

REPORT No 11538

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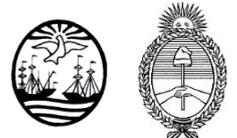
ISO 15184

DETERMINATION OF FILM HARDNESS BY PENCIL TEST

Program: SQ-2048.V2

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Prepared by:	Reviewed by:	Approved by:
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TABLE OF CONTENTS

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

1. FOREWORD

This report summarizes the results of the **SQ-2048.V2** proficiency testing program on the determination of film hardness by pencil test. 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 November 2025 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 determine of film hardness by pencil test using the following standard:

Standard
ISO 15184: 2020

To verify this, batches of painted sheet samples 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 Leong
 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: **50 units**

Tested samples from each batch: **10 units**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES		
	BATCH: LPA2076	BATCH: LPA2077	BATCH: LPA2078
FILM HARDNESS	YES	YES	NO

Size of each batch: **50 units**

Tested samples from each batch: **10 units**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES		
	BATCH: LPA2304	BATCH: LPA2305	BATCH: LPA2306
FILM HARDNESS	YES	YES	NO

Size of each batch: **50 units**

Tested samples from each batch: **10 units**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES		
	BATCH: LPA2494	BATCH: LPA2495	BATCH: LPA2496
FILM HARDNESS	NO	YES	YES

Samples for this program are taken from the selected batches identified as LPA2077, LPA2304 and LPA2496.

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:	LPA2077
Sample ID:	09
Characteristics:	White plate

Batch:	LPA2304
Sample ID:	15
Characteristics:	Black plate

Batch:	LPA2496
Sample ID:	05
Characteristics:	Blue plate

7. IMAGES



8. ASSIGNED VALUES

BATCH	PENCIL HARDNESS
LPA2077	F
LPA2304	H
LPA2496	B

9. PARTICIPANT RESULTS (SEE APPENDIX B)

CODE	PENCIL HARDNESS
LPA2077-09	F
LPA2304-15	H
LPA2496-06	B

10. STATISTICS

The results must be treated as qualitative.

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

11. EVALUATION OF PERFORMANCE

BATCH	PENCIL HARDNESS		PERFORMANCE RESULT
	PARTICIPANT RESULT	ASSIGNED VALUE	
LPA2077	F	F	SATISFACTORY
LPA2304	H	H	SATISFACTORY
LPA2496	B	B	SATISFACTORY

12. CONCLUSIONS

The overall performance of this **SQ-2048.V2** program from the participant laboratory **TÜV SÜD PSB Pte Ltd - Coatings Laboratory**, is **SUFFICIENT** based on expected results.

The criteria used for evaluating the overall performance are as follows:

- **SUFFICIENT** performance: No unsatisfactory results were obtained.
- **INSUFFICIENT** performance: An unsatisfactory result was obtained.

APPENDIX A

INSTRUCTIONS



INSTRUCTIONS

PROGRAM:	DETERMINATION OF FILM HARDNESS BY PENCIL TEST
CODE:	SQ-2048
VERSION:	2
STANDARD:	ISO 15184
COORDINATOR:	Lic. Esther Casas (ecasas@ptsouthquality.com)

1 - General

This document serves as a guide for managing the results of the **SQ-2048.V2** program.

2 - Standard

ISO 15184: 2020

3 - Tests involved

TEST
Determination of film hardness by pencil test

4 - Samples

CODE	SAMPLE	QUANTITY
LPA2077-09	White plate	1
LPA2304-15	Black plate	1
LPA2496-06	Blue plate	1

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 15184.
- 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 # CHM25-KLB)

Test Report No. Proficiency Test-CHM25-KLB (SQ-2048.V2)

Date: 26 November 2025 Email: Daniel.Leong@tuvsud.com

Client's Ref: -


**Add value.
Inspire trust.**

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.

SUBJECT

Proficiency Test of ISO 15184:2020

ORGANISER

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

SAMPLE SUBMISSION DATE

03 Jul 2025

DATE TEST CONDUCTED

10 – 25 Nov 2025

DESCRIPTION OF SAMPLE

Three coated panels described as below were submitted by the Organiser:

Batch No.	ID	Dimension	Quantity
LPA2077	09	151 x 102 mm	1 pc
LPA2304	15	151 x 98 mm	
LPA2496	05	146 x 100 mm	


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


Page 1 of 5

Test Report No. Proficiency Test-CHM25-KLB (SQ-2048.V2)
 26 November 2025



METHOD OF TEST

1. ISO 15184:2020
 "Paints and varnishes — Determination of film hardness by pencil test"

The manufacturer of pencil used	: Uni, manufactured by Mitsubishi Pencil Co., Ltd
Test conditions	: 23 ± 2 °C, 50 ± 10 %r.h.

RESULTS

Panel labelled	Pencil hardness	Types of defect in the marked surface
Batch: LPA2077 ID: 09	Grade F	Plastic deformation
Batch: LPA2304 ID: 15	Grade H	Plastic deformation
Batch: LPA2496 ID: 05	Grade B	Cohesive fracture



KOK LEI BING
 CHEMIST



LEONG ZHI SHENG, DANIEL
 ASSISTANT MANAGER
 COATINGS
 CHEMICAL & MATERIALS

Test Report No. Proficiency Test-CHM25-KLB (SQ-2048.V2)
26 November 2025



APPENDIX

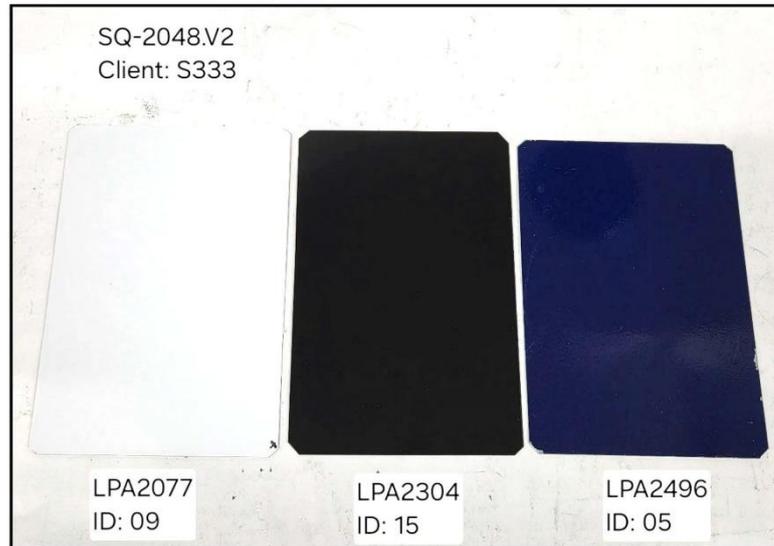


Figure 1. Sample panels as received

Test Report No. Proficiency Test-CHM25-KLB (SQ-2048.V2)
26 November 2025



APPENDIX (Cont'd)

Batch: LPA2077
ID: 09

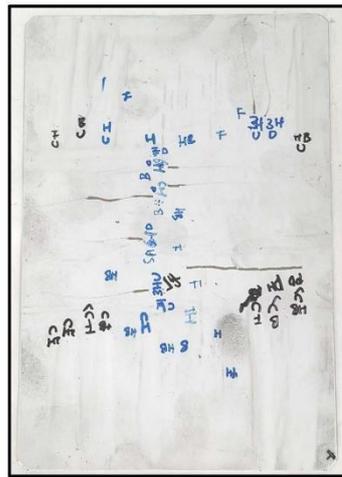


Figure 2. After Test

Batch: LPA2304
ID: 15

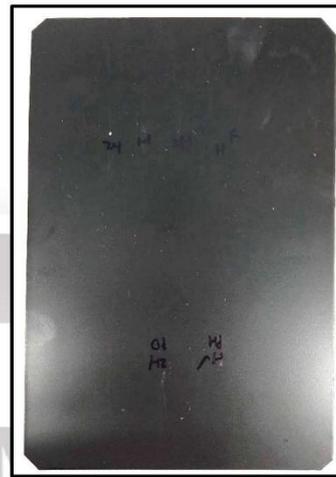


Figure 3. After Test

Batch: LPA2496
ID: 05



Figure 4. After Test

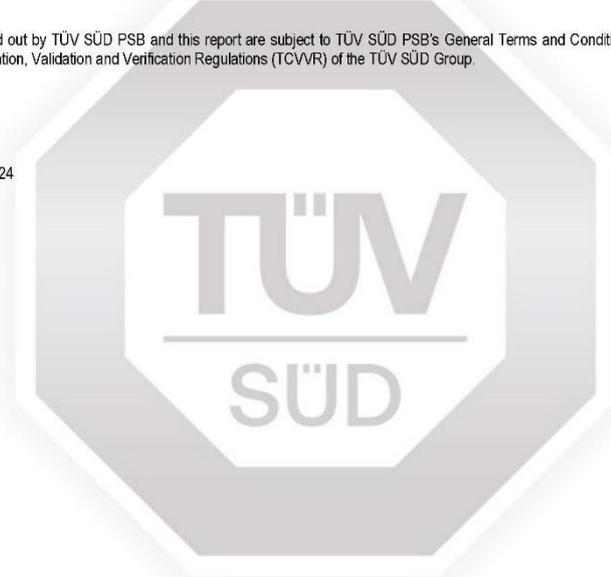
Test Report No. Proficiency Test-CHM25-KLB (SQ-2048.V2)
26 November 2025



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Effective 27 March 2024



Page 5 of 5

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