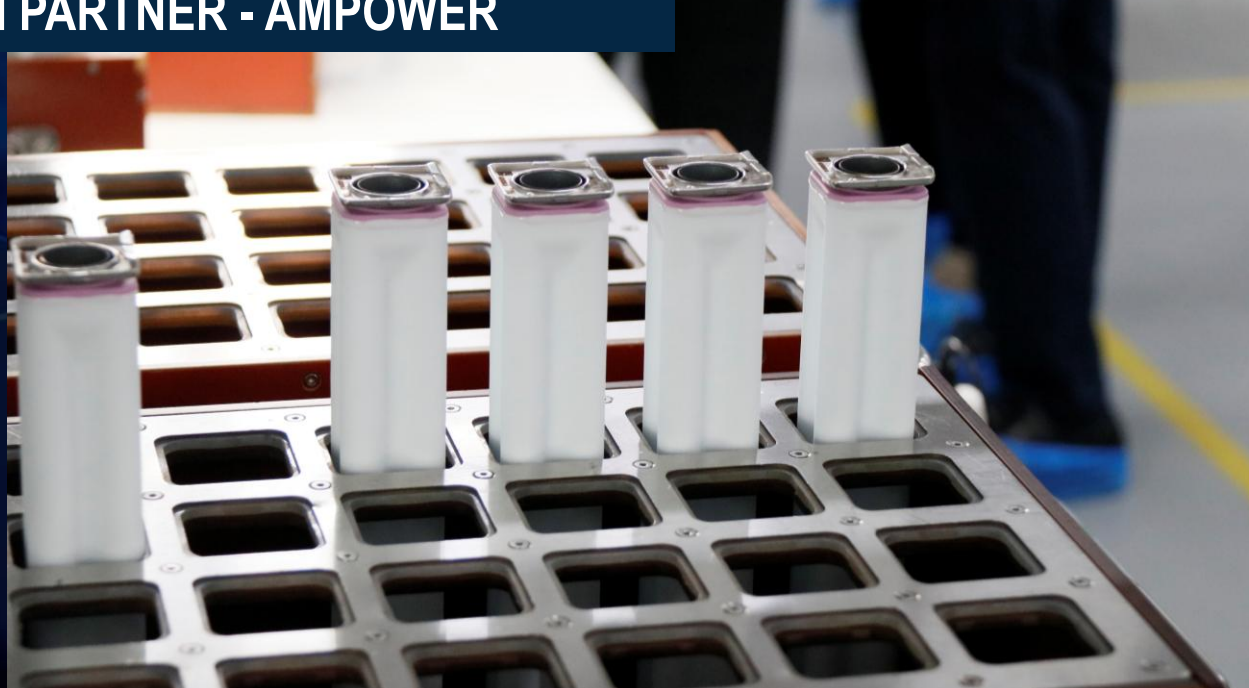


ALTECH PRODUCTION PARTNER - AMPOWER





ALTECH PRODUCTION PARTNER - AMPOWER





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PERFORMANCE METRICS

ALTECH SNC BATTERIES

- >20 Year Float Life with 0.6% Failure Rate
- Service Evidence from South Africa – 12 Years
- 1/5 Replacement Costs
- No Start Up Lag or Capacity Loss
- Cycling of Battery is Not Required
- Shelf Life of Cells – Demonstrated 28 Years
- More than 5,000 cycles with >80% Retained Capacity



SERVICE AND MAINTENANCE ALTECH SNC BATTERIES

- No need Impedance Checks
- No Need for Visual Inspections
- No Need for Regular Capacity Cycling
- More Operational Uptime – Replacement & Checks
- No Heating or Cooling Required – CAPEX, Maintenance
- Filters of Air Conditioners, Alarms, Ventilation
- Better and Safer Protection of Assets



PERFORMANCE

ALTECH SNC BATTERIES

- Minimal Capacity Loss – Sodium Ions Stable
- No Issue with Undercharging
- No Issue with Overcharging
- Incorrect charging (float) voltage
- Can Handle Frequent Short Power Disruptions
- Maintains Run Time on Outage
- No Unexpected Shutdowns
- No Premature Failures – Asset Protection



SAFETY TESTS

Cell Fire Exposure



Three fully charged hot Altech SNC battery cell exposed to 30 minute gasoline fire. Fire temperature reached 850°C. No explosion. Cell case did not rupture. No emission of cell internal contents.

Module Fire Exposure



Hot, fully charged Altech SNC battery endured 30 min gasoline fire (850°C). Extinguished in 1 min with 3" hose. No explosion; case remained intact, minor mechanical weakening only.

Module Rod Penetration



Fully charged Altech SNC battery pierced with 20 mm rod; water added. External reaction after 23 min produced steam, and minor HCl smoke over 4 h.

Module 10m Hot Drop



Fully charged, operational Altech SNC battery dropped 10 m onto pole, simulating 30 MPH impact. Dented, case intact.

Module Impact Test



Fully charged Altech SNC battery packs impacted a simulated utility pole at 48 km/h in a vehicle. No explosion or fire occurred.

Module Saltwater Exposure



Fully operational Altech SNC battery exposed to 3.5% saltwater, including 2.5 h immersion. No fire or explosion.

Module Overcharge Event



Fully charged Altech SNC battery exposed to 145% nominal voltage for 1 h (45% beyond UL1973)—no adverse effects.

Module Bullet Impact



Fully operational Altech SNC battery hit by shotgun and rifle rounds; only minor smoke, no fire or explosion.

48V Products Range

Designed for Telecom, Data Center, Railways,
Residential Energy Storage and other applications.



High Safety



Temperature
Extreme



Long Life



Recyclable



High Energy
Density



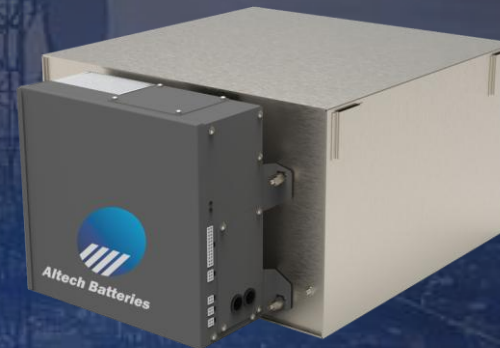
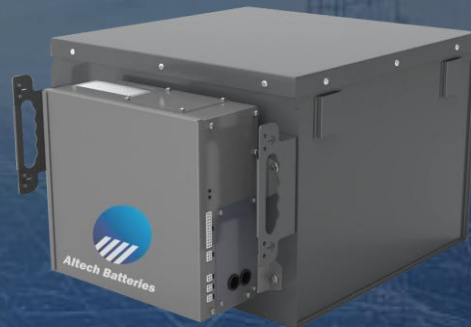
Small
Footprint



Minimal
Maintenance



Intelligent



MODEL	E4810	E4815
Usable Capacity	205Ah (10kWh)	250Ah (13kWh)
Operating Voltage	44~53.4Vdc	46~56Vdc
Rated Voltage	48Vdc	48Vdc
Maximum Charge Current	80A	100A
Operating Temperature	-40~65°C	-40~65°C
Operating Humidity	<95%RH (no condensation)	<95%RH (no condensation)
Commissioning Time	<16h	<16h
Energy Consumption	<140W	<140W
Module Combination	20S5P	21S6P
Dimension	374*654*520mm	303*637*511mm
Weight	122±2kg	145±2kg
Certification	UL9540A, CE, UL1973 Listed	UL1973 Listed, CE, UL9540A
Communication	RS485/CAN	RS485/CAN
Ingress Protection	IP20	IP20
Design Life	20yrs	20yrs

Industrial Backup Range

Designed for Oil & Gas, Utilities, Railways, Power substations and other industrial applications.



High Safety Temperature Extreme Long Life Recyclable High Energy Density Small Footprint Minimal Maintenance Intelligent

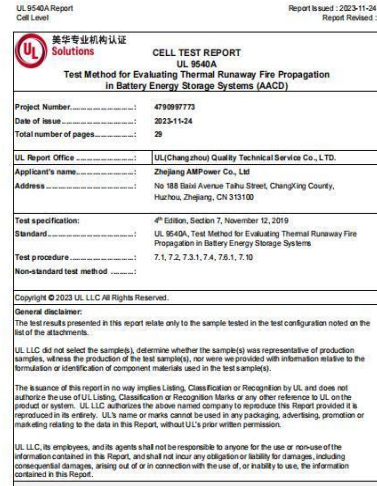


MODEL	E303	E1109	E12510
Usable Capacity	80Ah (2.2kWh)	82Ah (9kWh)	82Ah (10kWh)
Charging Voltage	33~40Vdc	120~160Vdc	136~160Vdc
Rated Voltage	30.96Vdc	113.5Vdc	129Vdc
Maximum Charge Current	16A	16A	16A
Maximum Discharge Current (1min)	120A	120A	120A
Maximum Discharge Current (1h)	60A	60A	60A
Operating Temperature	-40~65°C	-40~65°C	-40~65°C
Operating Humidity	<95%RH (no condensation)	<95%RH (no condensation)	<95%RH (no condensation)
Commissioning Time	<16h	<16h	<16h
Charging time from 0% to 100%SOC	<13h	<13h	<13h
Charging time from 0% to 90%SOC	<8h	<8h	<8h
Energy Consumption	<90W	<120W	<125W
Module Combination	12S2P	44S2P	50S2P
Dimension	353*505*506mm	353*556*506mm	353*631*506mm
Weight	51±2kg	117±2kg	130±2kg
Certification	UL9540A, CE, UL1973 Listed	UL9540A, CE, UL1973 Listed	UL9540A, CE, UL1973 Listed
Communication Optional	RS485	RS485	RS485
Ingress Protection	IP55	IP55	IP55
Design Life	20yrs	20yrs	20yrs

BATTERY CERTIFICATION



UL1773



UL9540A
Cell-Level Certificate



CE



ISO9001

Altech SNC battery holds **CE, UL1773, UL9540A, RoHS, and TLC** certifications, with **ISO9001** for the facility. And ABS (American Bureau of Shipping), DNV (Det Norske Veritas) and IEC62984 certifications are in progress.

TECHNOLOGY ADVANTAGES

Small Footprint

- Cell Energy Density: 135 Wh/kg
- Energy density at module level: 100 Wh/kg
- Cell voltage: 2.58V

Long Lifespan

- 6000+ cycles @0.5C 80%DOD
- Float Life over 20 years

Minimal Maintenance

- Can Tolerate 5%~10% cells short circuit for each string
- No VAC System Required; Eliminates Periodic Filter Cleaning
- Fully Sealed, Zero Emissions



Temperature Independence

- High Temperature Battery – Can operate in Extreme Cold, Desert Conditions
- Operating Environment Temperature: -40~65°C
- VAC free

Highest Safety

- Solid State Electrolyte - No Flammable Materials, No Explosion Risk
- Inner Short-Circuit Proof
- Passed Various Rigorous Safety Tests

Low Emission

- 100% Recyclable
- Dark Green Accreditation – Standard Poor
- 50% Carbon LIB Foot Print

FUTURE OF SNC BATTERIES

- SNC Energy Storage Batteries (ESS)
- Joint Venture with IKTS Fraunhofer Germany
- Upscaling the Zebra ceramic cell by 2.6 times
- Higher Energy Capacity for ESS Market
- CERENERGY® Brand



Fraunhofer



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FUTURE OF SNC BATTERIES

- 60 kWh Battery Packs
- 1 MWh Grid pack for Grid ESS Market
- 120 MWh SNC Battery Project – Saxony Germany



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120 MWh SNC BATTERY PROJECT, SAXONY, GERMANY



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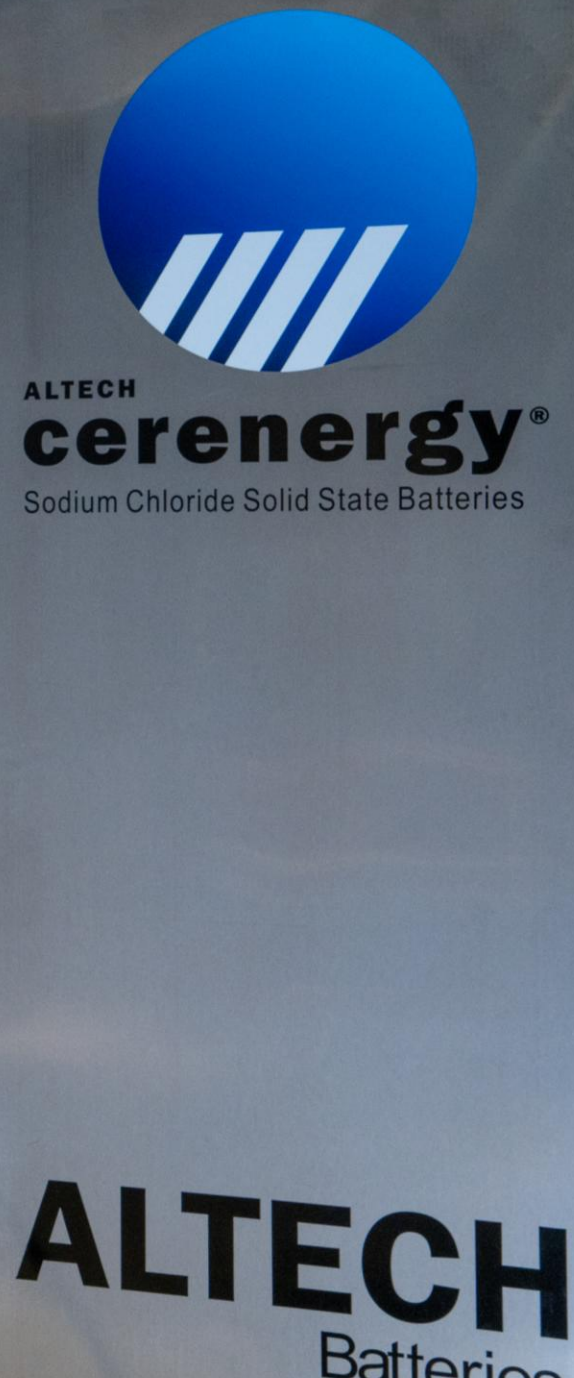


1 MWh CERENERGY GRID PACKS



60 kWh SNC BATTERY PROTOTYPE UNDER TEST

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