

Litona @ ALBA 2026

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Na-Ion Prussian White Cells for 12 V Automotive Batteries

IEC TC21 WG2 draft tests

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Pulse Test for 12 Volt Automotive Battery at -18 and -29 °C

procedure taken from IEC TC21 WG2 draft

Test 1:

Step 1:

Conditioning **non-optimized cells** at -18 / -29 °C and 100 % SoC

Step 2:

Every minute, a 1-second pulse is discharged at a constant rate of 1.67C ... 2.5C ... 3.33C ...

Step 3:

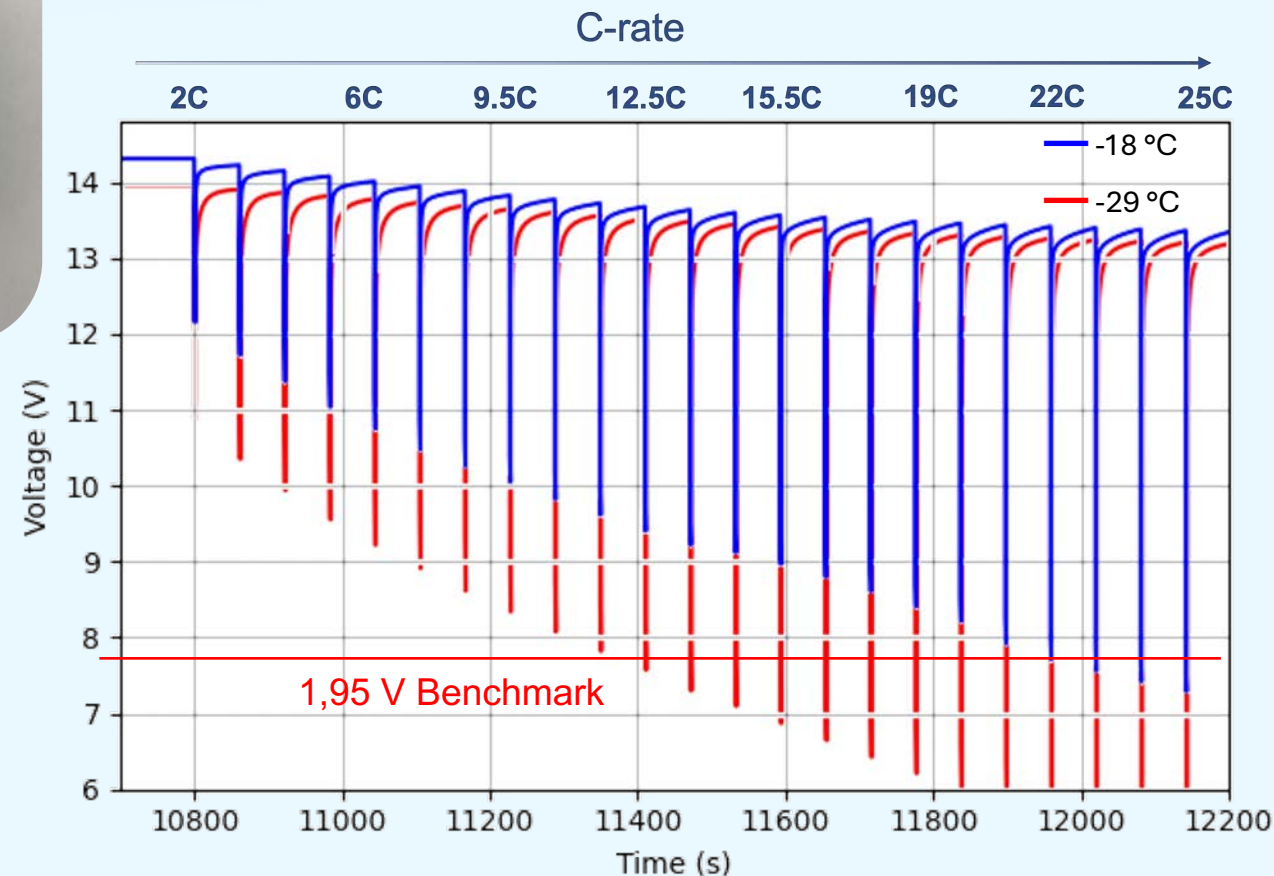
The resulting residual voltages at the end of the constant-current pulses are plotted against the C-rates (since the relationship is approximately linear).

Step 4:

The C-rate, at which the voltage at the end of the constant-current pulse is 1.95 V / cell (or 7.8 per pack, = the cold-start current), is determined.

► Cold start current -18 °C: **21C**

► Cold start current -29 °C: **10.3C**



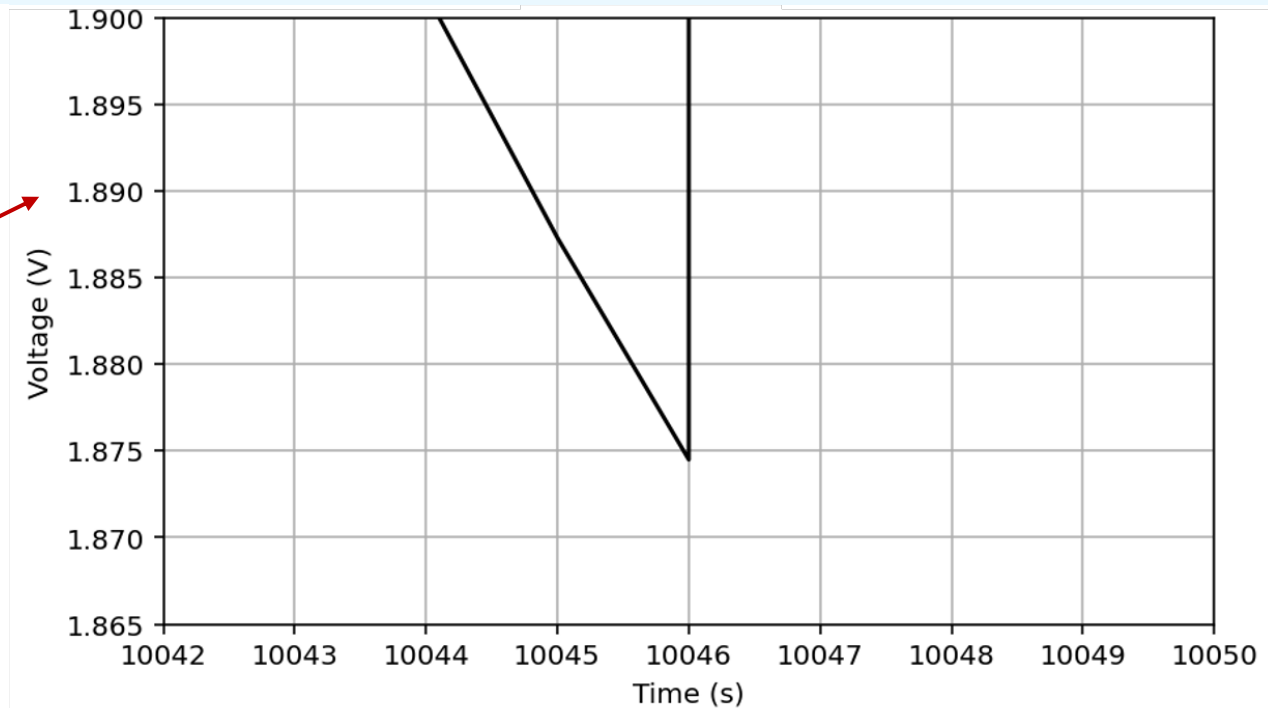
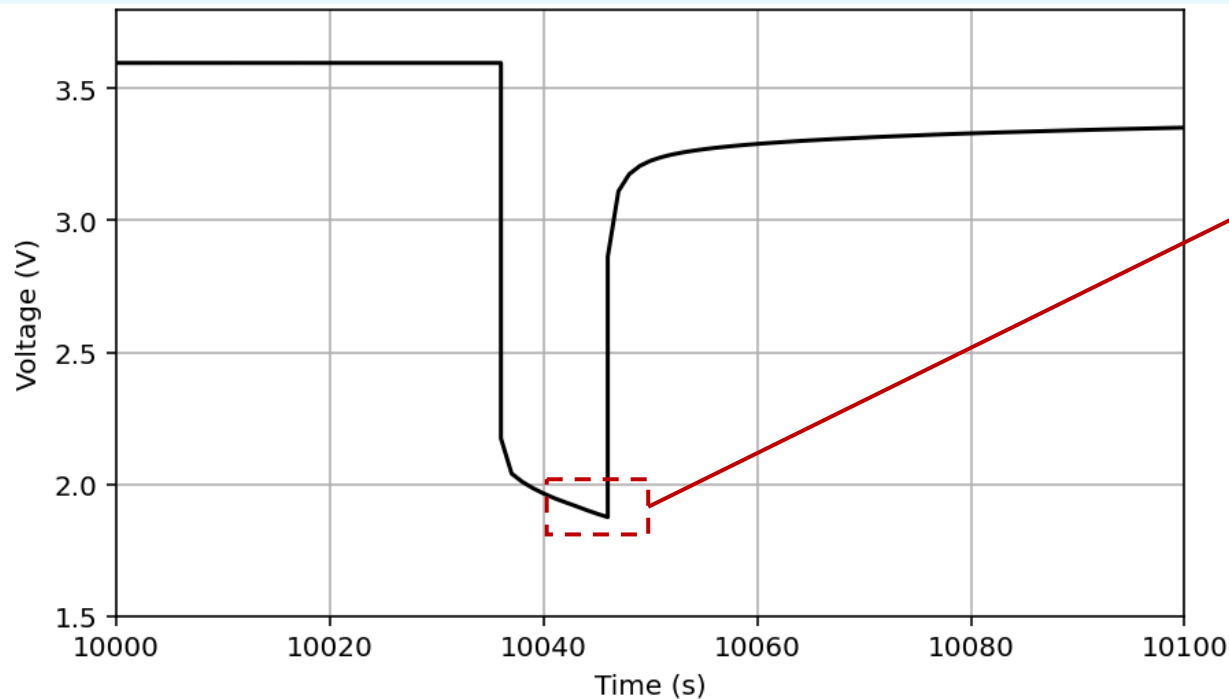
Pulse Test for 12 Volt Automotive Battery at -18 °C procedure taken from IEC TC21 WG2 draft

Test 2

Step 1:
Conditioning at -18 °C and 100 % SoC

Step 2:
The cold start current from Test 1 is discharged at a constant rate for 10 seconds.

If the voltage does not drop below 1.875 V, the test is considered passed.



Pulse Test for 12 Volt Automotive Battery at -18 °C

procedure taken from IEC TC21 WG2 draft

Test 3

Step 1: The cell is equilibrated to temperature of -18°C at 100% SoC.

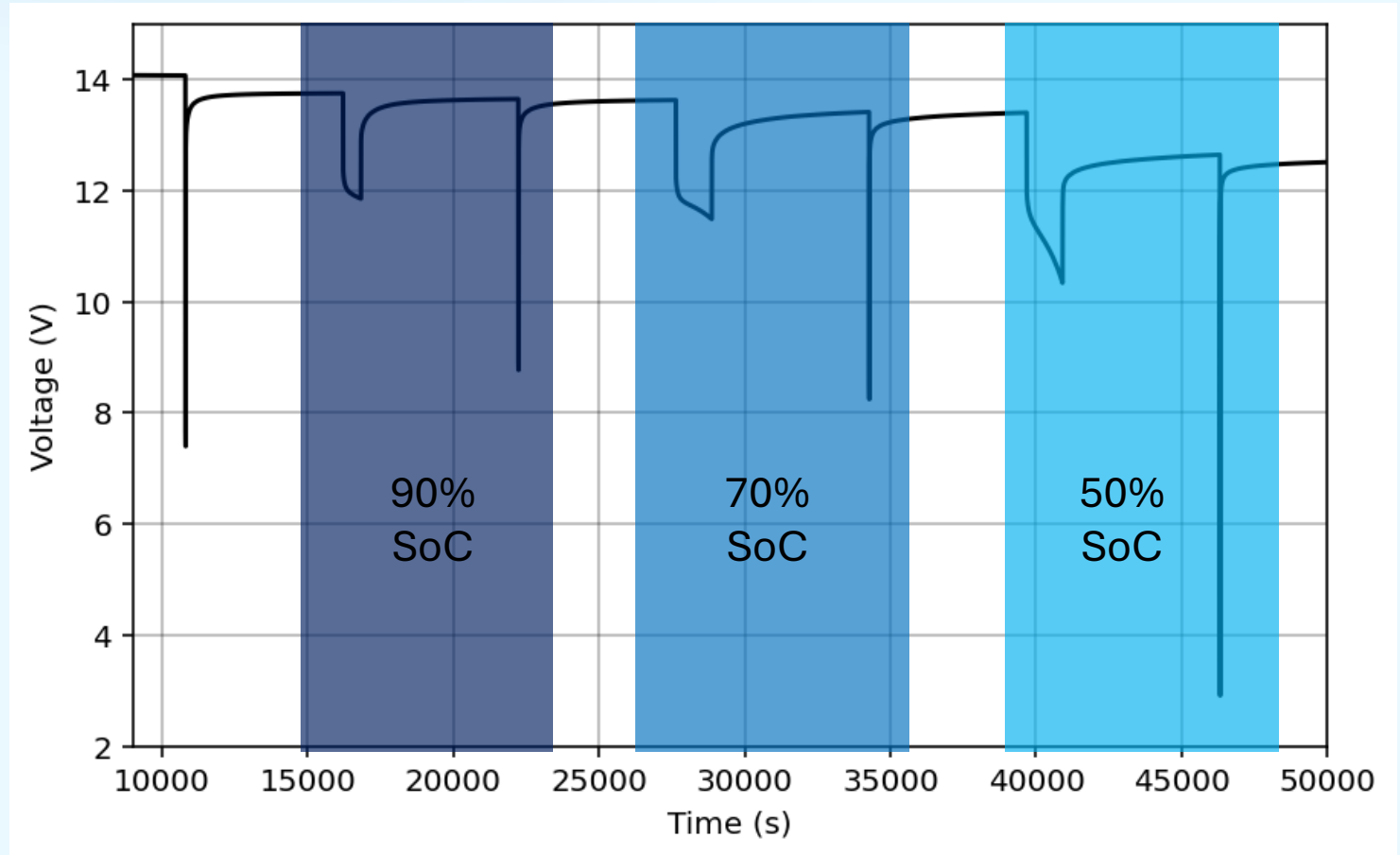
Step 2: The Kaltstartstrom found in the previous test is now applied for 10 seconds.

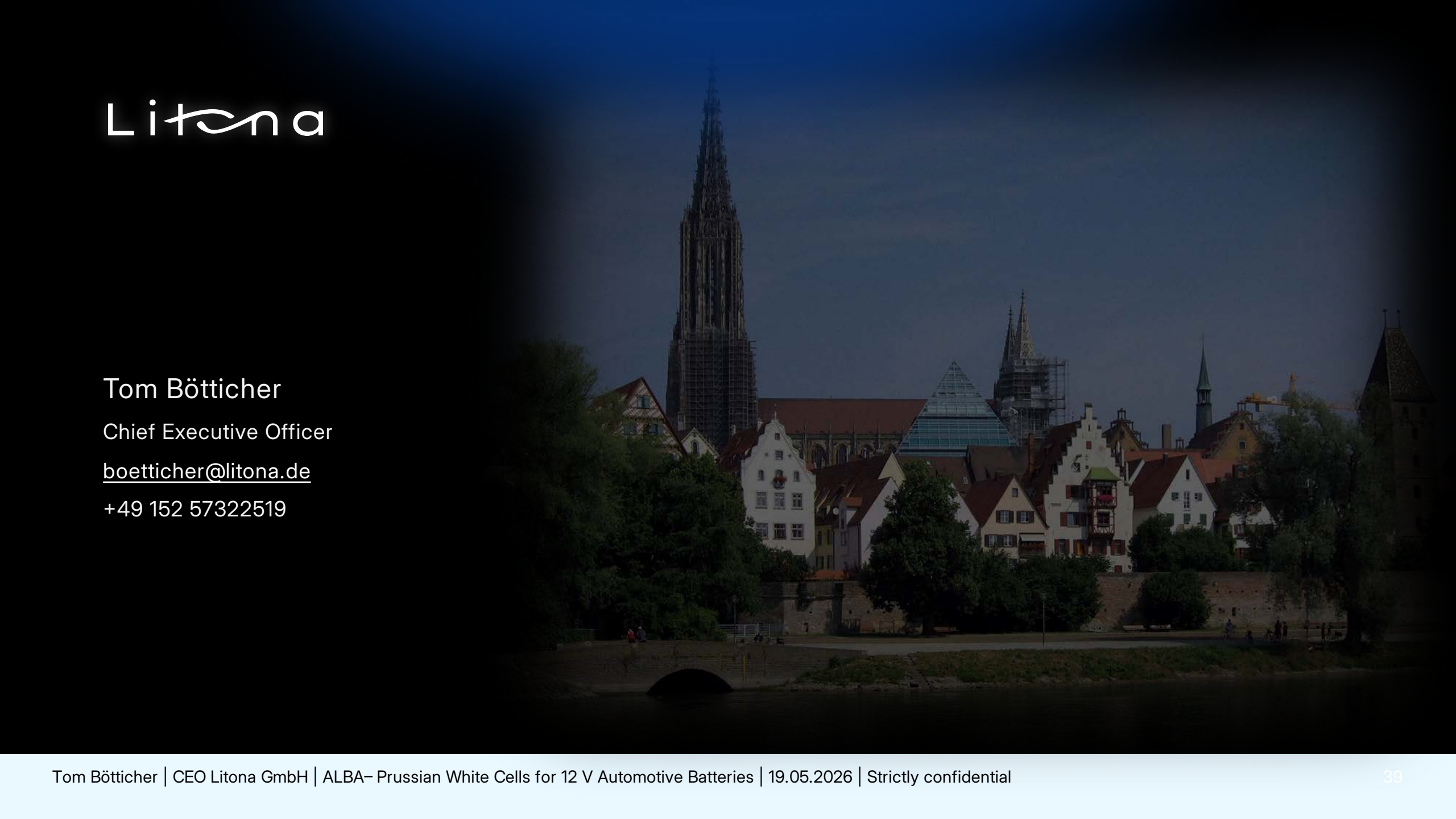
Step 3: 1.5h rest, followed by a C/2 discharge to 90% SoC.

Step 4: Current of **Kaltstartstrom/2** is applied for 10 seconds.

Step 5: 1.5h rest, followed by a C/2 discharge to 70% SoC.

Steps 3-4 are repeated with 50% SoC, 30% SoC and 10% SoC



The background of the slide is a photograph of the Regensburg Cathedral (Regensburger Dom) and the surrounding city of Regensburg, Germany. The cathedral's tall, ornate spire is the central focus, rising above the city's rooftops. The sky is a clear, deep blue. In the foreground, there are green trees and a stone wall along a riverbank.

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