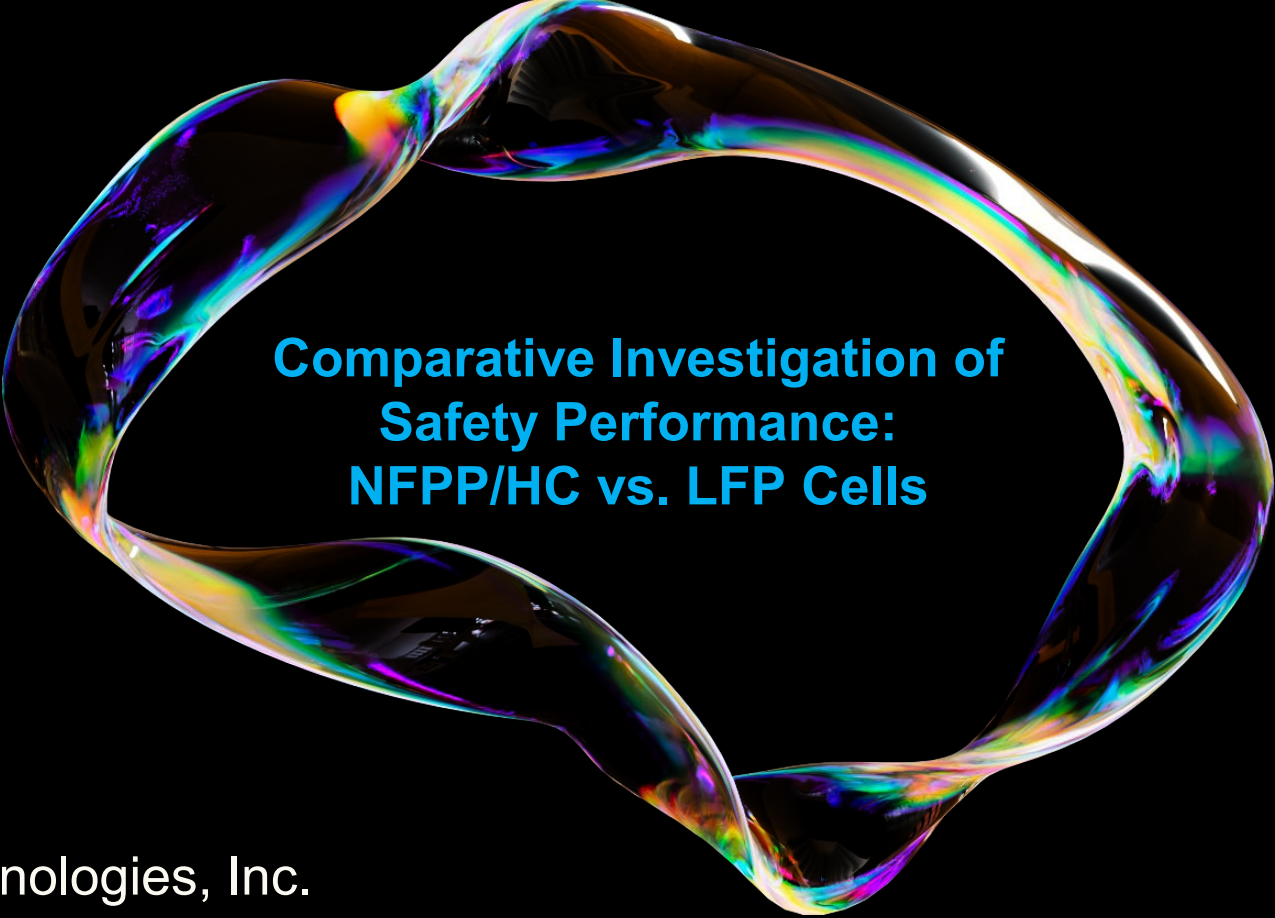


A large, abstract, colorful liquid ring or bubble structure, resembling a Möbius strip, with vibrant rainbow-like colors (red, orange, yellow, green, blue, purple) and a glossy, reflective surface. It is set against a solid black background.

## Comparative Investigation of Safety Performance: NFPP/HC vs. LFP Cells

QuantumShield Technologies, Inc.  
*May 2026*

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3. Safety Test data – LFP and NFPP comparison
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  - Thermal Runaway
  - Overcharge
  - Gun Shot

# 1. QuantumShield Technologies Inc. Introduction



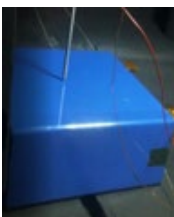
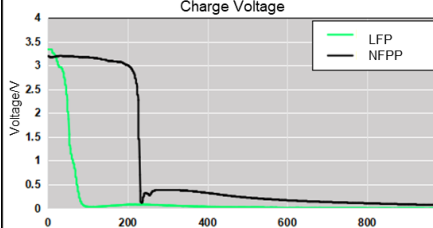
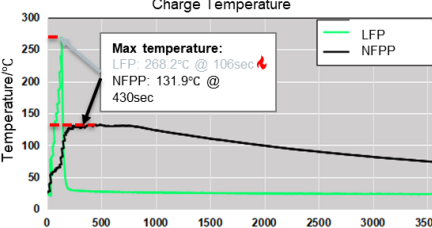
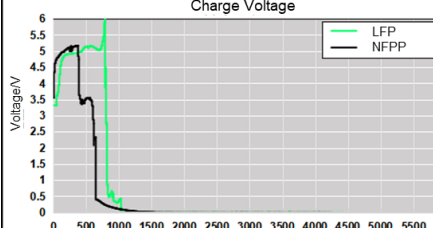
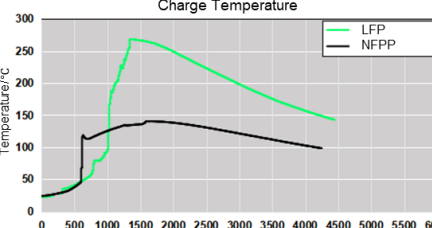
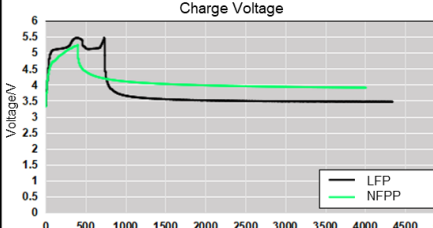
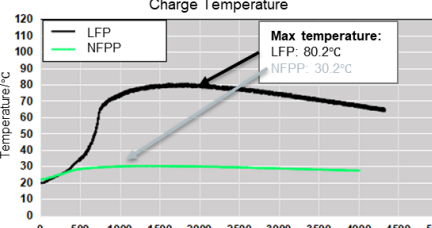
## 2. QuantumShield's Technology

| Features                                        | QST SIB | Lithium-Ion | Lead-Acid    |
|-------------------------------------------------|---------|-------------|--------------|
| Minimum operating temperature <sup>1</sup> (°C) | -40     | -5          | ~0           |
| Maximum operating temperature <sup>1</sup> (°C) | 80      | 60          | 70           |
| Minimum charging temperature <sup>2</sup> (°C)  | -30     | 0           | -20          |
| Minimum charging temperature <sup>3</sup> (°C)  | -20     | +10         | Not possible |
| Maximum charging temperature <sup>4</sup> (°C)  | 60      | 45          | 60           |
| Maximum Charging Rate                           | 5C+     | ~4C         | ~0.5C        |
| Maximum Discharging Rate                        | 20C+    | ~10C        | ~10C         |
| Gravimetric Energy Density (Wh/kg)              | 80-145  | 120-200     | 25-50        |
| Volumetric Energy Density (Wh/L)                | 140-240 | 200-400     | 60-100       |
| Cycle Life                                      | 4,000+  | 3,000+      | 300-500      |
| Maximum Depth of Discharge                      | 100%    | 90%         | 50%          |

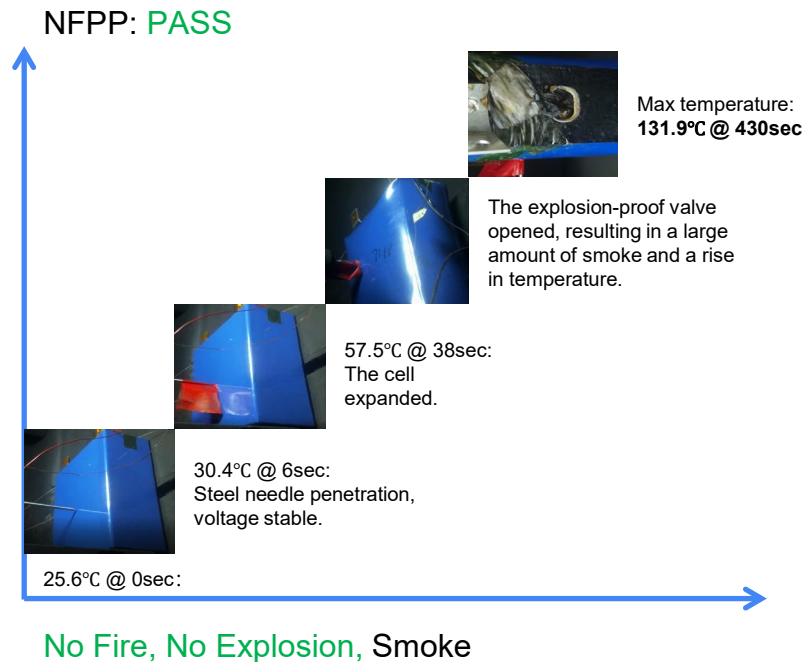
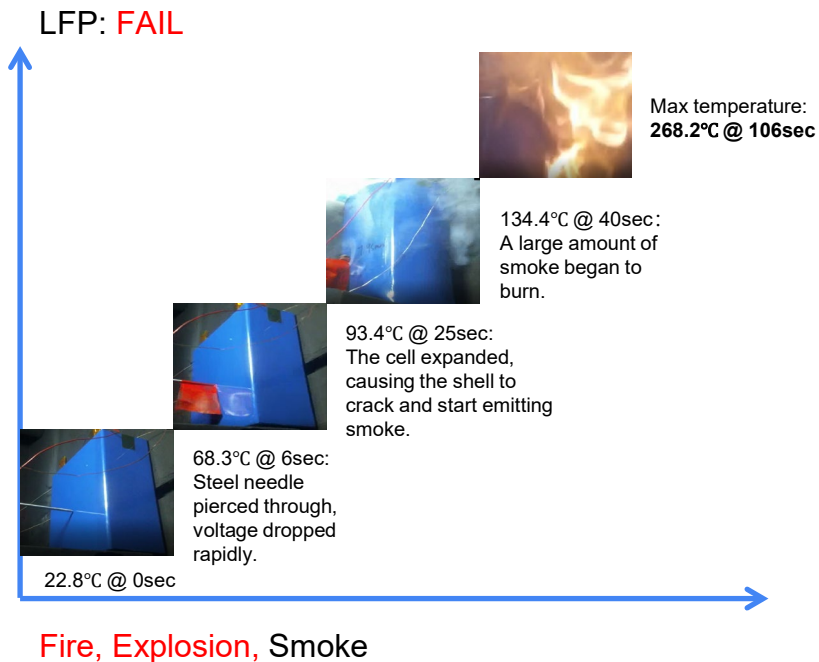
1. Delivers  $\geq 80\%$  of rated capacity
2. Compared at 0.1C due to floor on low-temp charge rate for lead-acid of 0.1C
3. Accepts charge at 0.5C
4. Can be charged repeatedly without degradation, venting or capacity loss



### 3. Safety Test – LFP vs NFPP - Summary

|                                                                                                              |                                                                                                         |                                                                                                                                                                                           |                                                                                               |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <p>a) Nail Penetration</p>  | <p>Charge Voltage</p>  | <p>Charge Temperature</p>  <p>Max temperature:<br/>LFP: 268.2°C @ 106sec<br/>NFPP: 131.9°C @ 430sec</p> | <p><b>LFP: Failed with fire and Explosion</b></p> <p><b>NFPP - Pass No fire</b></p>           |
| <p>b) Thermal</p>           | <p>Charge Voltage</p>  | <p>Charge Temperature</p>                                                                               | <p><b>LFP and NFPP: Pass No fire</b></p> <p><b>LFP: ~275°C</b></p> <p><b>NFPP: ~145°C</b></p> |
| <p>c) Over Charge</p>       | <p>Charge Voltage</p>  | <p>Charge Temperature</p>  <p>Max temperature:<br/>LFP: 80.2°C<br/>NFPP: 30.2°C</p>                     | <p><b>LFP and NFPP: Pass Stable/no vent</b></p>                                               |

### 3. Safety Test – LFP vs NFPP – Nail Penetration



### 3. Safety Test – LFP vs NFPP – Gun Shot



Figure 1. Example of samples at check-in (LFP left, Na right)

#### Test Procedure:

- Three samples of each battery chemistry, sodium and LFP, were shot with a 7.62 mm x 39 mm incendiary round. Each sample was fully charged prior to the ballistics test. Each sample was shot one time with the bullet entering through a different perpendicular axis of the sample. One axis per sample. The distance between the sample and firing device was 20 yards.
- Following bullet entry, the cell was monitored for signs of failure, including thermal events, venting, or physical deformation.

#### Test Results

|                     | LFP: <b>Failed</b>                                                                   | SIB: <b>Pass</b>                                                                                |
|---------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Face Bullet Entry   | Large amount of smoke<br>Extreme temperature rise.<br>Max temp: 310 °C               | Small amount of smoke.<br>No extreme temperature rise, fire, or explosion.<br>Max temp: 40.6 °C |
| Bottom Bullet Entry | Large amount of smoke<br>Deformation, extreme temperature rise.<br>Max temp: 218 °C  | Small amount of smoke.<br>No extreme temperature rise, fire, or explosion.<br>Max temp: 37.3 °C |
| Side Bullet Entry   | Large amount of smoke<br>Deformation, extreme temperature rise.<br>Max temp: 237.8°C | Small amount of smoke.<br>No extreme temperature rise, fire, or explosion.<br>Max temp: 38.4 °C |

### 3. Safety Test – LFP vs NFPP – Gun Shot

#### Bottom Bullet Entry

