SOUTH QUALITY

PROFICIENCY TESTING PROVIDER

REPORT No 11546

Date of issue: *February 16, 2026*

Status: FINAL REPORT

****

IEC 60068-2-30

ENVIRONMENTAL TESTING
TEST Db: DAMP HEAT, CYCLIC (12 h + 12 h CYCLE)

Program: SQO-EV4 Round 8

****

Prepared by:	Reviewed by:	Approved by:
cn=BERENICE C. FERREL, o=PT SOUTH QUALITY SAS, ou=SOUTH QUALITY, email=tech@ptsouthquality.com, c=AR 2026.02.16 16:10:06 -03'00'	cn=ESTHER CASAS, o=PT SOUTH QUALITY SAS, ou=SOUTH QUALITY, email=ecasas@ptsouthquality.com, c=AR 2026.02.19 14:55:18 -03'00'	cn=Emiliano Medina, o=SOUTH QUALITY, ou=PT SOUTH QUALITY SAS, email=quality@ptsouthquality.com, c=ES 2026.02.20 17:29:30 -03'00'
Berenice Ferrel Assistant Technician	**Lic. Esther Casas** Physics expert	**Eng. Emiliano Medina** Quality Assurance Lead

TABLE OF CONTENTS

1. FOREWORD

This report summarizes the results of the **SQO-EV4 (Round 8)** proficiency testing program on the determination of the suitability of equipment for use under conditions of high humidity - combined with cyclic temperature changes. This program is carried out under a simultaneous participation format, according to the A.3.1 classification of the ISO 17043 standard ("Model 2 - Figure A.1").

South Quality conducted the testing program from November 2025 to January 2026. The aim of the program was to assess the ability of laboratories to competently perform the nominated tests.

2. ORGANIZATION

Program Coordinator:	Lic. Esther Casas
Assistant Technician:	Berenice Ferrel
Statistic:	Lic. Manuel Tozaki
Supervision:	Eng. Emiliano Medina

3. OBJECTIVE

The objective of this proficiency testing program is to visually and functionally inspect the equipment under test, using the following standard:

Standard
IEC 60068-2-30: 2005

To verify this, electronic equipment has been selected.

Participants in this program have not been informed in advance about the expected behavior of the samples they receive.

As part of the usual practice of this program, three different sample combinations may be sent to participants.

i. Sample A (PASS) + Sample B (PASS).
ii. Sample A (PASS) + Sample B (FAIL).
iii. Sample A (FAIL) + Sample B (FAIL).

4. PARTICIPANTS

In the present round, 22 companies have participated with the following details:

CODE	Country	ISO 17025 accredited	Results delivered
01	Malaysia	Yes	Yes
02	South Korea	Yes	Yes
03	Colombia	No	No
04	Portugal	Yes	Yes
05	Argentina	No	Yes
06	Belgium	Yes	Yes
07	Spain	Yes	Yes
08	Peru	Yes	No
09	Chile	Yes	Yes
10	China	Yes	Yes
11	France	Yes	Yes
12	Spain	Yes	Yes
13	South Africa	No	Yes
14	Türkiye	Yes	Yes
15	Finland	Yes	No
16	Germany	Yes	Yes
17	Brazil	Yes	Yes
18	Netherlands	Yes	Yes
19	Italy	Yes	Yes
20	Mexico	Yes	Yes
21	France	No	No
22	Italy	Yes	Yes

5. HOMOGENEITY

A homogeneity study was conducted to verify compliance of the samples with the requirements of the IEC 60068-2-30 standard, using an ISO 17025-accredited laboratory.

Six batches, each consisting of 35 units of different electronic equipment, were prepared and tested to assess the result homogeneity.

Control procedures were carried out in accordance with ISO 33405:2024, clauses 7.4.1.1 and 7.4.1.2, applying stratified random sampling. Samples were selected using random number generation software.

The results of these tests appear below:

Size of each batch: **35 units**
Tested samples from each batch: **8 units**
Test conditions: **Variant 1 / 25-40°C / Cycles: 6**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE SAMPLES ANALYZED		
	BATCH: LEV3315	BATCH: LEV3316	BATCH: LEV3317
Visual inspection	YES	YES	YES
Functional performance	NO	YES	YES

Size of each batch: **35 units**
Tested samples from each batch: **8 units**
Test conditions: **Variant 2 / 25-55°C / Cycles: 6**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE SAMPLES ANALYZED		
	BATCH: LEV3445	BATCH: LEV3446	BATCH: LEV3447
Visual inspection	YES	YES	YES
Functional performance	YES	NO	YES

Samples for this program are taken from the selected batches identified as **LEV3317**, and **LEV3445**.

The analysis of the test data indicated that the selected samples exhibited sufficient homogeneity for the program. Therefore, the results of participants identified as outliers cannot be attributed to sample variability.

6. SAMPLE INFORMATION

The following samples were sent for testing (Participant **Code 18**):

Batch:	LEV3317
Sample ID:	18
Characteristics:	ATX power supply - 220-240 V - 50/60Hz - 550W Trademark: NOGANET Model: ATX 550 P4

Batch:	LEV3445
Sample ID:	18
Characteristics:	ATX power supply - 220 V - 50Hz - 600W Trademark: ACONCAWA Model: ATX 600 X 24 P 2S

7. IMAGES

SAMPLES

SAMPLES

8. ASSIGNED RESULTS

The assigned results are obtained from the results reported by all participants (**Consensus values**).

9. STATISTICS

The results must be treated as qualitative.

For qualitative results, the comparison will be made directly against the assigned results, so any difference will be evaluated as **Unsatisfactory**.

The assessment involves assigning a compliance verdict (PASS or FAIL) to each verification parameter (Visual and functional performance) carried out by each participant.

10. PARTICIPANTS RESULTS

LABORATORY CODE	LEV3317		LEV3445	
	Test conditions: Variant 1 / 25-40°C / Cycles: 6		Test conditions: Variant 2 / 25-55°C / Cycles: 6	
	Visual inspection	Functional performance	Visual inspection	Functional performance
01	PASS	PASS	PASS	PASS
02	PASS	PASS	PASS	PASS
04	NO VERDICT	NO VERDICT	PASS	PASS
05	PASS	PASS	PASS	PASS
06	PASS	PASS	PASS	PASS
07	PASS	PASS	PASS	PASS
09	PASS	FAIL	PASS	PASS
10	PASS	PASS	PASS	PASS
11	PASS	PASS	PASS	PASS
12	PASS	PASS	PASS	PASS
13	PASS	FAIL	PASS	FAIL
14	PASS	PASS	PASS	PASS
16	PASS	PASS	PASS	PASS
17	PASS	PASS	PASS	FAIL
18	PASS	PASS	PASS	PASS
19	PASS	PASS	PASS	PASS
20	PASS	PASS	PASS	PASS
22	PASS	PASS	PASS	PASS

ASSIGNED RESULTS			
LEV3317		LEV3445	
Visual inspection	Functional performance	Visual inspection	Functional performance
PASS	PASS	PASS	PASS

11. EVALUATION OF PERFORMANCE

Laboratory **Code 01**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 02**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 03**: The laboratory did not send the results before the deadline.

Laboratory **Code 04**: The laboratory obtained **SATISFACTORY** results in the parameter verification for sample LEV3445. No results were reported for sample LEV3317.

Laboratory **Code 05**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 06**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 07**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 08**: The laboratory did not send the results before the deadline.

Laboratory **Code 09**: The laboratory obtained an **UNSATISFACTORY** result in the functional performance verification of sample LEV3317. However, **SATISFACTORY** results were obtained for the remaining parameters.

Laboratory **Code 10**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 11**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 12**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 13**: The laboratory obtained a **UNSATISFACTORY** result in the functional performance verification of both samples. However, **SATISFACTORY** results were obtained for the remaining parameters.

Laboratory **Code 14**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 15**: The laboratory did not send the results before the deadline.

Laboratory **Code 16**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 17**: The laboratory obtained an **UNSATISFACTORY** result in the functional performance verification of sample LEV3445. However, **SATISFACTORY** results were obtained for the remaining parameters.

Laboratory **Code 18**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 19**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 20**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 21**: The laboratory did not send the results before the deadline.

Laboratory **Code 22**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

12. CONCLUSIONS

The overall performance of the participating laboratories in the **SQO-EV4 (Round 8)** program, based on the expected results, is as follow:

- Participants Codes **01, 02, 04, 05, 06, 07, 10, 11, 12, 14, 16, 18, 19, 20** and **22** achieved **SUFFICIENT** performance in comparison with the expected results and do not require any action.;
- Participants Codes **09, 13,** and **17** achieved **INSUFFICIENT** performance in comparison with the expected results and must take corrective action for the tests in which their results differ from the expected values (see Annex B).

The criteria used for the evaluation of the overall performance are as follows:

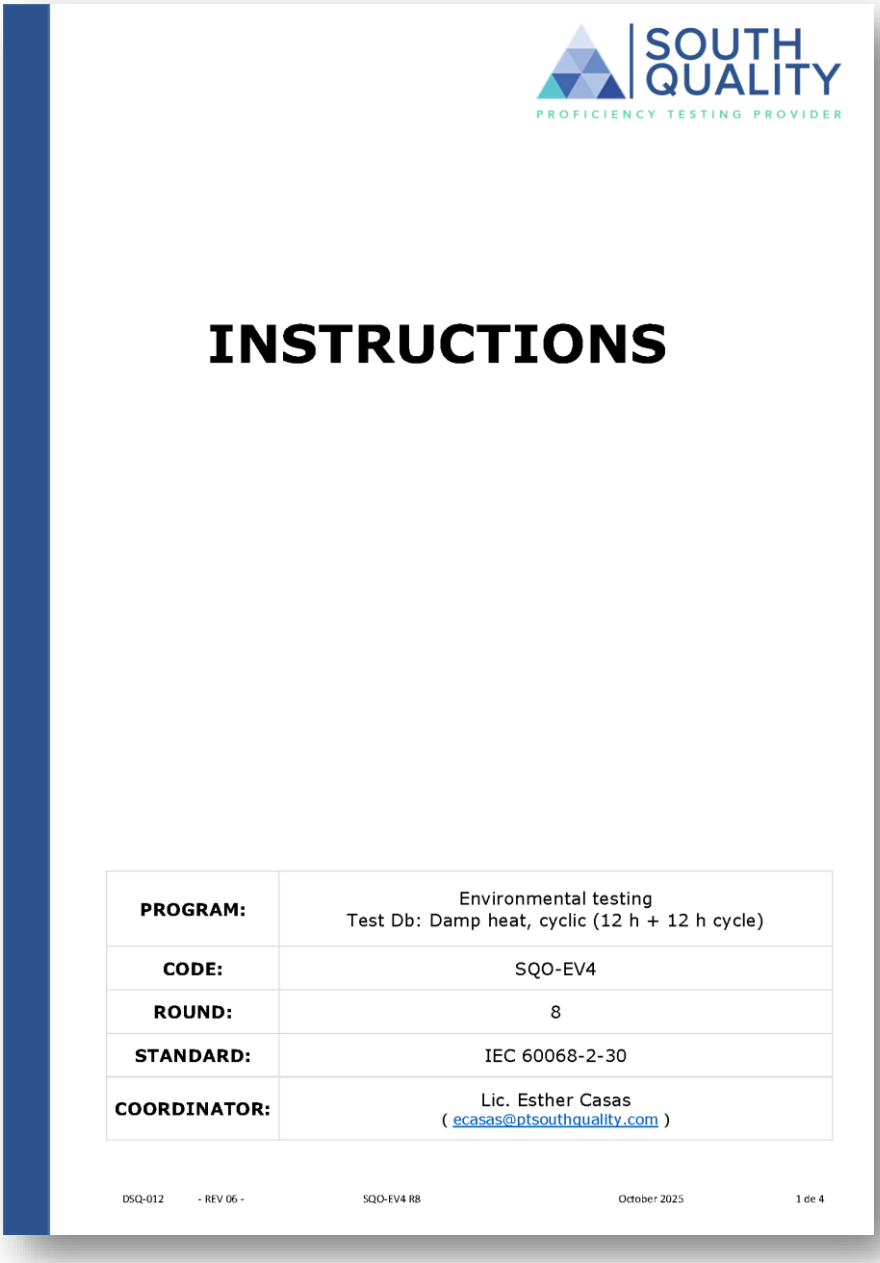
- **SUFFICIENT** performance: No unsatisfactory results were obtained.
- **INSUFFICIENT** performance: At least one unsatisfactory result was obtained.

APPENDIX A

A1 - PARTICIPANT DATA

Company:	**KEMA B.V.**
Laboratory:	**KEMA B.V.**
Country:	Netherlands
Client ID:	E533
Contact person:	Richard Roelofs (richard.roelofs@kema.com)
	Engineer - Metering, Protection & Substation Automation Laboratory

A2 - INSTRUCTIONS



INSTRUCTIONS

PROGRAM:	Environmental testing Test Db: Damp heat, cyclic (12 h + 12 h cycle)
CODE:	SQO-EV4
ROUND:	8
STANDARD:	IEC 60068-2-30
COORDINATOR:	Lic. Esther Casas (ecasas@ptsouthquality.com)

DSQ-012 - REV 06 - SQO-EV4 R8 October 2025 1 de 4

1 - **General**

This document serves as a guide for managing the results of the **SQO-EV4 (Round 8)** program.

2 - **Standard**

IEC 60068-2-30: 2005

3 - **Participant**

KEMA B.V.	CODE 18

4 - **Tests involved**

TEST
Determination the suitability of equipment for use under conditions of high humidity - combined with cyclic temperature changes

5 - **Samples**

CODE	SAMPLE	QUANTITY
LEV3317-18	ATX power supply - 220-240 V - 50/60Hz - 550W Trademark: NOGANET Model: ATX 550 P4	1
LEV3445-18	ATX power supply - 220 V - 50Hz - 600W Trademark: ACONCAWA Model: ATX 600 X 24 P 2S	1

6 - **Notes**

a) The deadline for the delivery of results is **December 23, 2025**.
b) Participants must submit the results using the usual report employed by their laboratory.
c) The samples are to be handled as routine lab samples, with all testing, documentation, and reporting adhering to **IEC 60068-2-30**.
d) Samples must be retained until the end of the program, which concludes with the submission of the final report.
e) To review the results, test images would be appreciated. Images can be attached at the end of this document or sent by email.

7 - **Test conditions**

CODE	CONDITION	TEST SEVERITIES
LEV3317-18	Powered-on (220V/50Hz) – No load	Variant 1 / 25-40°C / Cycles: 6
LEV3445-18	Powered-on (220V/50Hz) – No load	Variant 2 / 25-55°C / Cycles: 6

8 - **Parameters to determine**

CODE	PARAMETERS (BEFORE & AFTER)
LEV3317-18	VISUAL INSPECTION VOLTAGE
LEV3445-18	VISUAL INSPECTION VOLTAGE

PHOTOGRAPHS

A3 - PARTICIPANT RESULTS (TEST REPORT - BATCH LEV3317)

KEMA Labs

KEMA Labs Management System – Observation sheet

ISI-SST-4538-A8 – Climate - Damp heat, cyclic (12 + 12 h cycle)

Valid for:	Revision:	Date:
KEMA Labs Arnhem – MPSA	0	2025-12-15
Resp. unit/Author:	**Reviewed by:**	**Approved by:**
Marc Achterkamp	Mihai Bivolaru	Marc Achterkamp

Revisions in this document:

Rev. no.	Date	Description of revision
0	2025-12-15	Preparation of controlled document

KEMA Labs

Project information	
Customer	South Quality – Proviciency Testing Provider
Project number	SQO-EV4 (Round 8)
Code	LEV3317-18
Test object	ATX power supply - 220-240 V - 50/60Hz - 550W Trademark: NOGANET Model: ATX 550 P4
Basic standard	IEC 61068-2-30:2005 / EN 60068-2-30:2005

Tests carried out by:	
Test engineers	Peter Hildering
Date	01 December 2025 until 07 December 2025
Location	Arnhem, The Netherlands

Test instrumentation

Manufacturer	Type	Asset number
☐ Hielkema	C-40/600	AB101670
☐ Espec	ARS-1100	AB101817
☐ Espec	ARS-1100	AB101751
☒ Espec	ARS-1100	AB101972
☒ LT Lutron (Meter)	YK-2005WA	AB101398
☒ LT Lutron (Probe)	Probe	AB101542
☒ Fluke precision multimeter	8846A	AB101898
☒ Fluke precision multimeter	8846A	AB101899
☒ HP multimeter	972A	AB101664
☒ Voltcraft power supply	VIT 1000	MPSA #7

The measurement uncertainty estimation is presented in ISI-SST-4538.

Laboratory reference conditions		
Ambient temperature (20 ± 5) °C	21,6	°C
Ambient air pressure (860 – 1060) hPa	1020	hPa
Relative humidity (45 - 75) % RH	64,5	%

Characteristics

Test specification	
Type of test	Db
Lower temperature	25°C ± 3°C
Upper temperature	☒ 40°C ± 2°C ☐ 55°C ± 2°C
Humidity at lower temperature	97% +3%/-2%
Humidity at higher temperature	93% ± 3%
Number of cycles	40°C : ☐ 1 ☐ 2 ☒ 6 55°C : ☐ 2 ☐ 6 ☐ 12 ☐ 21 ☐ 56
Variant	☒ 1 ☐ 2
Water resistivity	0.4 µS/cm ; 25 kΩ.m (req. ≤ 2000 µS/m; ≥500 Ω.m)
Operating condition	Powered-on (220V/50Hz) – No load
Auxiliary power supply voltage	220 Vac

Test

Note:
As no electrical wiring diagrams and connectors were received from South Quality after request, the output voltages of the ATX power supply were not measured. The ATX power supply is powered with 220V/50Hz and the current drawn was measured under no load conditions.

Initial measurements

Initial measurement	Observations
Visual inspection	No visual damage
Functional verification	The sample draws 24,08 mA

Conditions

Test procedure	Duration of exposure (h)	Operating temperature (°C)	Hunidity (%)	Observations
Stabilizing period	1	25	60	-
24h Cycle	12	☒ 40°C ☐ 55°C	93	-
	12	25	97	-

Intermediate measurements

Intermediate measurement	Observations
Functional verification	The sample draws 25,89 mA – 29,25 mA

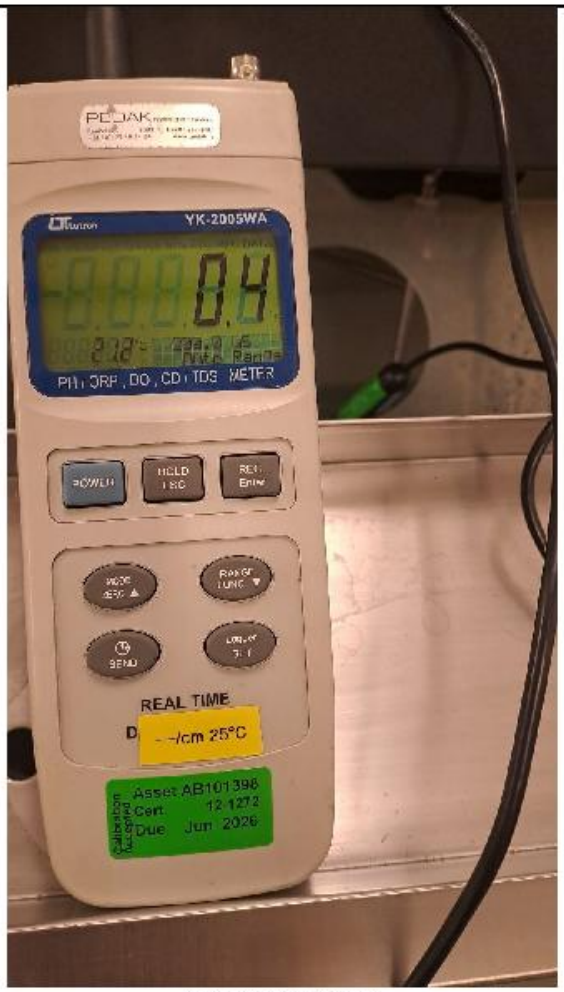
Recovery

Recovery measurement	Observations
Functional verification	The sample draws 24,94 mA
Visual inspection	No visual damage, No discolouration, no deterioration of materials

KEMA Labs

Pictures test setup

Test chamber



0.4 µS/cm ; 25 kΩ.m

Water conductivity

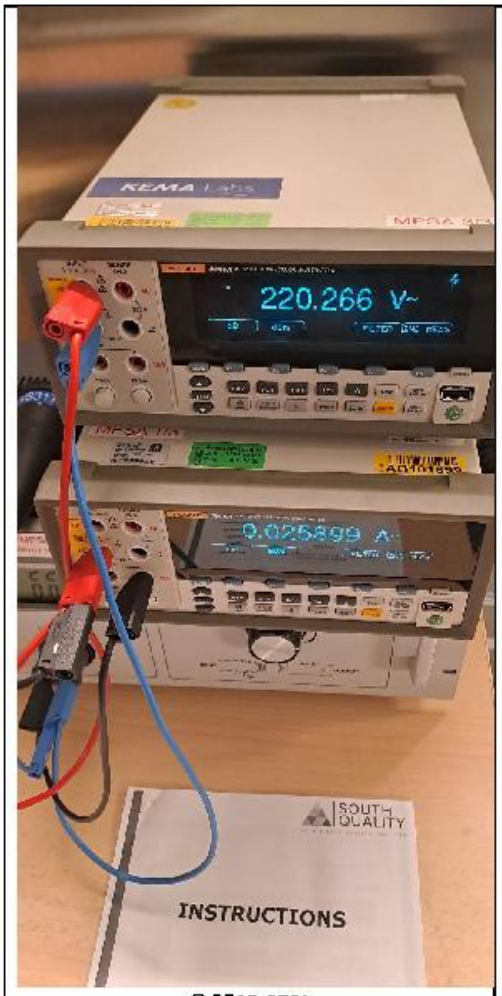
Before start damp heat cyclic test

KEMA Labs

@ 25°C 60%

Initial measurement

KEMA Labs



@ 25°C 97%

@ 40°C 93%

Intermediate measurement

KEMA Labs

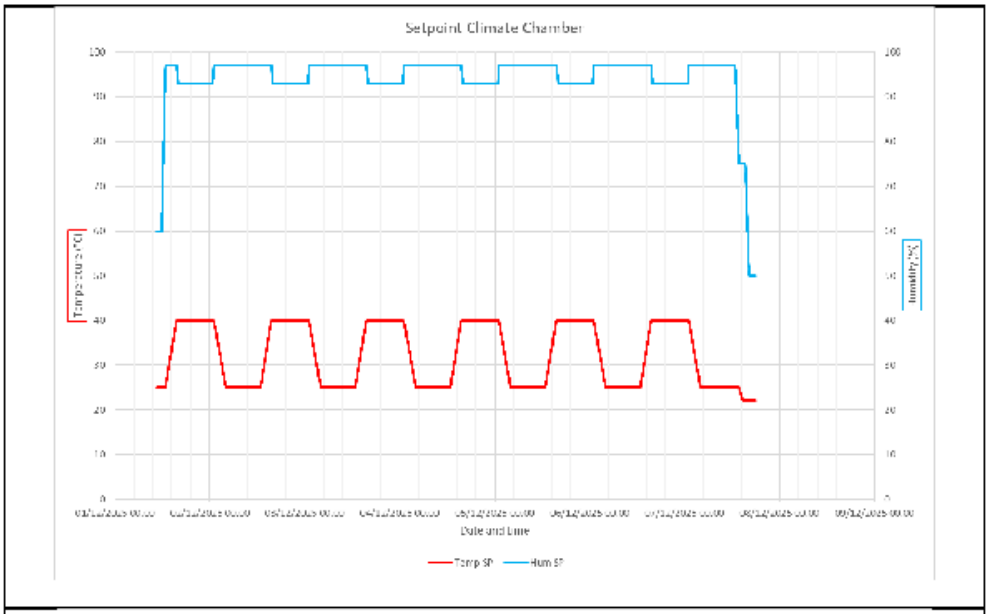
@ 22°C 50%

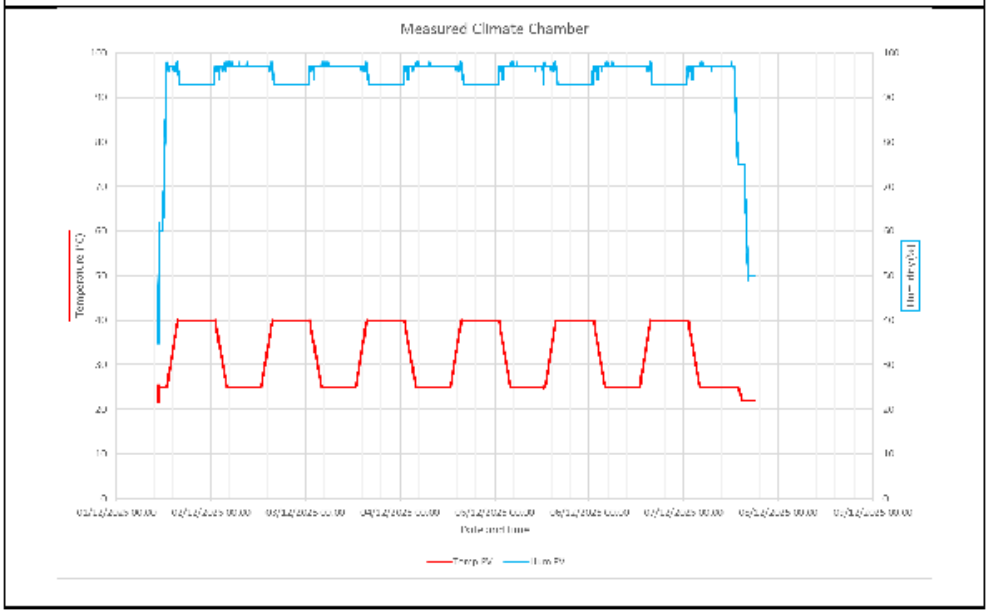
Recovery measurement

After end damp heat cyclic test

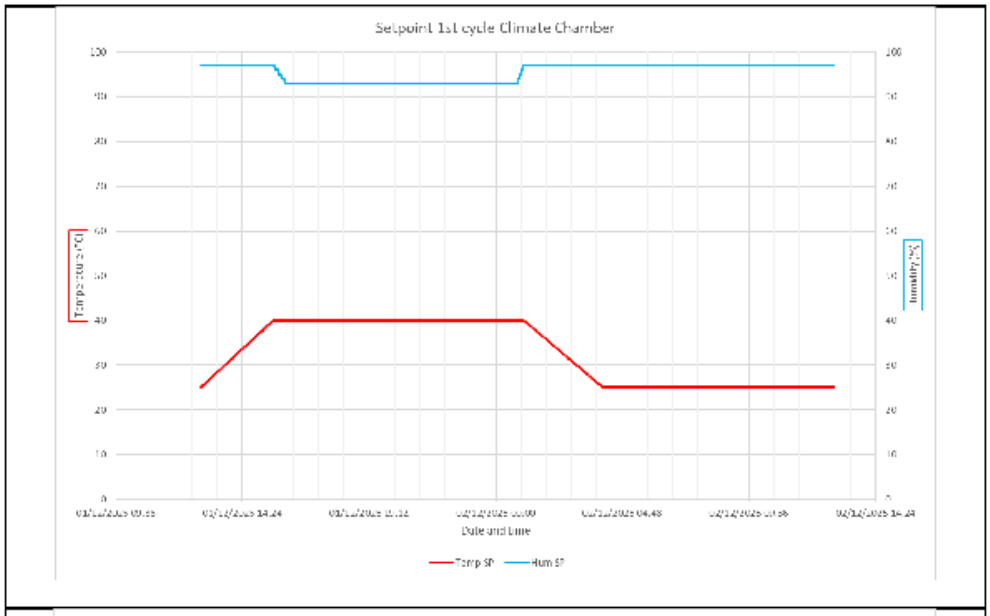
Chamber settings and logging

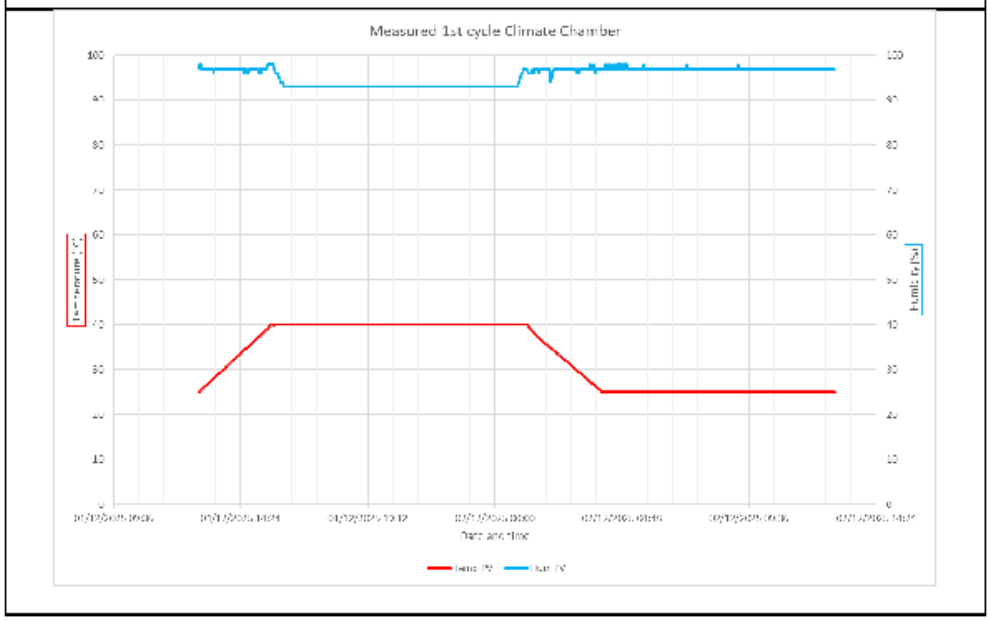
KEMA Labs


Setpoint Climate Chamber
Temperature (°C)
Humidity (%)
Date and Time
Temp SP
Hum SP


Measured Climate Chamber
Temperature (°C)
Humidity (%)
Date and Time
Temp PV
Hum PV

KEMA Labs


Setpoint 1st cycle Climate Chamber
Temperature [°C]
Humidity [%]
Date and Time
Temp SP
Hum SP


Measured 1st cycle Climate Chamber
Temperature [°C]
Humidity [%]
Date and time

A4 - PARTICIPANT RESULTS (TEST REPORT - BATCH LEV3445)

KEMA Labs

KEMA Labs Management System – Observation sheet

ISI-SST-4538-AB – Climate P equipment - Damp heat, cyclic (12 + 12 h cycle)

Valid for:	Revision:	Date:
KEMA Labs Arnhem – MPSA	0	2025-12-15
Resp. unit/Author:	**Reviewed by:**	**Approved by:**
Marc Achterkamp	Mihai Bivolaru	Marc Achterkamp

Revisions in this document:

Rev. no.	Date	Description of revision
0	2025-12-15	Preparation of controlled document

KEMA Labs

Project information	
Customer	South Quality – Proviciency Testing Provider
Project number	SQO-EV4 (Round 8)
Code	LEV3445-18
Test object	ATX power supply - 220 V - 50Hz - 600W Trademark: ACONCAWA Model: ATX 600 X 24 P 2S
Basic standard	IEC 61068-2-30:2005 / EN 60068-2-30:2005

Tests carried out by:	
Test engineers	Peter Hildering
Date	21 November 2025 until 28 November 2025
Location	Arnhem, The Netherlands

Test instrumentation

Manufacturer	Type	Asset number
☐ Hielkema	C-40/600	AB101670
☐ Espec	ARS-1100	AB101817
☐ Espec	ARS-1100	AB101751
☒ Espec	ARS-1100	AB101972
☒ LT Lutron (Meter)	YK-2005WA	AB101398
☒ LT Lutron (Probe)	Probe	AB101542
☒ Fluke precision multimeter	8846A	AB101898
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The measurement uncertainty estimation is presented in ISI-SST-4538.

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Upper temperature	☐ 40°C ± 2°C ☒ 55°C ± 2°C
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Humidity at higher temperature	93% ± 3%
Number of cycles	40°C : ☐ 1 ☐ 2 ☐ 6 55°C : ☐ 2 ☒ 6 ☐ 12 ☐ 21 ☐ 56
Variant	☐ 1 ☒ 2
Water resistivity	0.4 µS/cm ; 25 kΩ.m (req. ≤ 2000 µS/m; ≥500 Ω.m)
Operating condition	Powered-on (220V/50Hz) – No load
Auxiliary power supply voltage	220 Vac

Test

Note:
As no electrical wiring diagrams and connectors were received from South Quality after request, the output voltages of the ATX power supply were not measured. The ATX power supply is powered with 220V/50Hz and the current drawn was measured under no load conditions.

Initial measurements

Initial measurement	Observations
Visual inspection	No visual damage
Functional verification	The sample draws 18,79 mA

Conditions

Test procedure	Duration of exposure (h)	Operating temperature (°C)	Hunidity (%)	Observations
Stabilizing period	1	25	60	-
24h Cycle	12	☐ 40°C ☒ 55°C	93	-
	12	25	97	-

Intermediate measurements

Intermediate measurement	Observations
Functional verification	The sample draws 19,35 mA – 22,88 mA

Recovery

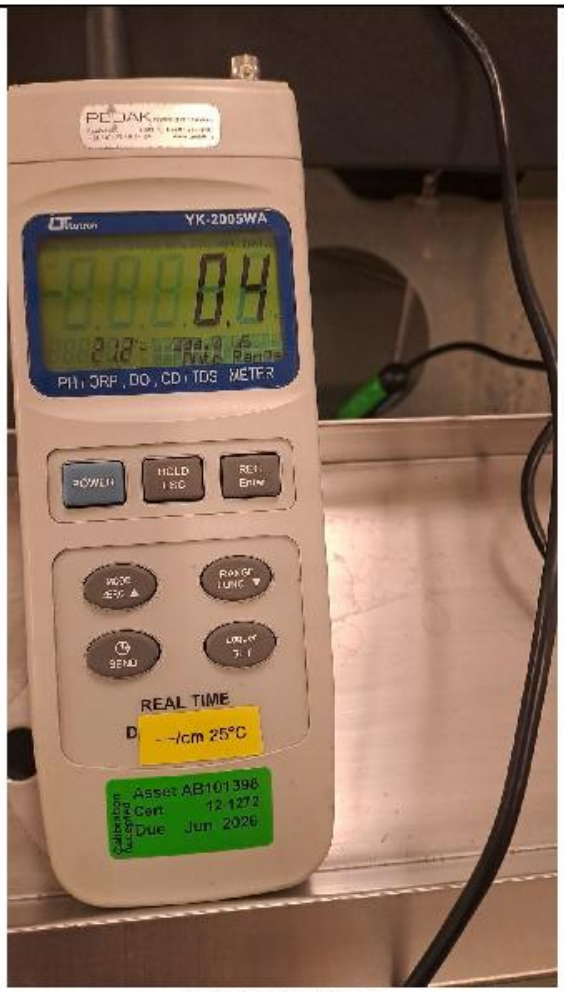
Recovery measurement	Observations
Functional verification	The sample draws 18,70 mA
Visual inspection	No visual damage, No discolouration, no deterioration of materials

KEMA Labs

Pictures test setup

Test chamber

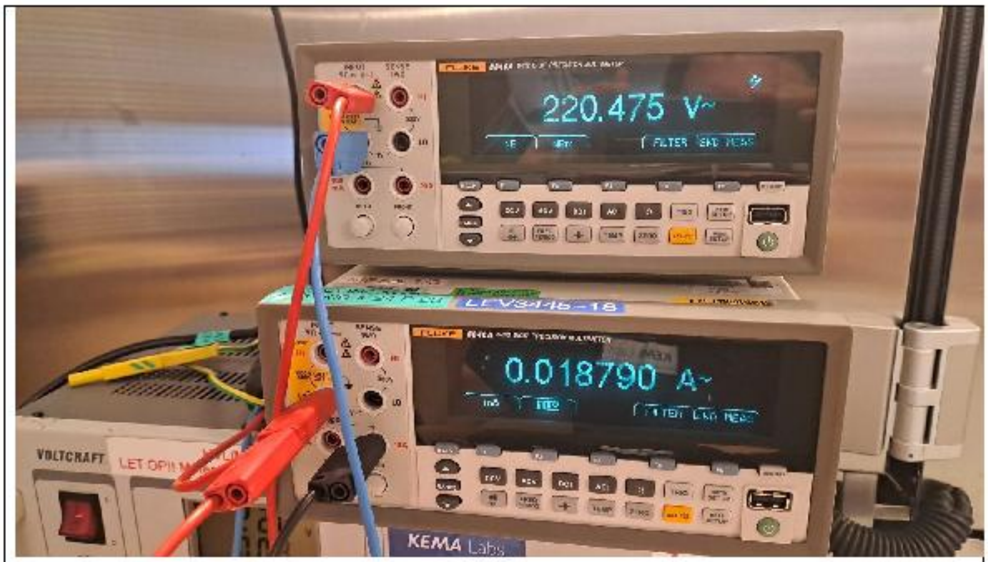
KEMA Labs



0.4 µS/cm ; 25 kΩ.m

Water conductivity

Before start damp heat cyclic test



@ 25°C 60%

Initial measurement

@ 25°C 97%

@ 55°C 93%

Intermediate measurement

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@ 22°C 50%

Recovery measurement

KEMA Labs

After end damp heat cyclic test

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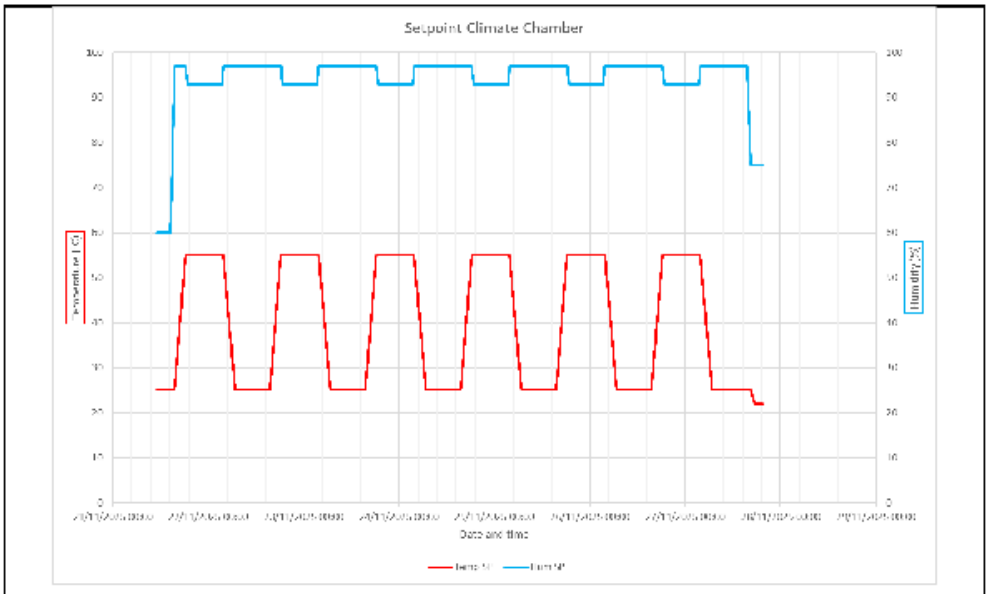
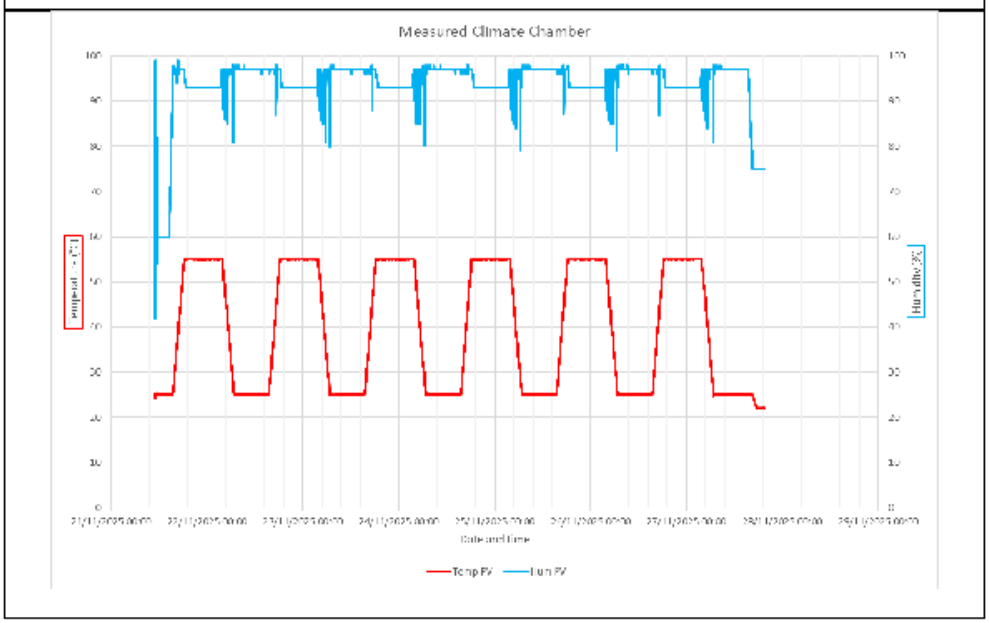
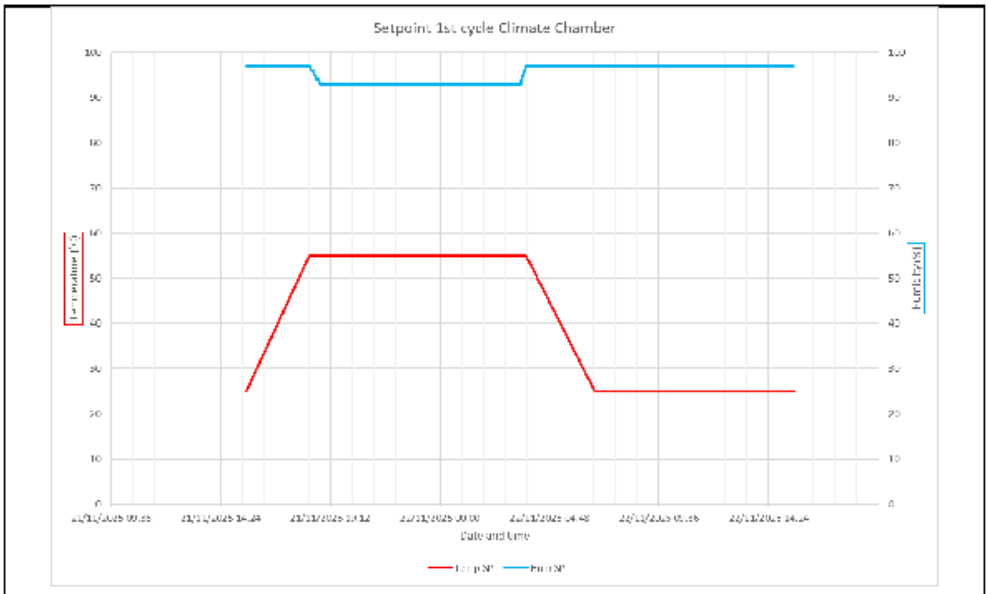
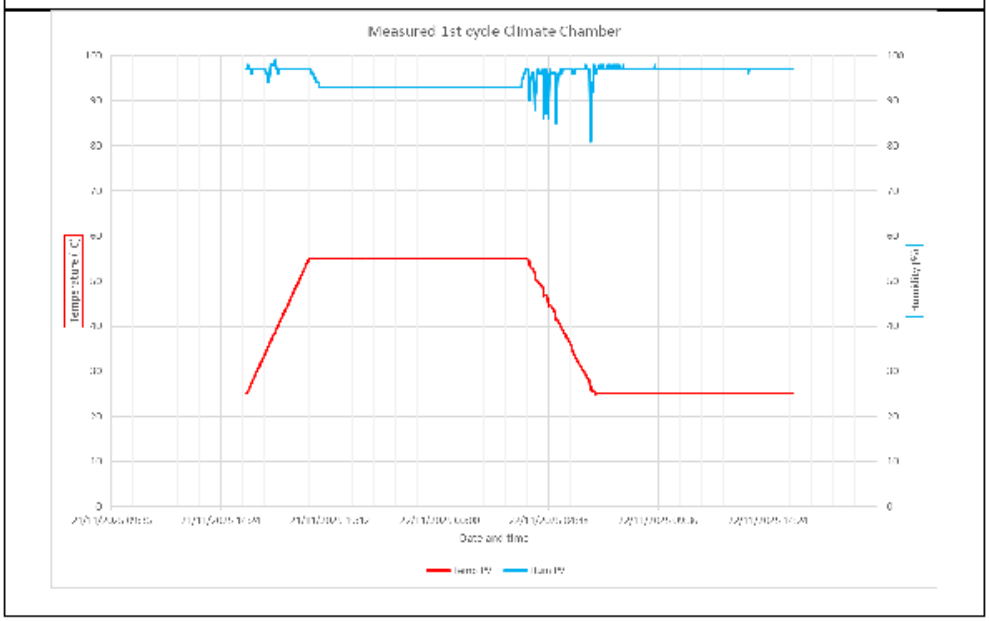
Chamber settings and logging


Setpoint Climate Chamber
Temperature [°C]
Humidity [%]
Date and time
Temp SP
Hum SP


Measured Climate Chamber
Temperature [°C]
Humidity [%]
Date and time
Temp PV
Hum PV

KEMA Labs


Setpoint 1st cycle Climate Chamber
Date and time


Measured 1st cycle Climate Chamber
Temperature (°C)
Humidity (%)
Date and time

APPENDIX B

VOID

----- END OF REPORT -----