

REPORT No 11747

Date of issue: June 1, 2026

Status: FINAL REPORT

ISO 10545-15 CERAMIC TILES LEAD AND CADMIUM GIVEN OFF BY GLAZED TILES Program: SQ-3525.V4

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| | | |
|--|--|---|
| Prepared by: | Reviewed by: | Approved by: |
| Berenice Ferrel Assistant Technician | Lic. Esther Casas Physics expert | Eng. Emiliano Medina Quality Assurance Lead |

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1. FOREWORD

This report summarizes the results of the **SQ-3525.V4** proficiency testing program on the determination lead and cadmium given off by the ceramic tiles surface. This program is conducted in a bilateral format, following the “split-sample” design described in clause A.4.2 of ISO/IEC 17043: 2023 (Alternative interlaboratory comparisons).

South Quality conducted the testing program in April 2026 with the aim of assessing the laboratory's ability to competently perform the designated tests.

2. ORGANIZATION

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

3. OBJECTIVE

The objective of this proficiency testing program is to measure the lead and cadmium released from the ceramic tile surface, using the following standard:

| Standard |
|--------------------|
| ISO 10545-15: 2021 |

To verify this, batches of ceramic tile samples have been selected.

Participants in this program have not been previously informed about the expected values or value ranges of the samples they receive.

4. PARTICIPANT

Company: **TCKI**
 Laboratory: **Laboratorium**
 Country: Netherlands
 Client ID: E548
 Contact person: Ing. Ineke Geist
 Head of laboratory
i.geist@tcki.nl

5. HOMOGENEITY

Several batches were prepared identically by the staff at South Quality.

Subsequently, a homogeneity study was conducted with an ISO 17025 accredited laboratory.

The control process followed ISO 33405: 2024, clauses 7.4.1.1 / 7.4.1.2. Stratified random sampling was applied, and samples were selected using random number generation software.

The results of this test are presented below:

Size of each batch: **150 units**

Tested samples from each batch: **15 units**

| DETERMINATION | HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES | | |
|------------------|--|----------------|----------------|
| | BATCH: LGC2103 | BATCH: LGC2104 | BATCH: LGC2105 |
| Pb CONCENTRATION | YES | YES | YES |
| Cd CONCENTRATION | YES | YES | YES |

| DETERMINATION | HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES | | |
|------------------|--|----------------|----------------|
| | BATCH: LGC2405 | BATCH: LGC2406 | BATCH: LGC2407 |
| Pb CONCENTRATION | YES | YES | YES |
| Cd CONCENTRATION | YES | YES | YES |

Samples for this program are taken from the selected batches identified as **LGC2105** and **LGC2406**.

For the indicated batches, the values determined in the homogeneity study are utilized as the assigned values.

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

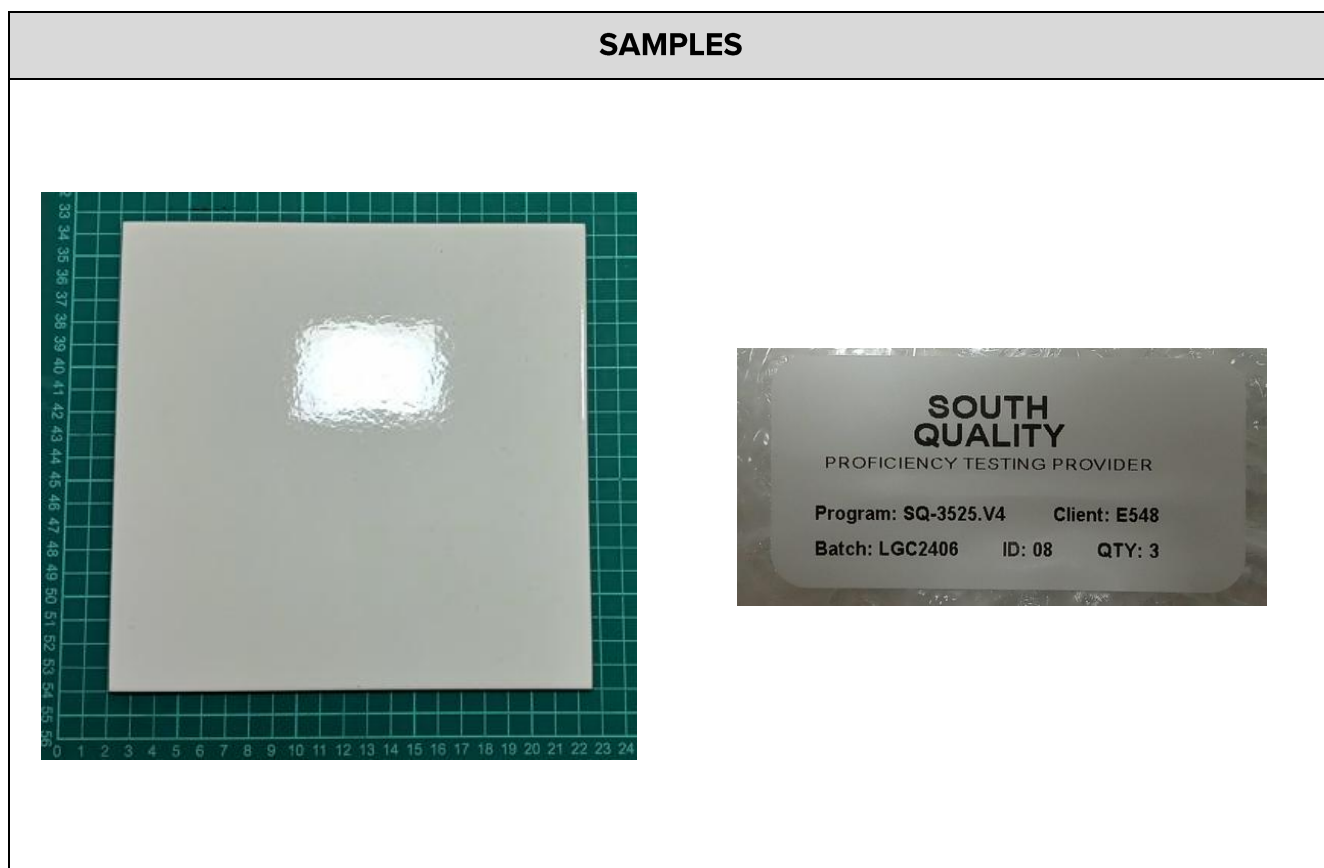
The following samples were sent for testing:

| | |
|------------------|--|
| Batch: | LGC2105 |
| Sample ID: | 04 |
| Characteristics: | White ceramic tile (Glazed) - 200 x 200 x 6 mm - 3 units |

| | |
|------------------|--|
| Batch: | LGC2406 |
| Sample ID: | 08 |
| Characteristics: | White ceramic tile (Glazed) - 200 x 200 x 6 mm - 3 units |

7. IMAGES





8. ASSIGNED VALUES

| PARAMETER | BATCH: LGC2105 | | BATCH: LGC2406 | |
|--|----------------|--------|----------------|----|
| | MEAN | SD | MEAN | SD |
| RELEASE OF LEAD (mg/dm ²) | 0.006 | 0.0029 | < LOQ | - |
| RELEASE OF CADMIUM (mg/dm ²) | < LOQ | - | < LOQ | - |

LOQ : (Lead: < 0.001 mg/dm²) - (Cadmium: < 0.001 mg/dm²)

9. PARTICIPANT RESULTS (SEE APPENDICES B AND C)

| PARAMETER | CODE: LGC2105-04 (MEAN) | CODE: LGC2406-08 (MEAN) |
|--|------------------------------|------------------------------|
| RELEASE OF LEAD (mg/dm ²) | 0.005 | < 0.001 |
| RELEASE OF CADMIUM (mg/dm ²) | < 0.001 | < 0.001 |

10. STATISTICS

The results must be treated as both qualitative and quantitative.

For qualitative results (Values below the limit of quantification, LOQ or not detected), the comparison will be made directly against the assigned values, so any difference will be evaluated as Unsatisfactory. In cases where the participant's LOQ is greater than the reference, it will be considered Satisfactory if the reference value is below the participant's LOQ.

For quantitative results the comparison is made according to B.4.1.3 of ISO 17043 and the appropriate technique is to compare participant results with the assigned values.

The results can be compared using ***z score***.

$$z = \frac{x - X}{\hat{\sigma}}$$

x is the participant's result

X is the assigned value

$\hat{\sigma}$ is the standard deviation

The performance evaluation of each sample is carried out with the following criteria:

$|z| \leq 2.0$ indicates "satisfactory" performance and generates no signal;

$2.0 < |z| < 3.0$ indicates "questionable" performance and generates a warning signal;

$|z| \geq 3.0$ indicates "unsatisfactory" performance and generates an action signal;

11. EVALUATION OF PERFORMANCE

| QUALITATIVE RESULTS | | | | |
|---------------------|--|--------------------|----------------|--------------------|
| BATCH | PARAMETER | PARTICIPANT RESULT | ASSIGNED VALUE | PERFORMANCE RESULT |
| LGC2105 | RELEASE OF CADMIUM (mg/dm ²) | < 0.001 | < LOQ | SATISFACTORY |
| LGC2406 | RELEASE OF LEAD (mg/dm ²) | < 0.001 | < LOQ | SATISFACTORY |
| LGC2406 | RELEASE OF CADMIUM (mg/dm ²) | < 0.001 | < LOQ | SATISFACTORY |

| QUANTITATIVE RESULTS | | | | | |
|----------------------|--|--------------------|----------------|---------|--------------------|
| BATCH | PARAMETER | AVERAGE | | z score | PERFORMANCE RESULT |
| | | PARTICIPANT RESULT | ASSIGNED VALUE | | |
| LGC2105 | RELEASE OF LEAD (mg/dm ²) | 0.005 | 0.006 | 0.33 | SATISFACTORY |

12. CONCLUSIONS

The overall performance of this **SQ-3525.V4** program from the participant laboratory **TCKI - Laboratorium**, is **SUFFICIENT** based on expected results.

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

- **SUFFICIENT** performance: No unsatisfactory/questionable results were obtained.
- **ALMOST SUFFICIENT** performance: No unsatisfactory results were obtained, but one questionable result was found.
- **INSUFFICIENT** performance: An unsatisfactory result or two questionable results were obtained.

APPENDIX A

INSTRUCTIONS



INSTRUCTIONS

| | |
|---------------------|--|
| PROGRAM: | CERAMIC TILES - LEAD AND CADMIUM GIVEN OFF BY GLAZED TILES - |
| CODE: | SQ-3525 |
| VERSION: | 4 |
| STANDARD: | ISO 10545-15 |
| COORDINATOR: | Eng. Erika Brest (ebrest@ptsouthquality.com) |

1 - General

This document serves as a guide for managing the results of the **SQ-3525.V4** program.

2 - Standard

ISO 10545-15: 2021

3 - Tests involved

| TEST |
|---|
| Determining lead and cadmium given off by the ceramic tiles surface (Concentration of metal extracted) |

4 - Samples

| CODE | SAMPLE | QUANTITY |
|------------|--|----------|
| LGC2105-04 | White ceramic tile (Glazed) - 200 x 200 x 6 mm | 3 |
| LGC2406-08 | White ceramic tile (Glazed) - 200 x 200 x 6 mm | 3 |

5 - Notes

- a) Being a bilateral program, there is no deadline for submitting results.
- b) The participant 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 **ISO 10545-15**.
- 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.

PHOTOGRAPHS

APPENDIX B

PARTICIPANT RESULTS (TEST REPORT #26.04.00032)



TCKI

Stichting TCKI Florijnweg 6, Velp-Arnhem, The Netherlands +31 26 3845600
PO Box 27, NL-6880 AA Velp KvK 41047499 info@tcki.nl www.tcki.nl



Customer :
T.C.K.I. (intern)

TCKI order number : 26.04.00032
Sample test number : SQ-3525V4 batch LGC2105 ID4
Your job description :

Report

Collective designation/sample test number (also invoice designation):
SQ-3525V4 batch LGC2105 ID4


Dear,

I herewith send you the results of the products you supplied.

- Sampling, recommendations and declarations of conformity of the results fall outside the scope of the accreditation.
- The laboratory management can give you, on request, supplementary information concerning the test procedure and measurement uncertainty of the results or can be found in the clarification document.
- Results from this report only have reference to the tested material.
- Duplication of this document is only allowed with preliminary permission of TCKI or client.
- Findings and declarations of conformity do not take into account the measurement uncertainty.

We trust to be of service to you with the information provided.

Yours faithfully,
Velp, 24-04-2026


Mieke Geist, Head of laboratory.

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Stichting TCKI Florijnweg 6, Velp-Arnhem, The Netherlands +31 26 3845600
 PO Box 27, NL-6880 AA Velp KvK 41047499 info@tcki.nl www.tcki.nl



INVESTIGATION ON CERAMIC TILES

| | |
|---|-------------------------------|
| Customer | : T.C.K.I. (intern) |
| Manufacturer | : T.C.K.I. (intern) |
| TCKI order number | : 26.04.00032 |
| Sample test number (Also invoice indication) | : SQ-3525V4 batch LGC2105 ID4 |
| Sampling date | : 18-03-2026 |
| Date of receipt | : 18-03-2026 |
| Sampling | : Unknown |
| Sample taken by | : South Quality |
| Supplied by | : South Quality |
| Finish | : Glazed |
| Application | : Wall tile |
| Offered product specification | : Not applicable |
| Spacers | : No |
| Number of tiles | : 3 |

1. Release of lead and cadmium



Stichting TCKI Florijnweg 6, Velp-Arnhem, The Netherlands +31 26 3845600
 PO Box 27, NL-6880 AA Velp KvK 41047499 info@tcki.nl www.tcki.nl



Q# 1. Release of lead and cadmium (EN-ISO 10545-15, 2021)

TCKI order number : 26.04.00032
 Sample number: SQ-3525V4 batch LGC2105 ID4
 Test item indication:

| Parameter | 1 | 2 | 3 |
|--|---------|---------|---------|
| Tested surface (dm ²) | 3.15 | 3.17 | 2.98 |
| Added volume of Acetic acid (ml) | 250 | 250 | 250 |
| Lead concentration (mg/l) | 0.060 | 0.098 | 0.032 |
| Release of lead (mg/dm ²) | 0.005 | 0.008 | 0.003 |
| Cadmium concentration (mg/l) | 0.003 | 0.006 | < 0.001 |
| Release of cadmium (mg/dm ²) | < 0.001 | < 0.001 | < 0.001 |

If less than 3 specimens have been tested, the number of tested specimens is deviating from the standard.

APPENDIX C

PARTICIPANT RESULTS (TEST REPORT #26.04.00033)



TCKI

Stichting TCKI Florijnweg 6, Velp-Arnhem, The Netherlands +31 26 3845600
PO Box 27, NL-6880 AA Velp KvK 41047499 info@tcki.nl www.tcki.nl



Customer :
T.C.K.I. (intern)

TCKI order number : 26.04.00033
Sample test number : SQ-3525V4 Batch LGC2406 ID8
Your job description :

Report

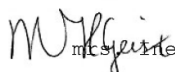
Collective designation/sample test number (also invoice designation):
SQ-3525V4 Batch LGC2406 ID8

Dear,

I herewith send you the results of the products you supplied.

- Sampling, recommendations and declarations of conformity of the results fall outside the scope of the accreditation.
 - The laboratory management can give you, on request, supplementary information concerning the test procedure and measurement uncertainty of the results or can be found in the clarification document.
 - Results from this report only have reference to the tested material.
 - Duplication of this document is only allowed with preliminary permission of TCKI or client.
 - Findings and declarations of conformity do not take into account the measurement uncertainty.
- We trust to be of service to you with the information provided.

Yours faithfully,
Velp, 04-05-2026


Mieke Geist, Head of laboratory.

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INVESTIGATION ON CERAMIC TILES

| | |
|---|-------------------------------|
| Customer | : T.C.K.I. (intern) |
| Manufacturer | : T.C.K.I. (intern) |
| TCKI order number | : 26.04.00033 |
| Sample test number (Also invoice indication) | : SQ-3525V4 Batch LGC2406 ID8 |
| Sampling date | : 18-03-2026 |
| Date of receipt | : 18-03-2026 |
| Sampling | : Unknown |
| Sample taken by | : South Quality |
| Supplied by | : South Quality |
| Finish | : Glazed |
| Application | : Wall tile |
| Offered product specification | : Not applicable |
| Spacers | : No |
| Number of tiles | : 3 |

1. Release of lead and cadmium



Stichting TCKI Florijnweg 6, Velp-Arnhem, The Netherlands +31 26 3845600
 PO Box 27, NL-6880 AA Velp KvK 41047499 info@tcki.nl www.tcki.nl



Q# 1. Release of lead and cadmium (EN-ISO 10545-15, 2021)

TCKI order number : 26.04.00033
 Sample number: SQ-3525V4 Batch LGC2406 ID8
 Test item indication:

| Parameter | 1 | 2 | 3 |
|--|---------|---------|---------|
| Tested surface (dm ²) | 3.20 | 3.20 | 3.33 |
| Added volume of Acetic acid (ml) | 250 | 250 | 250 |
| Lead concentration (mg/l) | 0.003 | 0.002 | 0.003 |
| Release of lead (mg/dm ²) | < 0.001 | < 0.001 | < 0.001 |
| Cadmium concentration (mg/l) | 0.005 | 0.006 | 0.003 |
| Release of cadmium (mg/dm ²) | < 0.001 | < 0.001 | < 0.001 |

If less than 3 specimens have been tested, the number of tested specimens is deviating from the standard.

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