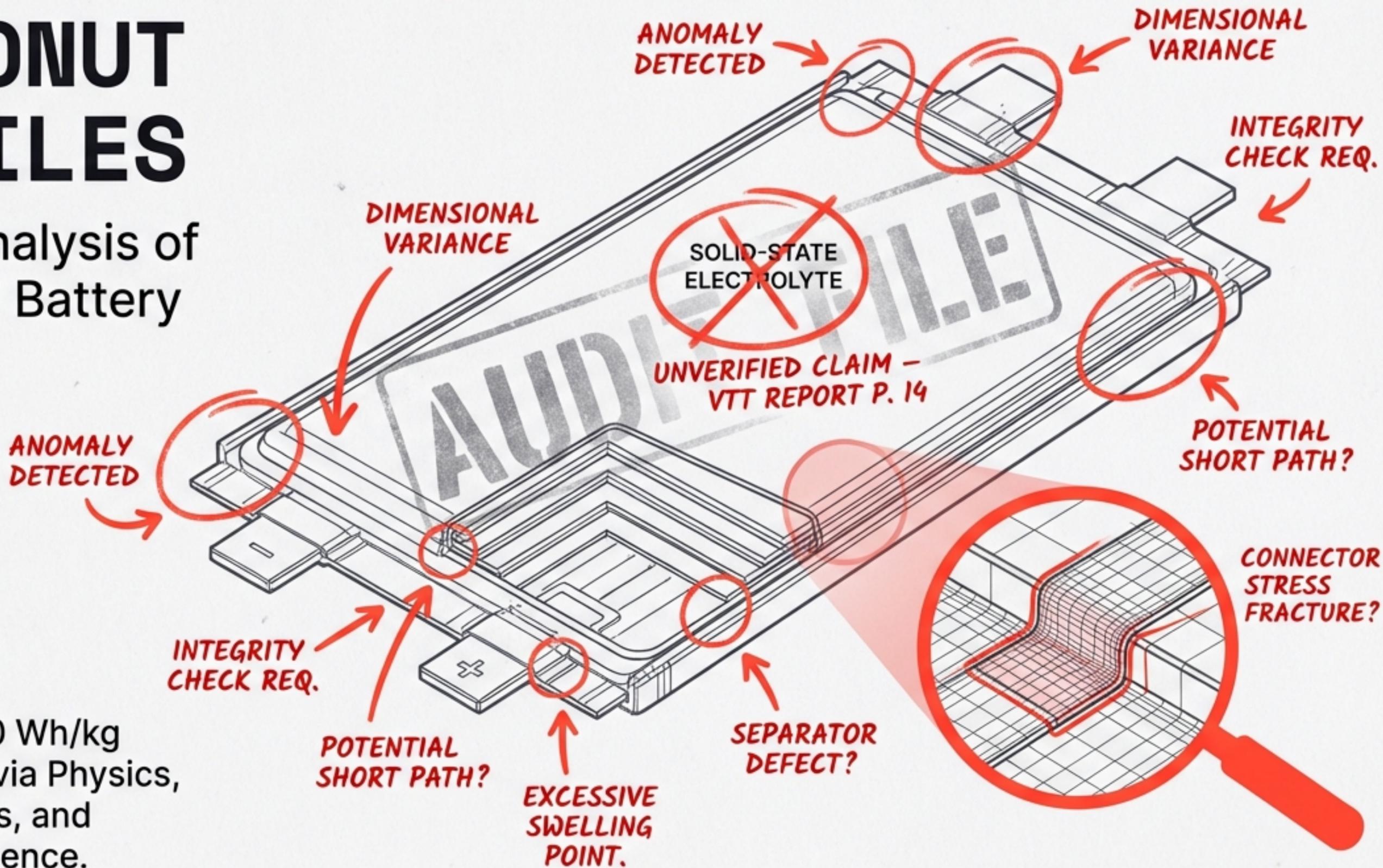


THE DONUT LAB FILES

A Forensic Analysis of the "Unicorn" Battery



Deconstructing 400 Wh/kg Solid-State Claims via Physics, VTT Report Analysis, and Corporate Due Diligence.

THE "HOLY GRAIL" PROMISES

CASE ID: 2024-BATT-ANALYSIS15 TIME: 14:30:00 UTC

400 Wh/kg

Energy Density (The Unicorn Metric)  **RED FLAG: UNVERIFIED IN COMMERCIAL SCALE**

CASE ID: 2024-BATT-ANALYSIS15 TIME: 14:30:00 UTC

All-Solid-State

Technology (No Liquid Electrolyte)  **RED FLAG: MATERIAL STABILITY & MANUFACTURING CHALLENGES**

CASE ID: 2024-BATT-ANALYSIS15 TIME: 14:30:00 UTC

100,000 Cycles

Lifespan (~22 Years Continuous Use)  **RED FLAG: EXTREMELY ACCELERATED TESTING ASSUMPTIONS**

CASE ID: 2024-BATT-ANALYSIS15 TIME: 14:30:00 UTC

< 5 Minutes

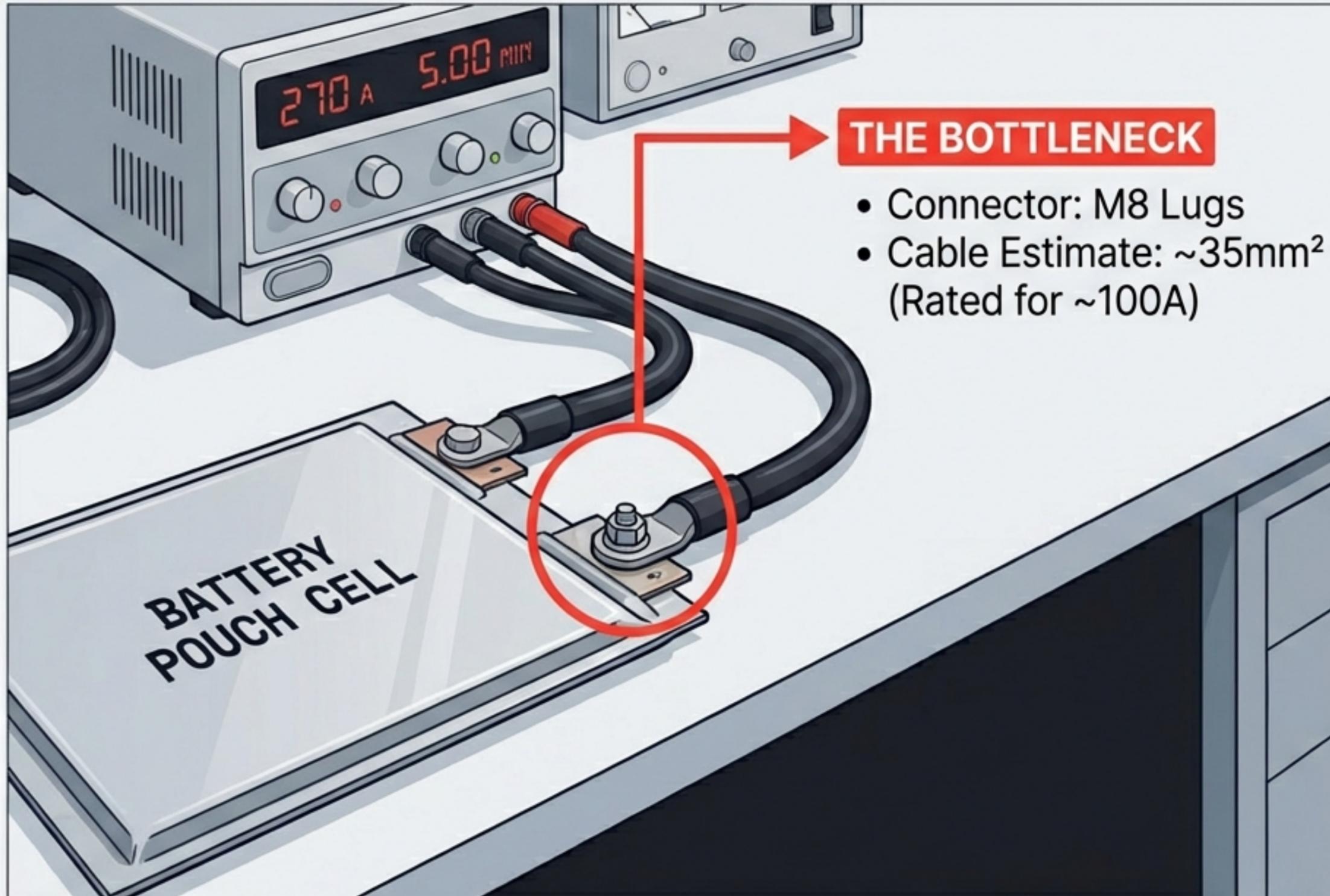
Charging Speed (0-80% / 26Ah Instantly)  **RED FLAG: HEAT MANAGEMENT & INFRASTRUCTURE CONSTRAINTS**

CASE ID: 2024-BATT-ANALYSIS15 TIME: 14:30:00 UTC

Gigafactory Ready

Production Status  **RED FLAG: SCALABILITY & SUPPLY CHAIN UNPROVEN**

EXHIBIT A: THE PHYSICS OF THE CABLE SETUP



THE BOTTLENECK

- Connector: M8 Lugs
- Cable Estimate: $\sim 35\text{mm}^2$ (Rated for $\sim 100\text{A}$)

THE LOAD:

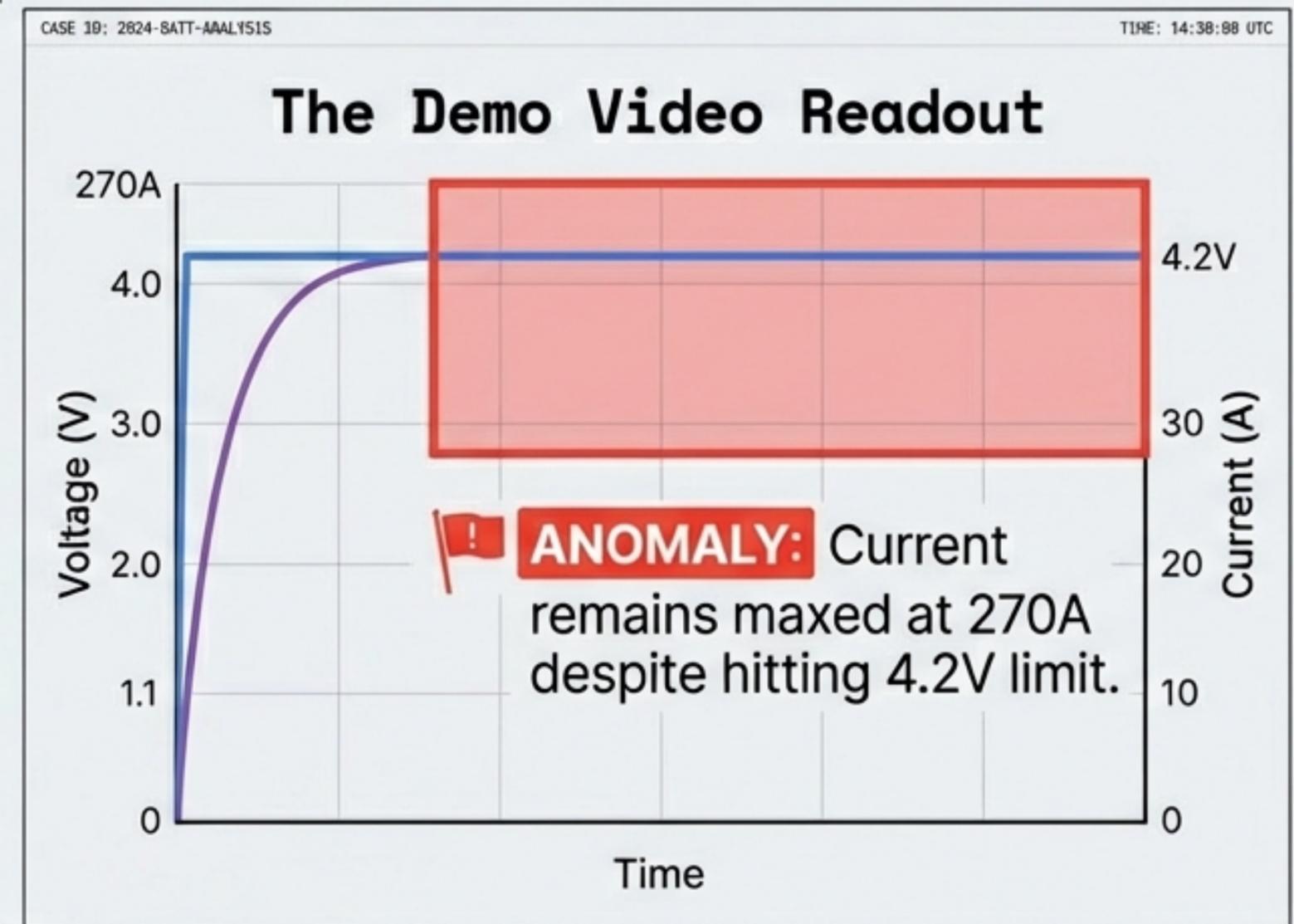
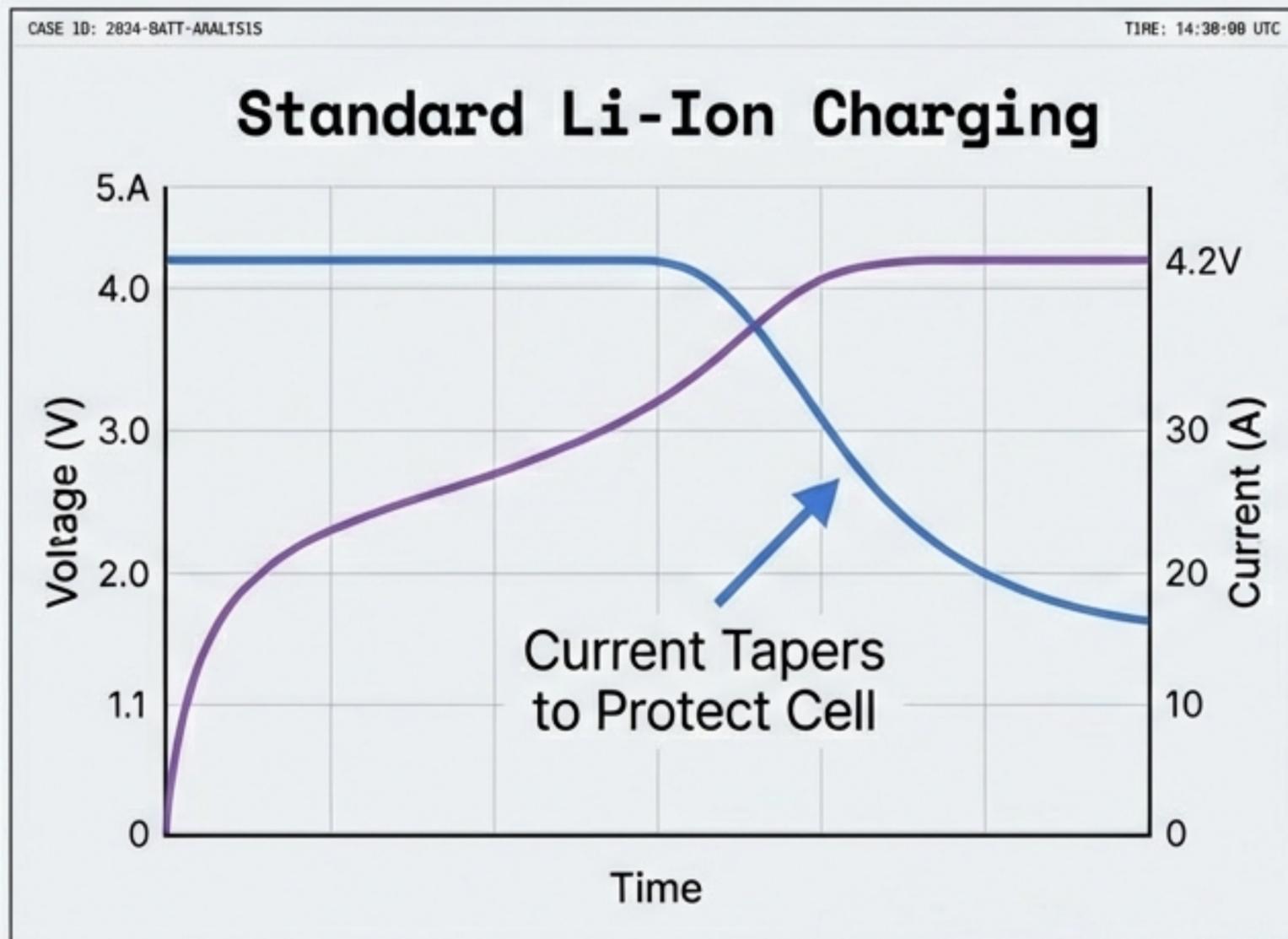
270 Amps sustained for 5 minutes.

PHYSICS VERDICT:

The setup is severely under-specified. At 270A, these cables and clamps would generate dangerous heat levels immediately.

This raises doubts about thermal management depicted in the demo video.

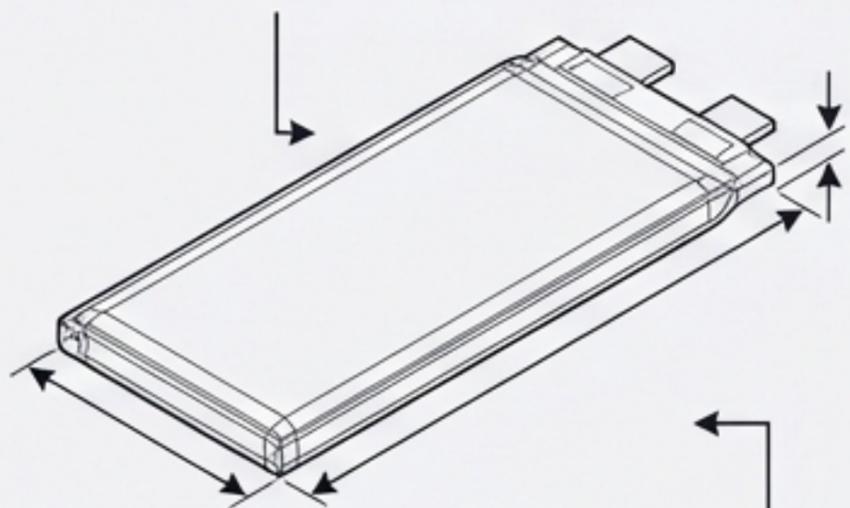
ANOMALIES IN THE CHARGING PROTOCOL



Insight Text: At 72% SoC, voltage is at the limit (4.2V) yet current does not taper. This behavior reæror resembles a a supercapacitor or lead-acid battery, not a sensitive solid-state lithium cell.

THE DENSITY DISCREPANCY: DOING THE MATH

Derived from Fluke meter reference:
7.43cm x 18.32cm x 1.00cm



Total Volume $\approx 136 \text{ cm}^3$
(approx 270cc total envelope)

The Energy

Capacity: $\sim 110 \text{ Wh}$ (26Ah @ $\sim 4\text{V}$)

Verdict

The cell is likely much heavier than claimed (invalidating the 400Wh/kg metric) or the capacity is overstated.

Claim: 400 Wh/kg

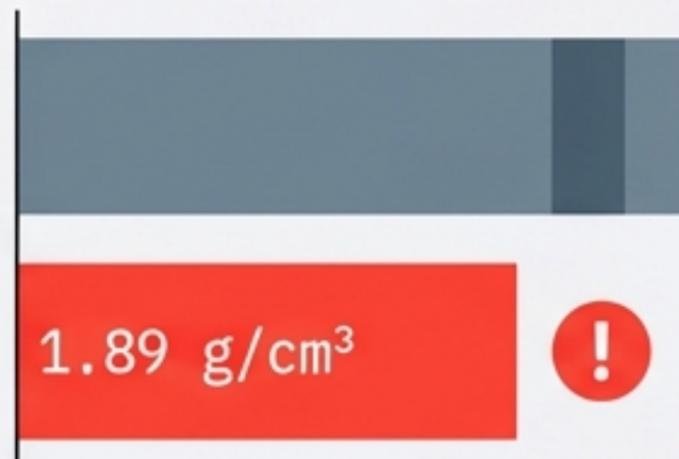
$$\text{Required Mass} = \frac{\text{Capacity}}{\text{Density Claim}}$$

$$\frac{110 \text{ Wh}}{400 \text{ Wh/kg}} = 0.275 \text{ kg (275g)}$$

Resulting Density:
1.89 g/cm³

Standard Li-Ion Density:

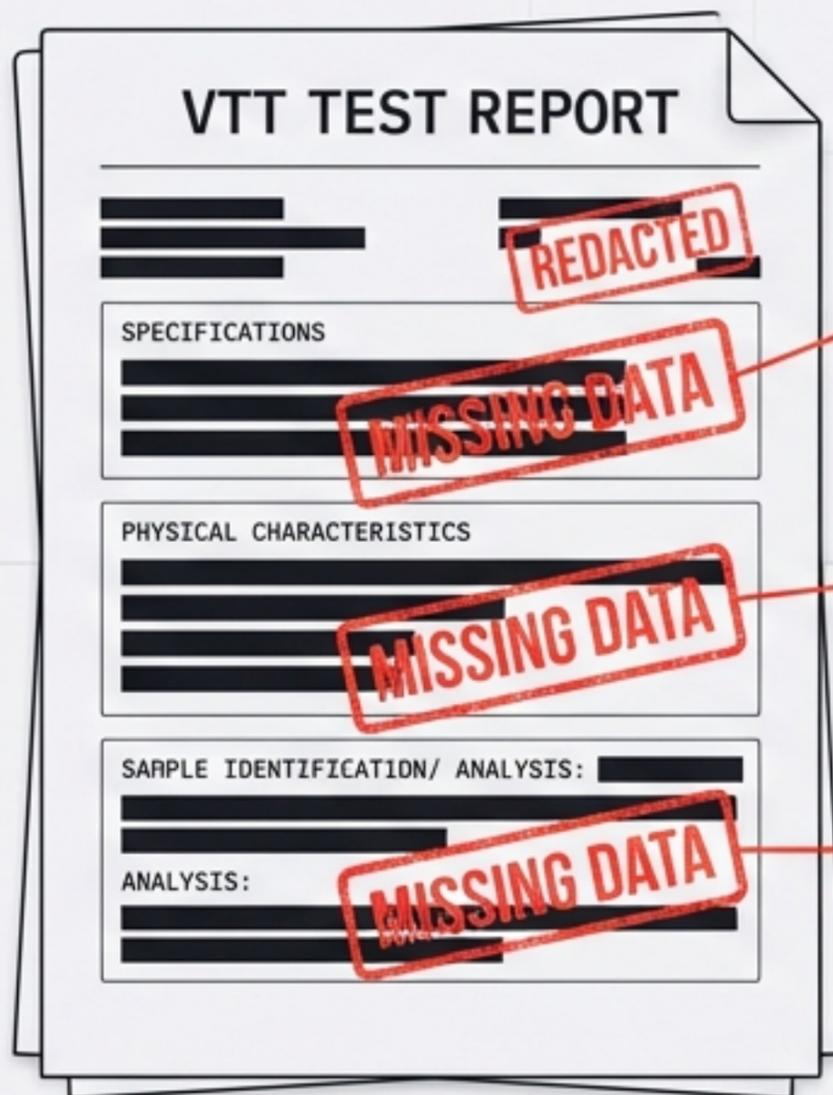
2.5 – 2.7 g/cm³



Solid-State Logic:

Replacing liquid with solid should make the cell DENSER, not lighter.

THE VTT REPORT: CONTEXT AND OMISSIONS



MISSING: MASS

The weight of the cell was excluded from the report. Without mass, Wh/kg cannot be verified.

MISSING: DIMENSIONS

Physical volume was not measured by VTT.

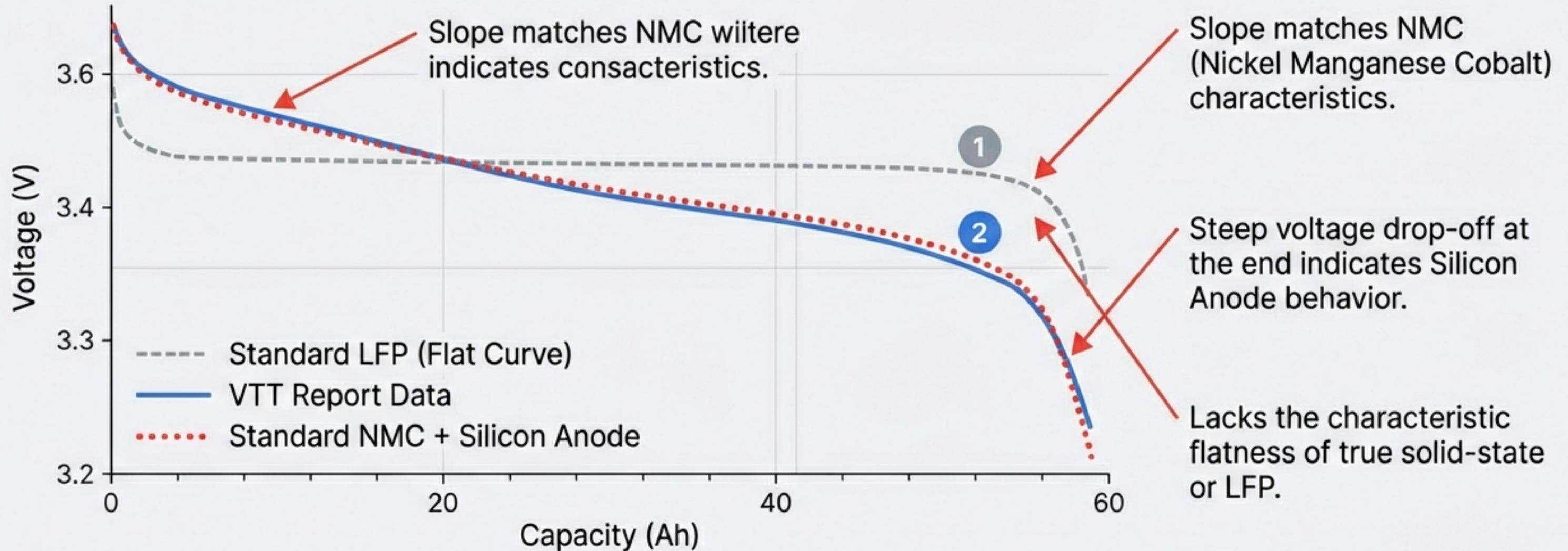
UNVERIFIED: CHEMISTRY

Sample labeled "Solid State Battery TTT" by the client. VTT did not verify internal chemistry; only electrical performance was tested.

Context Note

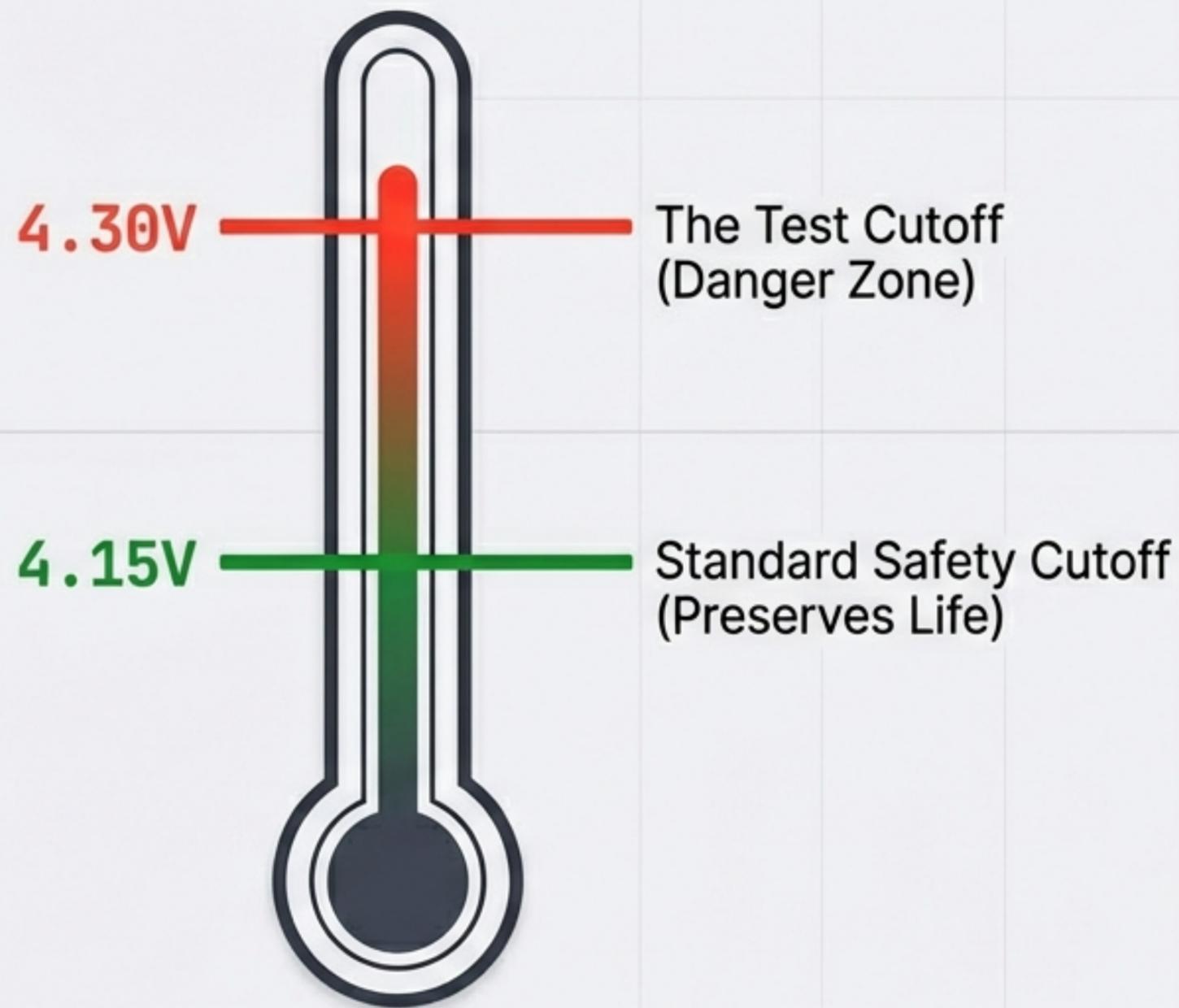
VTT performs exactly what the client requests. The omission of mass and dimensions suggests a deliberate strategy to hide density data.

THE CHEMICAL FINGERPRINT: VOLTAGE CURVE ANALYSIS



VERDICT: Data points to a high-performance semi-solid NMC with Silicon—not a new physics-breaking chemistry.

THE CHARGING "TRICK": AGGRESSIVE VOLTAGE



THE MECHANISM:

High current causes Voltage Sag (IR Drop).

To force 26Ah into the battery in <5 minutes, the test pushed voltage to 4.3V.

THE RESULT:

They 'filled the bucket' by overflowing safety limits.

This damages the cell structure but produces a successful one-time test number.

THE SILENT KILLER: COULOMBIC EFFICIENCY

>99.998% 

**Required Efficiency for
100,000 Cycles**

~99.5% 

**Observed Efficiency
in Fast Charge Test**

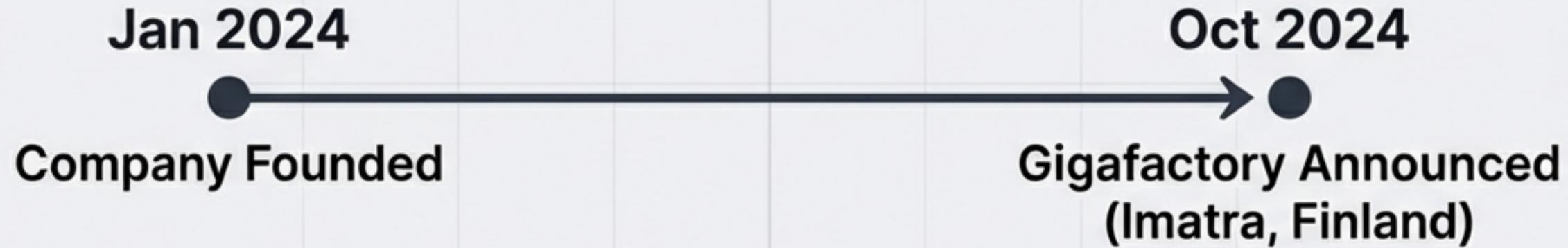
**Losing ~0.5% lithium per cycle means the battery dies
in hundreds of cycles, not thousands.**



THERMAL RUNAWAY RISK:

Cell hit 90°C safety cutoff during testing.
Test paused to re-tape heat sinks.

THE MANUFACTURER: NORDIC NANO GROUP



TEAM ANALYSIS



Total Headcount: ~9 Employees
Management, Sales, Board Members.

THE REALITY CHECK

LOGISTICAL IMPOSSIBILITY: Developing a revolutionary new chemistry AND building a gigafactory in < 2 years with 9 people. (Comparison: QuantumScape/CATL take decades and billions in R&D).

THE TRUE ORIGIN: THE “PRINTER” MODEL



THE “HP PRINTER” STRATEGY:

CT Coating does not sell batteries. They sell the **machines** to startups who then claim to manufacture the batteries. The “Gigafactory” is likely just a pilot line for the printer.

A DIFFERENT CORNER OF SCIENCE

“ We come from a different corner of science and physics... our specifications can sometimes even exceed theoretical limits. ”
- Comment by Creators

RED FLAG:

RED FLAG: In physics and investing, claiming to “exceed theoretical limits” is a classic indicator of **measurement error** or obfuscation, not innovation.

SUMMARY OF FINDINGS: FACT VS. FICTION



Fast Charging?

Confirmed (<5 mins), but generates high heat and uses **unsafe voltage levels**.



400 Wh/kg?

Unlikely. Density calculations do not match physics; mass data hidden from report.



100,000 Cycles?

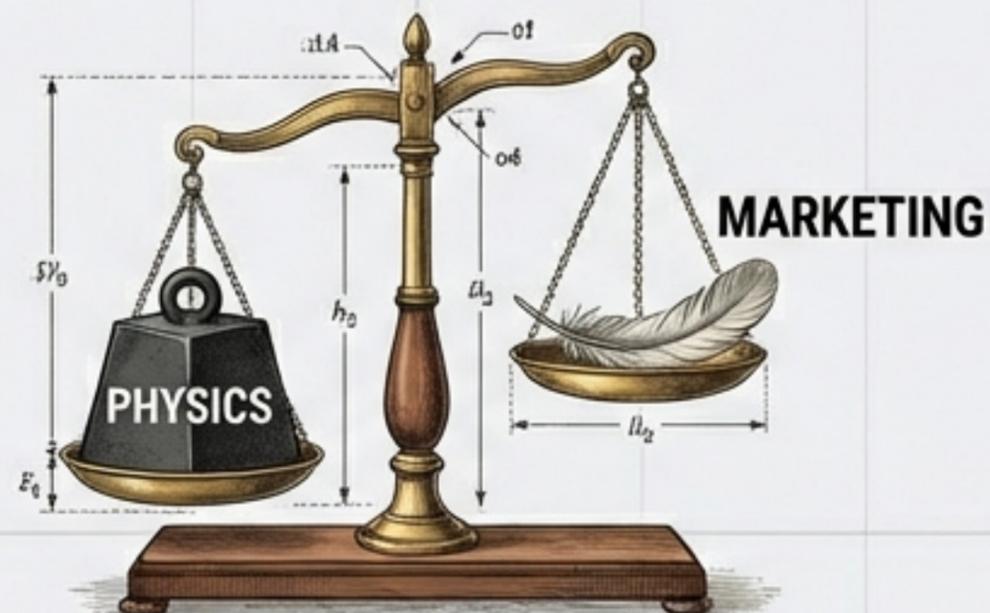
Debunked. Low Coulombic Efficiency (~99.5%) predicts standard degradation.



Solid State?

Dubious. Voltage curve matches NMC+Silicon; likely 'Semi-Solid' marketed as revolutionary.

THE FINAL VERDICT



Extraordinary claims require extraordinary evidence.

The technology appears to be a decent, high-power drone cell (NMC/Si) marketed as a revolutionary solid-state solution via a complex licensing web.

DUE DILIGENCE REQUIREMENTS:

1. Independent Mass Measurements.
2. Standardized Cycle Life Data (Long-term).
3. Independent Verification of Chemistry.