Test Report

No. 1-2356-26-03-02_TR1-R01

March 19, 2026

Applicant	3S Technologies GmbH
Product	Akkuguard
Model	Akkuguard
Test Standard(s)	BAM GGR-024 Anhang 2 Revision 2
Verdict	☒ PASS: All applicable Test(s) acc. to the standard(s) are PASS/complies

The test results relate only to devices specified in this document

This test report is electronically signed and valid without handwritten signature.
Public keys for verification of the electronic signatures can be requested at the testing laboratory.

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2026.03.20 09:16:33 +01'00'

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Martin Kirchner
Head of
E&B

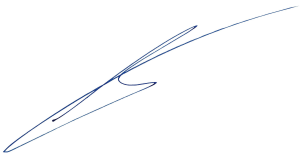

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Table of content

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2 Related cetecom advanced documents

Document	Content	Reference	Total pages

3 Document history

3.1 Current release

Release No.:	R01
Date of release:	March 09, 2026
Applied changes:	Initial Release

4 Test laboratory

4.1 Contact information

cetecom advanced GmbH
Untertuerkheimer Str. 6-10
66117 Saarbruecken
Germany

4.2 Involved test locations

	Saarbruecken lab		Essen lab
☒	Untertuerkheimer Str. 6-10 66117 Saarbruecken Germany	☐	Im Teelbruch 116 45219 Essen Germany

4.3 Subcontracted laboratories

None.

5 Client information

5.1 Applicant

Name:	3S Technologies GmbH
Address:	Saar-Lor-Lux Strasse 11 Saarbruecken GERMANY
Contact Person:	Martin Bartels
Contact Person's Email:	martin.bartels@3S-technologies.de

5.2 Manufacturer

Name:	3S Technologies GmbH
Address:	Saar-Lor-Lux Strasse 11 Saarbruecken GERMANY

6 Test sample information

The data about the test samples is given/supplied by the customer and not under control by cetecom advanced GmbH.

6.1 Generic information sample

6.1.1 General data of main EUT as declared by applicant

Safety box for storage and charging of lithium ion battery

6.1.2 Detailed technical data of main EUT as declared by applicant

Test item particulars	
S/N serial number:	202610001
Volume of the box [m^3]:	0,0418
Inner dimensions [mm]:	595 x 270 x 260
outer dimensions [mm]:	745 x 340 x 345
Maximum energy [kWh]:	0,64584
Integrated firefighting system:	--
Product weight [kg]:	28,7
Outer material:	Aluminium/Steel
Inner material:	Steel / Calcium silicate

6.2 Equipment under test

6.2.1 EUT

EUT no.	SN.	Weight [kg]	Additional information
01	202610001	28,7	Battery Safety box

The measured values in the table above represent the state of delivery.

6.2.2 Used Battery

Parameter	Value	Comment
Ucell_max	4,17 V	Max. cell voltage
Ucell_min	4,13 V	Min. cell voltage
Energy	0,64584 kWh	Maximum Energy
Chemistry	NCA	Cell Chemistry
For more details, please refer to the “ggr-024_anhang-6” which is attached to this report		

7 Application details

7.1 Scheduling

Date of sample reception:	2026-03-04
Start of test:	2026-03-06
End of test	2026-03-07

7.2 Climatic data

Temperature:	20°C ±10°C
Relative. humidity:	50%rH ±25%rH
Barometric pressure:	950hPa ±75hPa

7.3 Opinions and interpretations

None.

8 Test results summary

☒ No deviations from the technical specifications were ascertained

☐ There were deviations to the technical specifications ascertained

☐ This test report is only a partial test report. The content and verdict of the performed test cases are listed below

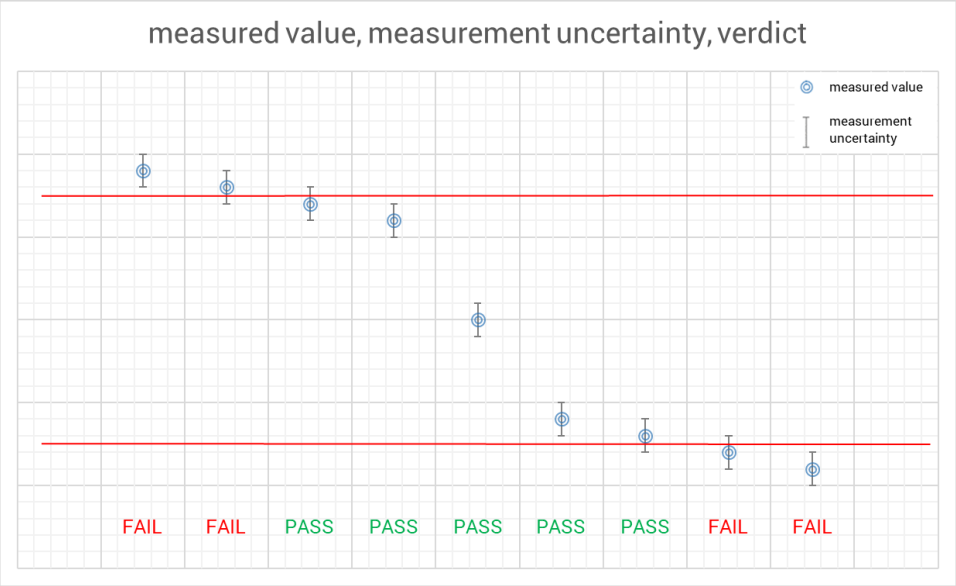
Nr.:	BAM-GR024	Test description	Selected:	EUT	Verdict:
01	01	SOC Setting of the used Battery	☐		N/T
02	02	Brandprüfung	☒	01	P
03	5.3	Forensic	☒	01	P

Test case verdicts

Test case does not apply to the test object :	N/A (NOT APPLICABLE)
Test item does meet the requirement :	P (PASS)
Test item does not meet the requirement :	F (FAIL)
Test case was not carried out :	N/T (NOT TESTED)
The test result cannot be clearly determined :	INC (INCONCLUSIVE)

8.1 Reporting statements of conformity – decision rule

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 8.1.
The measurement uncertainty is mentioned in this test report, see chapter above, but is not taken into account - neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong."



Decision rule for battery testing

cetecom advanced GmbH follows ILAC G8:2019 chapter 4.2.1 (Simple Acceptance Rule).
Therefore, the uncertainty is not considered for the statement of conformity in this test report.

9 Detailed test results

9.1 SOC adjustment

Clause	Requirement + Test					Verdict
01	**SOC adjustment**					
Battery Type		EUT State				
Cell	☐					
Cell block	☒	SOC state adjusted by customer				
Battery	☐					
Acceptance criteria:		Adjust SOC as given by the manufacturer of the box				**N/T**
EUT	OCV at start of charging	OCV at end of charging	Corresponding SOC	Charge current	Energy content	
#	[V]	[V]	[%]	[A]	[kWh]	
01	--	4,17	100	--	0,64584	
Supplementary information -						

9.2 Testresult

Clause	Requirement + Test		Verdict
02	**Brandversuch**		
Box for:		EUT State	
Cells Cell blocks Batterys	☐ ☒ ☐	Cell block consisting of 52 18650 cells was forced into thermal-runaway inside the storage box.	
Acceptance criteria:		No explosion, no fire outside the box and no outside temperature rise for 10 minutes over 100°C. Total maximum allowed temperature outside is 200°C	**P**
Trigger methode		Heating	
Number of trigger cells		1	Figure 1
Order of ignitions		--	

Results		
Fire outside the box	☐ YES	☒ NO
Flying parts	☐ YES	☒ NO
Leaking liquide	☐ YES	☒ NO
Outgassing	☒ YES	☐ NO
Temp. >100°C for 10 min	☐ YES	☒ NO
Temp. >200°C	☐ YES	☒ NO
Destroyed structure	☐ YES	☒ NO
Other observations	☐ YES	☒ NO

Other obervations:

-

Clause	Requirement + Test		Verdict
02	**Forensik**		
Box for:		EUT State	
Cells	☐		
Cell blocks	☒	Full propagation of the Cell block, box was in good shape	
Batterys	☐		
Acceptance criteria:		All Cells have to reach a Thermal Runaway	**P**
Trigger methode		Heating	
Number of trigger cells		1	Figure 1

Results		
All Cells in TR	☒ YES	☐ NO
Cells without TR	0	
Other obervations:		
-		

Detailed description of the trigger methode

One heater with a power of 0,4 kW was used.

The heater was powered with 230 V and 1,75 A until a self-heating was detected

9.3 Measuring Point map of outside sensors

Please refer Figure 1 to Figure 7

Measure Point (#)	Name	Maximum temperature [°C]	Temp. rise over 100°C [°C / min]
T1	Top panel locking mechanism right	70,60	--
T2	Top panel middle	79,00	--
T3	Top panel left side	55,40	--
T4	Top panel locking mechanism left	64,80	--
T5	Electronics compartment front left	55,60	--
T6	Front flap left side	85,20	--
T7	Front flap left locking mechanism	84,90	--
T8	Front flap right locking mechanism	81,60	--
T9	Front flap middle-right	87,00	--
T10	Front flap centre screw	92,30	--
T11	Left side panel centre	51,50	--
T12	Left side panel right screw	49,40	--
T13	Rear panel screw left	62,00	--
T14	Rear panel screw upper fan cover	99,00	--
T15	Rear panel screw bottom left	82,90	--
T17	Rear panel centre	86,70	--
T18	Rear panel screw lower fan cover	87,80	--
T20	Rear panel screw upper right	85,30	--
T21	Right panel centre	79,80	--
T22	Bottom panel centre	72,40	--
T23	Bottom panel front right	61,50	--

9.3.1 Additional information

The thermocouples T16 and T19 are not included in the list above because they are not representative due to poor placement.

9.4 Measuring Point map of inside sensors

Please refer Figure 8

Measure Point (#)	Name	Maximum temperature [°C]	Time stamp [sec]
T24	Inside flap centre	502,1	1083
T25	Upper meander middle	586,9	1071
T26	Lower meander bottom-left screw	309,70	1373
T27	Power strip	392,10	546
T28	Smoke detector	742,40	741
T29	Cellblock cell 1	808,20	528
T31	Cellblock cell 3	694,30	562
T32	Cellblock cell 4	710,90	499
T33	Cellblock cell 5	767,10	607
T34	Cellblock cell 6	439,50	958
T35	Cellblock cell 7	1019,40	499
T36	Cellblock cell 8	574,60	1001
E1	Electronics compartment	73,20	3556
E2	Electronics compartment	97,20	2757
E3	Electronics compartment	93,10	2537

9.4.1 Additional information

The thermocouple T30 was defective and is not included in the list above.

9.5 Schematic representations

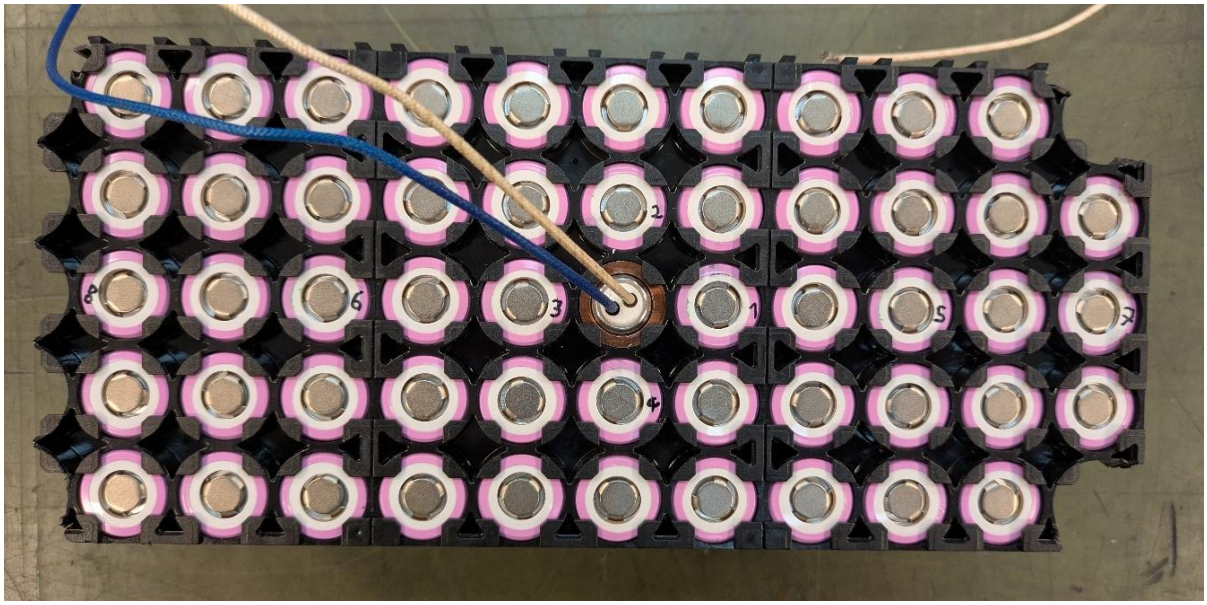


Figure 1 schematic representation of the trigger cells

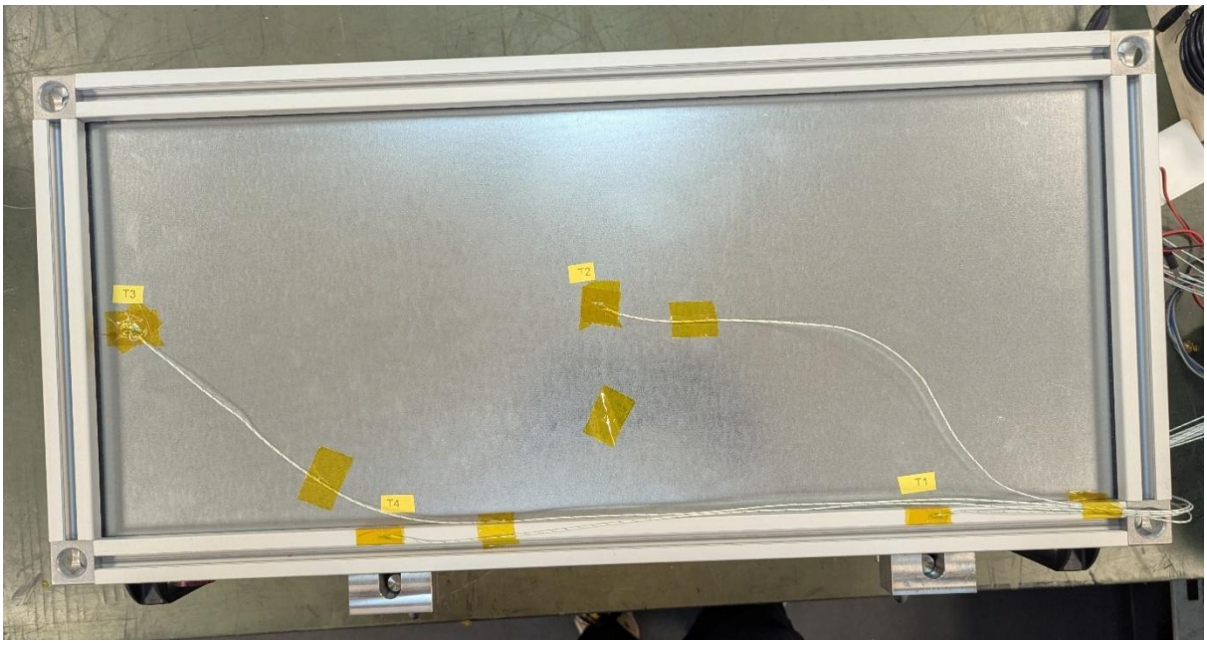


Figure 2 schematic representation of outside sensors TOP

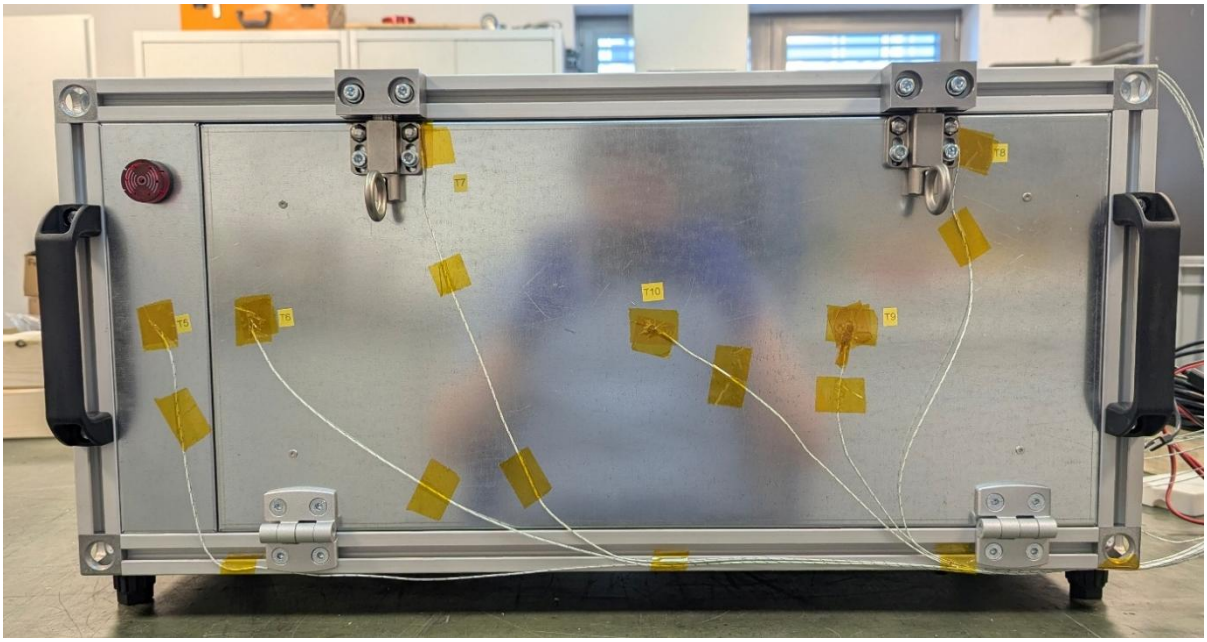


Figure 3 schematic representation of outside sensors FRONT

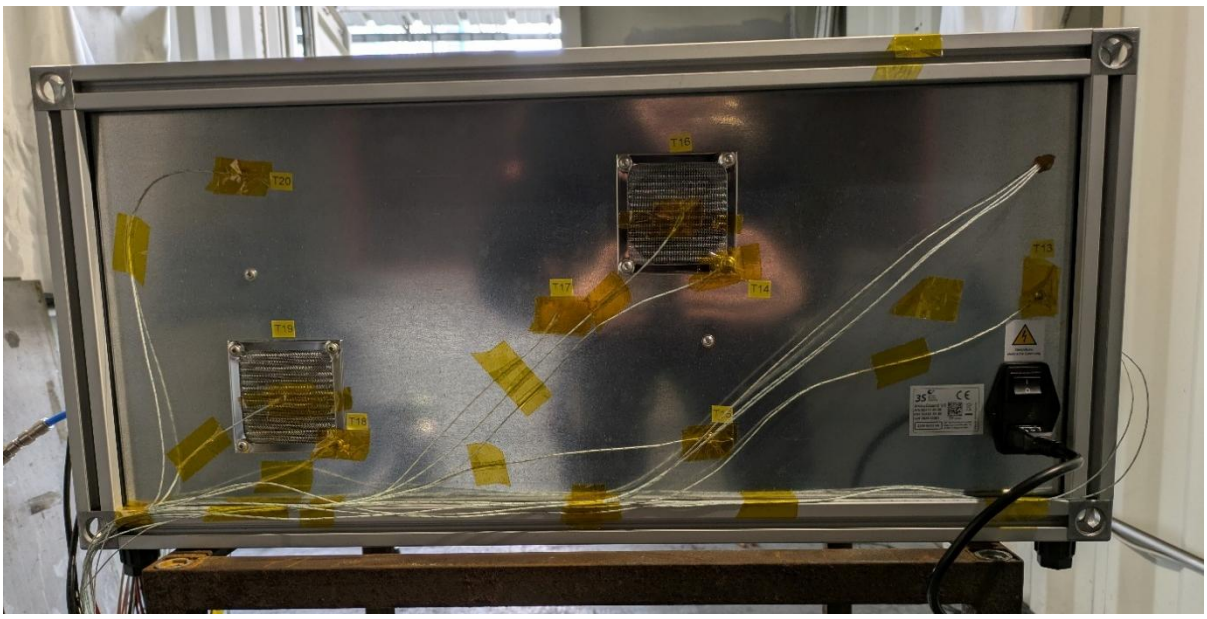


Figure 4 schematic representation of outside sensors BACK

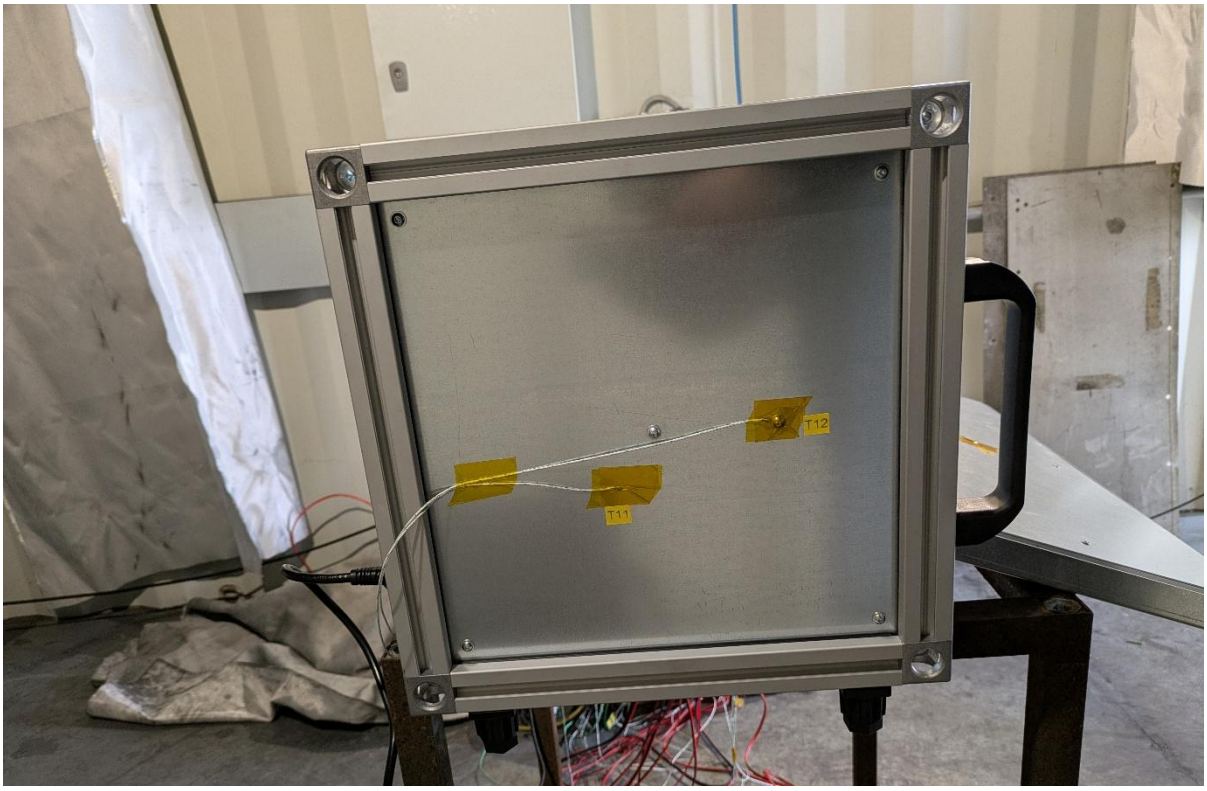


Figure 5 schematic representation of outside sensors LEFT

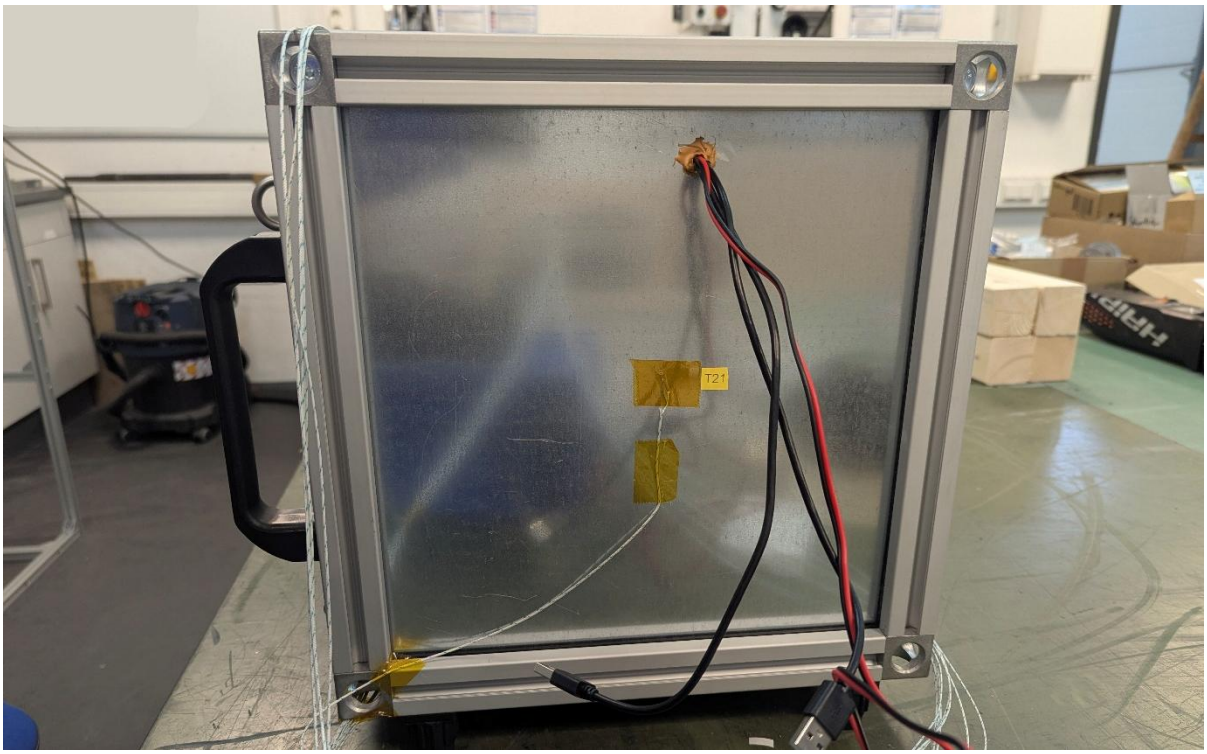


Figure 6 schematic representation of outside sensors RIGHT

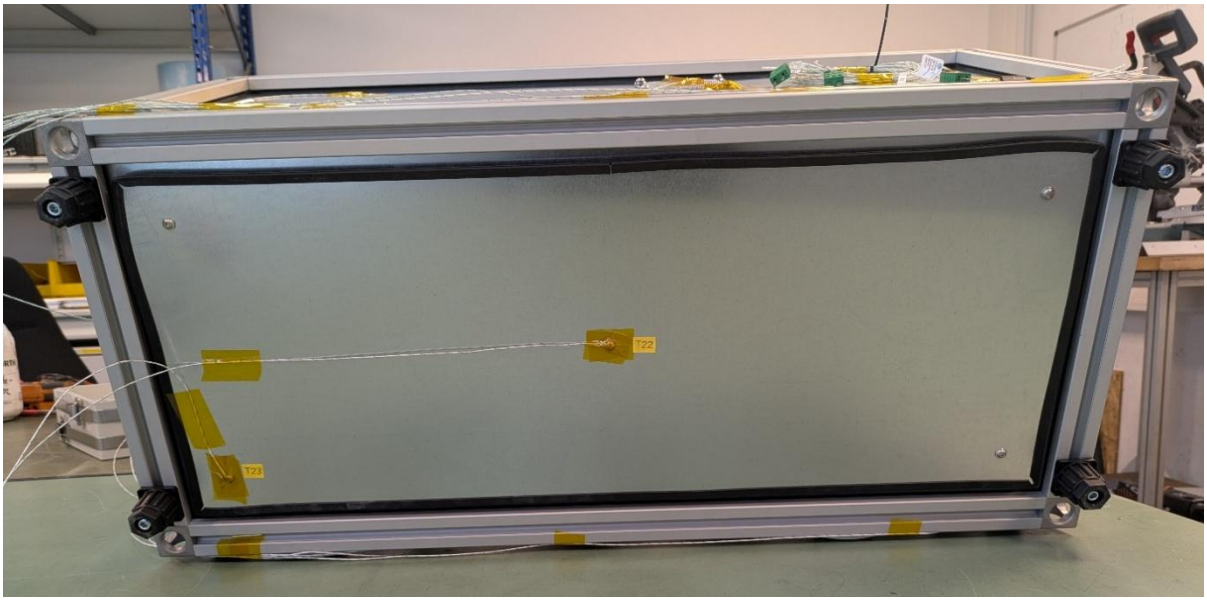


Figure 7 schematic representation of outside sensors Bottom

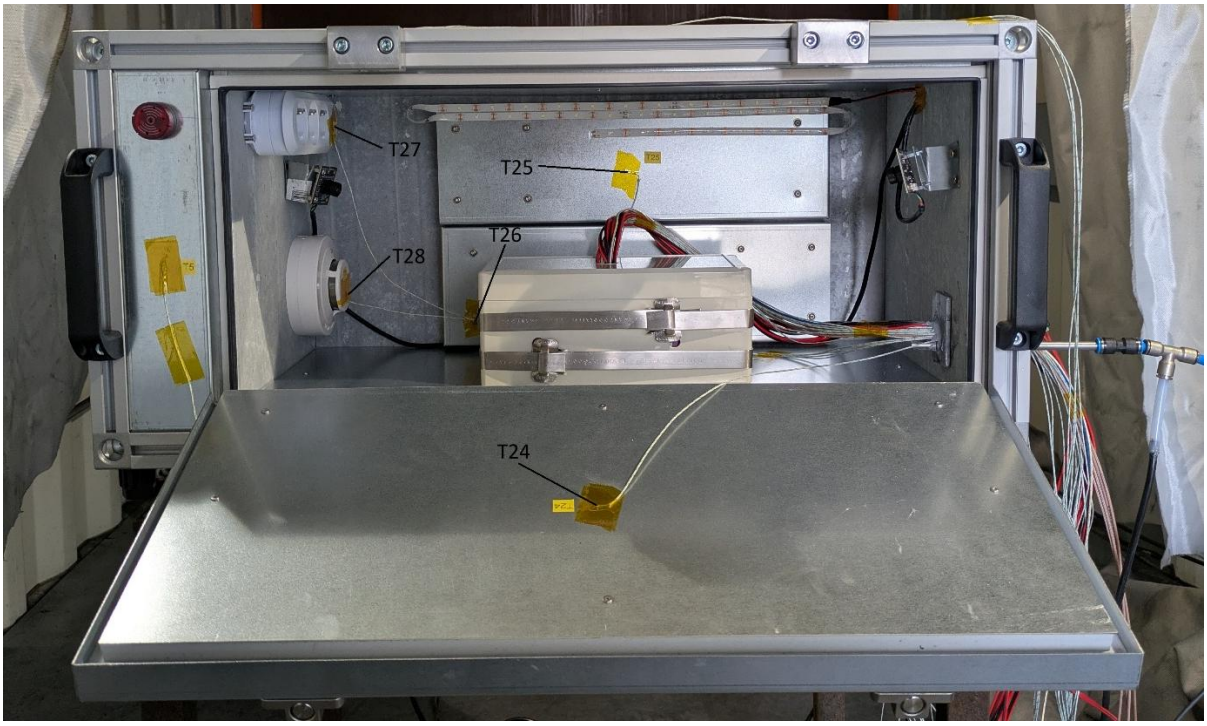


Figure 8 schematic representation of inside sensors

9.6 Observations

None

10 Photo documentation

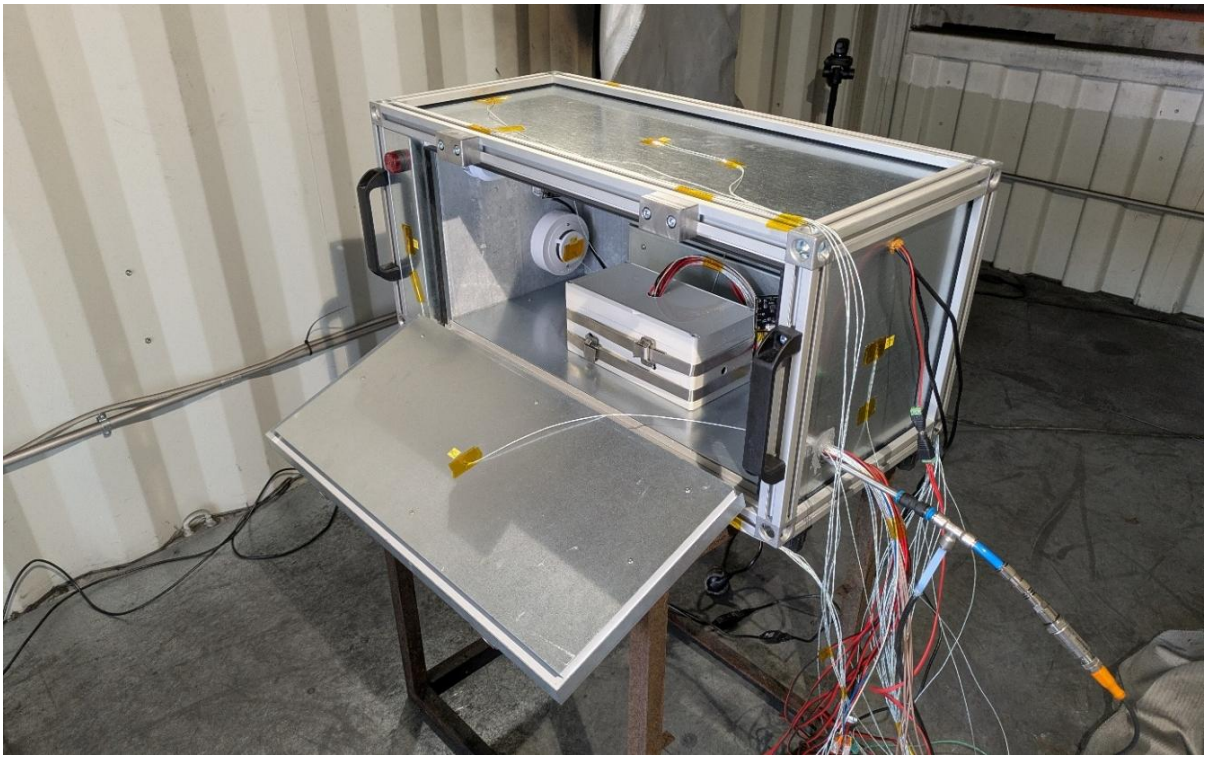


Photo 1: EUT – Test setup front

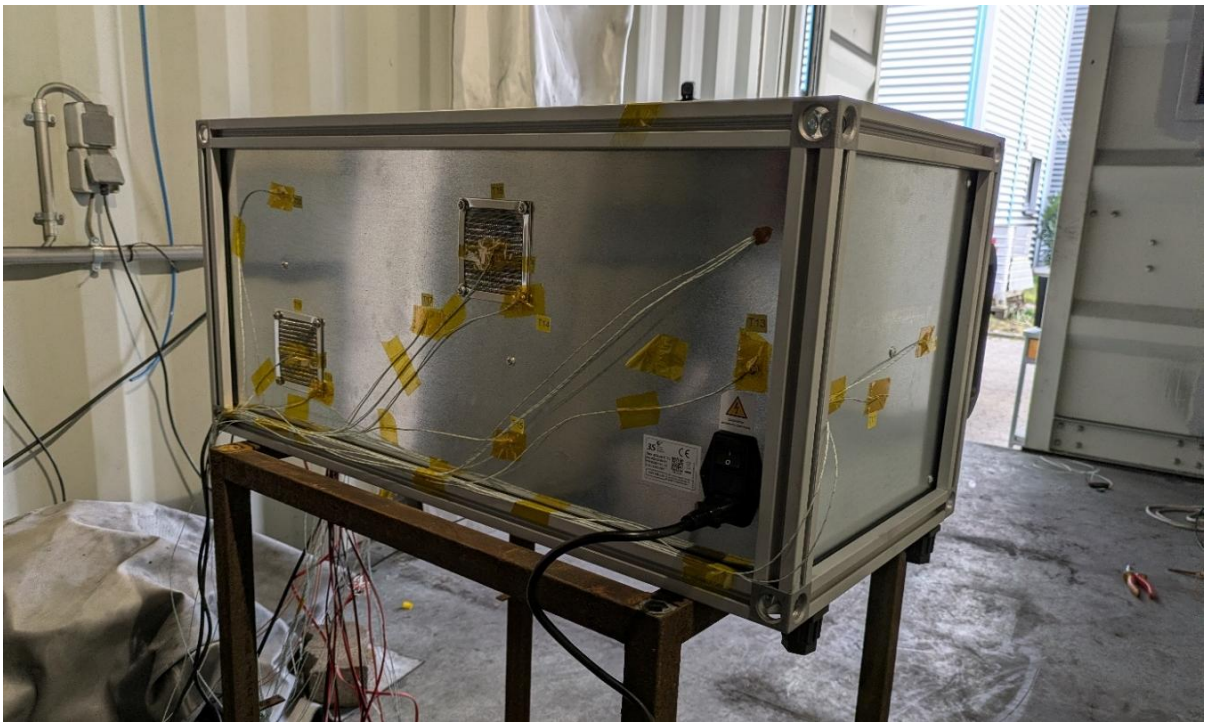


Photo 2: EUT – Test setup back

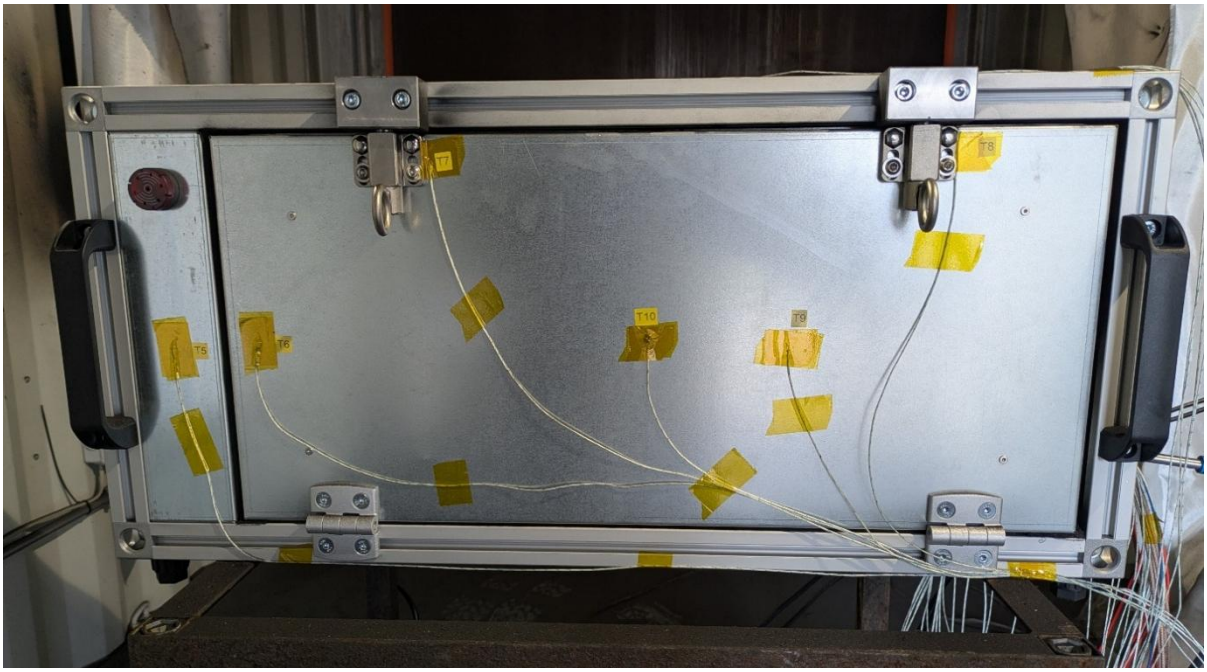


Photo 9: Front after test

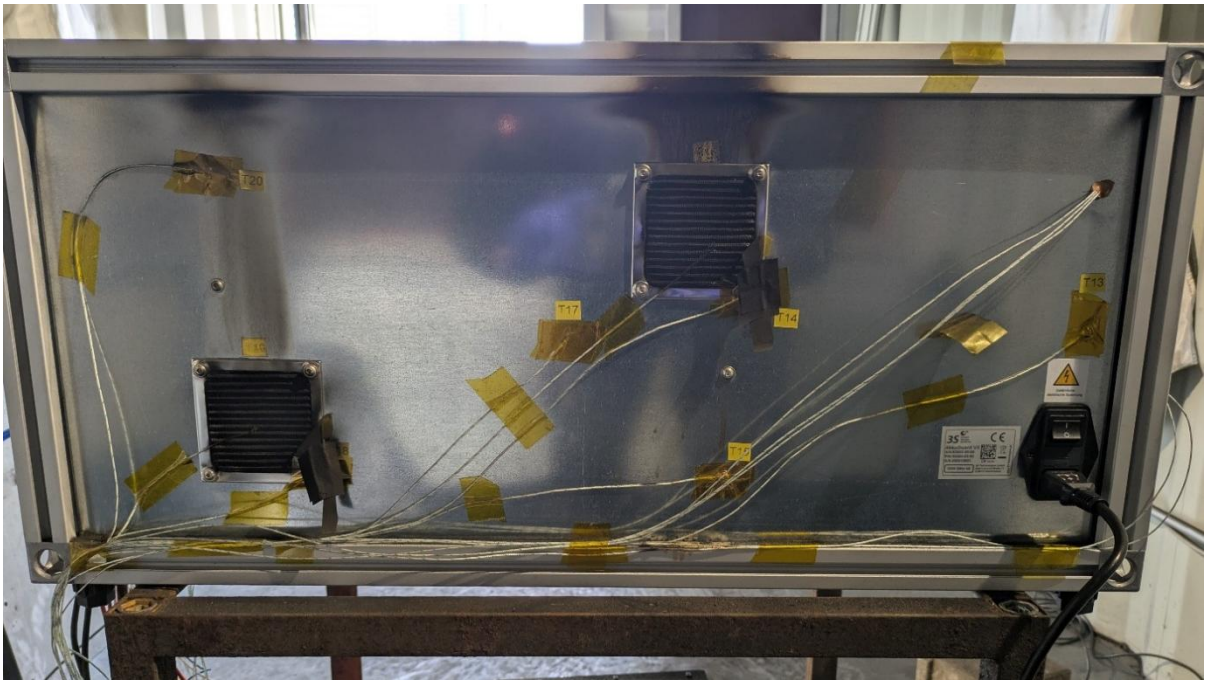


Photo 4: Back after test

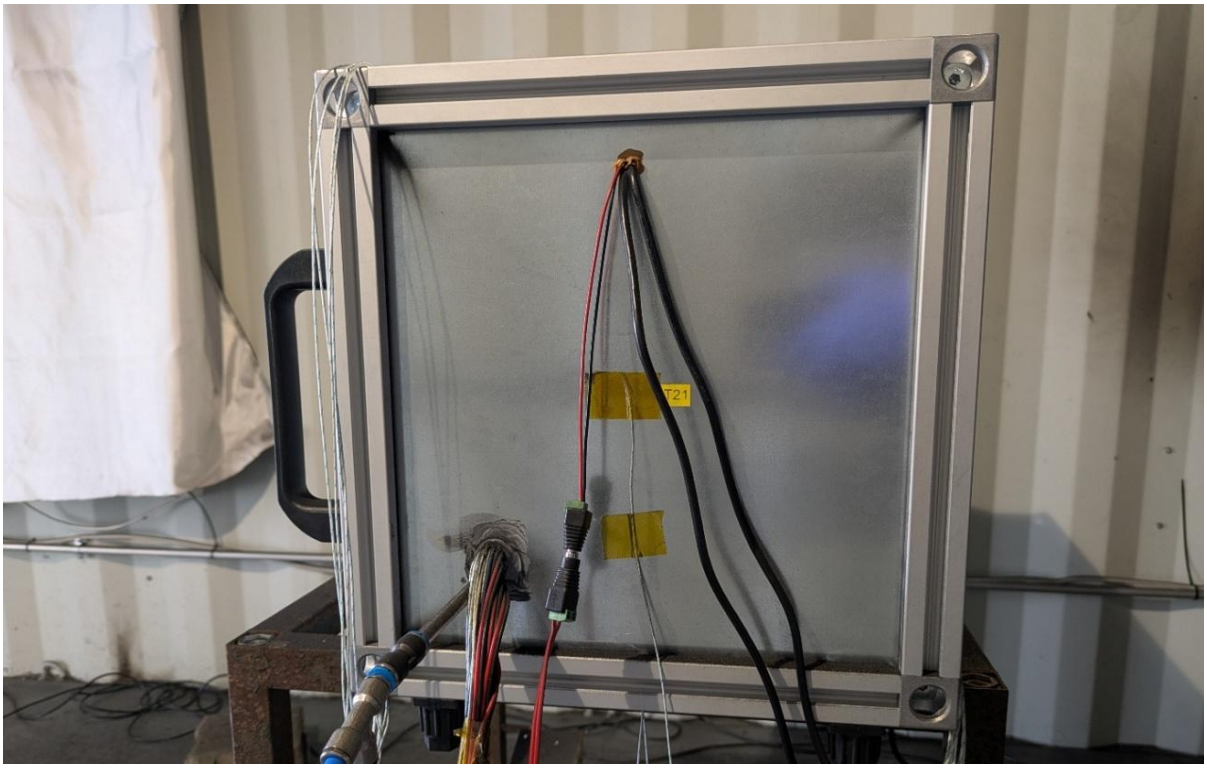


Photo 5: Right side after test

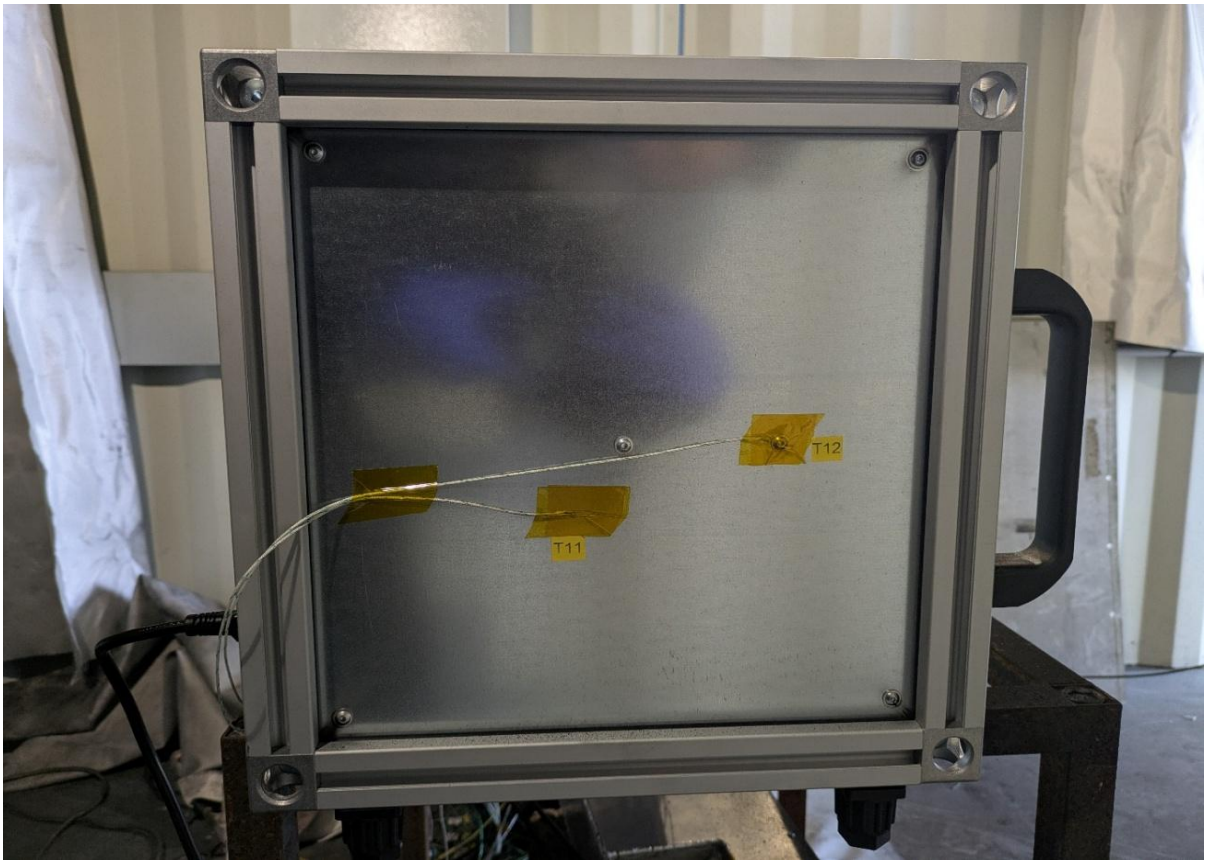


Photo 6: Left side after test

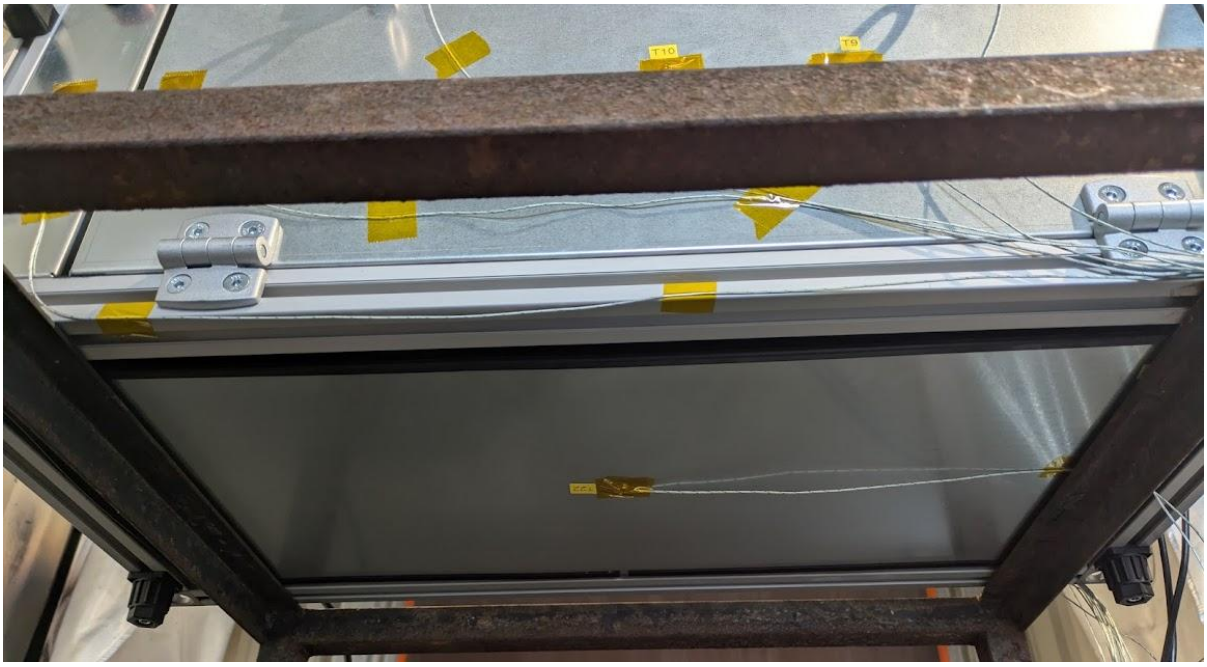


Photo 7: Bottom after test

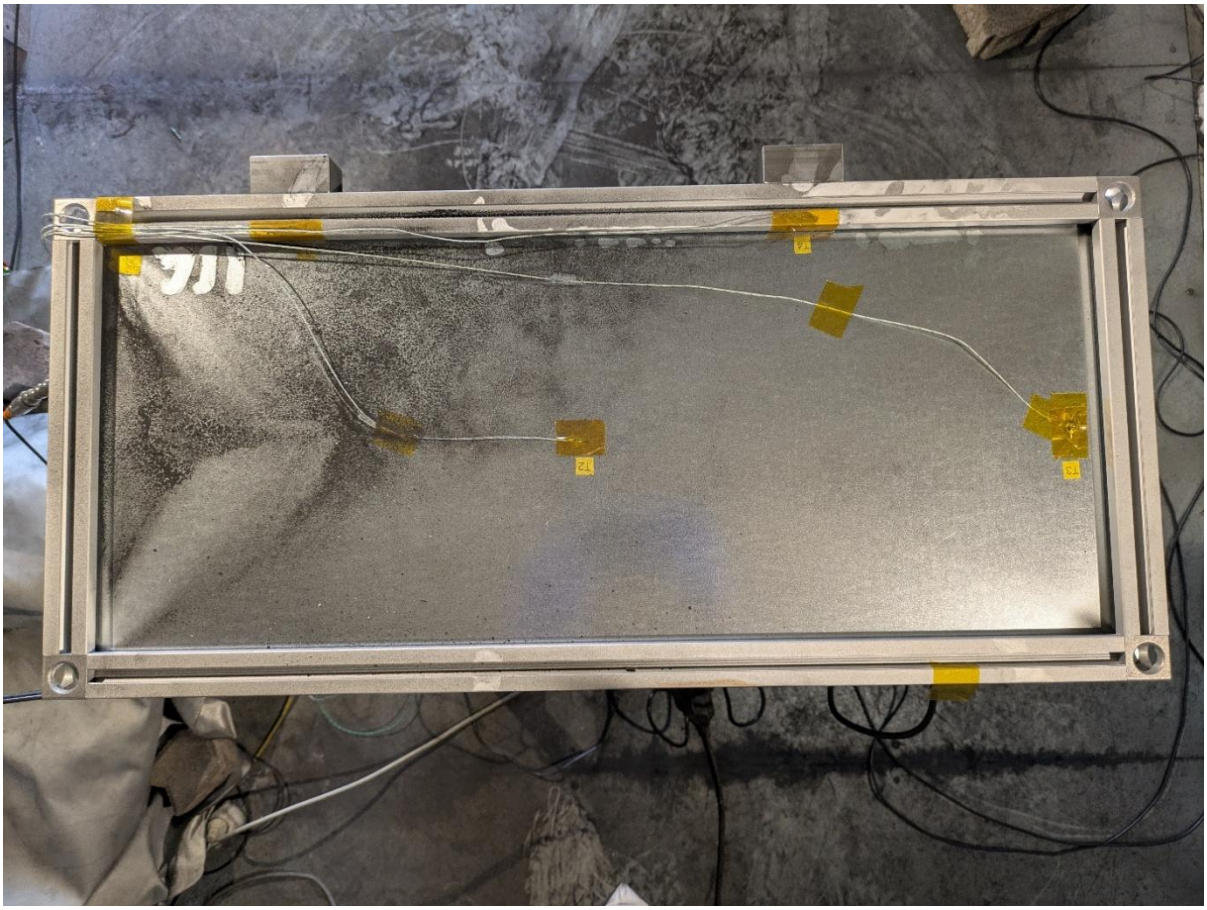


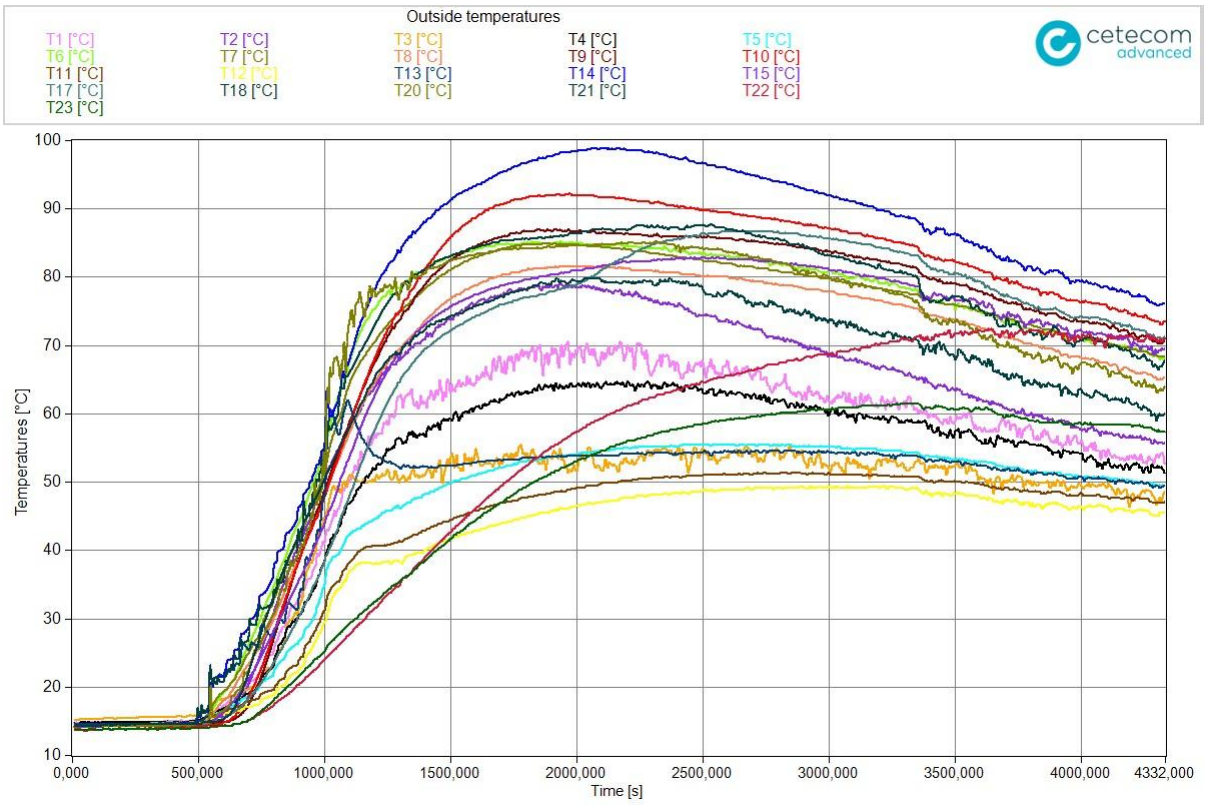
Photo 8: Top after test

Photo 9: Inside after test

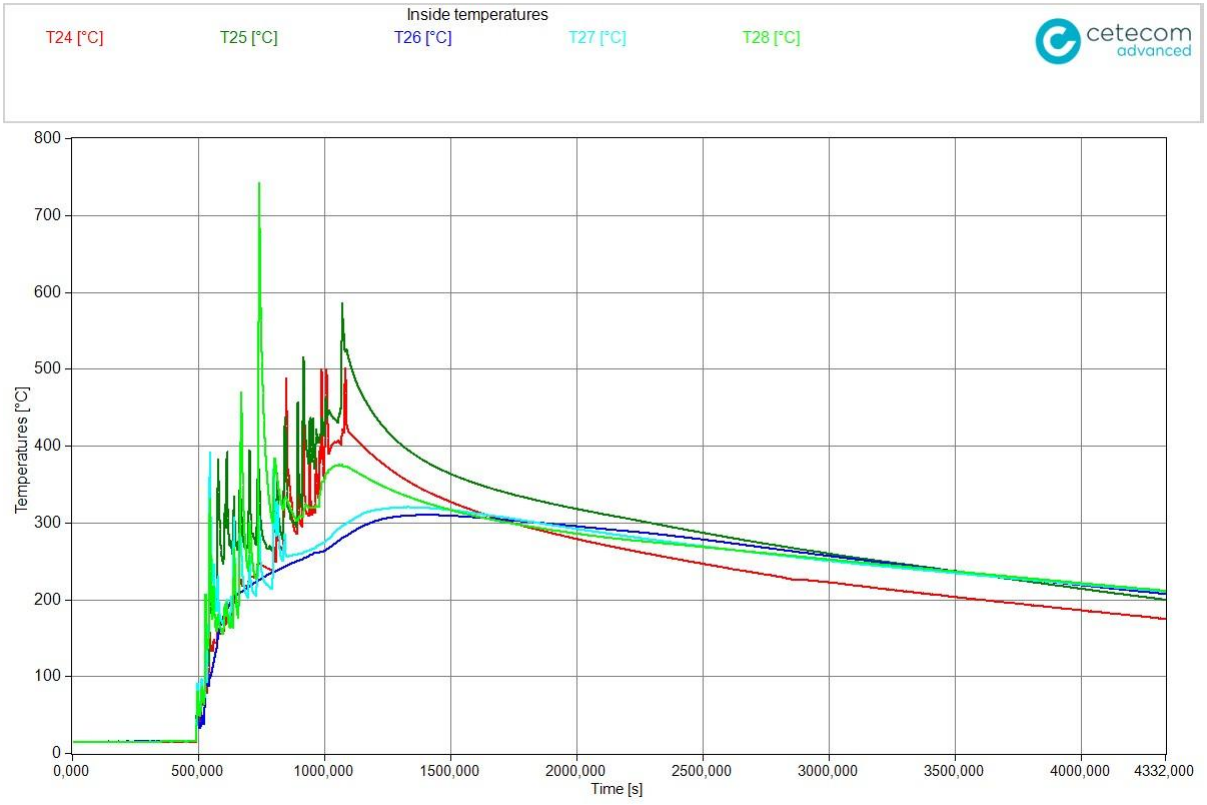
Photo 10: Inside after test

Photo 11: Inside after test

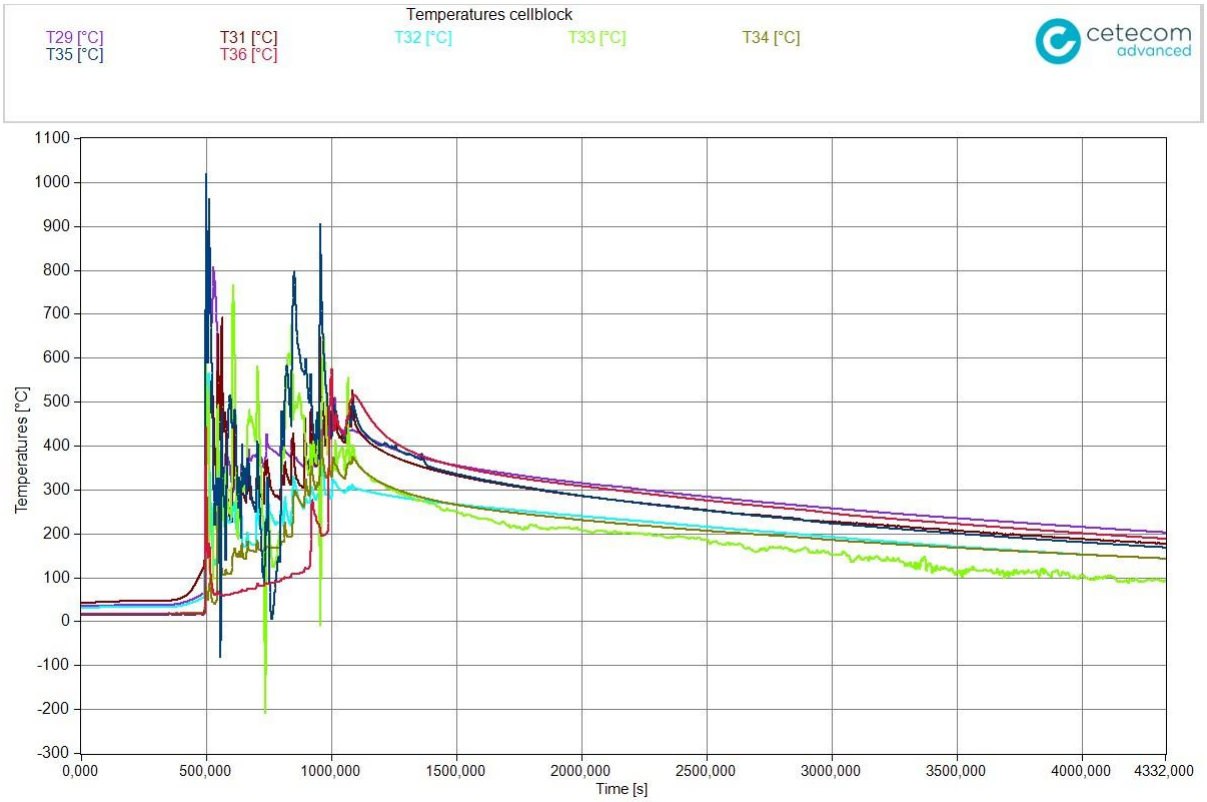
11 Plots during test



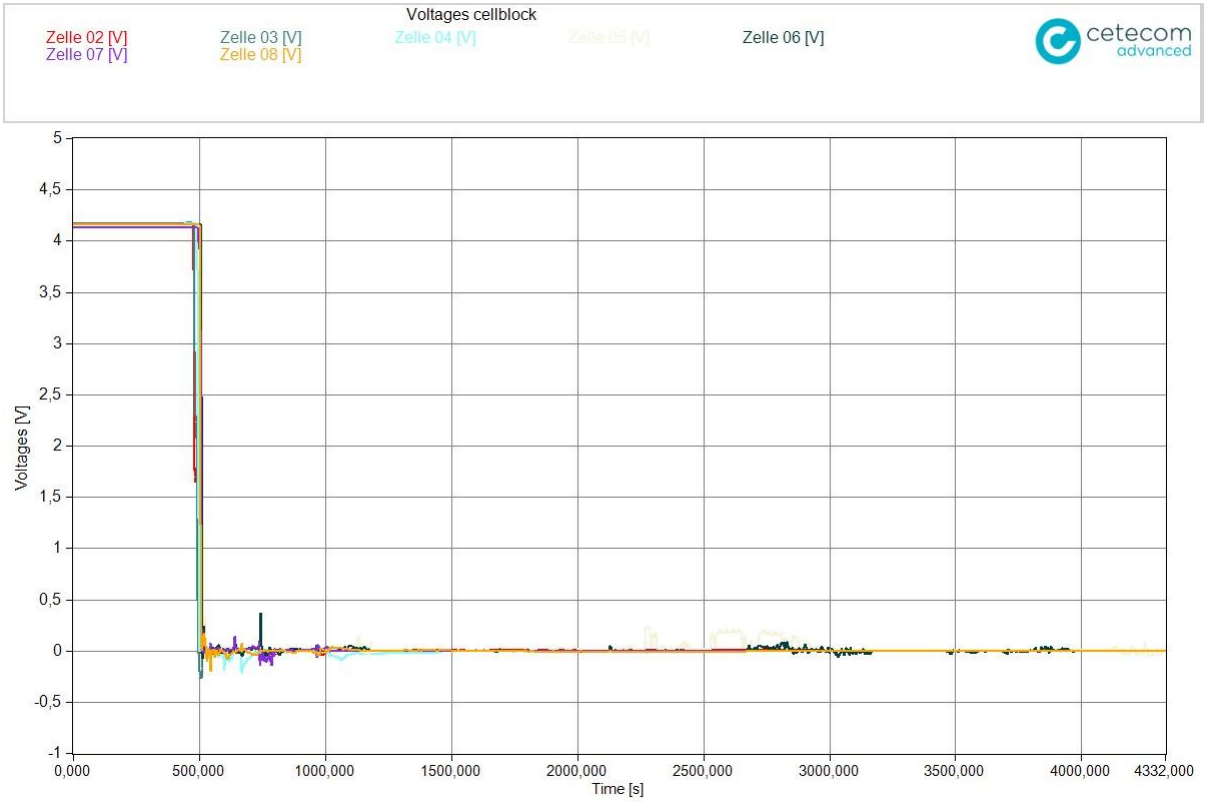
Plot 1: Outside temperatures



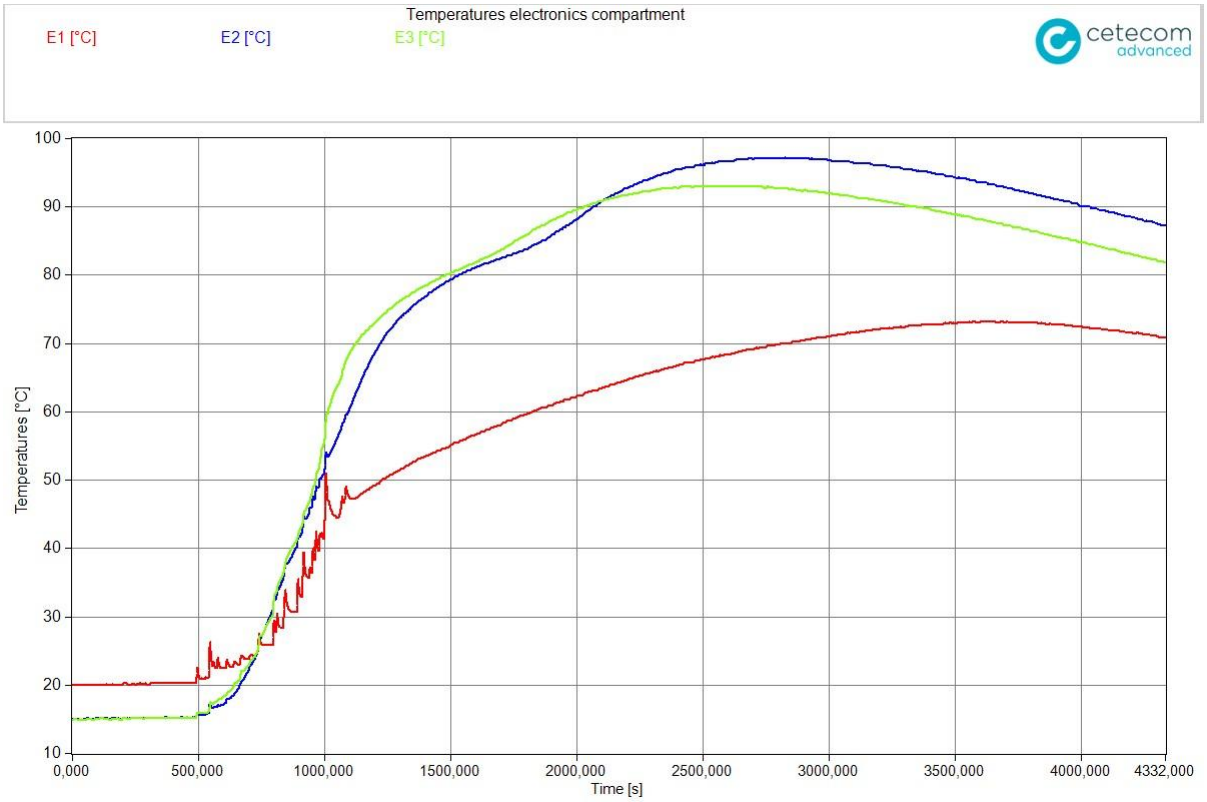
Plot 2: Inside temperatures



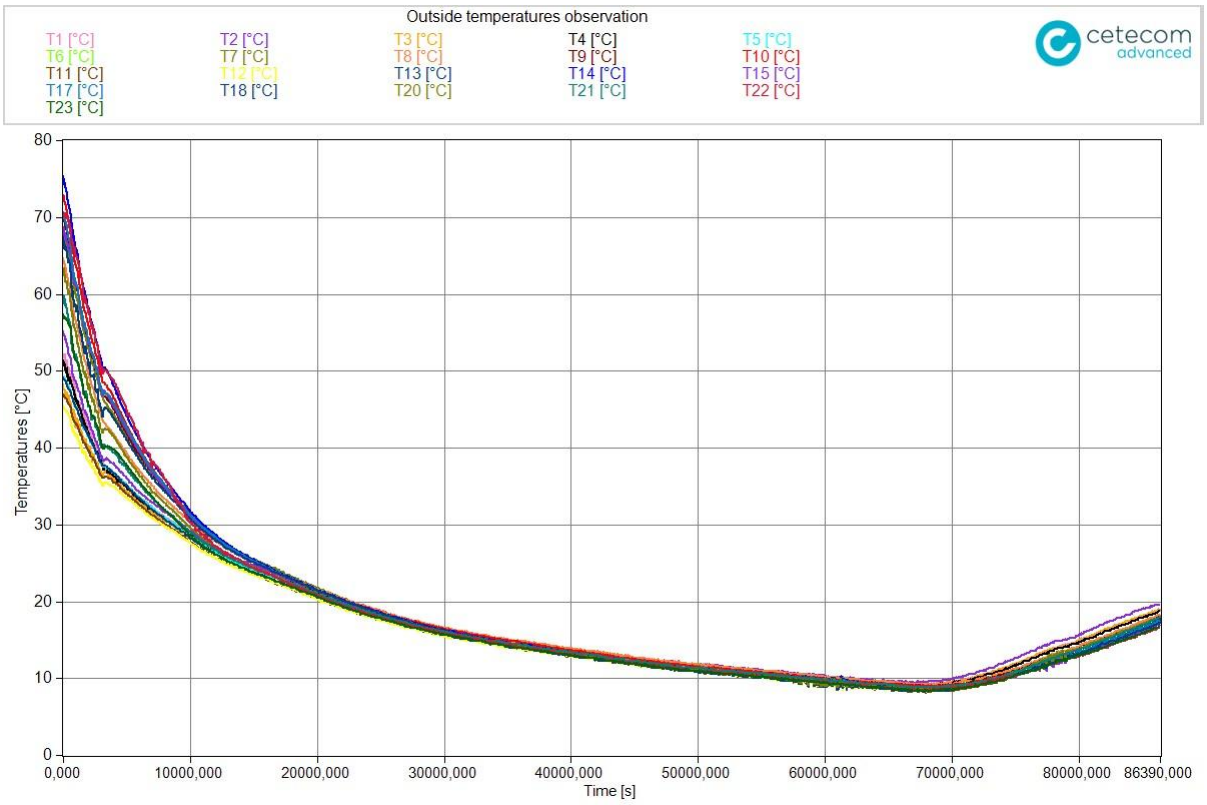
Plot 3: Temperatures cellblock



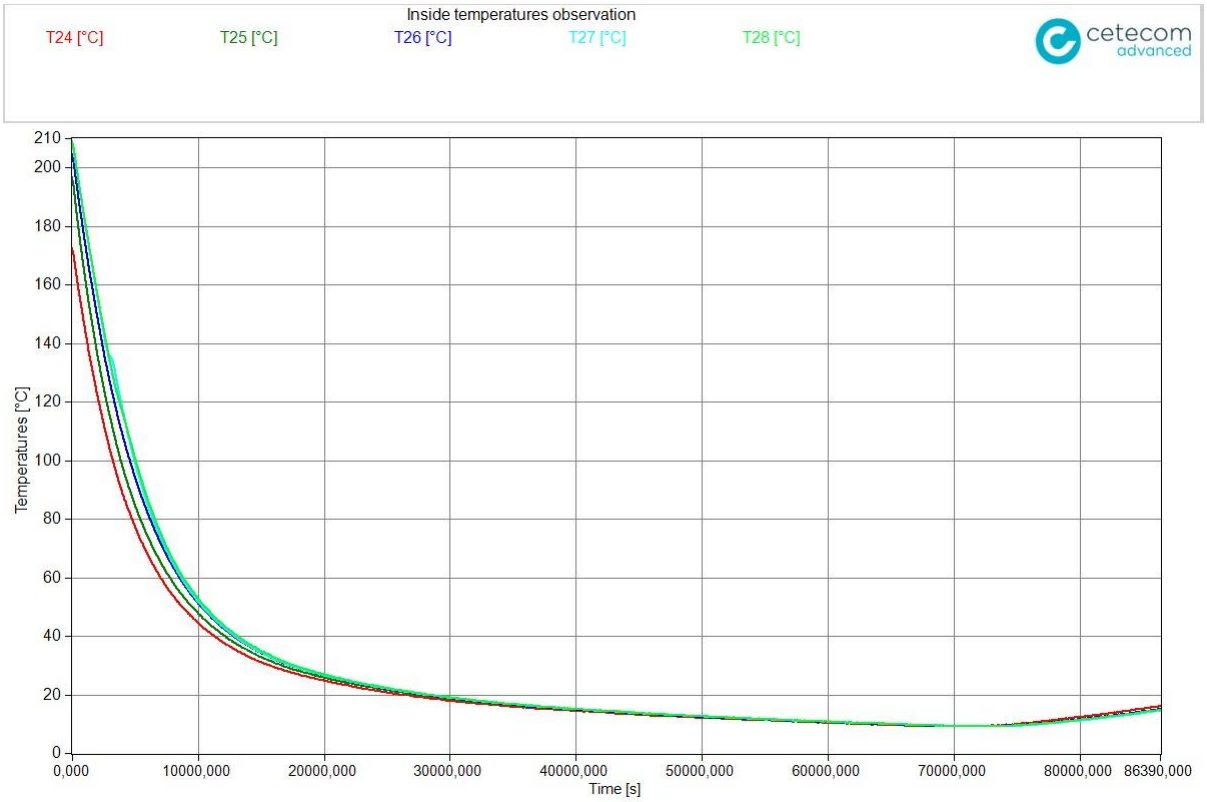
Plot 4: Voltages cellblock



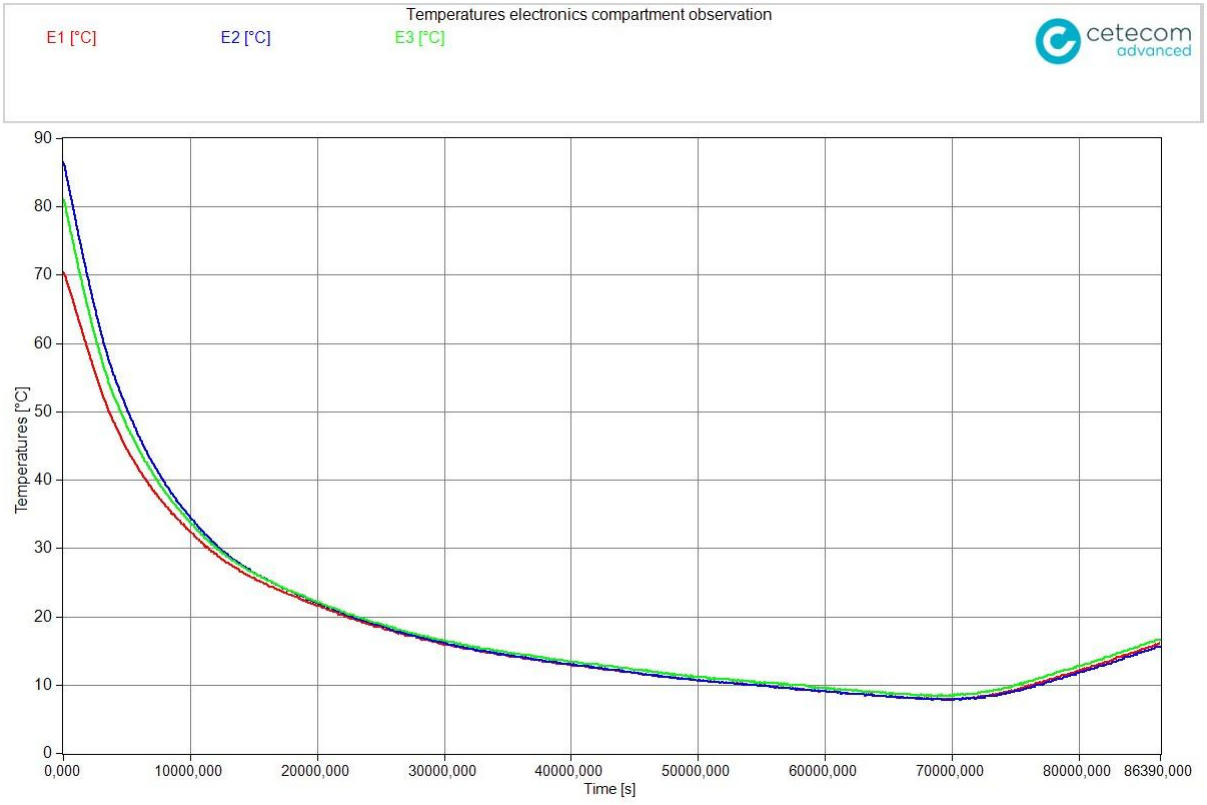
Plot 5: Temperature electronics compartment



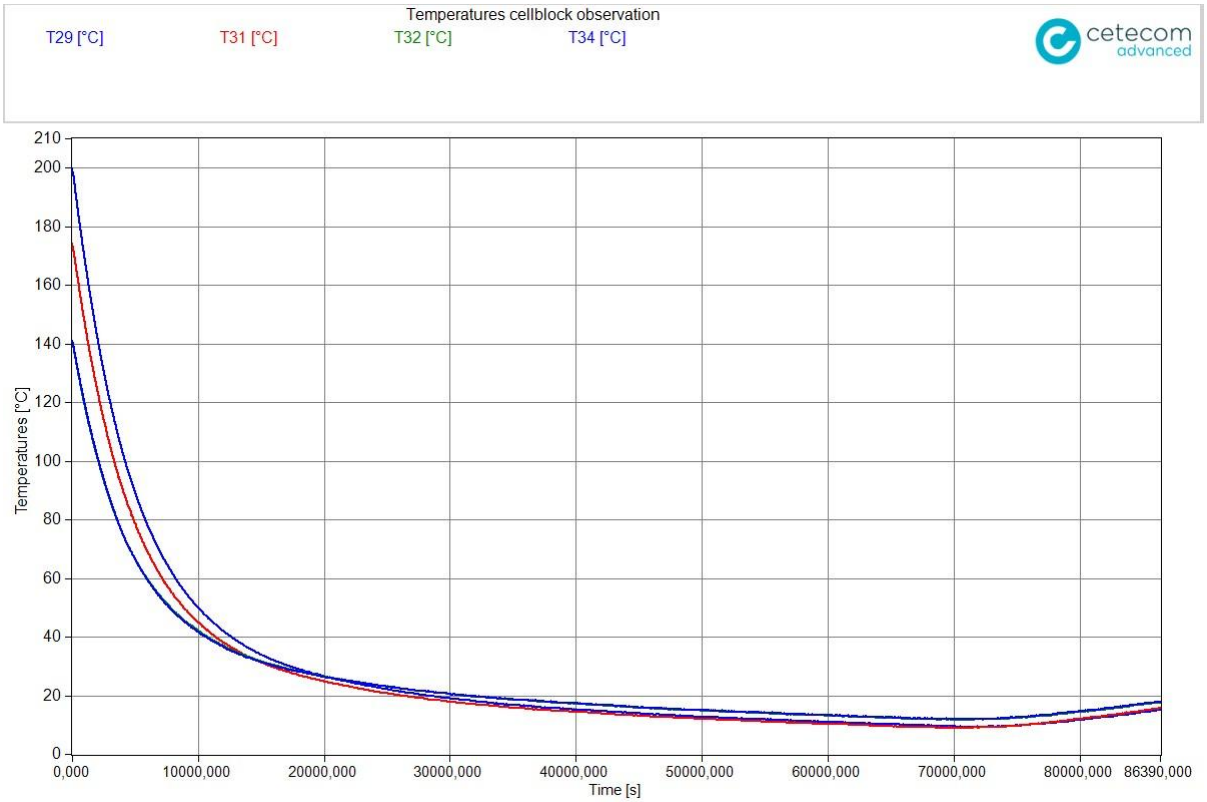
Plot 6: Outside temperatures observation



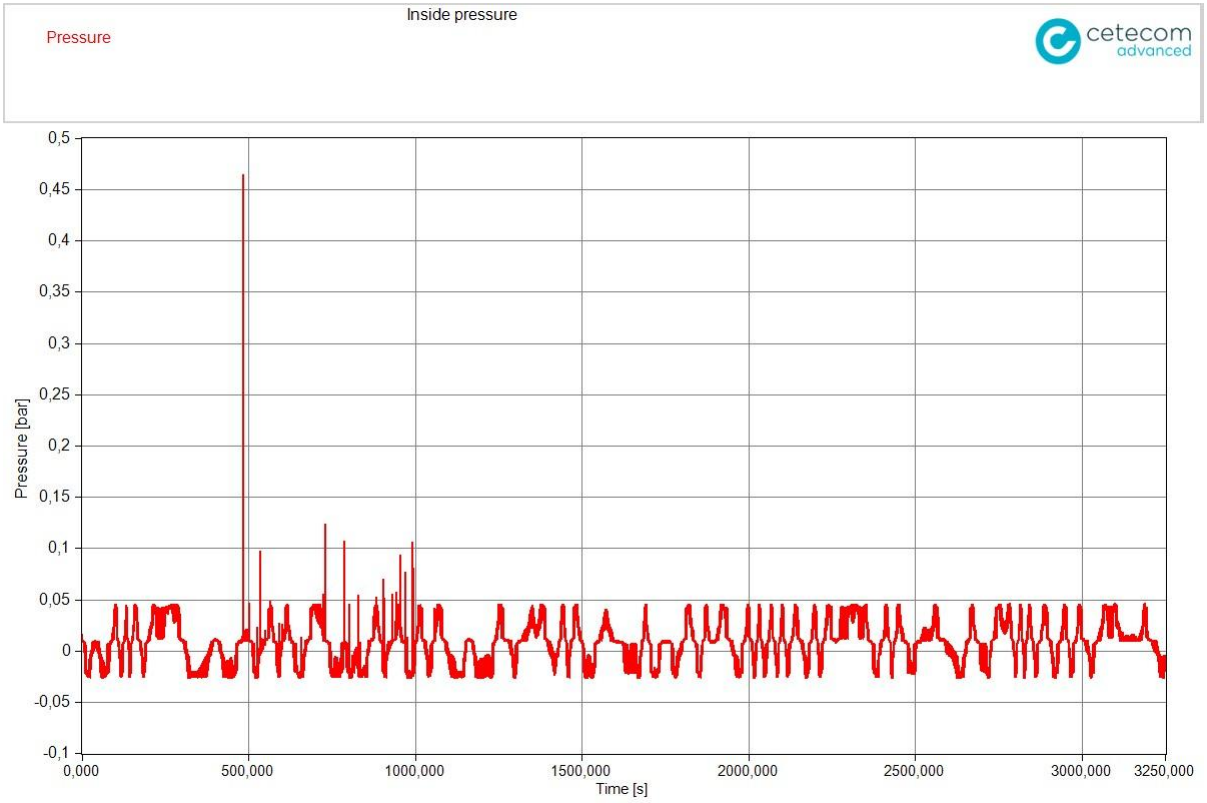
Plot 7: Inside temperatures observation



Plot 8: Temperatures electronics compartment observation



Plot 9: Temperatures cellblock observation



Plot 10: Inside pressure

12 Further information

12.1 Glossary

DUT	-	Device under Test
EMC	-	Electromagnetic Compatibility
EUT	-	Equipment under Test
Inv. No.	-	Inventory number
N/A	-	not applicable
S/N	-	Serial Number
SW	-	Software
ICS	-	Implementation Conformance Statement
SOC	-	State of Charge

12.2 Hazard Severity Level (HSL) according to “FreedomCar; SAND2017-6925; July 2017”

Hazard Level	Description	Classification Criteria & Effect
0	No effect	No effect. No loss of functionality
1	Passive protection activated	No damage or hazard; reversible loss of function. Replacement or re-setting of protection device is sufficient to restore normal functionality
2	Defect/Damage	No hazard but damage to RESS; irreversible loss of function
3	Minor Leakage or Minor Vent	Visual or audible evidence of leaking or venting. Leak without significant pooling or collection of free liquid. Venting without significant smoke or loss of particulate material. No visual obstruction of the RESS
4	Major Leakage or Major Vent	Visual evidence of leaking or venting. Leaking with significant pooling or observed free liquid. Venting with significant smoke, solvent vapor, and/or loss of particulate material. Visual obstruction of the RESS by vent gases and/or smoke. Total RESS mass loss < 30%.
5	Rupture	Loss of mechanical integrity of the RESS package, resulting in release of contents. The kinetic energy of released material is not sufficient to cause physical damage external to the RESS. Rupture may be the result of a RESS thermal runaway (but not necessarily). Total RESS mass loss 30 - 55%
6	Fire or Flame	Ignition and sustained combustion of flammable gas or liquid (≥1 s sustained fire). Sparks or incandescent material is not considered a fire or a flame.
7	Energetic Failure	Fast release of energy sufficient to cause pressure waves (slower than the speed of sound) and/or projectiles that may cause considerable structural and/or bodily damage, depending on the size of the RESS. The kinetic energy of flying debris from the RESS may be sufficient to cause damage as well. Total RESS mass loss ≥ 55%.

*The presence of flame requires the presence of an ignition source in combination with fuel and oxidizer in concentrations that will support combustion. A fire or flame will not be observed if any of these elements are absent. For this reason, we recommend that a spark source be use during tests that are likely to result in venting of cell(s). We believe that “credible abuse environments” would likely include a spark source. In this test, no ignition source was used.

- END OF TEST REPORT -