

REPORT No 12094

Date of issue: September 14, 2026

Status: FINAL REPORT

ISO 20344

PERSONAL PROTECTIVE EQUIPMENT - FOOTWEAR -

Program: SQ-5014.V12

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1. FOREWORD

This report summarizes the results of the **SQ-5014.V12** proficiency testing program for determining certain physical properties of materials used in personal protective footwear. 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 August/September 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 determine the electrical resistance of footwear in accordance with the following standard:

Standard
ISO 20344: 2021 + AMD 1: 2024

To verify this, batches of footwear were 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: **FITI Testing & Research Institute**
Country: Republic of Korea
Client ID: S371
Contact person: Tae Young Kim
Technical Manager
smilekty1004@fiti.re.kr

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: **40 pairs**

Tested samples from each batch: **12 pairs**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES		
	BATCH: LPP3456	BATCH: LPP3457	BATCH: LPP3458
Clause 5.13	YES	NO	YES

Samples for this program are taken from the selected batches identified as **LPP3456**.

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.

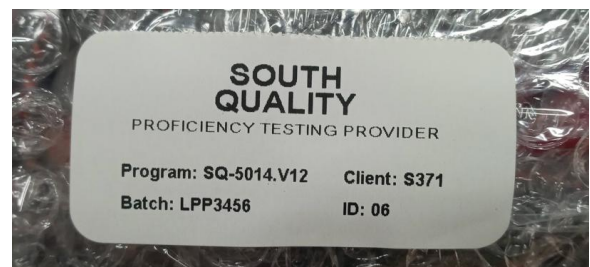
6. SAMPLE INFORMATION

The following samples were sent for testing:

Batch:	LPP3456
Sample ID:	06
Characteristics:	Safety shoes with steel toe cap - Size 36 - One pair Brand: Firestone Model: 9006f

7. IMAGES

SAMPLES



8. ASSIGNED VALUES

BATCH	ELECTRICAL RESISTANCE (Dry condition) - AVG (Pair)	
	(MΩ)	SD
LPP3456	17.25	0.251

9. PARTICIPANT RESULTS (SEE APPENDIX B)

CODE	ELECTRICAL RESISTANCE (Dry condition) - AVG (Pair)
LPP3456-06	17.03

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	ELECTRICAL RESISTANCE (Dry condition) - AVG (Pair)		z score	PERFORMANCE RESULT
	PARTICIPANT RESULT	ASSIGNED VALUE		
LPP3456	17.03	17.25	0.88	SATISFACTORY

12. CONCLUSIONS

The overall performance in this **SQ-5014.V12** program from the participant laboratory **FITI testing & Research Institue**, is **SUFFICIENT** based on expected results.

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

- **SUFFICIENT** performance: No questionable or unsatisfactory results were obtained.
- **ALMOST SUFFICIENT** performance: A questionable result was obtained.
- **INSUFFICIENT** performance: An unsatisfactory result was obtained.

APPENDIX A

INSTRUCTIONS



INSTRUCTIONS

PROGRAM:	Personal protective equipment - Footwear -
CODE:	SQ-5014
VERSION:	12
STANDARD:	ISO 20344
COORDINATOR:	Lic. Esther Casas (ecasas@ptsouthquality.com)

1 -General

This document serves as a guide for managing the results of the **SQ-5014.V12** program.

2 - Standard

ISO 20344: 2021 + AMD 1: 2024

3 - Tests involved

TEST
Testing footwear designed as personal protective equipment - Determination of electrical resistance (Cl. 5.13) -

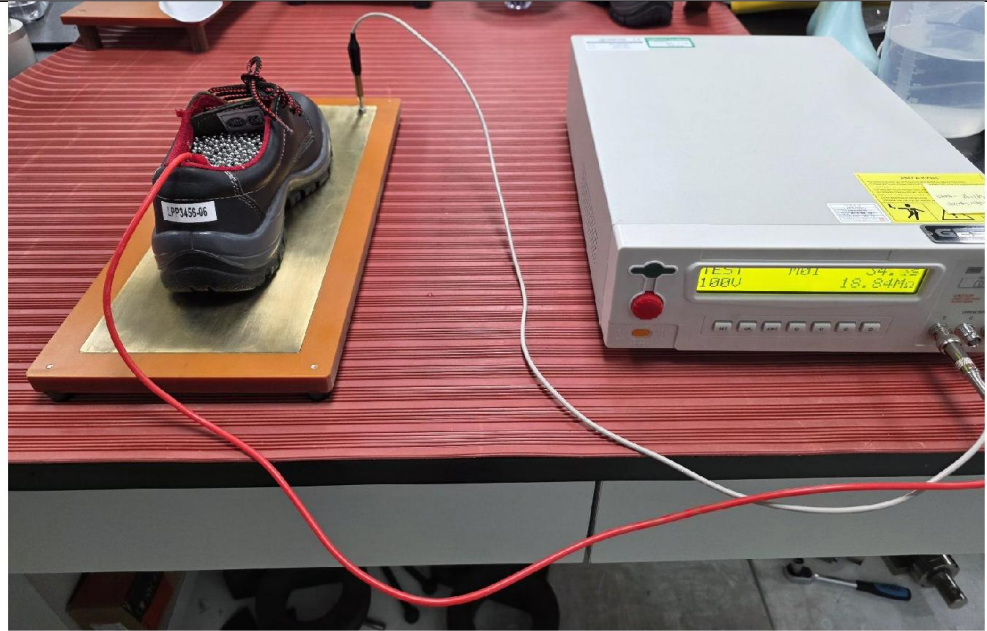
4 - Samples

CODE	SAMPLE	QUANTITY
LPP3456-06	Footwear - Size: 36	1 pair

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 20344**.
- 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



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- REV 06 -

SQ-5014.V12

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APPENDIX B

PARTICIPANT RESULTS

시험 분석 표 1 (공통)

검토	승인
	

접수번호 : 2026 SOUTH QUALITY 0201185		제품명 : Footwear		실무자 김지은 (성명) 정현승 (성명)				
시험항목 : Determination of electrical resistance (MΩ) ISO 20344:2021+AMD 1:2024, §5.13								
시료구분 시험항목	시험 분석 결과						비고	
	#1						기기번호: BAAA-260185	
	Small		Medium		Large			
	Left	Right	Left	Right	Left	Right		
	1	17.34	16.99					
	2	16.46	16.70					
	3	17.65	17.02					
	$\bar{x}$	17.150	16.903					
	Result	17.15	16.90					
	Avg	17.03						
	주사항	Specimen size: 36 Test condition: Dry						
시험 온도: (23.0 ± 1.0) °C			시험일: 2026년 9월 2일					
시험 습도: (50 ± 2) % R.H.								

FITI-P-011-02(Rev.0)

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