

REPORT No 11654

Date of issue: February 23, 2026

Status: FINAL REPORT

ISO 10545-16 CERAMIC TILES - SMALL COLOUR DIFFERENCES - Program: SQ-3552.V2

This document is issued by the Company subject to its Terms and Conditions, available on request or accessible at <https://www.ptsouthquality.com/terms-and-conditions>. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Copyright © 2024 South Quality, Buenos Aires, ARGENTINA



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

TABLE OF CONTENTS

1. FOREWORD	3
2. ORGANIZATION	3
3. OBJECTIVE	3
4. PARTICIPANT	3
5. HOMOGENEITY	4
6. SAMPLE INFORMATION	4
7. IMAGES	5
8. ASSIGNED VALUES	5
9. PARTICIPANT RESULTS	6
10. STATISTICS	6
11. EVALUATION OF PERFORMANCE	6
12. CONCLUSIONS	7
APPENDICES	
APPENDIX A - INTRUCTIONS	8
APPENDIX B - PARTICIPANT RESULTS (TR# PT-CHM25-FAR)	11

1. FOREWORD

This report summarizes the results of the **SQ-3552.V2** proficiency testing program on the quantification of the small colour differences between plain coloured ceramic tiles. This program is conducted in a bilateral format, following the A.3.3 classification of the ISO 17043 standard ("Split-sample testing schemes").

South Quality conducted the testing program in January 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
 Statistic: Lic. Manuel Tozaki
 Supervision: Eng. Emiliano Medina

3. OBJECTIVE

The objective of this proficiency testing program is to quantify small colour differences (CMC colour difference) between plain coloured ceramic tiles, using the following standard:

Standard
ISO 10545-16: 2010

To verify this, batches of ceramic tiles have been selected.

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

4. PARTICIPANT

Company: **TÜV SÜD PSB Pte Ltd**
 Laboratory: **Coatings Laboratory**
 Country: Singapore
 Client ID: S333
 Contact person: Daniel Long
 Assistant Manager
daniel.leong@tuvsud.com

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: **180 units**

Tested samples from each batch: **35 units**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES		
	BATCH: LGC3435	BATCH: LGC3436	BATCH: LGC3437
CMC colour difference	YES	YES	YES

Samples for this program are taken from the selected batch identified as **LGC3435**.

For the indicated batch, 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 was sent for testing:

Batch:	LGC3435
Sample ID:	05
Characteristics:	White glazed ceramic tile - 200 x 200 x 5 mm - 7 units

7. IMAGES



8. ASSIGNED VALUES

BATCH	SAMPLE / REFERENCE	dE - AVG	SD
LGC3435	1 - 5 / R1	0.08	0.05
	1 - 5 / R2	0.04	0.01

9. PARTICIPANT RESULTS (SEE APPENDIX B)

CODE	SAMPLE / REFERENCE	dE - AVG
LGC3435-05	1- 5 / R1	0.10
	1- 5 / R2	0.05

10. STATISTICS

The results must be treated as quantitative.

According B.3.1.3 of ISO 17043 the appropriate technique is to compare participant results with the assigned values. The results can be compare 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	SAMPLE / REFERENCE	dE - AVG		z score	PERFORMANCE RESULT
		PARTICIPANT RESULT	ASSIGNED VALUE		
LGC3435	1- 5 / R1	0.10	0.08	0.40	SATISFACTORY
	1- 5 / R2	0.05	0.04	1.00	SATISFACTORY

12. CONCLUSIONS

The overall performance of this **SQ-3552.V2** program from the participant laboratory **TÜV SÜD PSB Pte Ltd - Coatings Laboratory**, is **SUFFICIENT** based on expected results.

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

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

APPENDIX A

INSTRUCTIONS



INSTRUCTIONS

PROGRAM:	Ceramic tiles - Small colour differences -
CODE:	SQ-3552
VERSION:	2
STANDARD:	ISO 10545-16
COORDINATOR:	Lic. Esther Casas (ecasas@ptsouthquality.com)

1 - General

This document serves as a guide for managing the results of the **SQ-3552.V2** program.

2 - Standard

ISO 10545-16: 2010

3 - Tests involved

TEST
Quantifying the small colour differences between plain coloured ceramic tiles - CMC colour difference (AVG) -

4 - Samples

CODE	SAMPLE	QUANTITY
LGC3435-05	White glazed ceramic tile - 200 x 200 x 5 mm	7

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 10545-16.
- d) Five samples, identified as 1 through 5, are provided and must be compared against the reference samples, identified as R1 and R2.
- e) Samples must be retained until the end of the program, which concludes with the submission of the final report.
- f) 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 (TR # PT-CHM25-FAR)

Test Report No. Proficiency Test-CHM25-FAR (SQ-3552.V2)

Date: 15 January 2026 Email: Daniel.Leong@tuvsud.com

Client's Ref: -

Note: This report is issued subject to the Testing, Certification, Validation and Verification Regulations (TCVVR) of the TÜV SÜD Group and the General Terms and Conditions of Business of TÜV SÜD PSB Pte Ltd. In addition, this report is governed by the terms set out within this report.


**Add value.
Inspire trust.**
SUBJECT

Proficiency Test of ISO 10545-16 (2010)

ORGANISER

 PT SOUTH QUALITY SAS
 Pareja 3981 - Villa Devoto (C1419GVG)
 Ciudad Autónoma de Buenos Aires
 ARGENTINA

SAMPLE SUBMISSION DATE

19 November 2025

DATE TEST CONDUCTED

21 November 2025

DESCRIPTION OF SAMPLE

Two sets of samples described as below were submitted by the Organiser.

Sample	Sample No.	Batch	Dimension (mm)	Quantity
White glazed ceramic tile	1	LGC3435	200 x 200 x 5	05
	2			
	3			
	4			
	5			
Glazed ceramic tile	R1			02
	R2			



Laboratory:
TÜV SÜD PSB Pte. Ltd.
 15 International Business Park
 TÜV SÜD @ IBP
 Singapore 609937

Phone : +65-6778 7777
 E-mail: info.sg@tuvsud.com
<https://www.tuvsud.com/en-sg>
 Co. Reg : 199002667R

Regional Head Office:
TÜV SÜD Asia Pacific Pte. Ltd.
 15 International Business Park
 TÜV SÜD @ IBP
 Singapore 609937
TUV®

Page 1 of 3

Test Report No. Proficiency Test-CHM25-FAR (SQ-3552.V2)
15 January 2026



METHOD OF TEST

ISO 10545-16 (2010)
"Ceramic Tiles Small Colour Differences"

All panels prepared by client were subjected to the abovementioned test using the following equipment:

Equipment used	: MiniScan EZ Diffuse
Brand	: Hunterlab
Model	: Miniscan
Serial No.	: MSEZ2672
Calibrated Date	: 25 April 2025

RESULTS

Sample Description	L	a	b	dE
Glazed ceramic tile R1	88.89	1.00	4.37	-
White glazed ceramic tile 1	88.89	1.01	4.37	0.10
White glazed ceramic tile 2	88.96	1.01	4.41	0.08
White glazed ceramic tile 3	88.99	0.99	4.36	0.10
White glazed ceramic tile 4	88.89	1.02	4.39	0.02
White glazed ceramic tile 5	89.10	1.01	4.40	0.22
Glazed ceramic tile R1	89.08	1.03	4.42	-
White glazed ceramic tile 1	89.00	1.01	4.38	0.09
White glazed ceramic tile 2	89.03	1.01	4.40	0.05
White glazed ceramic tile 3	89.09	0.99	4.38	0.06
White glazed ceramic tile 4	89.10	1.01	4.43	0.03
White glazed ceramic tile 5	89.09	1.01	4.40	0.03



FARAH DAYANA
CHEMIST



LEONG ZHI SHENG, DANIEL
ASSISTANT MANAGER
COATINGS
CHEMICAL & MATERIALS

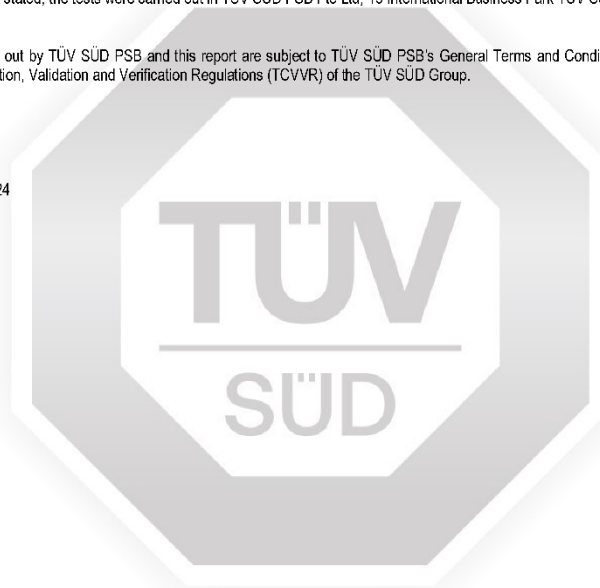
Test Report No. Proficiency Test-CHM25-FAR (SQ-3552.V2)
15 January 2026



Please note that this Report is issued under the following terms :

1. This report applies to the sample of the specific product/equipment given at the time of its testing/calibration. The results are not used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that TÜV SÜD PSB approves, recommends or endorses the manufacturer, supplier or user of such product/equipment, or that TÜV SÜD PSB in any way "guarantees" the later performance of the product/equipment. Unless otherwise stated in this report, no tests were conducted to determine long term effects of using the specific product/equipment.
2. The sample/s mentioned in this report is/are submitted/supplied/manufactured by the Client. TÜV SÜD PSB therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.
3. Nothing in this report shall be interpreted to mean that TÜV SÜD PSB has verified or ascertained any endorsement or marks from any other testing authority or bodies that may be found on that sample.
4. This report shall not be reproduced wholly or in parts and no reference shall be made by the Client to TÜV SÜD PSB or to the report or results furnished by TÜV SÜD PSB in any advertisements or sales promotion.
5. Unless otherwise stated, the tests were carried out in TÜV SÜD PSB Pte Ltd, 15 International Business Park TÜV SÜD @ IBP Singapore 609937.
6. The tests carried out by TÜV SÜD PSB and this report are subject to TÜV SÜD PSB's General Terms and Conditions of Business and the Testing, Certification, Validation and Verification Regulations (TCVVR) of the TÜV SÜD Group.

Effective 27 March 2024



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