# REPORT No 11353

***Date of issue:*** *September 16, 2025*

***Status: FINAL REPORT***

**********

# IEC 60068-2-14

## ENVIRONMENTAL TESTING
## TEST N: CHANGE OF TEMPERATURE

## Program: SQO-EV2 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 2025.09.16 15:57:21 -03'00' | cn=ESTHER CASAS, o=PT SOUTH QUALITY SAS, ou=SOUTH QUALITY, email=ecasas@ptsouthquality.com, c=AR 2025.09.18 14:23:53 -03'00' | cn=Emiliano Medina, o=SOUTH QUALITY, ou=PT SOUTH QUALITY SAS, email=quality@ptsouthquality.com, c=ES 2025.09.19 17:17:50 -03'00' |
| **Berenice Ferrel**<br>Assistant Technician | **Lic. Esther Casas**<br>Physics expert | **Eng. Emiliano Medina**<br>Quality Assurance Lead |

# TABLE OF CONTENTS

## 1. FOREWORD

This report summarizes the results of the **SQO-EV2 (Round 8)** proficiency testing program on the determination of the suitability of equipment to withstand rapid changes of ambient temperature. 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 in July/August 2025. 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 60068-2-14: 2023 |

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.

## 4. PARTICIPANTS

In the present round, 25 companies have participated with the following details:

| CODE | Country | ISO 17025 accredited | Results delivered |
|---|---|---|---|
| **01** | France | Yes | Yes |
| **02** | Colombia | Yes | No |
| **03** | Germany | Yes | Yes |
| **04** | Spain | No | Yes |
| **05** | Italy | Yes | Yes |
| **06** | Belgium | Yes | Yes |
| **07** | Germany | Yes | Yes |
| **08** | China | Yes | Yes |
| **09** | Malaysia | Yes | Yes |
| **10** | England | Yes | Yes |
| **11** | Italy | Yes | No |
| **12** | Australia | Yes | Yes |
| **13** | Portugal | Yes | Yes |
| **14** | Canada | Yes | Yes |
| **15** | Finland | Yes | Yes |
| **16** | Spain | Yes | Yes |
| **17** | Chile | No | No |
| **18** | Türkiye | Yes | Yes |
| **19** | Brazil | Yes | Yes |
| **20** | France | Yes | Yes |
| **21** | South Africa | Yes | Yes |
| **22** | Mexico | No | Yes |
| **23** | Argentina | Yes | Yes |
| **24** | Finland | Yes | Yes |
| **25** | Hong Kong | Yes | No |

## 5. HOMOGENEITY

A homogeneity study was conducted to verify the compliance of the samples with the requirements of the IEC 60068-2-14 standard, utilizing an ISO 17025 accredited laboratory.

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

Control procedures were conducted in accordance with ISO Guide 35:2017, clause 7.4.1.2, where stratified random sampling was applied. Samples were selected using random number generation software.

The results of this tests appear below:

Size of each batch: **35 units**
Tested samples from each batch: **8 units**
Test conditions: **TA: -20 °C / TB: 85 °C / t1: 1 h**

| DETERMINATION | HOMOGENEITY OF RESULTS IN THE SAMPLES ANALYZED | | |
|---|---|---|---|
| | BATCH: LEV2932 | BATCH: LEV2933 | BATCH: LEV2934 |
| Visual inspection | YES | YES | YES |
| Functional performance | YES | NO | YES |

Size of each batch: **35 units**
Tested samples from each batch: **8 units**
Test conditions: **TA: -20 °C / TB: 60 °C / t1: 2 h**

| DETERMINATION | HOMOGENEITY OF RESULTS IN THE SAMPLES ANALYZED | | |
|---|---|---|---|
| | BATCH: LEV3006 | BATCH: LEV3007 | BATCH: LEV3008 |
| Visual inspection | YES | YES | YES |
| Functional performance | YES | YES | NO |

Samples for this program are taken from the selected batches identified as **LEV2932**, and **LEV3007**.

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 15**):

| | |
|---|---|
| Batch: | LEV2932 |
| Sample ID: | 15 |
| Characteristics: | Switching power supply with cooler<br>In: 110/220V; 50/60Hz; Class 1 - Out: 12Vcc; 20A; 240W<br>Trademark: SIMALED<br>Model: 12V-20A (Fan) - 240W |

| | |
|---|---|
| Batch: | LEV3007 |
| Sample ID: | 15 |
| Characteristics: | Switching power supply<br>In: 110/220V; 50/60Hz; Class 1 - Out: 12Vcc; 20A; 240W<br>Trademark: SIMALED<br>Model: 12V-5A (S) - 60W |

## 7. IMAGES

**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 | LEV2932 | | LEV3007 | |
|---|---|---|---|---|
| | Test conditions: TA: -20 °C / TB: 85 °C / t1: 1 h | | Test conditions: TA: -20 °C / TB: 60 °C / t1: 2 h | |
| | Visual inspection | Functional performance | Visual inspection | Functional performance |
| 01 | PASS | PASS | PASS | PASS |
| 03 | PASS | PASS | PASS | PASS |
| 04 | PASS | FAIL | PASS | PASS |
| 05 | PASS | PASS | PASS | PASS |
| 06 | PASS | PASS | PASS | PASS |
| 07 | PASS | PASS | PASS | PASS |
| 08 | PASS | PASS | FAIL | FAIL |
| 09 | PASS | PASS | PASS | PASS |
| 10 | PASS | PASS | PASS | PASS |
| 12 | PASS | PASS | PASS | PASS |
| 13 | PASS | PASS | PASS | PASS |
| 14 | PASS | PASS | PASS | PASS |
| 15 | PASS | PASS | PASS | PASS |
| 16 | PASS | PASS | PASS | PASS |
| 18 | PASS | PASS | PASS | PASS |
| 19 | PASS | PASS | PASS | PASS |
| 20 | PASS | PASS | PASS | PASS |
| 21 | PASS | PASS | PASS | PASS |
| 22 | PASS | PASS | PASS | FAIL |
| 23 | PASS | PASS | PASS | PASS |
| 24 | PASS | PASS | PASS | PASS |

| ASSIGNED RESULTS | | | |
|---|---|---|---|
| LEV2932 | | LEV3007 | |
| 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 did not send the results before the deadline.

Laboratory **Code 03**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 04**: The laboratory obtained an **UNSATISFACTORY** result in the verification of functional performance for batch **LEV2932**. However, it achieved **SATISFACTORY** results in the verification of the remaining parameters.

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 obtained **UNSATISFACTORY** results in the verification of visual inspection and functional performance for batch **LEV3007**. However, it achieved **SATISFACTORY** results in the verification of the remaining parameters.

Laboratory **Code 09**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

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

Laboratory **Code 11**: The laboratory did not send the results before the deadline.

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

Laboratory **Code 13**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

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

Laboratory **Code 15**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

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

Laboratory **Code 17**: The laboratory did not send the results before the deadline.

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 obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 22**: The laboratory obtained an **UNSATISFACTORY** result in the verification of functional performance for batch **LEV3007**. However, it achieved **SATISFACTORY** results in the verification of the remaining parameters.

Laboratory **Code 23**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 24**: The laboratory obtained **SATISFACTORY** results in the verification of all parameters.

Laboratory **Code 25**: The laboratory did not send the results before the deadline.

## 12. CONCLUSIONS

The overall performance on this **SQO-EV2 Round 8** program from the participating laboratories, based on expected results, are the following:

- Participants Codes **01, 03, 05, 06, 07, 09, 10, 12, 13, 14, 15, 16, 18, 19, 20, 21, 23** and **24** have achieved a **SUFFICIENT** performance according to the expected results and do not need to take any action;

- Participants Codes **04, 08** and **22** have achieved an **INSUFFICIENT** performance according to the expected results and must take action in the tests where their results differ from the expected ones (See annex B).

The criteria used for the evaluation of the overall performance is the following:

- **SUFFICIENT** performance: No unsatisfactory results obtained.

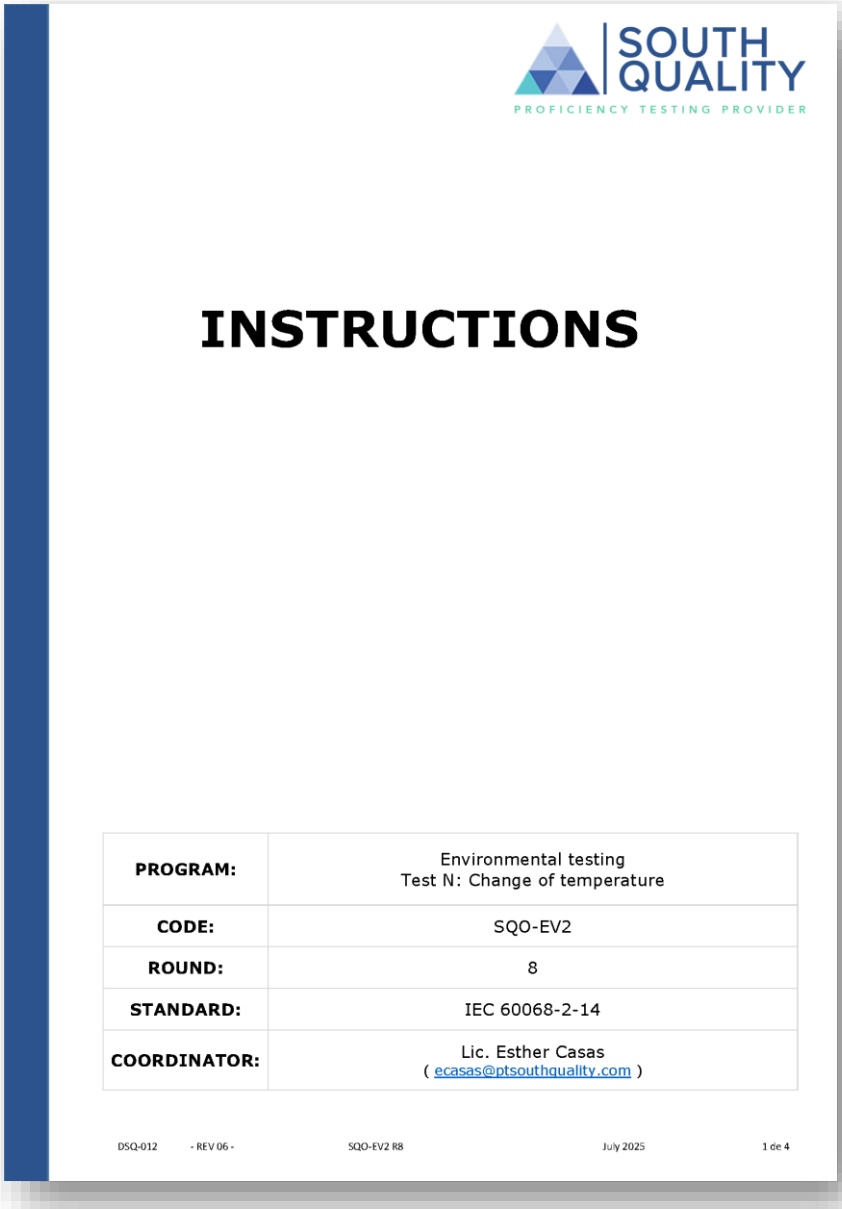
- **INSUFFICIENT** performance: An unsatisfactory result was obtained.

# APPENDIX A

## A1 - PARTICIPANT DATA

| | |
|---|---|
| Company: | **Toptester Oy** |
| Laboratory: | **Toptester Oy** |
| Country: | Finland |
| Client ID: | E494 |
| Contact person: | Tomi Inkeri - Quality Manager |
| | tomi.inkeri@toptester.fi |

## A2 - INSTRUCTIONS



INSTRUCTIONS

| | |
|---|---|
| **PROGRAM:** | Environmental testing<br>Test N: Change of temperature |
| **CODE:** | SQO-EV2 |
| **ROUND:** | 8 |
| **STANDARD:** | IEC 60068-2-14 |
| **COORDINATOR:** | Lic. Esther Casas<br>( ecasas@ptsouthquality.com ) |

DSQ-012 - REV 06 - SQO-EV2 R8 July 2025 1 de 4

1 - **General**

This document serves as a guide for managing the results of the **SQO-EV2** program, round 8.

2 - **Standard**

**IEC 60068-2-14: 2023**

3 - **Participant**

| TOPTESTER OY | CODE 15 |
|---|---|

4 - **Tests involved**

| TEST |
|---|
| Determination the suitability of equipment to withstand rapid changes of ambient temperature |

5 - **Samples**

| CODE | SAMPLE | QUANTITY |
|---|---|---|
| LEV2932-15 | Switching power supply with cooler<br>In: 110/220V; 50/60Hz; Class 1 - Out: 12Vcc; 20A; 240W<br>Trademark: SIMALED<br>Model: 12V-20A (Fan) - 240W | 1 |
| LEV3007-15 | Switching power supply<br>In: 110/220V; 50/60Hz; Class 1 - Out: 12Vcc; 20A; 240W<br>Trademark: SIMALED<br>Model: 12V-5A (S) - 60W | 1 |

6 - **Notes**

**a)** The deadline for the delivery of results is **August 18, 2025**.
**b)** Participants must submit the results in the usual report used by their laboratory.
**c)** The samples must be kept until the end of the program, which concludes with the submission of the final report.
**d)** The samples are to be handled as routine lab samples, with all testing, documentation, and reporting adhering to IEC 60068-2-30.
**e)** To review the results, the submission of images of the tests is appreciated. These images can be attached at the end of this document or sent via email.

## 7 - **Test conditions**

| CODE | TEST TYPE | TEST SEVERITIES |
|---|---|---|
| LEV2932-15 | Na | $T_A$: -20 °C<br>$T_B$: 85 °C<br>$t_1$: 1 h |
| LEV3007-15 | Na | $T_A$: -20 °C<br>$T_B$: 60 °C<br>$t_1$: 2 h |

## 8 - **Parameters to determine**

| CODE | PARAMETERS (BEFORE & AFTER) |
|---|---|
| LEV2932-15 | VISUAL INSPECTION<br>VOLTAGE |
| LEV3007-15 | VISUAL INSPECTION<br>VOLTAGE |

| PHOTOGRAPHS |
| --- |
| |

## A3 - PARTICIPANT RESULTS (TEST REPORT #1)

# TOPTESTER OY

# TEST REPORT

# ENVIRONMENTAL TESTING: IEC 60068-2-14, 2023 TEST NA: CHANGE OF TEMPERATURE

| | |
|---|---|
| Customer: | South Quality |
| Device name: | LEV2932-15 |

TOPTESTER
Your partner in reliability testing

TOPTESTER
Your partner in reliability testing

**TEST REPORT**

Customer: South Quality
Test name: IEC 60068-2-14, Test Na: Change of Temperature
EUT: LEV2932-15

TOPTESTER OY

# 1. TEST INFORMATION

| | |
|---|---|
| CUSTOMER: | South Quality |
| TEST NAME: | IEC 60068-2-14, TEST Na: Change of Temperature |
| TEST DATE: | August 13. – August 14. 2025 |
| TEST SITE: | Toptester Oy, Rovaniemi, Finland |

## EQUIPMENT UNDER TEST

| | |
|---|---|
| DEVICE NAME: | SIMALED power supply LEV2932-15 |
| DEVICE MODEL: | 12V-20A (Fan) 240W |

| | |
|---|---|
| Test ID: | ENV_South Quality_250812 |
| Report version: | 1.0 |
| Class: | Cust |

## Persons in charge of the test

| | |
|---|---|
| Customer: | Esther Casas |
| Toptester: | Ossi Hiltunen |
| Test ordered by: | Joni Huotari, Toptester Oy |
| Test order date: | July 2025 |

TOPTESTER OY
Postal address: Ahjotie 23, FI-96300 Rovaniemi, Finland
Visiting and courier address: Teollisuustie 34, FI-96300 Rovaniemi, Finland
Tel. +358 (0)400 322 344 | E-mail: info@toptester.com | www.toptester.com
VAT No. FI17036376

## 2. TEST REPORT HISTORY

| Version | Date | Change description | Changes made by |
|---|---|---|---|
| 1.0 | 18.8.2025 | First version of the report is 1.0. If no changes are necessary, it will be also the final version. | Ossi Hiltunen |

## 3. CONTENTS

# 4. TEST SUMMARY

### Used standard or test method summary

The test was performed according to IEC 60068-2-14, Test Na: Change of Temperature. Low temp: -20°C, High temp: +85°C, exposure time: 1 hour, test duration 5 cycles.

### Description of equipment under test

SIMALED switching power supply.

### Test result summary

The goal of the test was to see the effect of IEC 60068-2-14, Test Na: Change of Temperature.

After the test, the EUT was operational, and measured output voltage was similar to value measured before test. No visual change was found from the EUT. The test result is Pass.

### Signatures

Test performed and reported by: Ossi Hiltunen

Date: 18.8.2025 Ossi Hiltunen

.

# 5. INTRODUCTION

## 5.1. Background

The test was an external comparison test and was done part of quality system program.

## 5.2. Equipment under test

SIMALED switching power supply. model: 12V-20A (Fan) – 240W. Product ID: LEV2932-15

## 5.3. Goal of the test

The goal of the test was to determine the suitability of equipment for use under rapid temperature change.

# 6. TEST METHOD AND MEASUREMENT DESCRIPTION

## 6.1. Test Method

Test was performed according to IEC 60068-2-14, Test Na: Change of Temperature. Low temp: -20°C, High temp: +85°C, exposure time: 1hour, test duration 5 cycles. Theoretical test cycle, see on Figure 1.

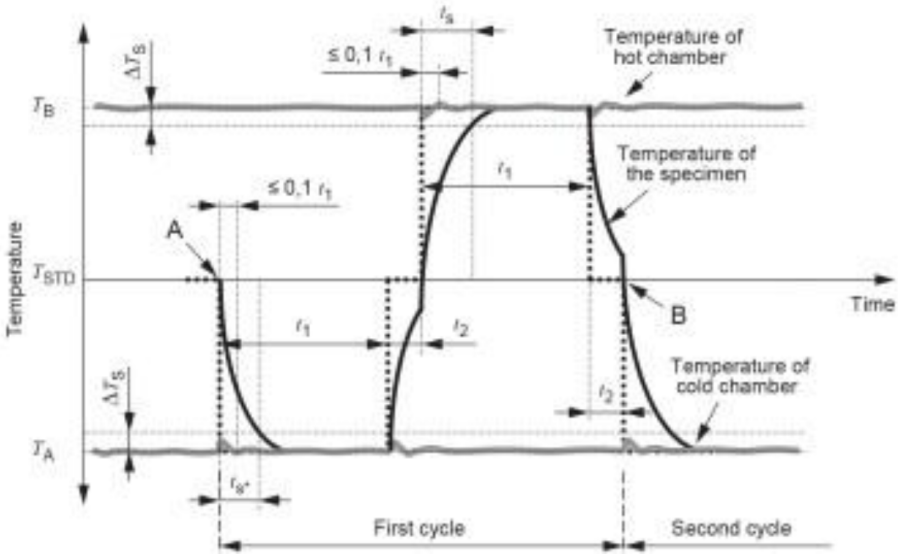



**Figure 1. Test Na, example of test cycle from SFS-EN IEC 60068-2-14 standard, figure 8.**

## 6.2. Acceptance Criteria

The acceptance criterion was that the EUT is functional and there should be no visual changes detected on the outer surface of the EUT after the test.

## 6.3. Analyses

The following steps were done before and after the test:

- Visual inspection
- Operationality was verified by measuring output voltage (12V) of the main tab of the power supply.

### 6.4. Test Equipment, Reliability Control and Measurement

CTS thermal shock chamber was controlled and the temperature data was recorded by CDI-Pro (version 5.03) chamber control software.

Thermal shock chamber CTS TSS-70/130/S, sn: 217248, last calibration date is 13.11.2024, calibration is valid until 13.5.2026.

The estimated, expanded measurement uncertainty is ±3,61%. This value takes only into account the uncertainties caused by the measurement equipment used in the test, i.e. ENV chamber control sensors for temperature and humidity.

Toptester laboratory air pressure, temperature and humidity were measured with Ruuvi Tag 4in1 sensor, sn: 0D63. The last calibration date is 11.8.2025. The calibration is valid until 11.2.2027.

The voltage measured by Fluke 179 multimeter sn: 25620082. Calibration date is 17.4.2025 and next calibration is 17.10.2026.

### 6.5. EUT functional Control and Measurement

According to customer email.

## 7. TEST PROCESS

Before EUT was placed into a programmable thermal shock chamber, it was inspected visually and operationality was checked.

Ambient conditions before test: temperature 22.7 °C, air humidity 52.5 %Rh and air pressure 999.9 hPa.

**Figure 2. The EUT in environmental chamber.**

After the test, the EUT was operational, and no visual change was found.
Operational check done before and after test.

**Table 1. Measured voltages.**

| Nominal Voltage | After test | Before test |
|---|---|---|
| 12V | 12.52V | 12.59V |

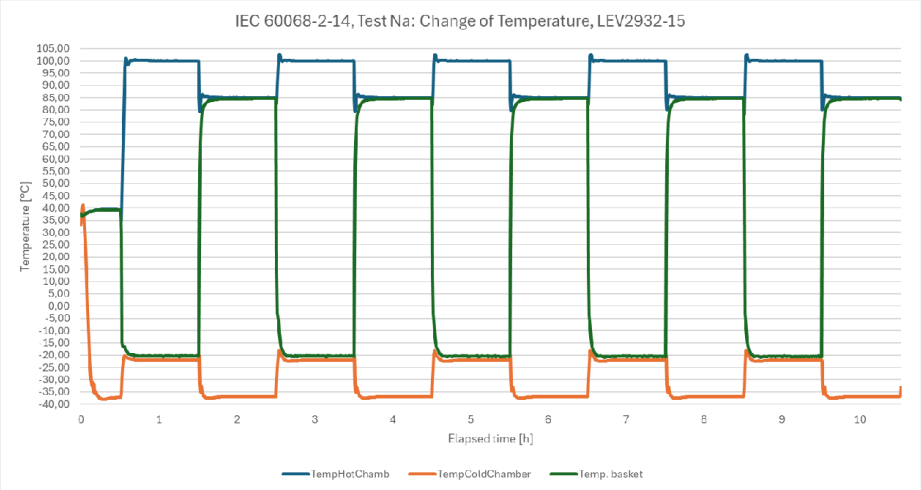



**Figure 3. Measured temperature from thermal shock chamber during the test.**

## 8. RESULTS AND CONCLUSIONS

The goal of the test was to see the effect of IEC 60068-2-14, Test Na: Change of Temperature.

After the test, the EUT was operational, and measured output voltage was similar to value measured before test. No visual change was found from EUT. The test result is Pass.

## 9. QUALITY CONTROL

QUALITY SYSTEM CERTIFICATION
DNV
ISO 9001

FINAS
Finnish Accreditation Service
T275 (EN ISO/IEC 17025)

TOPTESTER OY
Postal address: Ahjotie 23, FI-96300 Rovaniemi, Finland
Visiting and courier address: Teollisuustie 34, FI-96300 Rovaniemi, Finland
Tel. +358 (0)400 322 344 | E-mail: info@toptester.com | www.toptester.com
VAT No. FI17036376

## A4 - PARTICIPANT RESULTS (TEST REPORT #2)

# TOPTESTER OY

# TEST REPORT

# ENVIRONMENTAL TESTING: IEC 60068-2-14, 2023 TEST NA: CHANGE OF TEMPERATURE

| | |
|---|---|
| Customer: | South Quality |
| Device name: | LEV3007-15 |

TOPTESTER
Your partner in reliability testing

TOPTESTER
Your partner in reliability testing

**TEST REPORT**

Customer: South Quality
Test name: IEC 60068-2-14, Test Na: Change of Temperature
EUT: LEV3007-15

TOPTESTER OY

## 1. TEST INFORMATION

| | |
|---|---|
| CUSTOMER: | South Quality |
| TEST NAME: | IEC 60068-2-14, TEST Na: Change of Temperature |
| TEST DATE: | August 12. – August 13. 2025 |
| TEST SITE: | Toptester Oy, Rovaniemi, Finland |

### EQUIPMENT UNDER TEST

| | |
|---|---|
| DEVICE NAME: | SIMALED power supply LEV3007-15 |
| DEVICE MODEL: | 12V-5A (S) 60W |

| | |
|---|---|
| Test ID: | ENV_South Quality_250812 |
| Report version: | 1.0 |
| Class: | Cust |

### Persons in charge of the test

| | |
|---|---|
| Customer: | Esther Casas |
| Toptester: | Ossi Hiltunen |
| Test ordered by: | Joni Huotari, Toptester Oy |
| Test order date: | July 2025 |

TOPTESTER OY
Postal address: Ahjotie 23, FI-96300 Rovaniemi, Finland
Visiting and courier address: Teollisuustie 34, FI-96300 Rovaniemi, Finland
Tel. +358 (0)400 322 344 | E-mail: info@toptester.com | www.toptester.com
VAT No. FI17036376

## 2. TEST REPORT HISTORY

| Version | Date | Change description | Changes made by |
|---|---|---|---|
| 1.0 | 18.8.2025 | First version of the report is 1.0. If no changes are necessary, it will be also the final version. | Ossi Hiltunen |

## 3. CONTENTS

# 4. TEST SUMMARY

**Used standard or test method summary**

The test was performed according to IEC 60068-2-14, Test Na: Change of Temperature. Low temp: -20°C, High temp: +60°C, exposure time: 2 hours, test duration 5 cycles.

**Description of equipment under test**

SIMALED switching power supply.

**Test result summary**

The goal of the test was to see the effect of IEC 60068-2-14, Test Na: Change of Temperature.

After the test, the EUT was operational, and measured output voltage was similar to value measured before test. No visual change was found from the EUT. The test result is Pass.

**Signatures**

Test performed and reported by: Ossi Hiltunen

Date: 18.8.2025 Ossi Hiltunen

.

# 5. INTRODUCTION

## 5.1. Background

The test was an external comparison test and was done part of quality system program.

## 5.2. Equipment under test

SIMALED switching power supply. model: 12V-5A (S) – 60W. Product ID: LEV3007-15

## 5.3. Goal of the test

The goal of the test was to determine the suitability of equipment for use under rapid temperature change.

# 6. TEST METHOD AND MEASUREMENT DESCRIPTION

## 6.1. Test Method

Test was performed according to IEC 60068-2-14, Test Na: Change of Temperature. Low temp: -20°C, High temp: +60°C, exposure time: 2 hours, test duration 5 cycles. Theoretical test cycle, see on Figure 1.

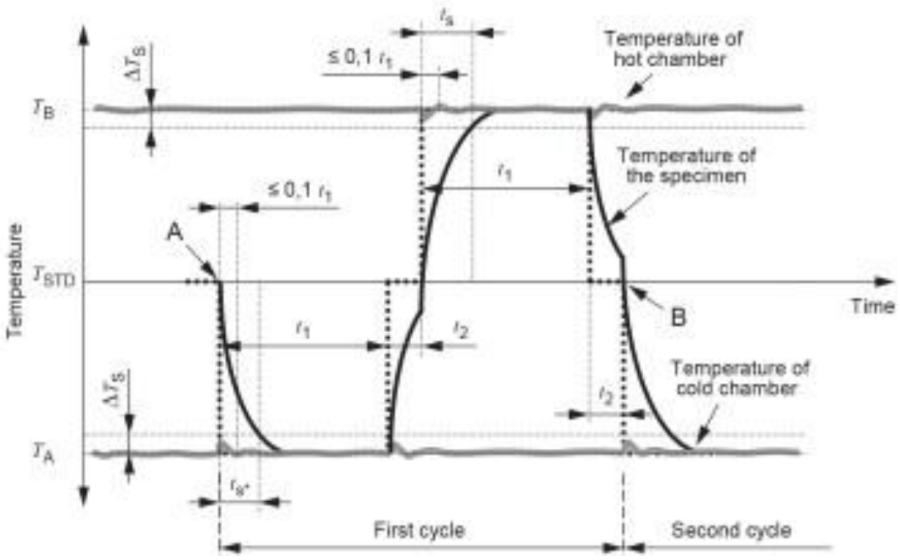



**Figure 1. Test Na, example of test cycle from SFS-EN IEC 60068-2-14 standard, figure 8.**

## 6.2. Acceptance Criteria

The acceptance criterion was that the EUT is functional and there should be no visual changes detected on the outer surface of the EUT after the test.

## 6.3. Analyses

The following steps were done before and after the test:

- Visual inspection
- Operationality was verified by measuring output voltage (12V) of the main tab of the power supply.

## 6.4. Test Equipment, Reliability Control and Measurement

CTS thermal shock chamber was controlled and the temperature data was recorded by CDI-Pro (version 5.03) chamber control software.

Thermal shock chamber CTS TSS-70/130/S, sn: 217248, last calibration date is 13.11.2024, calibration is valid until 13.5.2026.

The estimated, expanded measurement uncertainty is ±3,61%. This value takes only into account the uncertainties caused by the measurement equipment used in the test, i.e. ENV chamber control sensors for temperature and humidity.

Toptester laboratory air pressure, temperature and humidity were measured with Ruuvi Tag 4in1 sensor, sn: 0D63. The last calibration date is 11.8.2025. The calibration is valid until 11.2.2027.

The voltage measured by Fluke 179 multimeter sn: 25620082. Calibration date is 17.4.2025 and next calibration is 17.10.2026.

## 6.5. EUT functional Control and Measurement

According to customer email.

## 7. TEST PROCESS

Before EUT was placed into a programmable thermal shock chamber, it was inspected visually and operationality was checked.

Ambient conditions before test: temperature 21.8 °C, air humidity 51.8 %Rh and air pressure 999.5 hPa.

**Figure 2. The EUT in environmental chamber.**

After the test, the EUT was operational, and no visual change was found.
Operational check done before and after test.

**Table 1. Measured voltages.**

| Nominal Voltage | Before test | After test |
|---|---|---|
| 12V | 12.22V | 12.27V |

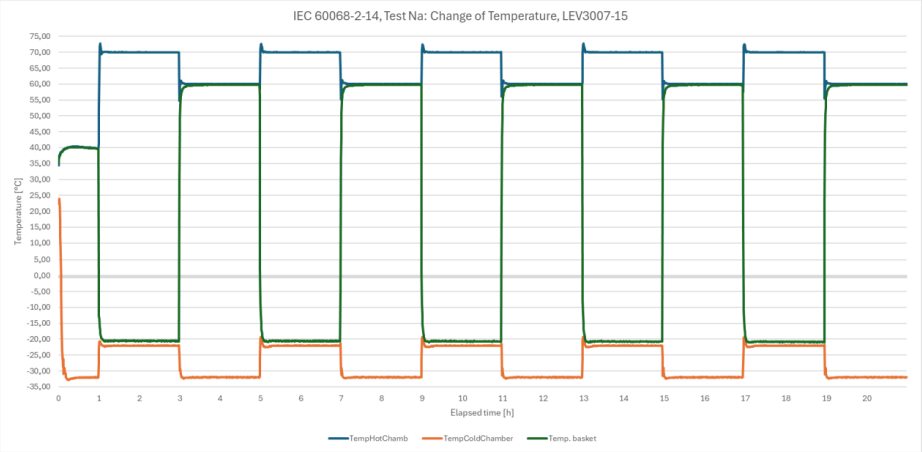



**Figure 3. Measured temperature from environmental chamber during the test.**

TOPTESTER OY
Postal address: Ahjotie 23, FI-96300 Rovaniemi, Finland
Visiting and courier address: Teollisuustie 34, FI-96300 Rovaniemi, Finland
Tel. +358 (0)400 322 344 | E-mail: info@toptester.com | www.toptester.com
VAT No. FI17036376

## 8. RESULTS AND CONCLUSIONS

The goal of the test was to see the effect of IEC 60068-2-14, Test Na: Change of Temperature.

After the test, the EUT was operational, and measured output voltage was similar to value measured before test. No visual change was found from EUT. The test result is Pass.

## 9. QUALITY CONTROL

QUALITY SYSTEM CERTIFICATION
DNV
ISO 9001

FINAS
Finnish Accreditation Service
T275 (EN ISO/IEC 17025)

TOPTESTER OY
Postal address: Ahjotie 23, FI-96300 Rovaniemi, Finland
Visiting and courier address: Teollisuustie 34, FI-96300 Rovaniemi, Finland
Tel. +358 (0)400 322 344 | E-mail: info@toptester.com | www.toptester.com
VAT No. FI17036376

# APPENDIX B

# VOID

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