

REPORT No 11677

Date of issue: May 21, 2026

Status: FINAL REPORT

ASTM E8 TENSION TESTING OF METALLIC MATERIALS

Program: SQ-0068.V8

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1. FOREWORD

This report summarizes the results of the **SQ-0068.V8** proficiency testing program on the determination of tensile properties of 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 March 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 following parameters of metallic materials:

- Yield Strength 0.2 Offset
- Tensile Strength
- Elongation at fracture
- Reduction of area

These parameters were verified using the following standard:

Standard
ASTM E8/E8M - 24

To verify this, batches of metallic 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: **INDURA S.A.**

Laboratory: **Laboratorio Mecánico - Área Desarrollo de Soldadura**

Country: Chile

Client ID: C102

Contact person: Gonzalo Zamorano Rojo
 Coordinador Laboratorio Químico - Gerencia Supply Chain
zamorage@airproducts.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: **150 units**

Tested samples from each batch: **30 units**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES		
	BATCH: LM3317	BATCH: LM3318	BATCH: LM3319
Yield strength 0.2 offset	YES	NO	YES
Tensile strength	YES	NO	YES
Elongation at fracture	YES	YES	YES
Reduction of area	YES	YES	YES

Size of each batch: **150 units**

Tested samples from each batch: **30 units**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES		
	BATCH: LM3414	BATCH: LM3415	BATCH: LM3416
Yield strength 0.2 offset	YES	YES	YES
Tensile strength	YES	YES	YES
Elongation at fracture	YES	YES	NO
Reduction of area	YES	YES	YES

The samples for this program are taken from the selected batches identified as **LM3317**, and **LM3415**.

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.

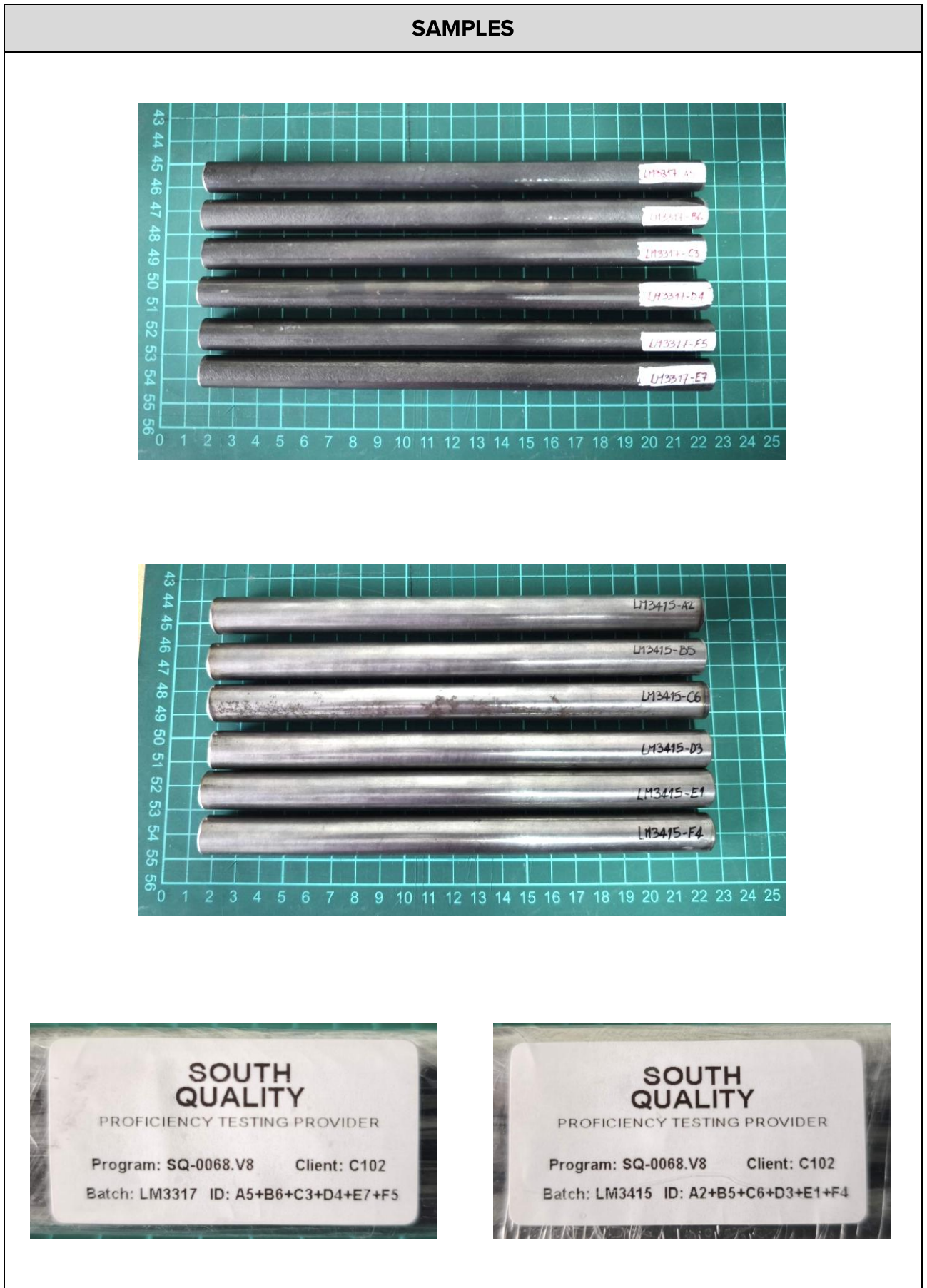
6. SAMPLE INFORMATION

The following samples were sent for testing:

Batch:	LM3317
Sample ID:	A5 + B6 + C3 + D4 + E7 + F5
Characteristics:	Ø 12.7 x 200 mm - Low-carbon steel (SAE 1010)

Batch:	LM3415
Sample ID:	A2 + B5 + C6 + D3 + E1 + F4
Characteristics:	Ø 15.9 x 200 mm - Low-carbon steel (SAE 1010)

7. IMAGES



8. ASSIGNED VALUES

LM3317				
	Yield strength 0.2 Offset (MPa)	Tensile strength (MPa)	Elongation at fracture (%)	Reduction of area (%)
AVG	332.9	467.9	37.65	68.95
SD	6.65	4.82	0.926	0.495

LM3415				
	Yield strength 0.2 Offset (MPa)	Tensile strength (MPa)	Elongation at fracture (%)	Reduction of area (%)
AVG	529.9	550.2	17.25	64.49
SD	16.85	13.09	1.026	0.378

9. PARTICIPANT RESULTS (SEE APPENDIX)

	Yield strength 0.2 Offset (MPa)	Tensile strength (MPa)	Elongation at fracture (%)	Reduction of area (%)
LM3317 AVG	326	465	38.10	69.28
LM3415 AVG	546	561	18.42	64.89

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	AVERAGE		z score	PERFORMANCE RESULT
		PARTICIPANT RESULT	ASSIGNED VALUE		
LM3317	Yield strength 0.2 Offset (MPa)	326.00	332.90	1.0	SATISFACTORY
	Tensile strength (MPa)	465.00	467.90	0.6	SATISFACTORY
	Elongation at fracture (%)	38.10	37.65	0.5	SATISFACTORY
	Reduction of area (%)	69.28	68.95	0.7	SATISFACTORY
LM3415	Yield strength 0.2 Offset (MPa)	546.00	529.90	1.0	SATISFACTORY
	Tensile strength (MPa)	561.00	550.20	0.8	SATISFACTORY
	Elongation at fracture (%)	18.42	17.25	1.1	SATISFACTORY
	Reduction of area (%)	64.89	64.49	1.1	SATISFACTORY

12. CONCLUSIONS

The overall performance on this **SQ-0068.V8** program from the participant laboratory **INDURA S.A. - Laboratorio Mecánico - Área Desarrollo de Soldadura**, is **SUFFICIENT** based on expected results.

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

- **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 was obtained, or two questionable results were obtained.

APPENDIX

PARTICIPANT RESULTS

(Result form)



INSTRUCTIONS & RESULTS FORM

PROGRAM:	Tension testing of metallic materials
CODE:	SQ-0068
VERSION:	8
STANDARD:	ASTM E8
COORDINATOR:	Eng. Alfredo Schmidt (aschmidt@ptsouthquality.com)

1 - General

This document serves as a guide for managing the results of the **SQ-0068.V8** program.

Results must be typed, not handwritten.

2 - Standard

ASTM E8/E8M - 24

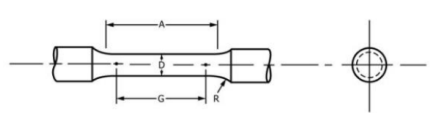
3 - Tests involved

TEST	SUBTEST
Tension testing of metallic material (E8)	<ul style="list-style-type: none"> - Yield Strength 0.2 Offset - Tensile Strength - Elongation at fracture - Reduction of area

4 - Samples

CODE	SAMPLE	QUANTITY
LM3317-A5 LM3317-B6 LM3317-C3 LM3317-D4 LM3317-E7 LM3317-F5	Steel - $\varnothing 12.7 \times 200$ mm	6
LM3415-A2 LM3415-B5 LM3415-C6 LM3415-D3 LM3415-E1 LM3415-F4	Steel - $\varnothing 15.9 \times 200$ mm	6

5 - Sample preparation

SAMPLE	DIMENSIONS (mm)
 <p>According FIG. 9 Standard Specimen (Specimen 2)</p>	G - Gauge length: 36.0 ± 0.1 D - Diameter: 9.0 ± 0.1 R - Radius of fillet, min: 8 A - Length of reduced parallel section, min: 45

6 - Notes

- a) Being a bilateral program, there is no deadline for submitting results.
- b) The tables in this document may be modified by the participant, if desired, to include data or observations.
- c) The samples are to be handled as routine lab samples, with all testing, documentation, and reporting adhering to **ASTM E8**.
- 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.
- f) Once this document is completed, it must be converted into a PDF file and sent to the program coordinator.

7 - Test results

Method:	According to standard
Testing rate:	Method C

Test date:	03/09/2026	Temperature:	24.4°C
Equipment:	Instron 4486	Date calibration:	11/04/2025
Resolution:	0.01Kgf	Resolution uncertainty:	0.0058Kgf
Types of ends:	Type 3	Speed:	2.5mm/min

SAMPLE	Yield strength 0.2 Offset (MPa)	Tensile strength (MPa)	Elongation at fracture (%)	Reduction of area (%)
LM3317-A5	308	449	36.67	69.54
LM3317-B6	339	472	37.64	68.52
LM3317-C3	317	463	37.64	70.42
LM3317-D4	333	470	38.89	69.13
LM3317-E7	330	468	39.72	68.72
LM3317-F5	327	465	38.06	69.33
AVG	326	465	38.10	69.28
U (±)	2.7	4.7	0.03	0.03

Test date:	03/09/2026	Temperature:	24.4°C
Equipment:	Instron 4486	Date calibration:	11/04/2025
Resolution:	0.01Kgf	Resolution uncertainty:	0.0058Kgf
Types of ends:	Type 3	Speed:	2.5mm/min

SAMPLE	Yield strength 0.2 Offset (MPa)	Tensile strength (MPa)	Elongation at fracture (%)	Reduction of area (%)
LM3415-A2	529	545	17.08	64.24
LM3415-B5	525	537	16.94	64.24
LM3415-C6	526	541	17.08	64.90
LM3415-D3	534	570	20.56	64.66
LM3415-E1	580	583	19.44	65.97
LM3415-F4	583	587	19.44	65.32
AVG	546	561	18.42	64.89
U (±)	2.2	2.08	0.03	0.03

PHOTOGRAPHS



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