

REPORT No 11680

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ISO 10545-3

CERAMIC TILES - WATER ABSORPTION, APPARENT POROSITY, APPARENT RELATIVE DENSITY AND BULK DENSITY

Program: SQ-3522

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Prepared by:	Reviewed by:	Approved by:
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1. FOREWORD

This report summarizes the results of the **SQ-3522** proficiency testing program on the determination of water absorption, apparent porosity, apparent relative density and bulk density of ceramic tiles. 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 the determination of water absorption, apparent porosity, apparent relative density and bulk density of ceramic tiles, using the following standard:

Standard
ISO 10545-3: 2018

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: **250 units**

Tested samples from each batch: **25 units**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES		
	BATCH: LGC2875	BATCH: LGC2876	BATCH: LGC2877
E_v	YES	NO	YES
P	YES	NO	YES
T	YES	NO	YES
B	YES	YES	YES

Samples for this program are taken from selected batch identified as **LGC2875**.

For the batch indicated, the values determined in the homogeneity study are used as assigned values.

Analysis of this test data indicated that the selected samples were sufficiently homogeneous for the program and therefore the results of participants identified as outliers cannot be attributed to sample variability.

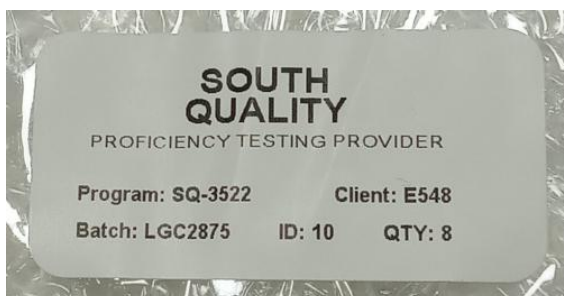
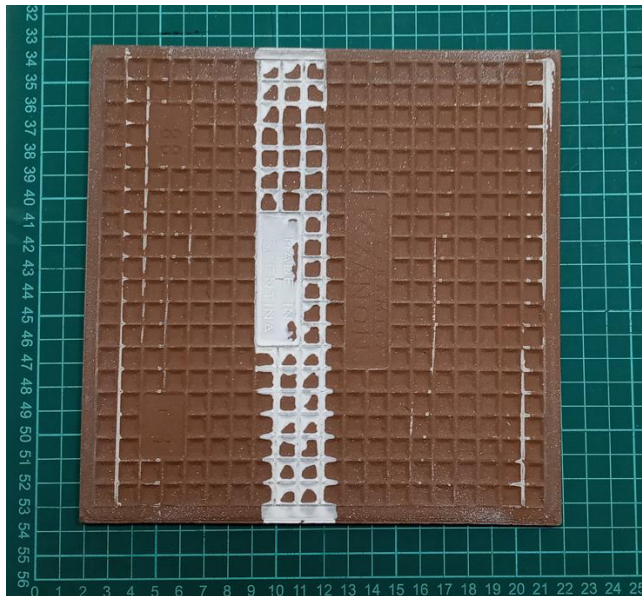
6. SAMPLE INFORMATION

The following sample was sent for testing:

Batch:	LGC2875
Sample ID:	10
Characteristics:	White ceramic tile (Glazed) - 200 x 200 x 6 mm - 8 units

7. IMAGES

SAMPLES



8. ASSIGNED VALUES

BATCH	MEAN VALUES			
	E_v (mass %) (SD)	P (volume %) (SD)	T (g/cm ³) (SD)	B (g/cm ³) (SD)
LGC2875	4.95 (0.125)	11.2 (0.25)	2.56 (0.015)	2.27 (0.012)

9. PARTICIPANT RESULTS (SEE APPENDIX B)

CODE	MEAN VALUES			
	E_v (mass %)	P (volume %)	T (g/cm ³)	B (g/cm ³)
LGC2875-10	5.02	11.4	2.55	2.26

10. STATISTICS

The results must be treated as quantitative.

According to B.4.1.3 of ISO 17043 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

BATCH	PARAMETER	MEAN VALUES		z score	PERFORMANCE RESULT
		PARTICIPANT RESULT	ASSIGNED VALUE		
LGC2875	E_v (mass %)	5.02	4.95	0.56	SATISFACTORY
	P (volume %)	11.4	11.2	0.80	SATISFACTORY
	T (g / cm ³)	2.55	2.56	0.67	SATISFACTORY
	B (g / cm ³)	2.26	2.27	0.83	SATISFACTORY

12. CONCLUSIONS

The overall performance on this **SQ-3522** 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 - WATER ABSORPTION, APPARENT POROSITY, APPARENT RELATIVE DENSITY AND BULK DENSITY -
CODE:	SQ-3522
VERSION:	-
STANDARD:	ISO 10545-3
COORDINATOR:	Lic. Esther Casas (ecasas@ptsouthquality.com)

1 - General

This document serves as a guide for managing the results of the **SQ-3522** program.

2 - Standard

ISO 10545-3: 2018

3 - Tests involved

TEST
Determining water absorption, apparent porosity, apparent relative density and bulk density of ceramic tiles

4 - Samples

CODE	SAMPLE	QUANTITY
LGC2875-10	White ceramic tile (Glazed) - 200 x 200 x 6 mm	8

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 10545-3**.
- 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 #26.04.00025)



TCKI

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PO Box 27, NL-6880 AA Velp KvK 41047499 info@tcki.nl www.tcki.nl



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

TCKI order number : 26.04.00025
Sample test number : SQ-3522 Batch LGC2875 ID10
Your job description :

Report

Collective designation/sample test number (also invoice designation):
SQ-3522 Batch LGC2875 ID10

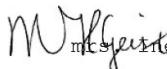
Dear,

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, 09-04-2026


Mike Geist, Head of laboratory.

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TCKI

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INVESTIGATION ON CERAMIC TILES

Customer	: T.C.K.I. (intern)
Manufacturer	: T.C.K.I. (intern)
TCKI order number	: 26.04.00025
Sample test number (Also invoice indication)	: SQ-3522 Batch LGC2875 ID10
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	: Floor tile
Offered product specification	: Not applicable
Work size (l x w x h in mm)	: 200.0 x 200.0 x 6.0
Spacers	: No
Number of tiles	: 8

1. Water absorption, apparent porosity, apparent relative density and bulk density



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**Q# 1. Water absorption, apparent porosity, apparent relative density and bulk density
 (EN-ISO 10545-3)**

TCKI order number : 26.04.00025
 Sample test number: SQ-3522 Batch LGC2875 ID10

Sample number	Dry mass (grams)	Water absorption by vacuum (mass %)	Apparent porosity (volume %)	Apparent relative density (g/cm ³)	Bulk density (g/cm ³)
1/a	546.56	4.89	11.1	2.56	2.27
2/a	555.57	5.32	12.0	2.56	2.25
3/a	548.56	4.85	11.0	2.55	2.27
4/a	558.37	4.97	11.3	2.55	2.27
5/a	559.98	5.08	11.5	2.55	2.26
Number	5	5	5	5	5
Minimum	546.56	4.85	11.0	2.55	2.25
Maximum	559.98	5.32	12.0	2.56	2.27
Mean	553.81	5.02	11.4	2.55	2.26

If not 5 tiles have been tested with a surface $\leq 3600 \text{ cm}^2$ or 3 units with a surface $> 3600 \text{ cm}^2$, the number of tiles is deviating from the standard.



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Dimensions for water absorption

TCKI order number : 26.04.00025
 Sample test number: SQ-3522 Batch LGC2875 ID10

Sample number	Length (mm)	Width (mm)
1	199	199
1/a	199	199
2	199	199
2/a	199	199
3	200	199
3/a	200	199
4	200	200
4/a	200	200
5	199	199
5/a	199	199

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