

REPORT No 11978

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ASTM E18 ROCKWELL HARDNESS OF METALLIC MATERIALS Program: SQ-0039.V18

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1. FOREWORD

This report summarizes the results of the **SQ-0039.V18** proficiency testing program on the determination of Rockwell hardness number on metallic materials. 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 May 2026 with the aim of assessing the laboratory's ability to competently perform the designated tests.

2. ORGANIZATION

Program Coordinator:	Eng. Alfredo Schmidt
Assistant Technician:	Sergio Andrada
Statistics:	Lic. Manuel Tozaki
Supervision:	Eng. Emiliano Medina

3. OBJECTIVE

The objective of this proficiency testing program is to determine the Rockwell hardness number on metallic materials using the following standard:

Standard
ASTM E18 - 24 (HR15T / HR30T)

To verify this, samples of steel 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:	Columbus Stainless (Pty) Ltd
Laboratory:	Mechanical Laboratory
Country:	South Africa
Client ID:	F290
Contact person:	Susan Masela Technician Production masela.susan@columbus.co.za

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 (LOW CARBON STEEL)		
	BATCH: LM4325	BATCH: LM4326	BATCH: LM4327
HR30T	YES	YES	YES

Size of each batch: **50 units**

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

DETERMINATION	HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES (GALVANIZED STEEL SHEET)		
	BATCH: LM4444	BATCH: LM4445	BATCH: LM4446
HR15T	YES	YES	NO

The samples for this program are taken from the selected batches identified as **LM4325**, and **LM4445**.

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

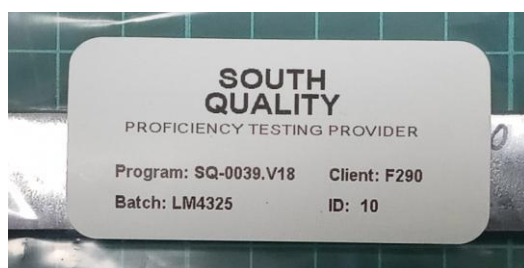
The following samples were sent for testing:

Batch:	LM4325
Sample ID:	10
Characteristics:	Low carbon steel (SAE 1010) - 100 x 9.25 x 20mm

Batch:	LM4445
Sample ID:	19
Characteristics:	Galvanized steel sheet - 85 x 85 x 0.5 mm

7. IMAGES

SAMPLES



8. ASSIGNED VALUES

BATCH	HR30T	<i>U</i>
LM4325	64.21	2.25

BATCH	HR15T	<i>U</i>
LM4445	80.54	2.63

9. PARTICIPANT RESULTS (SEE APPENDIX)

CODE	HR30T	<i>U</i>
LM4325-10	64.09	2.7

CODE	HR15T	<i>U</i>
LM4445-19	80.90	3.1

10. STATISTICS

The results must be treated as quantitative.

According to B.3.1.3 of ISO 17043 the appropriate technique is to compare participant results with the assigned values. The results can be compared using E_n .

$$E_n = \frac{x - X}{\sqrt{U_{\text{lab}}^2 + U_{\text{ref}}^2}}$$

x is the participant's result

X is the assigned value

U_{lab} is the expanded uncertainty of a participant's result

U_{ref} is the expanded uncertainty of the reference laboratory's assigned value

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

$|E_n| \leq 1.0$ indicates "satisfactory" performance and generates no signal;

$|E_n| > 1.0$ indicates "unsatisfactory" performance and generates an action signal;

11. EVALUATION OF PERFORMANCE

BATCH	HR30T		$ E_n $	PERFORMANCE RESULT
	PARTICIPANT RESULT	ASSIGNED VALUE		
LM4325	64.09	64.21	0.03	SATISFACTORY

BATCH	HR15T		$ E_n $	PERFORMANCE RESULT
	PARTICIPANT RESULT	ASSIGNED VALUE		
LM4445	80.90	80.54	0.09	SATISFACTORY

12. CONCLUSIONS

The overall performance on this **SQ-0039.V18** program from the participant laboratory **Columbus Stainless (Pty) Ltd - Mechanical Laboratory**, is **SUFFICIENT** based on expected results.

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

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

APPENDIX

PARTICIPANT RESULTS

(Results form)



INSTRUCTIONS & RESULTS FORM

PROGRAM:	Rockwell hardness of metallic materials
CODE:	SQ-0039
VERSION:	18
STANDARD:	ASTM E18
COORDINATOR:	Eng. Alfredo Schmidt (aschmidt@ptsouthquality.com)

1 - General

This document serves as a guide for managing the results of the **SQ-0039.V18** program.

Results must be typed, not handwritten.

2 - Standard

ASTM E18 - 24

3 - Tests involved

TEST
Determination of Rockwell superficial hardness (HR15T / HR30T)

4 - Samples

CODE	SAMPLE	QUANTITY
LM4325-10	Low carbon steel - 100 x 9.25 x 20 mm	1
LM4445-19	Galvanized steel sheet - 85 x 85 x 0.5 mm	1

5 - Notes

- Being a bilateral program, there is no deadline for submitting results.
- The tables in this document may be modified by the participant, if desired, to include data or observations.
- The samples are to be handled as routine lab samples, with all testing, documentation, and reporting adhering to **ASTM E18**.
- Participants may improve the surface to provide a better testing area. If this is done, the procedure must be detailed in the observations box.
- Indentations must be made on the identified face of the samples.
- Samples must be retained until the end of the program, which concludes with the submission of the final report.
- To review the results, test images would be appreciated. Images can be attached at the end of this document or sent by email.
- Once this document is completed, it must be converted into a PDF file and sent to the program coordinator.

6 - Test results

Test date:	11/05/2026	Temperature:	21.1
Equipment:	Wilson Hardness tester (S/N: W2K-0158)	Date calibration:	28/11/2025
Resolution:	0.01	Resolution uncertainty:	0.0029

SAMPLE	MEASUREMENT No	RESULT (HR30T)
LM4325-10	1	64.14
	2	64.27
	3	64.35
	4	63.92
	5	63.76
	AVG	64.09
	Expanded uncertainty (U), K=2	2.7

OBSERVATIONS

Test date:	11/05/2026	Temperature:	21.1
Equipment:	Wilson Hardness tester (S/N: W2K-0158)	Date calibration:	28/11/2025
Resolution:	0.01	Resolution uncertainty:	0.0029

SAMPLE	MEASUREMENT No	RESULT (HR15T)
LM4445-19	1	80.68
	2	80.64
	3	81.58
	4	81.31
	5	80.31
	AVG	80.90
	Expanded uncertainty (U), K=2	3.1

OBSERVATIONS

PHOTOGRAPHS



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