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Revision 0

FINAL REPORT

SITE CHAMBER TEST – STRUCTURAL PERFORMANCE TEST

Test Undertaken for:

Metalo Aluminium
Wally Complex-Abu Rawash,
October 6th City, Egypt
Tel: 01223187137

Project:

Testing of Declined Curtain wall - Petrobel Headquarters

File: YD069

File Name: YD069 Metalo Aluminium-Petrobel-Dedline CW-FR00

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Accreditation

ISO 17025 General requirements for the competence of testing and calibrating laboratories by

1. United Kingdom Accreditation Service (UKAS) – 4439
www.ukas.com
2. Emirates International Accreditation Centre – LB-TEST-188
www.eiac.gov.ae



Memberships

Member of Centre for Window and Cladding Technology
www.cwct.co.uk



Member of Council on Tall Buildings and Urban Habitat
www.ctbuh.org



The work included in this document falls wholly or partly under the accreditation checked below

ISO 17025	UKAS	☐
ISO 17025	EIAC	☐

It is a non-accredited test ☒



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SITE CHAMBER TEST - FINAL REPORT

TESTING OF DECLINED CURTAIN WALL - PETROBEL HEADQUARTERS

PROJECT INFORMATION	
Client/Owner	Petrobel Headquarters
Main Contractor	Proger Egypt
Alum. Contractor	Metalo Aluminium
Consultant	ESE

MOCKUP/SAMPLE INFORMATION	
Specimen Type	DECLINED CURTAIN WALL
Specimen Size	4.7 meters x 2.5 meters
Orientation	Declined 40°
Test Location	Metalo Aluminium - Factory
Manufacturer	Please refer section 11
Model	
Material	

1. GENERAL PARAMETERS

TEST SEQUENCE			
TEST NO.	TEST DESCRIPTION	TEST STANDARD	PROJECT SPECS REF.
Test 1	Structural Performance Test	ASTM E330-14	Client email dated 24/04/2024
Test 2	Structural Performance at 150% positive and negative wind load design pressures	ASTM E330-14	

2. SAMPLING PROCEDURE

The test specimen was selected by the Consultant/Client. M/s. TBWIC was not responsible in the selection of the test location.

3. METHOD OF TEST

3.1. Structural Performance Test Method A, ASTM E 330-14

1. Ambient conditions such as barometric pressure, temperature, wind speed and direction were recorded at or near the exposed surface of the test specimen during the test.
2. 03 linear transducers were installed on the exterior of the specimen. They were fixed near two successive anchorages of a typical mullion and one in between,
3. For the mullion, the distance between the outermost transducers was measured and recorded. This distance was divided by allowable deflection to arrive at the permitted deflection.

4. The pressure in the chamber was decreased to 430 Pascals, 50% of the positive test load to set the anchorages, held for 10 seconds and returned to zero. (Positive test load = the pressure on the external side or exposed to the weather is higher than pressure along the internal side of the specimen).
5. After waiting for one minute, the reading of the transducer was set to zero at the computer read program.
6. Pressure was slowly decreased to 860 Pascals, 100% of the positive design load, and held for 10 seconds, the maximum reading of the transducers was recorded.
7. The pressure is returned to zero after waiting for one minute, and the residual readings on the transducers was recorded.
8. The pressure in the chamber was increased to 430 Pascals, 50% of the negative design load to set the anchorages, and the maximum reading of the transducers was read. (Negative test load = the pressure on the external side or exposed to the weather is lesser than pressure along the internal side of the specimen).
9. After waiting for one minute, the reading at the data acquisition software will be set to zero.
10. Pressure was slowly increased to 860 Pascals, 100% of the Negative design load, held for 10 seconds, and the deflection recorded.
11. Return the pressure to zero after waiting for one minute, the residual readings on the transducers will be recorded.

3.2. Structural Proof Load Test 1.5 X, Method A, ASTM E330-14

1. Ambient conditions such as barometric pressure, temperature, wind speed and direction were recorded at or near the exposed surface of the test specimen during the test.
2. The same Linear Displacement Transducers installed was kept in place on the exterior of the specimen for this test.
3. The distance between the outermost transducers, if moved was measured and recorded as the L, length. This distance L was divided by the allowable deformation to arrive at the permitted value.
4. The pressure in the chamber was then be decreased to 645 Pascals, 75% of the Negative test load to set the anchorages, held for ten seconds and return to zero pressure. (Negative test load = the pressure on the external side or exposed to weather is lesser than pressure along internal side of the specimen).
5. After waiting for one minute, the reading of the transducer was set to zero at the computer read program.
6. Pressure was slowly decreased to 1290 Pascals, 150% of the Positive test load and held for 10 seconds.
7. The pressure then was returned to zero and after one minute at least, the residual readings of the transducers was recorded to constitute the net deformation.
8. The pressure in the chamber was increased to 645 Pascals, 75% of the Negative test load to set the anchorages, held for ten seconds and return to zero pressure. (Negative test load = the pressure on the external side or exposed to weather is lesser than pressure along internal side of the specimen).
9. After waiting for one minute, the reading at the data acquisition software was set to zero.
10. Pressure was slowly increased to 1290 Pascals, 150% of the Negative test load, held for 10 seconds, and the maximum and net deflections recorded for information.
11. Return the pressure to zero and after waiting for one minute at least, the residual readings of the transducers were recorded to constitute the net deformation.

- For more detailed information, please refer to the submitted method statement reference YD069/05/11/2024/MS00/SCT

4. TEST CRITERIA

The following values were mentioned in the approved MS no: YD069/05/11/2024/MS00/SCT

TEST	CRITERIA	REFERENCE
A. Test Briefing B. Visual Inspection		
1. Structural Performance Test	ASTM E 330-14	
Test Pressure (inward and outward directions)	860 Pa inward & 860 Pa outward pressures	Client email dated 24/04/2024
Acceptable Deflection	L/ 175 (distance between end gauges)	
2. Structural Proof Load Test 1.5 X, Method A	ASTM E 330-14	
Test Pressure (inward and outward directions)	1290 Pa inward & 1290 Pa outward pressures	Client email dated 24/04/2024
Acceptable Deflection	L/ 500 (distance between end gauges)	

5. TEST SUMMARY

This is the final report of site chamber testing at Metalo Aluminium Factory at Egypt. The testing was done under the supervision of the Testing Engineer and assisted by the testing aid of this firm as witnessed by the respective representative from Client.

5.1. Physical Condition of Test Specimen

The test specimen was completed during the tests.

5.2. Description of the Sample

Please refer section 11 for sample description.

5.3. Ambient Test Conditions

Indoor Temperature:	20 °C
Outdoor Temperature:	19 °C
Wind Speed:	1.2 m/s
Wind Direction:	South-West
Humidity:	50.2 %
Barometric pressure:	1005 mbar

5.4. Test Results

No.	TEST	DATE & TIME	RESULT
1	Structural Performance Test, ASTM E 330-14	05-Feb-2025 11:30 AM	PASS

The table below shows the net calculated deflections, in mm, for gauge no. 2 which show the net deflection measurements for the mullion.

Both the positive and negative peak load deflections were within the allowable limits.

See Figure 1 in Section 10 for the gauge locations.

Gauge no.	Allowable	+ve peak	+ve residual	-ve peak	-ve residual
2* - mullion	25.3	5.8	0.0	6.3	0.1

No.	TEST	DATE & TIME	RESULT
6	Structural Proof Load Test 1.5 X, Method A ASTM E 330-14	05-Feb-2025 12:00 PM	PASS

The table below shows the net calculated residual deflections, in mm, for gauge 2, which shows the net residual deflection measurement for the mullion.

No damage to the sample was visible.

Both the positive and negative residual deflections were within the allowable limits.

See Figure 1 in Section 10 for the gauge locations.

Gauge no.	Allowable	+ve residual	-ve residual
2* - mullion	8.8	3.0	1.2

5.5. Description of Modification or Rectification (By Contractor)

No modification or adjustment was done to the test specimen by the contractor

5.6. Description of Adjustment or Exclusion of Test Area

No modification or adjustment was done to the test specimen by the contractor

5.7. Deviation from Standard

Test has been performed as per the standard test procedure with no deviation unless otherwise specified.

5.8. Status of Internal Finishes

This is PMU test and hence this not applicable.

5.9. Test Equipment Details

The following equipment were employed for performing the test.

Sr. No.	Equipment Details	Asset Code	Calibration Due Date
1	Manometer	ARE-A-21-06-STD-0063	25-Jun-2025
3	Thermohydrometer	ARE-A-21-05-STD-0060	10-Jun-2025
4	Barometer	ARE-A-19-10-STD-0086	14-May-2025
5	Stopwatch	ARE-E-17-11-STD-0018	24-May-2025
6	Measuring Tape	ARE-E-18-02-STD-0020	25-May-2025
7	Anemometer	ARE-A-23-08-STD-0119	23-Sep-2025
8	LDTs/Dial Gauge 1	ARE-A-23-08-STD-0123	24-May-2025
9	LDTs/Dial Gauge 2	ARE-A-23-08-STD-0122	24-May-2025
10	LDTs/Dial Gauge 3	ARE-A-23-01-STD-0077	11-Jun-2025

The copies of calibration certificates will be issued upon request.

6. COMPLIANCE STATEMENT

The specimen was tested as per the procedure described in section 3 of this document in conformance with project requirements and corresponding test standards with corresponding test results as mentioned in section 5.4

7. CONCLUSION

The tests were conducted according to the procedure mentioned and project specification requirements.

Test sequence no.	Test	Result	Observation
1	Structural Performance Test ASTM E 330-14 Test Pressure: +/- 860 Pa	PASS	Both the positive and negative peak load deflections were within the allowable limits.
2	Structural Proof Load Test 1.5 X, Method A ASTM E 330-14 Test Pressure: +/- 1290 Pa	PASS	Residual deflections recorded for information. No damage to the sample was visible.

Refer to the decision rule provided in the method statement.

8. LIMITATIONS

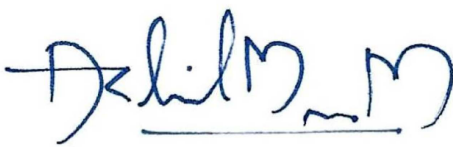
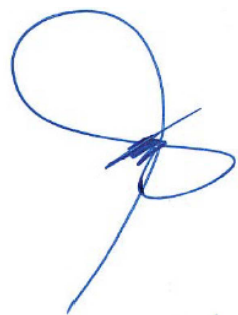
The test results are valid only for the specific tested locations during the time of test mentioned herein.

9. REVISION HISTORY

Revision No.	Description
00	Initial Issue

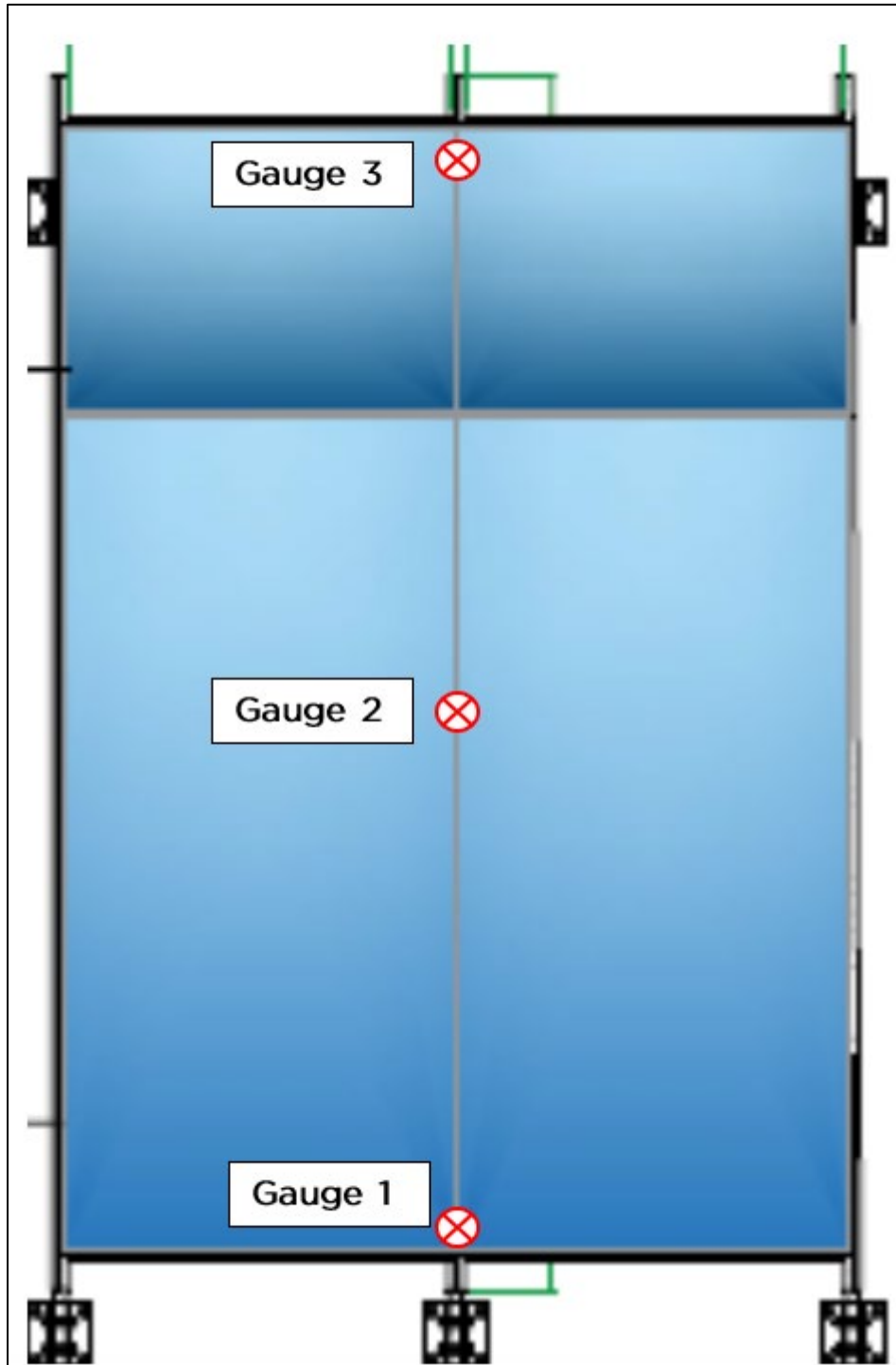
This Final Report is respectfully submitted by:

Thomas Bell-Wright International Consultants

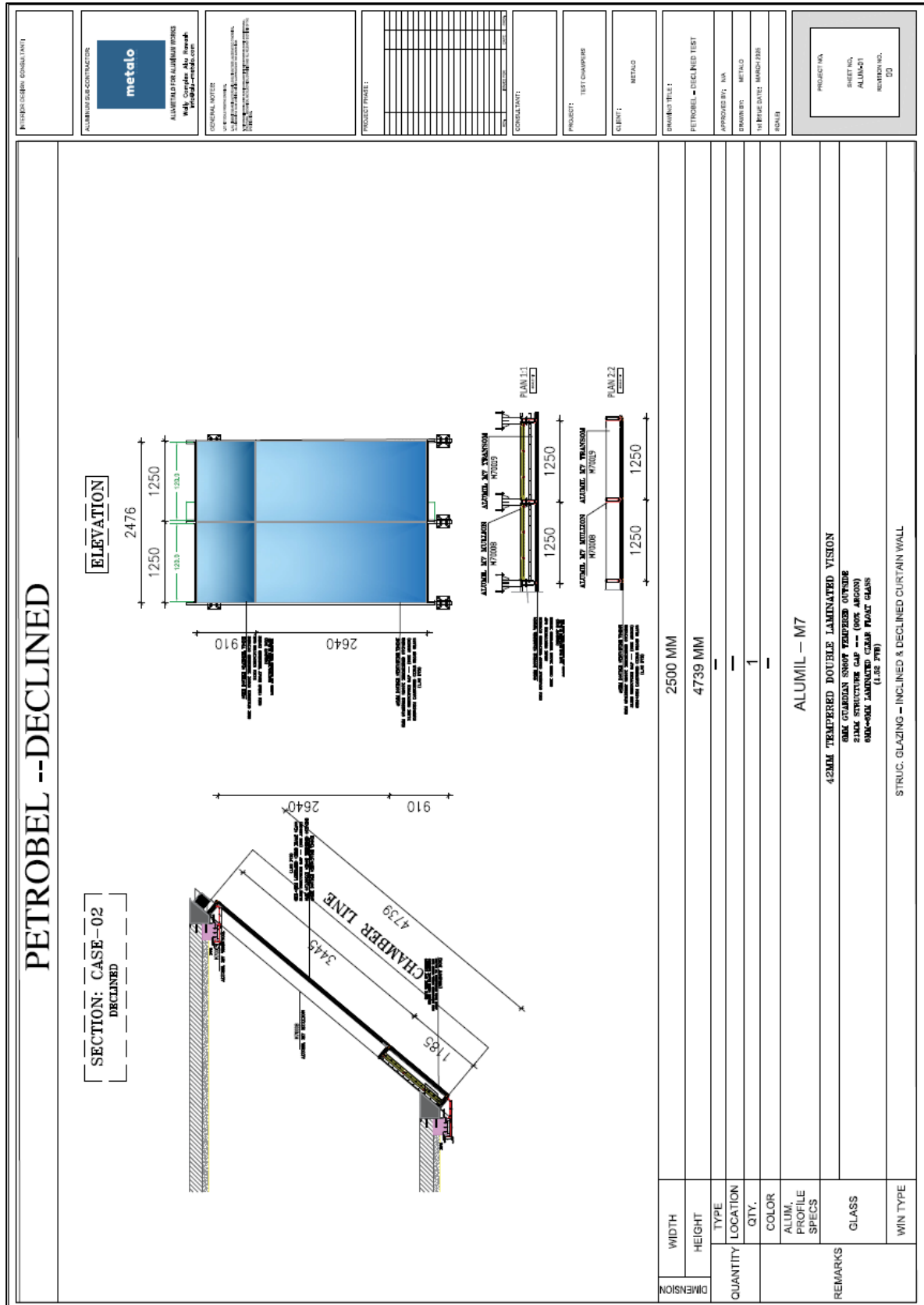
Test Conducted by & Report Prepared by:	Reviewed & authorized by:
 Akhil Mohan Site Testing Engineer	 Clarence Facun Façade Testing Manager

10. FIGURES

Please see below figures for locations for transducers for structural performance test;



11. DRAWINGS



12. PHOTOGRAPHS

Photo No.	Description	Photograph
1	External View of test specimen	
2	Site chamber test set-up Manometer and controller to regulate and monitor test pressure	

3	Dial gauge set-up to record deflection of framing member	 Wednesday, 5 February 2025 at 11:34 AM Metalo Egypt Petrobel
4	Structural Performance Test loading in progress	 Wednesday, 5 February 2025 at 12:05 PM Metalo Egypt Petrobel

5	Structural Proof Load Test in progress	
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13. TEST WITNESS FORM

SI No.	Name	Company
1	Sherif Zohny (CEO)	Metalo Aluminium
2	George Wadie (Finance Manager)	Metalo Aluminium
3	Kareem Esawy (Technical Office Manager)	Metalo Aluminium
4	Mostafa Abu-Elkhier (Operation Manager)	Metalo Aluminium

---End of Report---