SOUTH QUALITY

PROFICIENCY TESTING PROVIDER

REPORT No 11285

Date of issue: *July 24, 2025*

Status: FINAL REPORT

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ASTM A923 - Method C

DETECTING DETRIMENTAL INTERMETALLIC PHASES IN DUPLEX (AUSTENITIC / FERRITIC) STAINLESS STEEL

Program: SQ-0085

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Prepared by:	Reviewed by:	Approved by:
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1. FOREWORD

This report summarizes the results of the **SQ-0085** proficiency testing program on the detection of the presence of intermetallic phases in duplex stainless steels. 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 June 2025 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
Statistic:	Lic. Manuel Tozaki
Supervision:	Eng. Emiliano Medina

3. OBJECTIVE

The objective of this proficiency testing program is to determine the corrosion rate in duplex stainless steels, using the following standard:

Standard
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To verify this, duplex stainless steel samples 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:	**Columbus Laboratory**
Country:	South Africa
Client ID:	F290
Contact person:	Kobie Groenewald QA Manager groenewald.kobie@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 Guide 35: 2017, clause 7.4.1.2. Stratified random sampling was employed, and samples were chosen 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: LM3712	BATCH: LM3713	BATCH: LM3714
CORROSION RATE	YES	NO	YES

Size of each batch: **50 units** Tested samples from each batch: **10 units**

DETERMINATION	HOMOGENEITY OF RESULTS IN THE ANALYZED SAMPLES		
	BATCH: LM3782	BATCH: LM3783	BATCH: LM3784
CORROSION RATE	YES	NO	YES

Samples for this program are taken from the selected batches identified as LM3714 and LM3782.

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

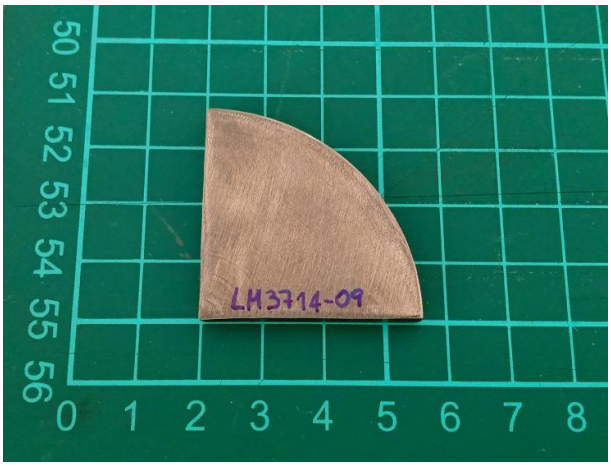
The following samples were sent to be tested:

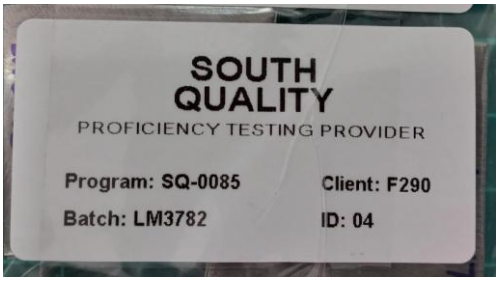
Batch:	LM3714
Sample ID:	09
Characteristics:	Duplex stainless steel - Ø70 x 5 mm (¼ disk)

Batch:	LM3782
Sample ID:	04
Characteristics:	Duplex stainless steel - Ø65 x 5 mm (¼ disk)

7. IMAGES

SAMPLES





8. ASSIGNED VALUES

BATCH	CORROSION RATE (mdd)	SD
LM3714	2.41	0.17
LM3782	2.11	0.33

9. PARTICIPANT RESULTS (SEE APPENDIX)

CODE	CORROSION RATE (mdd)
LM3714-09	2.35
LM3782-04	2.05

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	CORROSION RATE (mdd)		| z score |	PERFORMANCE RESULT
	PARTICIPANT RESULT	ASSIGNED VALUE		
LM3714	2.35	2.41	**0.35**	**SATISFACTORY**
LM3782	2.05	2.11	**0.18**	**SATISFACTORY**

12. CONCLUSIONS

The overall performance on this **SQ-0085** program from the participant laboratory **COLUMBUS STAINLESS PTY (LTD) - Columbus 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.

APPENDIX

PARTICIPANT RESULTS

(RESULTS FORM)

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INSTRUCTIONS
&
RESULTS FORM

PROGRAM:	Detecting detrimental intermetallic phases in duplex (Austenitic / Ferritic) stainless steel
CODE:	SQ-0085
VERSION:	-
STANDARD:	ASTM A923
COORDINATOR:	Eng. Alfredo Schmidt (aschmidt@ptsouthquality.com)

1 - General

This document serves as a guide for managing the results of the **SQ-0085** program.

Results must be typed, not handwritten.

2 - Standard

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3 - Tests involved

TEST
Detection of the presence of intermetallic phases in duplex stainless steels **- Method C -**

4 - Samples

CODE	SAMPLE	QUANTITY
LM3714-09	Duplex stainless steel - Ø70 x 5 mm (¼ disk)	1
LM3782-04	Duplex stainless steel - Ø65 x 5 mm (¼ disk)	1

5 - 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) Samples must be retained until the end of the program, which concludes with the submission of the final report.
d) To review the results, test images would be appreciated. Images can be attached at the end of this document or sent by email.
e) Once this document is completed, it must be converted into a PDF file and sent to the program coordinator.

6 - **Test results**

Test date:	23/06/2025			
Polish finish:	220	-grit finish		
Wet polishing:	X	Dry polishing:		(Mark with an **X**)

SAMPLE	TEST TEMPERATURE (°C)	TEST SOLUTION (pH)	SAMPLE DIMENSIONS (mm)	SAMPLE AREA (mm^2)	WEIGHT 1 (mg)	WEIGHT 2 (mg)	CORROSION RATE (mdd)
LM3714-09	20	1.3	70 x 5 / 4	2549	38826.3	38825.7	**2.35**
LM3782-04	20	1.3	65 x 5 /4	2239	33698.4	33697.9	**2.05**

OBSERVATIONS

PHOTOGRAPHS

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