



## LETTER REPORT

Report Number | 0093-31  
Client | Engage Building Products  
Address | 101-4441 76th Ave SE, Calgary, AB T2C 2G8

Issue Number | 2-5934  
Issue Date | 2025-11-17

### SUBJECT

Summary conclusion and application of test results derived from ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*, completed for Engage Building Products' Quick Panel Systems.

### TEST SUMMARY

Thirty three (33) representative wall assemblies have been tested for Transverse Load – Negative Wind Load and six (6) Positive Wind Load in accordance with ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*, at Engage Building Products in Calgary, Alberta.

### PRODUCT DESCRIPTION

QuickPanel Systems are aluminum composite panels with back framing stiffeners affixed to framing, serving as an exterior wall covering.

**Aluminum Composite Material (ACM):** The composite panel is nominally 4mm in thickness, composed of an inside and outside skin of nominal 0.5mm thick aluminum sheets bonded to a nominal 3mm thickness inner core of polyethylene with mineral (magnesium hydroxide) fire-retardant, and available in lengths of up to 16 ft.

**Sub-framing Stiffeners and Trims:** The stiffeners and trims are two-piece 6063-T6 aluminum shaped in to the dimensions shown in the part drawings in the appendix.

**Fasteners And Adhesives:** The fastener used to attach stiffener backplate to framing is #10-12 x 1-1/2" HWH Self Drilling Screw. Stiffener top cap to panel attachment is either 1) Silicone adhesive with 1/16" x 1" Double-sided tape, or 2) Two strips of 1/16" x 1" Double-sided tape.

ACM panels are held in place with adhesive and the flanges of the snap-fit top cap of the edge trims, and adhered to the back-framing stiffeners.

Material	Specification / Grade
Sub-framing Stiffeners & Trims	Aluminum Grade: 6063-T6 Min. Tensile Yield: 25,000 psi Stiffener Top Cap: Mill finish Stiffener Back Plate: Powder Coated All other parts: Powder Coated
Aluminum Composite (ACM) Panels	4 mm total thickness, 3 mm FR Core 0.5 mm 3000 Series Aluminum Skins Paint/Finish: PVDF AAMA 2605



	Relative Stiffness EI: 2200 lb-in <sup>2</sup> /in-width
	Certified to ICC-ES AC25 by an accredited product certification agency <sup>1</sup>
Silicone	ASTM C920 Type S, Grade NS, Class 50, Use NT, G, and A, and ASTM C1184, Peel Adhesion tested with Aluminum
3M Double-sided tape	VHB RP+160GF
3M Tape Primer	Isopropyl alcohol

1. ACM panels supplied to ENGAGE are certified by the International Code Council's ICC-ES or an ICC-IAS accredited product certification body and labeled as meeting ICC-ES AC 25, *Acceptance Criteria for Metal Composite Material*.

**Table 1: Negative and Positive Pressure Test Assembly Configurations for Quick Panel with 4mm ACM.**

Assembly Number	Stiffener Configuration	Framing	Sheathing	Fastener - backplate into framing	Adhesive – stiffener to ACM panel
QG5	No stiffeners	2x6 18 ga 33 ksi steel stud @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	NA
QI12 <sup>1</sup> QG5 Equivalent	No stiffeners	2x6 wood studs @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	NA
QI1	Horizontal, spaced @ 24" o/c	2x6 18 ga 33 ksi steel stud @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	2-strips tape
QI11 <sup>1</sup> QI1 Equivalent	Horizontal, spaced @ 24" o/c	2x6 wood studs @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	2-strips tape
QI3	Horizontal, spaced @ 12" o/c	2x6 16 ga 50 ksi steel stud @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	2-strips tape
QI4	Horizontal, spaced @ 24" o/c	2x6 16 ga 50 ksi steel stud @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	2-strips tape
QI5	Horizontal, along center line of panel	2x6 16 ga 50 ksi steel stud @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	2-strips tape
QI6	Horizontal, along center line of panel	2x6 18 ga 33 ksi steel stud @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	2-strips tape
QI7	2-Horizontal, along center line 2-5/8" apart	2x6 16 ga 50 ksi steel stud @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	2-strips tape
QI9	Horizontal, spaced @ 12" o/c	2x6 18 ga 33 ksi steel stud @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	2-strips tape
QI2	Horizontal, spaced @ 24" o/c	2x6 18 ga 33 ksi steel stud @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	1-strip tape, 1-bead silicone
QI8	Horizontal, along center line of panel	2x6 16 ga 50 ksi steel stud @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	1-strip tape, 1-bead silicone
QI10	Horizontal, spaced @ 24" o/c	2x6 16 ga 50 ksi steel stud @16"o/c	½" Drywall	#10 – 12 x 1-1/2" metal screw	1-strip tape, 1-bead silicone

1. Positive pressure test assemblies



**Table 2: Negative Pressure Testing Results**

Test	Load Data					Allowable Deflection <sup>1,3</sup> at Deflection Service Load				
	Max Load (psf)	Max Load Ave. (psf)	Deviation from Ave.	< 15% Variance	Allowable Deflection Service Load (ASD) (psf) <sup>1</sup>	L/180 Limit (in.)	Measured Deflection (in.) <sup>2</sup>	L/60 Limit (in.)	Measured Deflection (in.) <sup>2</sup>	Measure > Limit
						Wall		Panel		
QI1-1	145	140	3.64%	OKAY	58	0.667	0.047	0.400	0.182	OKAY
QI1-2	137		1.97%	OKAY	55	0.667	0.086	0.400	0.115	OKAY
QI1-3	138		1.75%	OKAY	55	0.667	0.041	0.400	0.192	OKAY
QI2-1	222	214	4.07%	OKAY	89	0.667	0.014	0.400	0.321	OKAY
QI2-2	205		4.15%	OKAY	82	0.667	0.063	0.400	0.224	OKAY
QI2-3	213		0.01%	OKAY	85	0.667	0.084	0.400	0.244	OKAY
QI3-1	249	260	4.42%	OKAY	100	0.667	0.007	0.400 <sup>4</sup>	0.182	OKAY
QI3-2	285		9.54%	OKAY	114	0.667	0.024	0.400 <sup>4</sup>	0.247	OKAY
QI3-3	282		8.5%	OKAY	113	0.667	0.201	0.400 <sup>4</sup>	0.232	OKAY
QI4-1	233	214	9.08%	OKAY	93	0.667	0.111	0.400	0.266	OKAY
QI4-2	203		5.53%	OKAY	81	0.667	0.126	0.400	0.251	OKAY
QI4-3	206		3.74%	OKAY	82	0.667	0.156	0.400	0.118	OKAY
QI5-1	135	146	8.25%	OKAY	54	0.667	0.072	1.000	0.142	OKAY
QI5-2	150		3.09%	OKAY	60	0.667	0.085	1.000	0.139	OKAY
QI5-3	152		4.60%	OKAY	61	0.667	0.079	1.000	0.174	OKAY
QI6-1	145	145	0.21%	OKAY	58	0.667	0.082	1.000	0.185	OKAY
QI6-2	150		3.30%	OKAY	60	0.667	0.096	1.000	0.151	OKAY
QI6-3	141		3.27%	OKAY	56	0.667	0.085	1.000	0.189	OKAY
QI7-1	181	183	0.88%	OKAY	72	0.667	0.105	0.956	0.694	OKAY
QI7-2	176		3.86%	OKAY	70	0.667	0.112	0.956	0.789	OKAY
QI7-3	191		4.54%	OKAY	76	0.667	0.095	0.956	0.752	OKAY
QI8-1	130	123	7.42%	OKAY	52	0.667	0.068	1.000	0.162	OKAY
QI8-2	113		7.82%	OKAY	45	0.667	0.070	1.000	0.122	OKAY
QI8-3	121		0.25%	OKAY	48	0.667	0.065	1.000	0.136	OKAY
QI9-1	218	212	2.74%	OKAY	87	0.667	0.104	0.400 <sup>4</sup>	0.238	OKAY
QI9-2	210		1.00%	OKAY	84	0.667	0.190	0.400 <sup>4</sup>	0.226	OKAY
QI9-3	208		1.88%	OKAY	83	0.667	0.172	0.400 <sup>4</sup>	0.233	OKAY
QI10-1	303	309	1.81%	OKAY	121	0.667	0.271	0.400	0.315	OKAY
QI10-2	301		2.46%	OKAY	120	0.667	0.235	0.400	0.569	EXCEEDS
QI10-3	321		4.21%	OKAY	129	0.667	0.267	0.400	0.399	OKAY
QG5-1	103	95	8.01%	OKAY	41	0.667	N/A	2.000	1.176	OKAY
QG5-2	72		31.8%	EXCEEDS	29	0.667	N/A	2.000	0.943	OKAY
QG5-3	110		16.1%	EXCEEDS	44	0.667	N/A	2.000	1.336	OKAY

1. Allowable Deflection Service Load is equal to Max Load divided by 2.5 multiplied by 0.7.
2. A linear trendline was created for each data set and used to calculate the wall/panel deflection at the Allowable Deflection Service Load of the test series.
3. Span (L) is the distance between anchorage points of the element being considered.
4. Panel Deflection limit adjusted to match stiffeners @ 24" o/c limit.



**Table 3: Positive Pressure Testing Results**

Test	Load Data					Allowable Deflection <sup>1,3</sup> at Deflection Service Load				
	Max Load (psf)	Max Load Ave. (psf)	Deviation from Ave.	< 15% Variance	Allowable Deflection Service Load (ASD) (psf) <sup>1</sup>	L/180 Limit (in.)	Measured Deflection (in.) <sup>2</sup>	L/60 Limit (in.)	Measured Deflection (in.) <sup>2</sup>	Measure > Limit
						Wall		Panel		
QI11-1	148	144	2.78%	OKAY	59	0.667	0.178	0.400	0.043	OKAY
QI11-2	139		3.47%	OKAY	56	0.667	0.139	0.400	0.074	OKAY
QI11-3	145		0.69%	OKAY	58	0.667	0.140	0.400	0.046	OKAY
QI12-1	92	97	4.96%	OKAY	37	0.667	0.078	0.400	0.171	OKAY
QI12-2	92		4.86%	OKAY	37	0.667	0.081	0.400	0.184	OKAY
QI12-3	106		8.94%	OKAY	43	0.667	0.113	0.400	0.201	OKAY

1. Allowable Deflection Service Load is equal to Max Load divided by 2.5 multiplied by 0.7.
2. A linear trendline was created for each data set and used to calculate the wall/panel deflection at the Allowable Deflection Service Load of the test series.
3. Span (L) is the distance between anchorage points of the element being considered.
4. Panel Deflection limit adjusted to match stiffeners @ 24" o/c limit.

**Table 4: Failure Modes Data**

Test	Max Load (psf)	Failure mode
QI1-1	145	Screw pull out
QI1-2	137	Screw pull out
QI1-3	138	Screw pull out
QI2-1	222	Screw pull out
QI2-2	205	Drywall failed
QI2-3	213	Steel stud bent
QI3-1	249	Steel stud bent
QI3-2	285	Steel stud bent
QI3-3	282	Tape failed on stiffener
QI4-1	233	Tape and screw failed on stiffener
QI4-2	203	Tape failed on stiffener
QI4-3	206	Tape failed on stiffener
QI5-1	135	Tape failed on stiffener
QI5-2	150	Tape failed on stiffener
QI5-3	152	Tape failed on stiffener
QI6-1	145	Tape failed on stiffener
QI6-2	150	Screw pull out
QI6-3	141	Tape failed on stiffener
QI7-1	181	Panel came out of top cap
QI7-2	176	Panel came out of top cap
QI7-3	191	Panel came out of top cap
QI8-1	130	Screw pull out
QI8-2	113	Screw pull out
QI8-3	121	Screw pull out
QI9-1	218	Screw pull out
QI9-2	210	Steel stud bent
QI9-3	208	Steel stud bent
QI10-1	303	Steel stud bent
QI10-2	301	Stiffener broke
QI10-3	321	Steel stud bent and tape failed
QI11-1	148	Tape failed on poly
QI11-2	139	Tape failed on poly



QI11-3	145	Tape failed on poly
QI12-1	92	N/A
QI12-2	92	Tape failed on poly
QI12-3	106	Tape failed on poly
QG5-1	103	Panel came out of top cap
QG5-2	72	Panel came out of top cap
QG5-3	110	Panel came out of top cap

**Table 5: QuickPanel ACM Allowable Design Load**

Test	Allowable Design Load (ASD) (psf) <sup>1</sup> Negative	Allowable Design Load (ASD) (psf) <sup>1</sup> Positive
QI1 / QI11	56	58
QI2	85	-
QI3	109	-
QI4	86	-
QI5	58	-
QI6	58	-
QI7	73	-
QI8	49	-
QI9	85	-
QI10	85	-
QG5 / QG12	36	39

1. Allowable design load is lesser of:
  - i. Average max test load divided by safety factor of 2.5.
  - ii. Test load divided by 0.7 when panel reaches service deflection limit.
  - iii. If data set has samples that exceed 15% tolerance, lowest result divided by safety factor of 2.5.

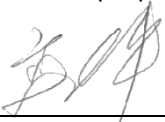
## CONCLUSION


This test report includes 33 representative wall assemblies tested for Transverse Load – Negative Wind Load and 6 representative wall assemblies tested for Transverse Load – Positive Wind Load in accordance with the criteria of ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*. Based on the test results, when comparing equivalent assemblies for positive and negative pressure walls, the negative pressure was taken as the worst-case condition for the allowable design load.

The testing results in Table 5 have been evaluated by engineering design methodology in general accordance with ASCE7-22 and has been prepared in a format with design information that is based on the IBC and NBCC Codes. The results are intended to be for informational purposes at this time and not suitable for distribution or use for code compliance or building design.

## SIGNED

This report has been prepared and reviewed on behalf of BOCA by:

  
\_\_\_\_\_  
Craig Gao Eng. Tech.

  
\_\_\_\_\_  
Chris Bowness, P.Eng., P.E.

2025-11-17  
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Date

2025-11-17  
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Date

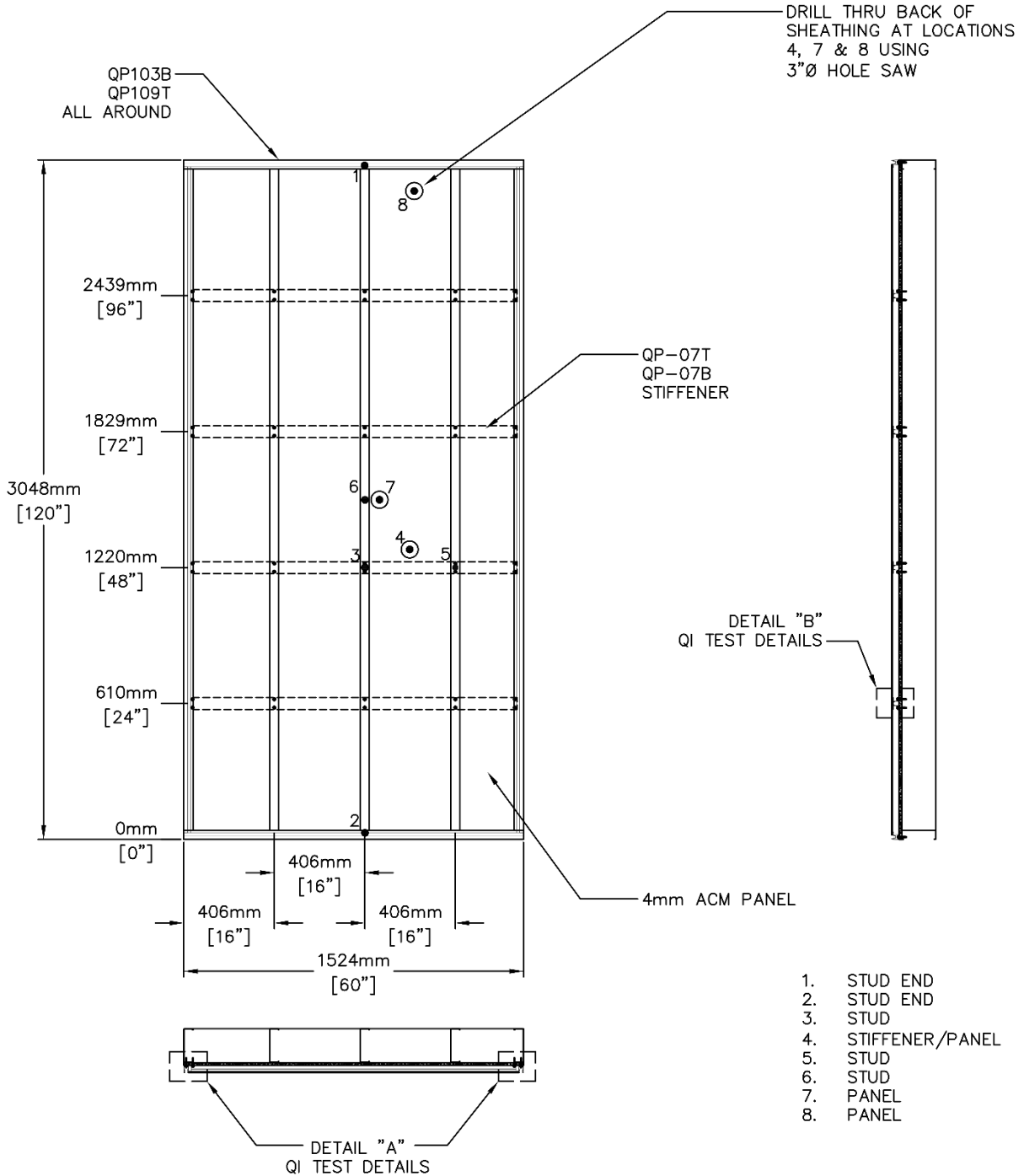




**ATTACHMENTS:**

1. Test Assembly Drawings	Pg. 7-20
2. QI1-1 Test Results	Pg. 21-22
3. QI1-2 Test Results	Pg. 23-24
4. QI1-3 Test Results	Pg. 25-26
5. QI2-1 Test Results	Pg. 27-28
6. QI2-2 Test Results	Pg. 29-30
7. QI2-3 Test Results	Pg. 31-32
8. QI3-1 Test Results	Pg. 33-34
9. QI3-2 Test Results	Pg. 35-36
10. QI3-3 Test Results	Pg. 37-38
11. QI4-1 Test Results	Pg. 39-40
12. QI4-2 Test Results	Pg. 41-42
13. QI4-3 Test Results	Pg. 43-44
14. QI5-1 Test Results	Pg. 45-46
15. QI5-2 Test Results	Pg. 47-48
16. QI5-3 Test Results	Pg. 49-50
17. QI6-1 Test Results	Pg. 51-52
18. QI6-2 Test Results	Pg. 53-54
19. QI6-3 Test Results	Pg. 55-56
20. QI7-1 Test Results	Pg. 57-58
21. QI7-2 Test Results	Pg. 59-60
22. QI7-3 Test Results	Pg. 61-62
23. QI8-1 Test Results	Pg. 63-64
24. QI8-2 Test Results	Pg. 65-66
25. QI8-3 Test Results	Pg. 67-68
26. QI9-1 Test Results	Pg. 69-70
27. QI9-2 Test Results	Pg. 71-72
28. QI9-3 Test Results	Pg. 73-74
29. QI10-1 Test Results	Pg. 75-76
30. QI10-2 Test Results	Pg. 77-78
31. QI10-3 Test Results	Pg. 79-80
32. QI11-1 Test Results	Pg. 81-82
33. QI11-2 Test Results	Pg. 83-84
34. QI11-3 Test Results	Pg. 85-86
35. QI12-1 Test Results	Pg. 87-88
36. QI12-2 Test Results	Pg. 89-90
37. QI12-3 Test Results	Pg. 91-92
38. QG5-1 Test Results	Pg. 93-94
39. QG5-2 Test Results	Pg. 95-96
40. QG5-3 Test Results	Pg. 97-98

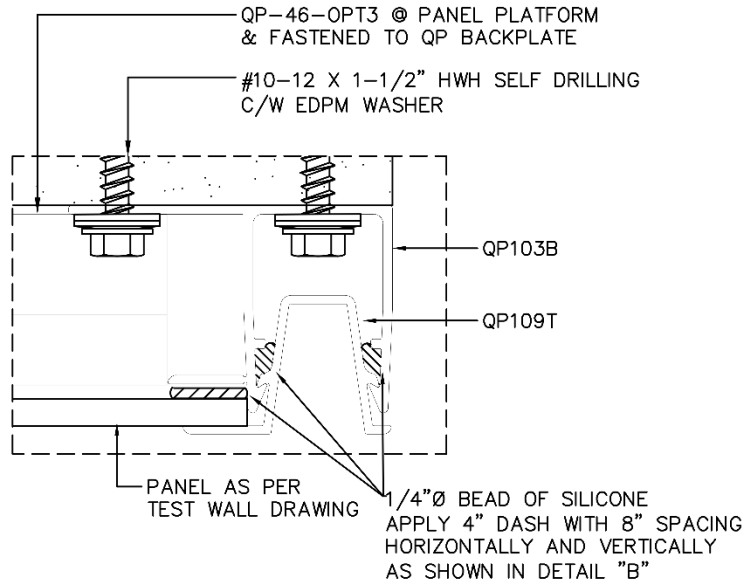
# QI1 TEST WALL



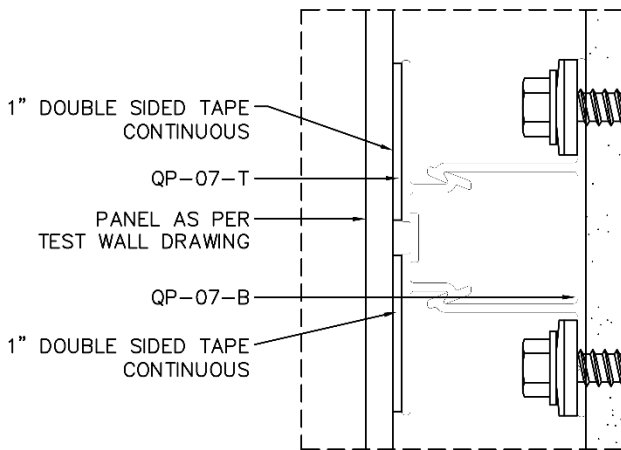
THREE MOCK-UP REQUIRED  
2x6 18 Ga.(33KSI) STEEL STUDS W/ 1/2" DENSGLASS  
4MM ACM PANEL  
#10-12 X 1-1/2" HWH SELF DRILLING C/W EDPM WASHER  
DOUBLE SIDED 3M TAPE ON STIFFENERS

STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07T 09JAN2025  
STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07B 09JAN2025  
WALL DETAILS CHANGED 15NOV2024  
02SEP2024

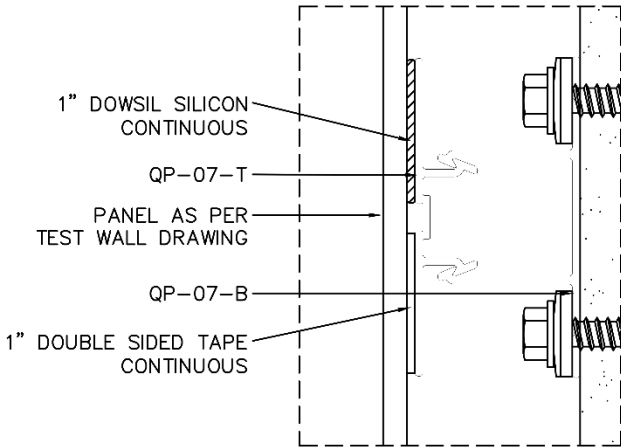
# QI TEST DETAILS 1 of 1



**A** QI FAB & SILICONE  
Scale: NTS



**B** QP-07 OPT1 HORIZONTAL STIFFENER  
Scale: NTS

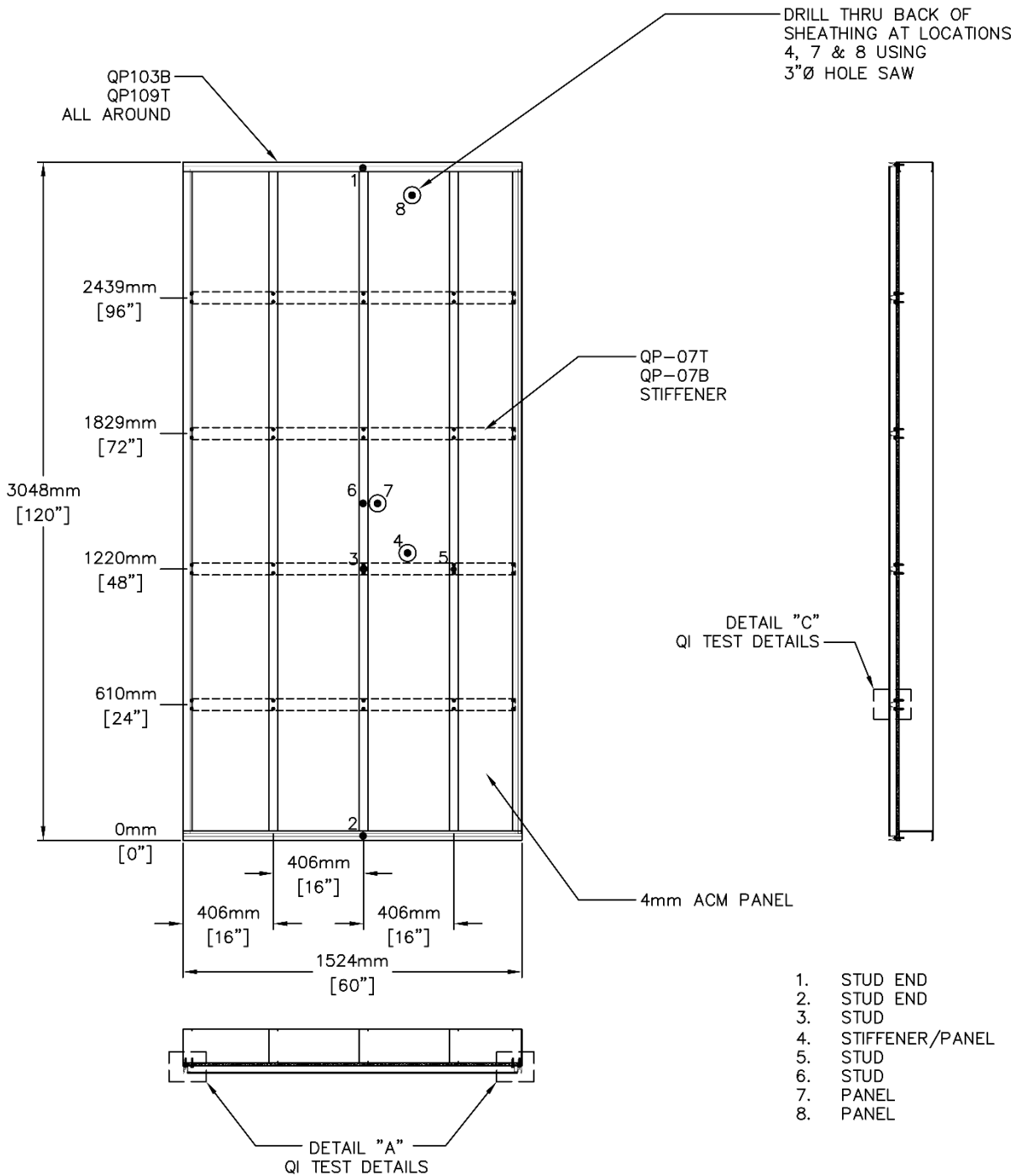


**C** QP-07-OPT2 HORIZONTAL STIFFENER  
Scale: NTS

SILICONE TO BE DOWSIL 995  
3M DOUBLE SIDED TAP

STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07T 09JAN2025  
STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07B 09JAN2025  
04SEP2024

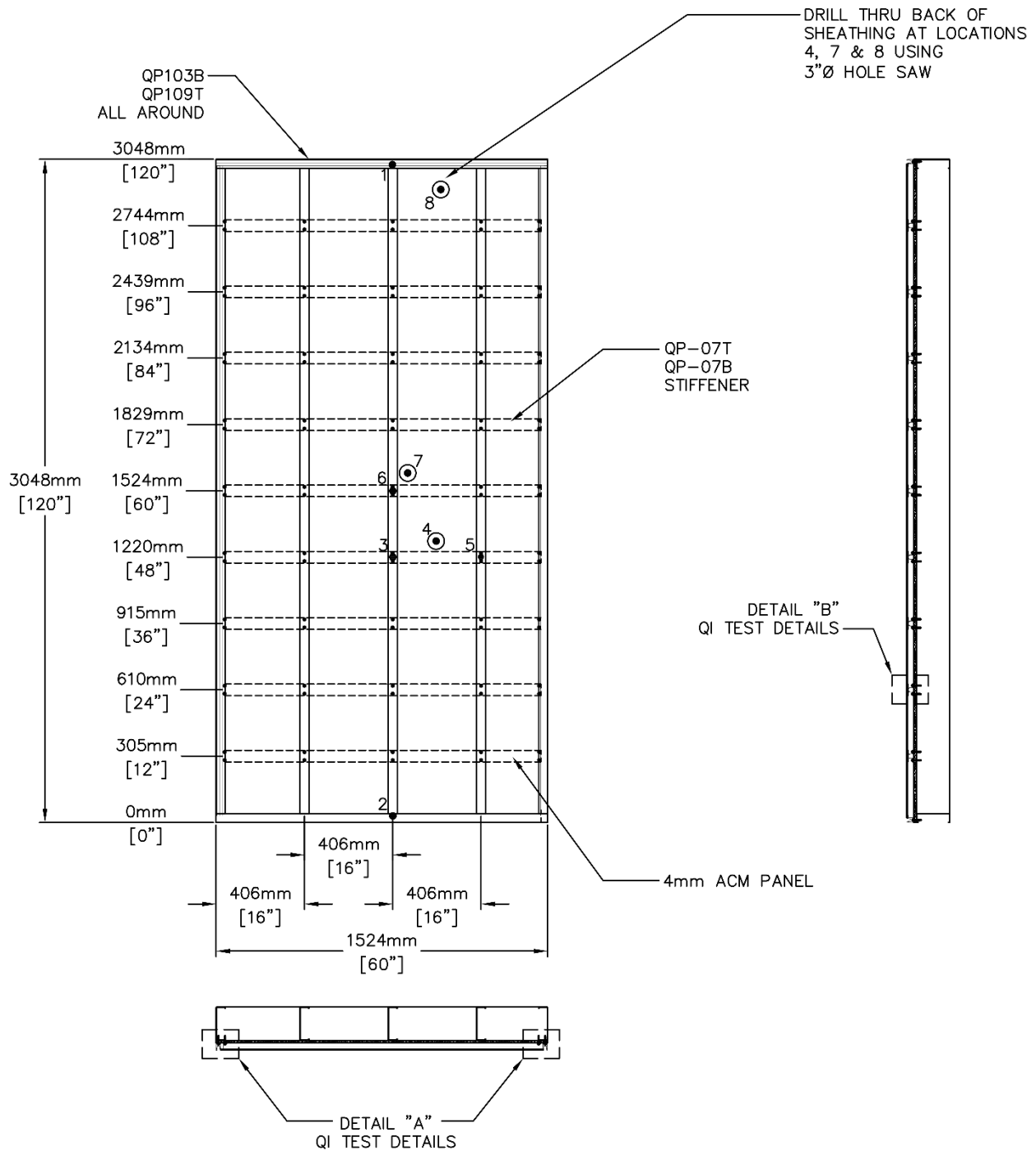
# Q12 TEST WALL



THREE MOCK-UP REQUIRED  
2x6 18 G<sub>a</sub>.(33KSI) STEEL STUDS W/ 1/2" DENSGLASS  
4MM ACM PANEL  
#10-12 X 1-1/2" HWH SELF DRILLING C/W EDPM WASHER  
DOUBLE SIDED TAPE ON ONE SIDE AND SILICONE ON OTHER  
SIDE OF STIFFENER

STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07T 09JAN2025  
STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07B 09JAN2025  
WALL DETAILS CHANGED 15NOV2024  
02SEP2024

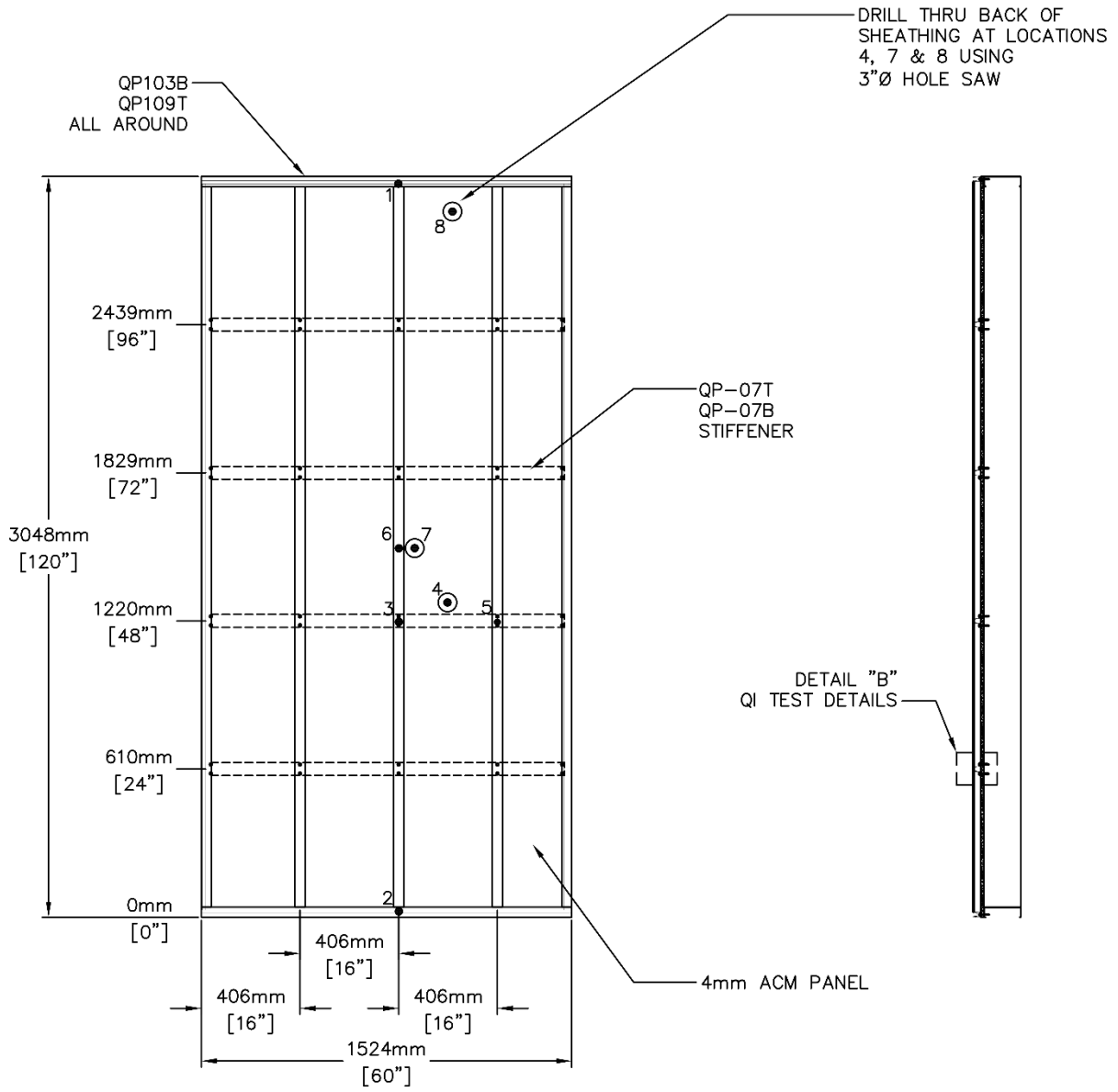
# QI3 TEST WALL



THREE MOCK-UP REQUIRED  
2x6 16 Ga.(50KSI) STEEL STUDS W/ 1/2" DENSGLASS  
4MM ACM PANEL  
#10-12 X 1-1/2" HWH SELF DRILLING C/W EDPM WASHER  
DOUBLE SIDED 3M TAPE ON PANEL STIFFENERS

STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07T 09JAN2025  
STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07B 09JAN2025  
02SEP2024

# QI4 TEST WALL

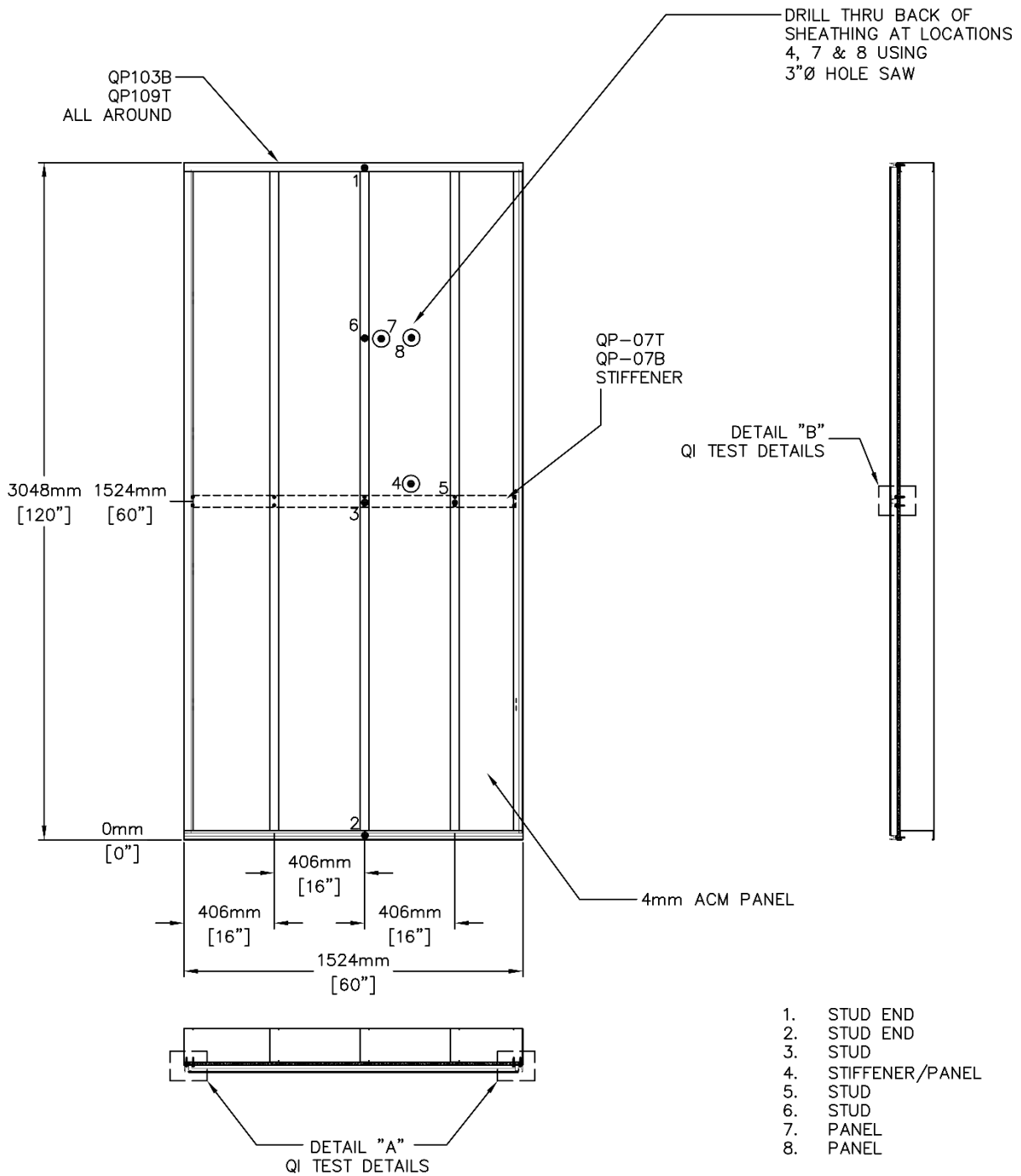


1. STUD END
2. STUD END
3. STUD
4. STIFFENER/PANEL
5. STUD
6. STUD
7. PANEL
8. PANEL

THREE MOCK-UP REQUIRED  
 2x6 16 Ga.(50KSI) STEEL STUDS W/ 1/2" DENSGLOSS  
 4MM ACM PANEL  
 #10-12 X 1-1/2" HWH SELF DRILLING C/W EDPM WASHER  
 DOUBLE SIDED 3M TAPE ON PANEL STIFFENERS

STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07T 09JAN2025  
 STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07B 09JAN2025  
 02SEP2024

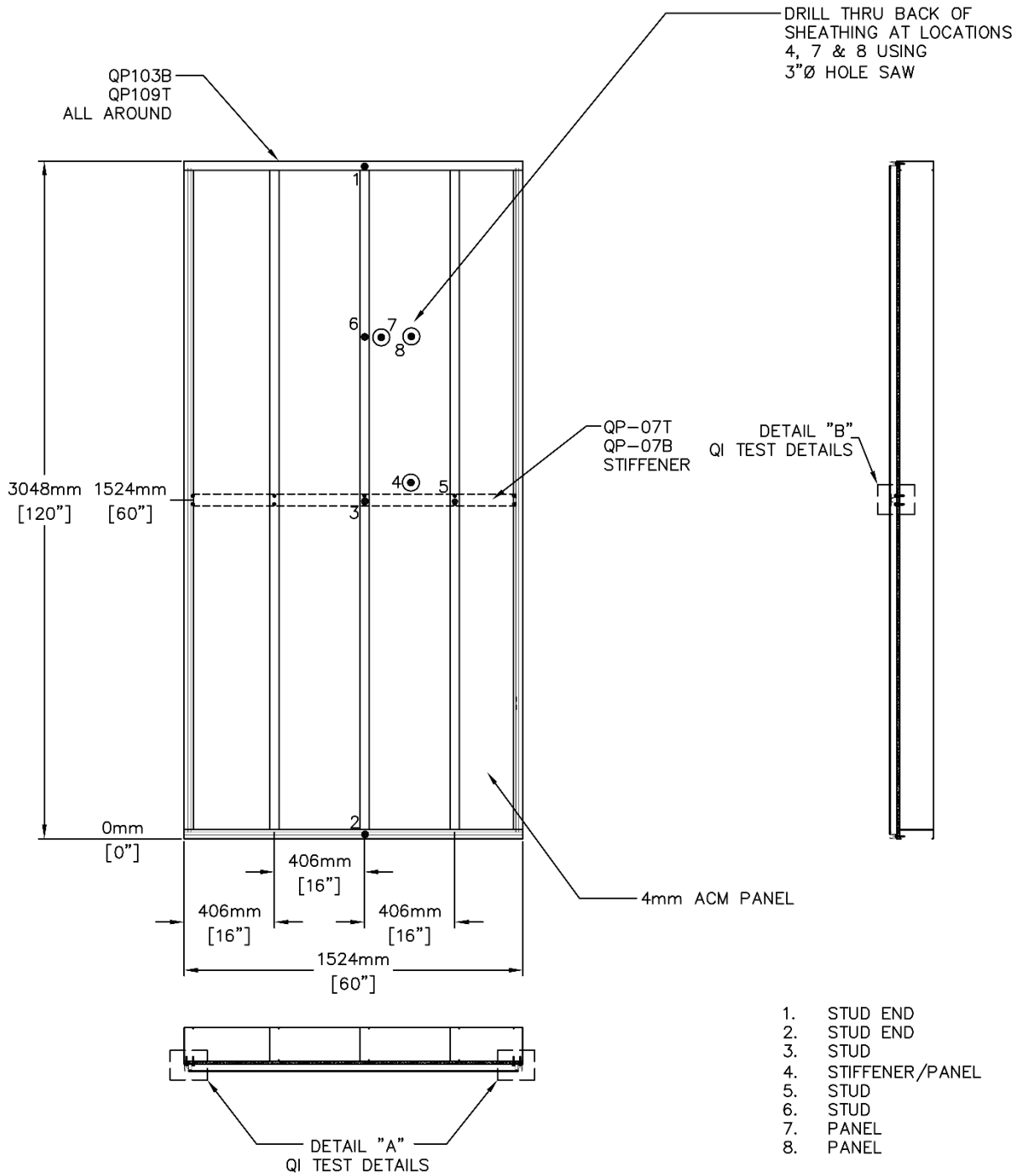
# QI5 TEST WALL



THREE MOCK-UP REQUIRED  
2x6 16 Ga.(50KSI) STEEL STUDS W/ 1/2" DENSGLASS  
4MM ACM PANEL  
#10-12 X 1-1/2" HWH SELF DRILLING C/W EDPM WASHER  
DOUBLESIDED TAPE ON PANEL STIFFENER

STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07T 09JAN2025  
STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07B 09JAN2025  
WALL DETAILS CHANGED 15NOV2024  
02SEP2024

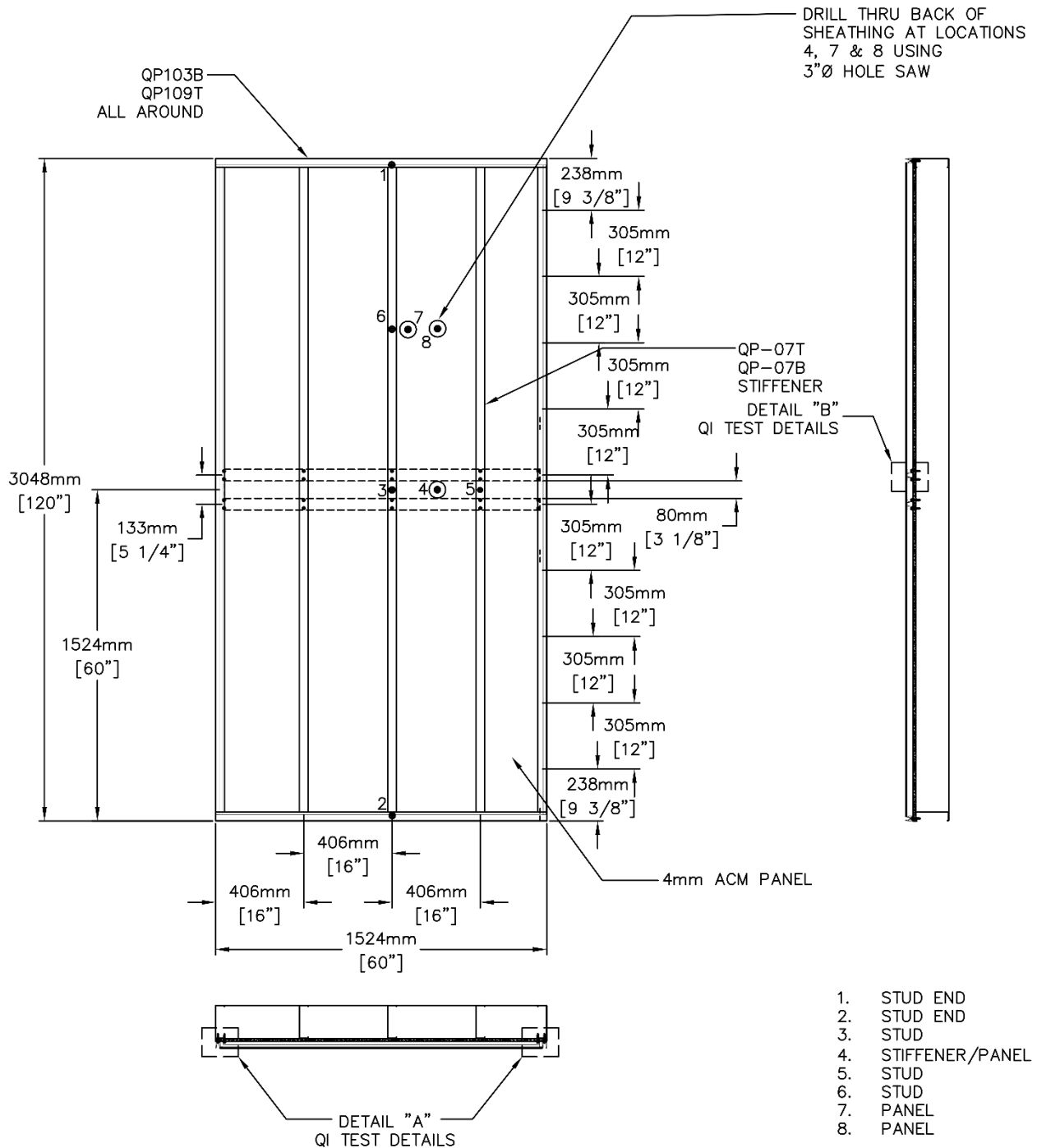
# QI6 TEST WALL



THREE MOCK-UP REQUIRED  
2x6 18 Ga.(33KSI) STEEL STUDS W/ 1/2" DENSGLASS  
4MM ACM PANEL  
#10-12 X 1-1/2" HWH SELF DRILLING C/W EDPM WASHER  
DOUBLESIDED TAPE ON PANEL STIFFENER

STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07T 09JAN2025  
STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07B 09JAN2025  
WALL DETAILS CHANGED 15NOV2024  
02SEP2024

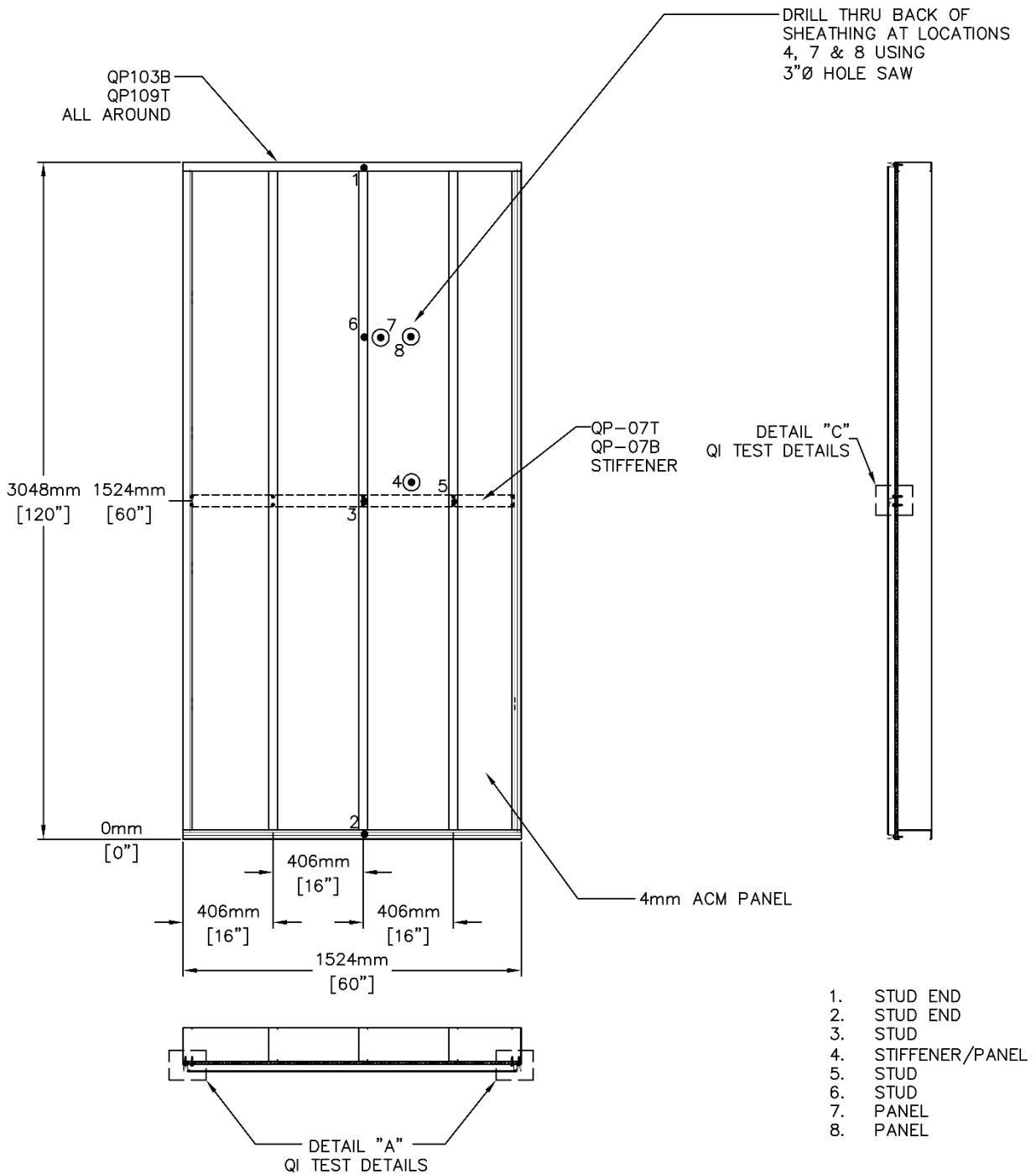
# QI7 TEST WALL



THREE MOCK-UP REQUIRED  
2x6 16 Ga.(50KSI) STEEL STUDS W/ 1/2" DENSGLASS  
4MM ACM PANEL  
#10-12 X 1-1/2" HWH SELF DRILLING C/W EDPM WASHER  
DOUBLE SIDED TAPE ON PANEL STIFFENERS

STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07T 09JAN2025  
STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07B 09JAN2025  
LOCATION OF STIFFENERS CHANGED 24OCT2024  
02SEP2024

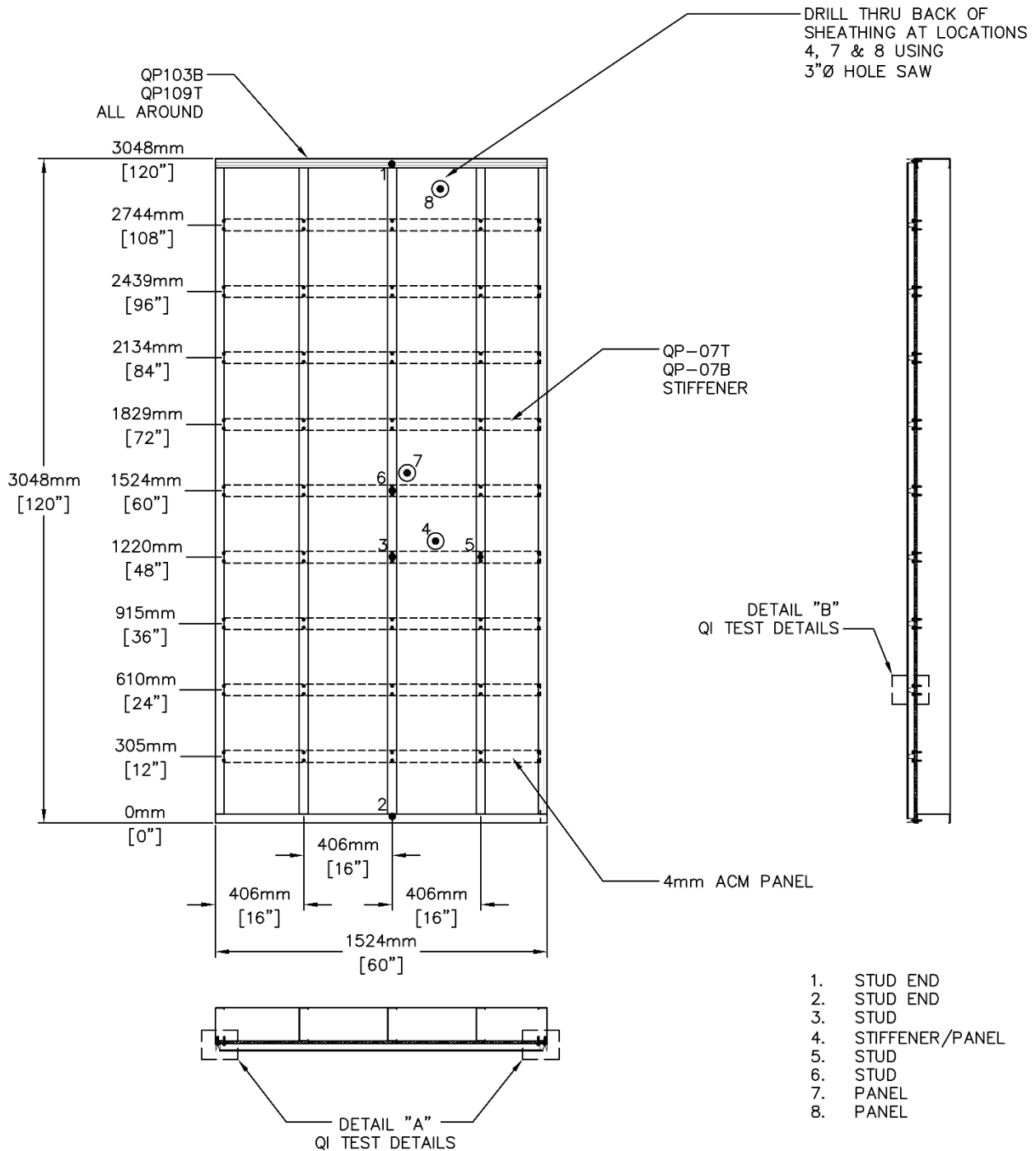
# Q18 TEST WALL



THREE MOCK-UP REQUIRED  
2x6 18 Ga.(50KSI) STEEL STUDS W/ 1/2" DENSGLASS  
4MM ACM PANEL  
#10-12 X 1-1/2" HWH SELF DRILLING C/W EDPM WASHER  
DOUBLESIDED TAPE AND SILICONE ON STIFFENER

STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07T 09JAN2025  
STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07B 09JAN2025  
WALL DETAILS CHANGED 15NOV2024  
02SEP2024

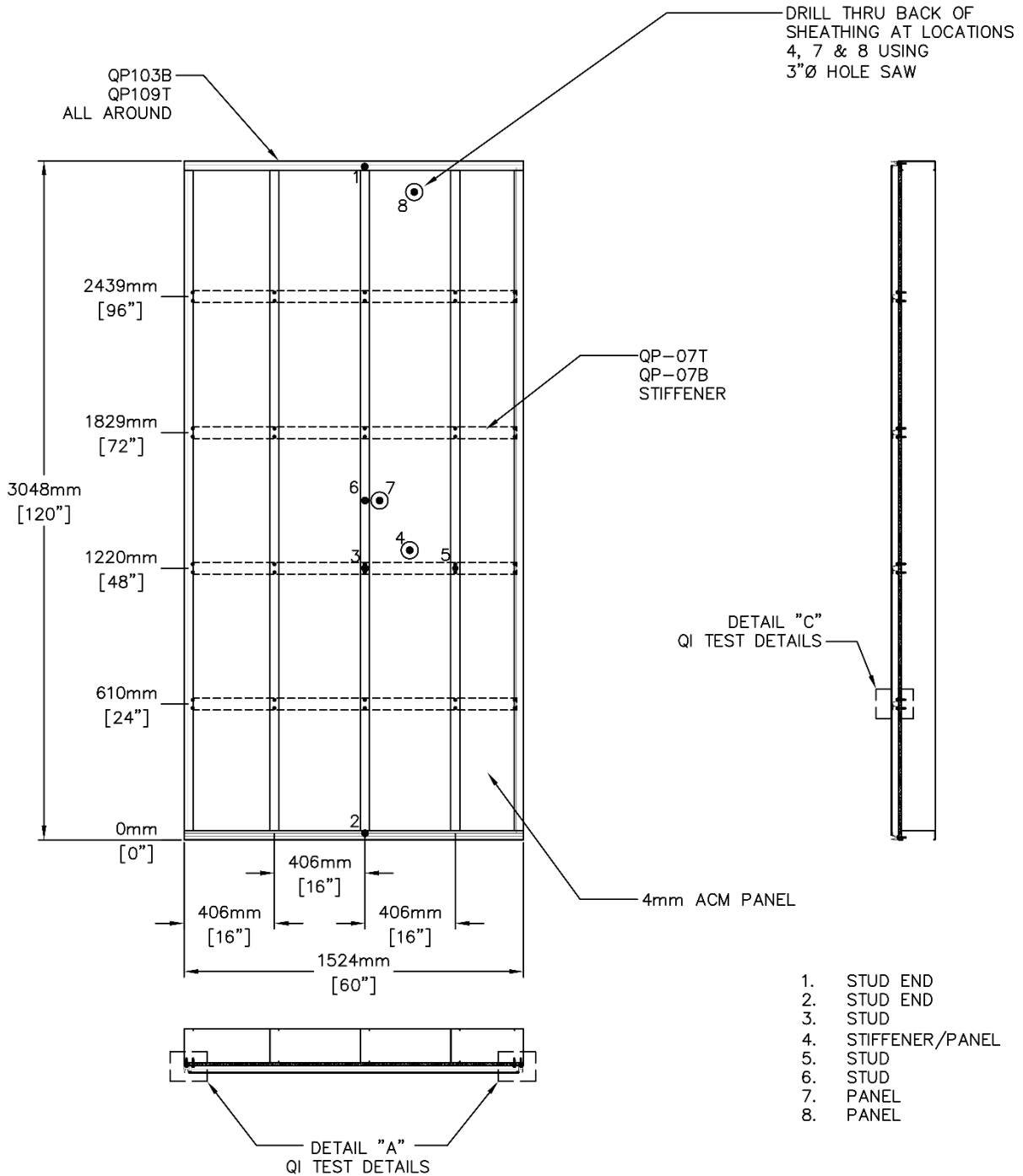
# QI9 TEST WALL



THREE MOCK-UP REQUIRED  
2x6 18 Ga.(33KSI) STEEL STUDS W/ 1/2" DENSGLASS  
4MM ACM PANEL  
#10-12 X 1-1/2" HWH SELF DRILLING C/W EDPM WASHER  
DOUBLE SIDED 3M TAPE ON PANEL STIFFENERS

STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07T 09JAN2025  
STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07B 09JAN2025  
25NOV2024

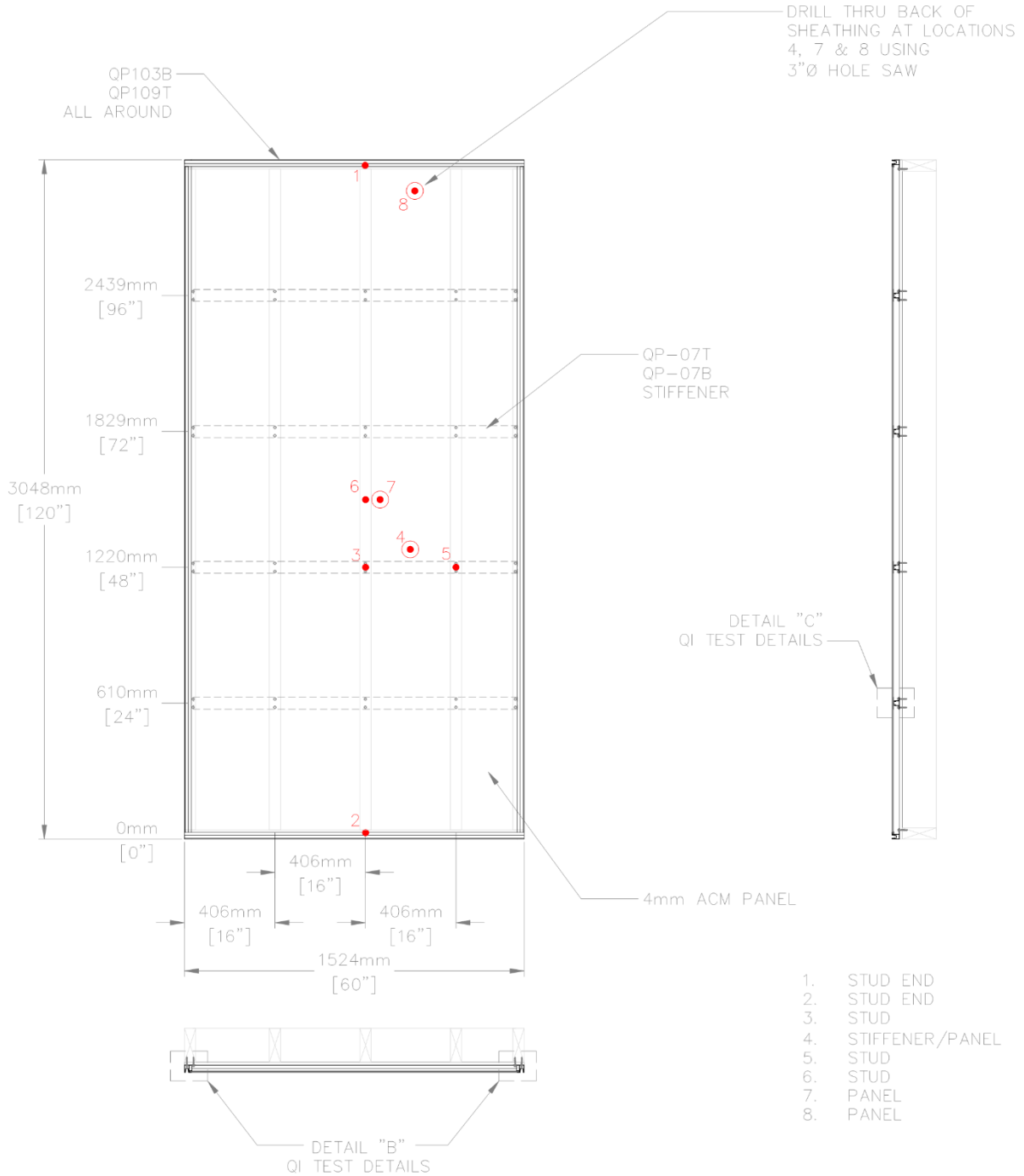
# QI10 TEST WALL



THREE MOCK-UP REQUIRED  
2x6 16 Ga.(50KSI) STEEL STUDS W/ 1/2" DENSGLASS  
4MM ACM PANEL  
#10-12 X 1-1/2" HWH SELF DRILLING C/W EDPM WASHER  
DOUBLE SIDED 3M TAPE & SILICON ON STIFFENERS

STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07T 09JAN2025  
STIFFENER NAME CHANGED FROM QP-46B-OPT3 TO QP07B 09JAN2025  
25NOV2024

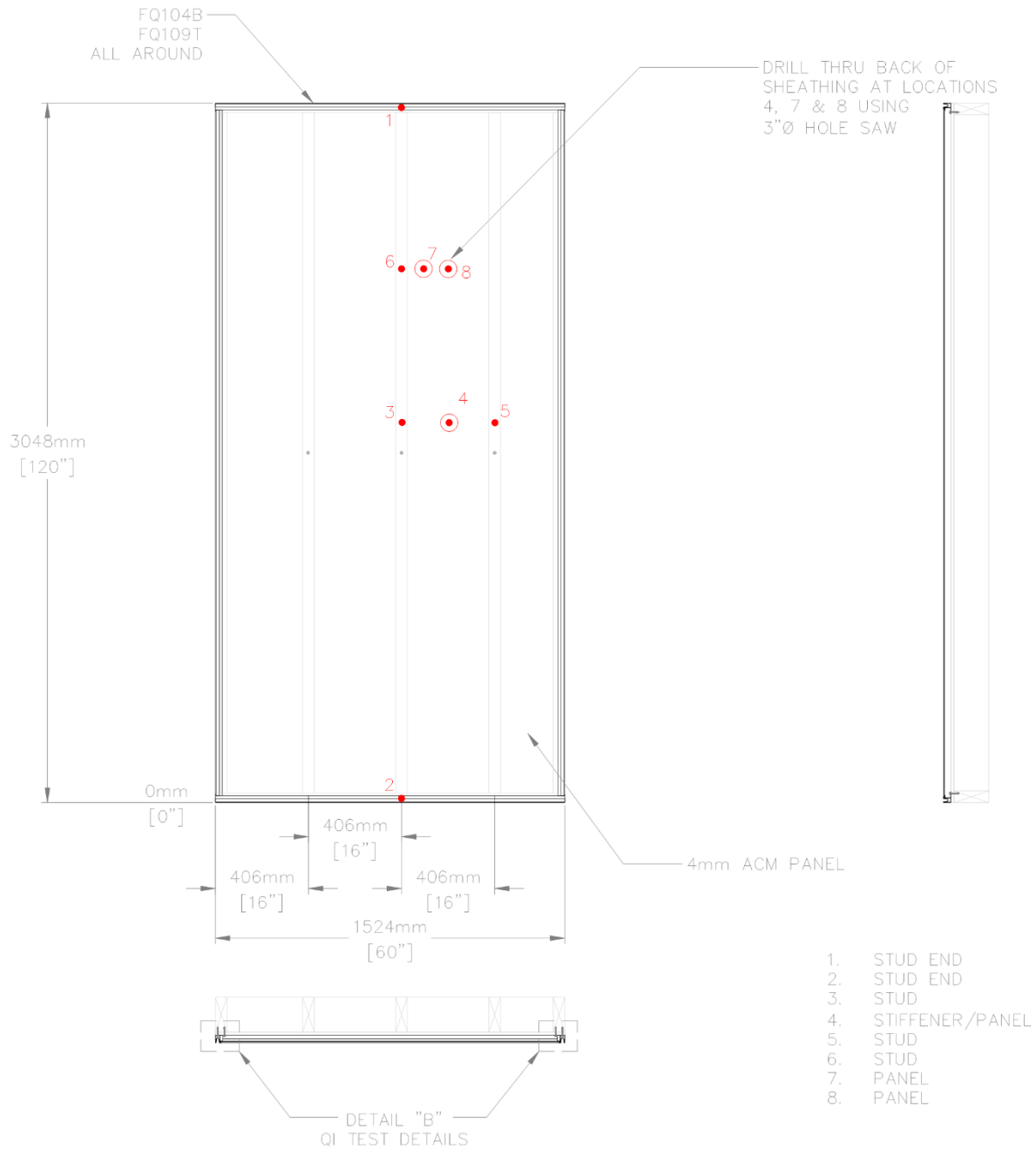
# QI11 TEST WALL



THREE MOCK-UP REQUIRED  
2x6 WOOD STUDS W/ 7/16" OSB SHEATHING  
4MM ACM PANEL  
#10 - 1-1/2" SELF PIERCING SCREW C/W EDPM WASHER  
DOUBLE SIDED 3M TAPE ON STIFFENERS

21JUL2025

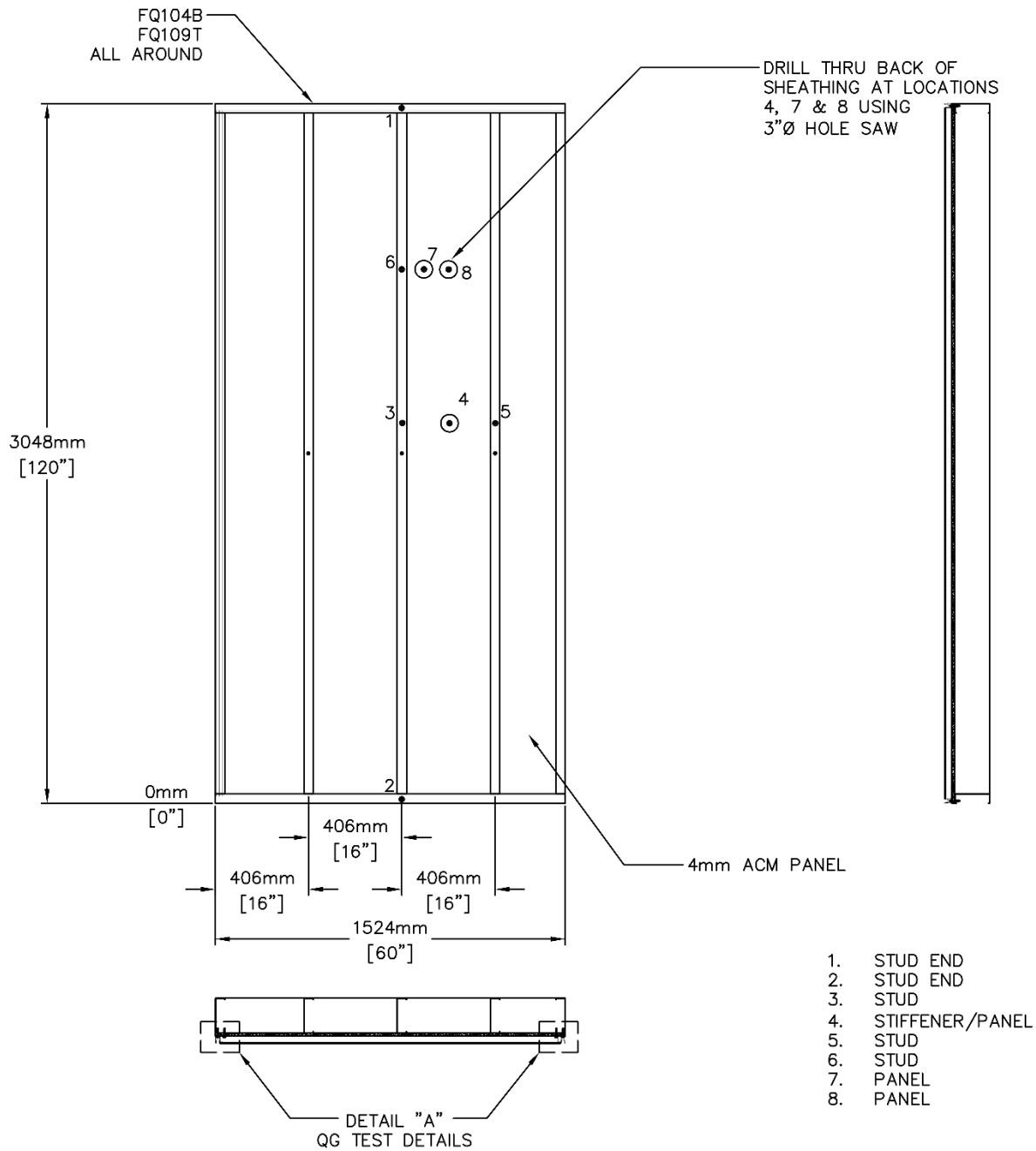
# QI12 TEST WALL



THREE MOCK-UP REQUIRED  
2x6 WOOD STUDS W/ 7/16" OSB SHEATHING  
4MM ACM PANEL  
#10 - 1-1/2" SELF PIERCING SCREW C/W EDPM WASHER

21JUL2025

# QG5 TEST WALL



THREE MOCK-UP REQUIRED  
2x6 18 Ga.(33KSI) STEEL STUDS W/ 1/2" DENSGLASS  
4MM ACM PANEL  
#10-12 X 1-1/2" HWH SELF DRILLING C/W EDPM WASHER

SENSORS LOCATION UPDATED 15JUL2024  
25JUN2024



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

Test: **Transverse Load - Negative Wind Load**  
 Client: Engage Building Products  
 Date: 16-Dec-24  
 Product: **QuickPanel Systems**  
 Test Method(s): ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

Test#: Q11-1

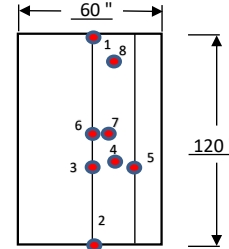
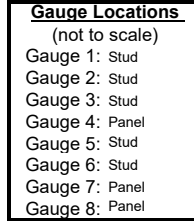
Project#: 0093  
 Technician(s): Ali  
 Reviewer: Chris  
 Location: 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**  
 Configuration: 24" O.C. stiffeners, 16" O.C. studs  
 Framing: 2x6 steel stud, 33ksi  
 Fastener: #10-1x1-1/2 HWH  
 Sheathing: 1/2" Drywall  
 Air Seal: 3M Tape used to air seal panel gaps with Primer

**Equipment:**

**Pressure Chamber**  
 Motor: Core Sensors Model: CS10 - 240C  
 Press. Controller: S/N - G205141344  
 Pressure Sensors:  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
 Phidget: S/N - 5015249240311

**Deflection Gauges ( Phidget potentiometers)**  
 Sensor 1: S/N - F29B  
 Sensor 2: S/N - 9BFA  
 Sensor 3: S/N - 87CE  
 Sensor 4: S/N - F16B  
 Sensor 5: S/N - F14E  
 Sensor 6: S/N - F28I  
 Sensor 7: S/N - F174  
 Sensor 8: S/N - F282



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	12:11	Temp:	21.5 C
Finish:	12:27	%RH	19

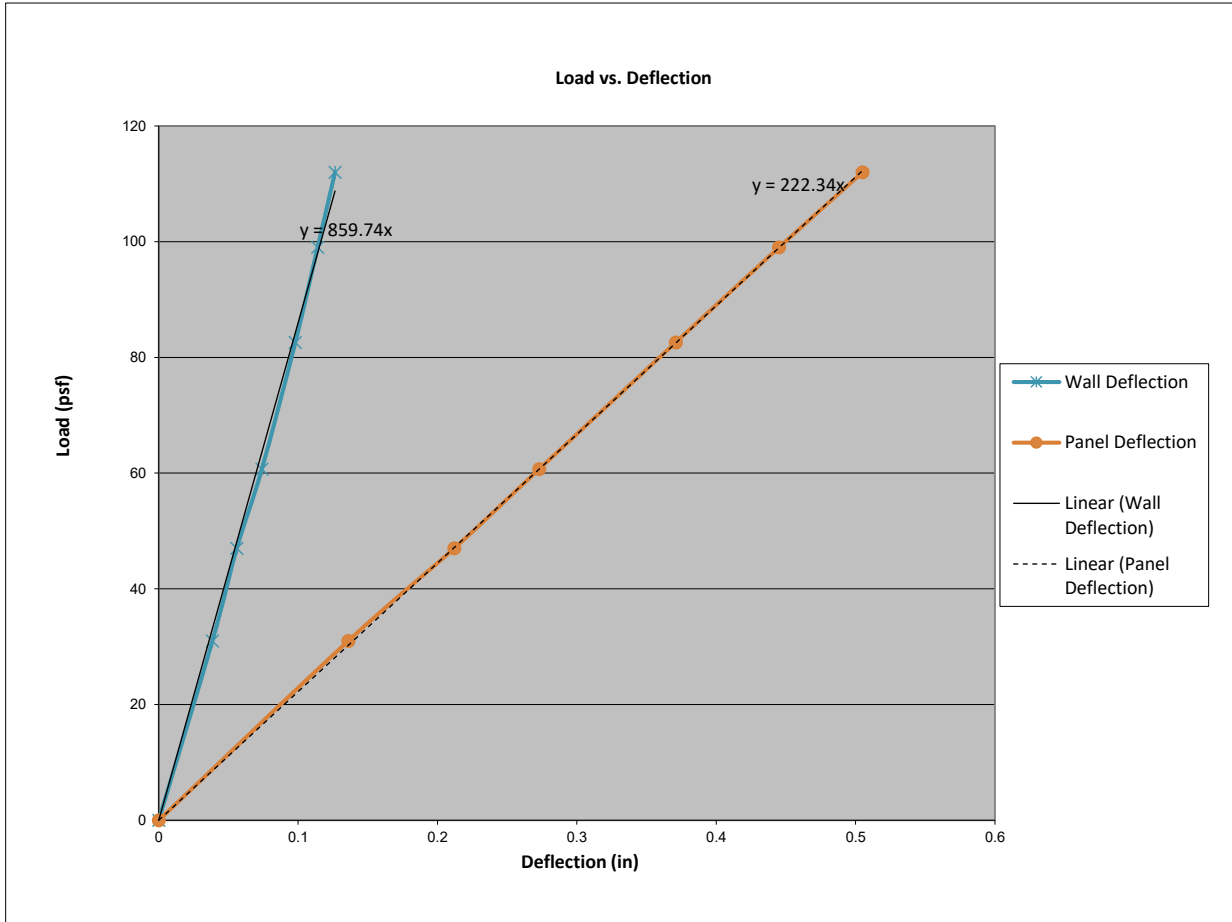
Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	24

Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	immed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	31	10 sec.	0.063	0.072	0.146	0.172	0.103	0.106	0.242	0.158	
0		1-5mins	0.005	0.009	0.009	0.009	0.007	0.007	0.01	0.009	
45	47	10 sec.	0.099	0.115	0.231	0.269	0.167	0.163	0.375	0.25	
0		1-5mins	0.013	0.019	0.019	0.022	0.015	0.014	0.022	0.019	
60	60.7	10 sec.	0.126	0.148	0.304	0.352	0.22	0.211	0.484	0.328	
0		1-5mins	0.017	0.027	0.028	0.032	0.021	0.018	0.033	0.027	
75	82.6	10 sec.	0.173	0.205	0.421	0.489	0.306	0.287	0.658	0.449	
0		1-5mins	0.028	0.042	0.042	0.051	0.033	0.028	0.05	0.041	
90	99	10 sec.	0.207	0.251	0.505	0.589	0.367	0.343	0.788	0.54	
0		1-5mins	0.036	0.052	0.052	0.066	0.041	0.035	0.063	0.05	
115	112	10 sec.	0.232	0.283	0.569	0.669	0.414	0.384	0.889	0.608	
0		1-5mins	0.041	0.058	0.059	0.076	0.048	0.038	0.072	0.055	
130	128.8	10 sec.	0.261	0.318	0.65	0.773	0.473	0.435	1.017	0.696	
0		1-5mins	0.049	0.065	0.07	0.094	0.057	0.046	0.091	0.065	
145	145	10 sec.	0.292	0.352	0.731	0.881	0.529	0.487	1.146	0.782	
0		1-5mins	0.057	0.07	0.079	0.111	0.065	0.051	0.109	0.074	

Mode of Failure		
Max Load (psf)	145.0	Screws were pulled out of the steel studs. □



Test#:	QI1-1
Max Load	145.0 psf
Allowable Design Load (ASD) = Max Load / 2.5	58.0 psf
Deflection Service Load (ASD) = Allowable * 0.7	40.6 psf
Wall Deflection limit = L / 180 of wall height	0.667 in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.400 in
Wall Deflection @ Deflection Service Load (ASD)	0.0472 in
Panel Deflection @ Deflection Service Load (ASD)	0.1824 in
Max Load @ Wall Deflection Limit	145 psf
Max Load @ Panel Deflection Limit	89 psf



Target Load (psf)	Wall Deflection (= ga 6 - ga 1 + ga 2)/2 (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
31.0	0.039	0.136
47.0	0.056	0.212
60.7	0.074	0.273
82.6	0.098	0.371
99.0	0.114	0.445
112.0	0.127	0.505
128.8	0.146	0.582
145.0	0.165	0.659



**BOCA ENGINEERING CO. | SPAR**  
STRUCTURAL & CIVIL CONSULTANTS

Test: **Transverse Load - Negative Wind Load**  
Client: Engage Building Products  
Date: 21-Dec-24  
Product: **QuickPanel Systems**

Test#: **Q11-2**

Project#: 0093  
Technician(s): Ali  
Reviewer: Chris  
Location: 101-4441 76 Ave. SE Calgary AB T2C2G8

Test Method(s): ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

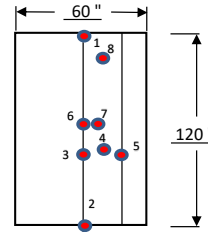
**Installation:**  
Configuration: 24" O.C. stiffeners, 16" O.C. studs  
Framing: 2x6 steel stud, 33ksi  
Fastener: #10-1x1-1/2 HWH  
Sheathing: 1/2" Drywall  
Air Seal: 3M Tape used to air seal panel gaps with Primer

**Equipment:**  
Pressure Chamber  
Motor: Core Sensors Model: CS10 - 2400  
Press. Controller: S/N - G205141344  
Pressure Sensors:  
+/- 2 kPa: p/n 1136  
+/- 7 kPa: p/n 1137  
50 kPa: p/n 1138  
Phidget: S/N - 5015249240311

**Deflection Gauges( Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F174
Sensor 8:	S/N - F282

**Gauge Locations**  
(not to scale)  
Gauge 1: Stud  
Gauge 2: Stud  
Gauge 3: Stud  
Gauge 4: Panel  
Gauge 5: Stud  
Gauge 6: Stud  
Gauge 7: Panel  
Gauge 8: Panel



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	12:30	Temp:	21.2 C
Finish:	12:52	%RH	17

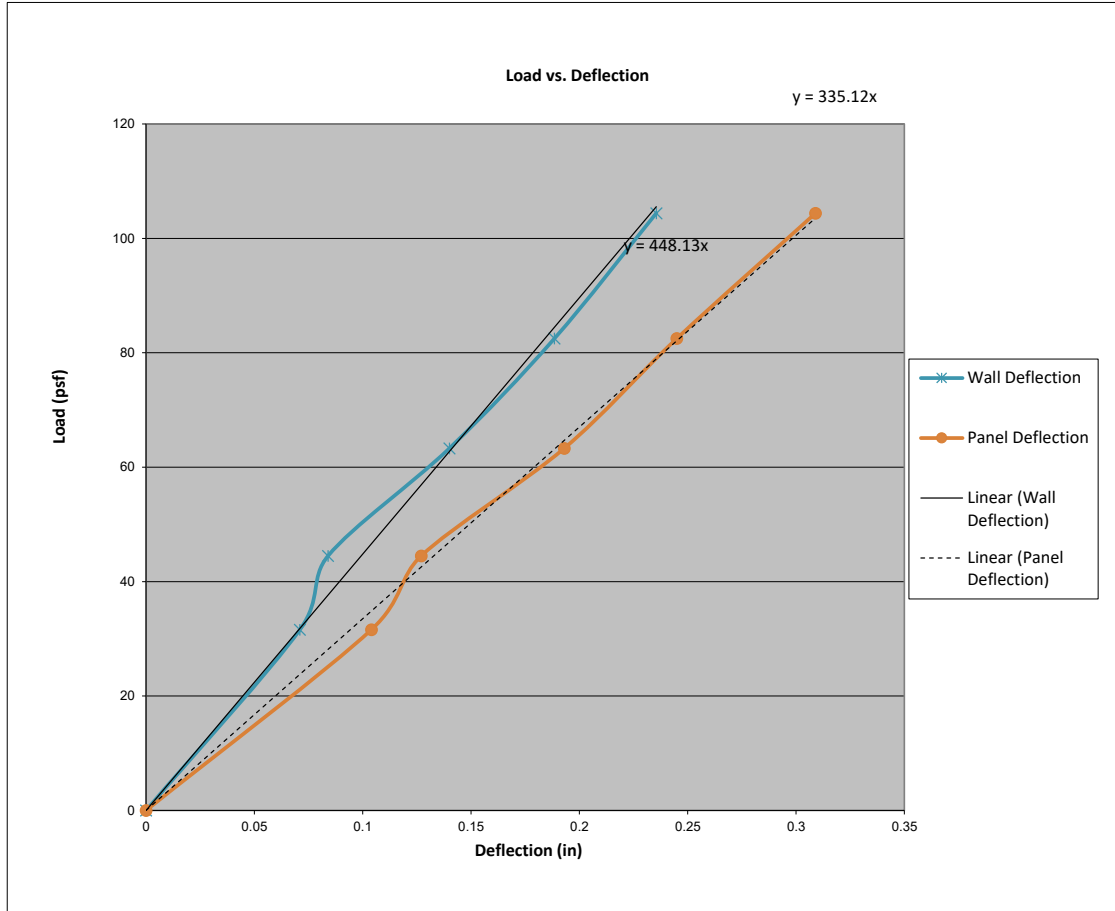
Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	24

Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	immed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15.8	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins									
30	31.6	10 sec.	0.074	0.068	0.148	0.191	0.097	0.142	0.246	0.146	
0		1-5mins	0.013	0.012	0.017	0.042	0.013	0.015	0.042	0.015	
45	44.5	10 sec.	0.105	0.095	0.2	0.25	0.13	0.184	0.311	0.186	
0		1-5mins	0.021	0.019	0.025	0.051	0.019	0.026	0.05	0.023	
60	63.3	10 sec.	0.169	0.141	0.316	0.378	0.215	0.295	0.488	0.318	
0		1-5mins	0.033	0.015	0.037	0.065	0.03	0.037	0.062	0.035	
75	82.5	10 sec.	0.208	0.181	0.414	0.495	0.283	0.383	0.628	0.417	
0		1-5mins	0.042	0.023	0.047	0.078	0.038	0.048	0.074	0.045	
90	104.4	10 sec.	0.252	0.235	0.525	0.63	0.359	0.479	0.788	0.528	
0		1-5mins	0.054	0.033	0.06	0.096	0.05	0.059	0.095	0.057	
115	120.5	10 sec.	0.286	0.276	0.605	0.73	0.416	0.541	0.905	0.608	
0		1-5mins	0.064	0.041	0.071	0.115	0.06	0.069	0.112	0.067	
130	137.2	10 sec.	0.32	0.315	0.688	0.837	0.475	0.608	1.032	0.693	
0		1-5mins	0.072	0.049	0.08	0.135	0.069	0.079	0.131	0.076	

Mode of Failure	
Max Load (psf)	137.2
Screws were pulled out of the steel studs. □	



Test#:	QI1-2	
Max Load	137.2	psf
Allowable Design Load (ASD) = Max Load / 2.5	54.9	psf
Deflection Service Load (ASD) = Allowable * 0.7	38.4	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.400	in
Wall Deflection @ Deflection Service Load (ASD)	0.0857	in
Panel Deflection @ Deflection Service Load (ASD)	0.1146	in
Max Load @ Wall Deflection Limit	137	psf
Max Load @ Panel Deflection Limit	134	psf



Target Load (psf)	Wall Deflection (= ga 6 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
31.6	0.071	0.104
44.5	0.084	0.127
63.3	0.140	0.193
82.5	0.189	0.245
104.4	0.236	0.309
120.5	0.260	0.364
137.2	0.291	0.424



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

Test: **Transverse Load - Negative Wind Load**  
 Client: Engage Building Products  
 Date: 16-Dec-24  
 Product: **QuickPanel Systems**  
 Test Method(s): ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

Test#: QI1-3

Project#: 0093  
 Technician(s): Ali  
 Reviewer: Chris  
 Location: 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

Configuration: 24" O.C. stiffeners, 16" O.C. studs  
 Framing: 2x6 steel stud, 33ksi  
 Fastener: #10-1x1-1/2 HWH  
 Sheathing: 1/2" Drywall  
 Air Seal: 3M Tape used to air seal panel gaps with Primer

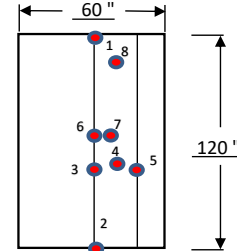
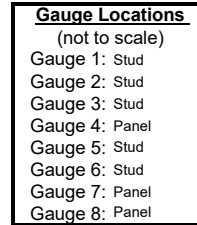
**Equipment:**

**Pressure Chamber**

Motor: Core Sensors Model: CS10 - 2400  
 Press. Controller: S/N - G205141344  
 Pressure Sensors:  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
 Phidget: S/N - 5015249240311

**Deflection Gauges( Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F174
Sensor 8:	S/N - F282



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	12:11	Temp:	21.5 C
Finish:	12:27 PM	%RH	19

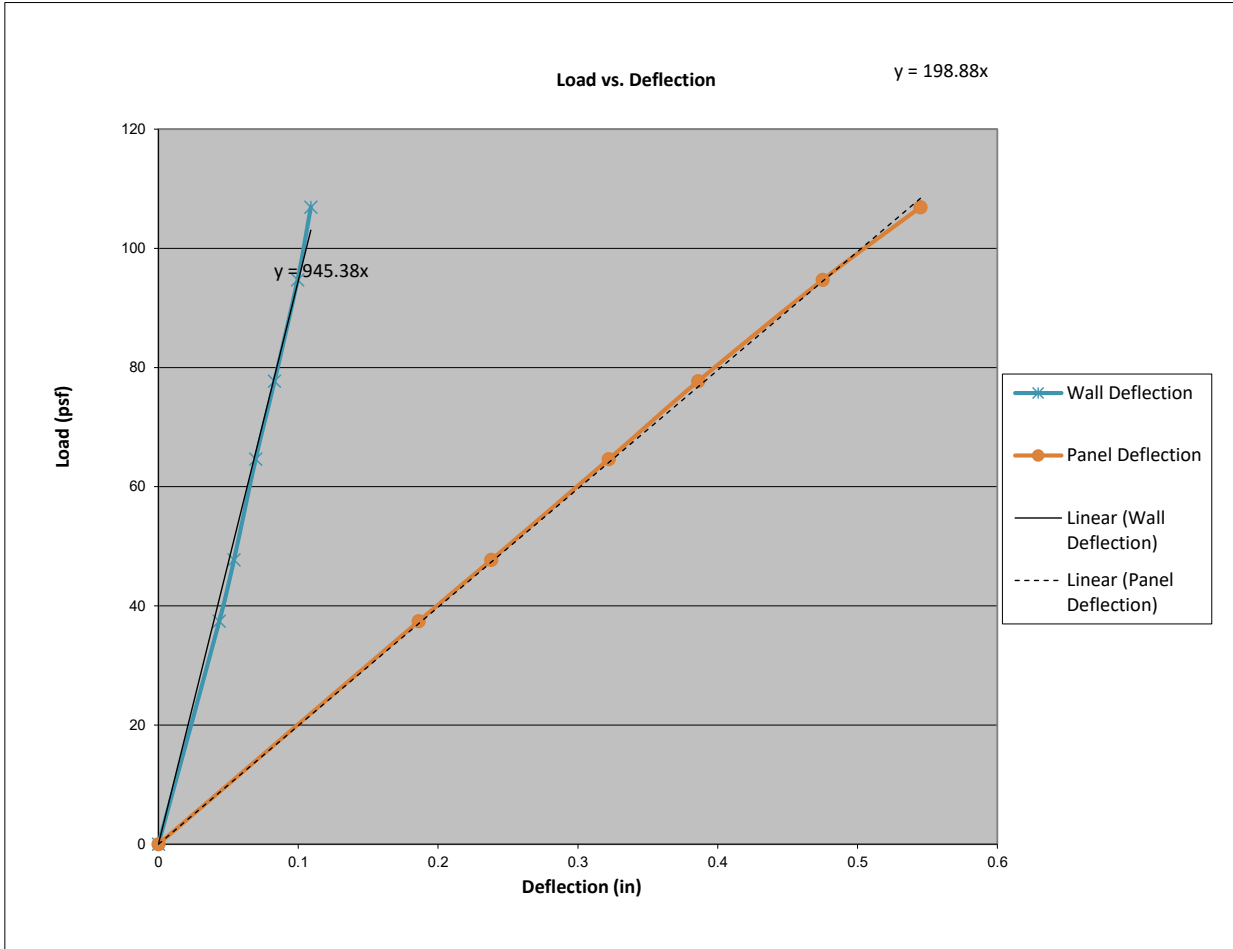
Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	24

Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	immed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	37.4	10 sec.	0.07	0.097	0.194	0.235	0.155	0.127	0.313	0.213	
0		1-5mins	0.005	0.008	0.013	0.011	0.011	0.01	0.013	0.013	
45	47.7	10 sec.	0.089	0.127	0.253	0.303	0.199	0.162	0.4	0.275	
0		1-5mins	0.009	0.014	0.019	0.018	0.016	0.014	0.021	0.019	
60	64.6	10 sec.	0.122	0.179	0.35	0.419	0.276	0.22	0.542	0.378	
0		1-5mins	0.015	0.023	0.028	0.028	0.023	0.021	0.032	0.029	
75	77.7	10 sec.	0.15	0.222	0.43	0.514	0.338	0.269	0.655	0.46	
0		1-5mins	0.02	0.031	0.037	0.038	0.031	0.029	0.042	0.037	
90	94.7	10 sec.	0.185	0.274	0.529	0.638	0.415	0.329	0.804	0.568	
0		1-5mins	0.027	0.04	0.048	0.052	0.04	0.033	0.057	0.048	
105	106.9	10 sec.	0.207	0.313	0.6	0.735	0.475	0.369	0.914	0.646	
0		1-5mins	0.032	0.047	0.054	0.066	0.046	0.037	0.068	0.056	
120	119	10 sec.	0.229	0.354	0.674	0.825	0.533	0.408	1.015	0.726	
0		1-5mins	0.038	0.057	0.064	0.085	0.057	0.042	0.09	0.067	
145	137.6	10 sec.	0.261	0.41	0.79	0.969	0.62	0.465	1.179	0.855	
0		1-5mins	0.044	0.07	0.084	0.121	0.072	0.048	0.125	0.087	

Mode of Failure	
Max Load (psf)	137.6
Screws were pulled out of the steel studs. □	



Test#:	QI1-3	
Max Load	137.6	psf
Allowable Design Load (ASD) = Max Load / 2.5	55.0	psf
Deflection Service Load (ASD) = Allowable * 0.7	38.5	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.400	in
Wall Deflection @ Deflection Service Load (ASD)	0.0415	in
Panel Deflection @ Deflection Service Load (ASD)	0.1923	in
Max Load @ Wall Deflection Limit	138	psf
Max Load @ Panel Deflection Limit	80	psf



Target Load (psf)	Wall Deflection (= ga 6 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - (ga 6) (in)
0.0	0.000	0.000
37.4	0.044	0.186
47.7	0.054	0.238
64.6	0.070	0.322
77.7	0.083	0.386
94.7	0.100	0.475
106.9	0.109	0.545
119.0	0.117	0.607



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

Test: **Transverse Load - Negative Wind Load**  
 Client: Engage Building Products  
 Date: 03-Jan-25  
 Product: **QuickPanel Systems**  
 Test Method(s): ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

Test#: **QI2-1**

Project#: 0093  
 Technician(s): Ali  
 Reviewer: Chris  
 Location: 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

Configuration: 24" O.C. stiffeners, 16" O.C. studs  
 Framing: 2x6 steel stud, 33ksi  
 Fastener: #10-1x1-1/2 HWH  
 Sheathing: 1/2" Drywall  
 Air Seal: Double sided 3M Tape with Primer & Silicon

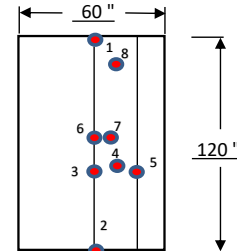
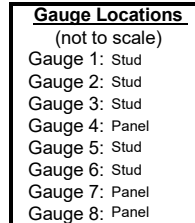
**Equipment:**

**Pressure Chamber**

Motor: Core Sensors Model: CS10 - 2400  
 Press. Controller: S/N - G205141344  
 Pressure Sensors:  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
 Phidget: S/N - 5015249240311

**Deflection Gauges (Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F174
Sensor 8:	S/N - F282



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	9:38	Temp:	20.4 C
Finish:	10:08	%RH	16

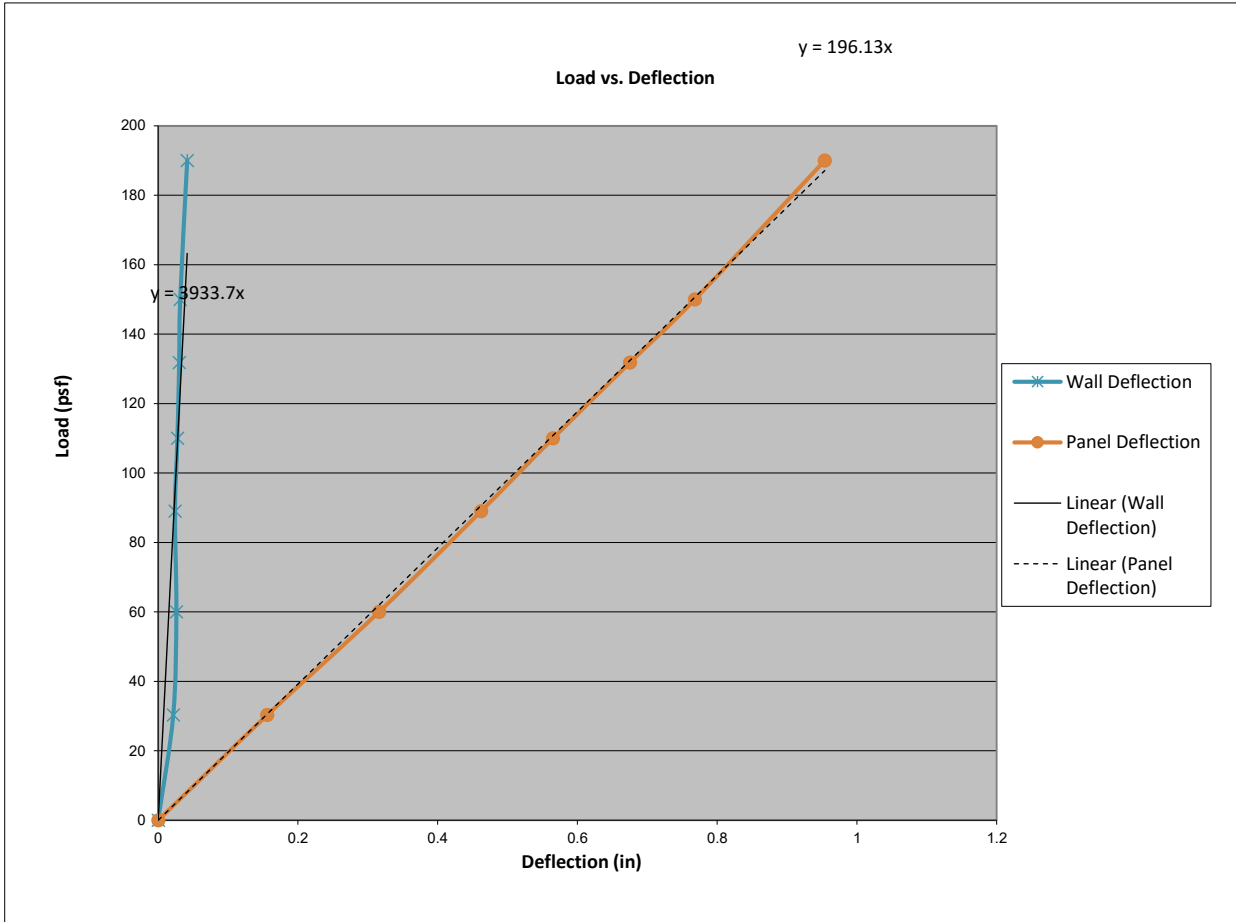
Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	24

Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	immed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	30.3	10 sec.	0.062	0.077	0.149	0.181	0.124	0.091	0.247	0.15	
0		1-5mins	0.002	0.003	0.005	0.004	0.002	0.003	0.005	0.003	
60	60	10 sec.	0.121	0.171	0.312	0.377	0.261	0.172	0.488	0.318	
0		1-5mins	0.012	0.026	0.022	0.022	0.017	0.012	0.025	0.019	
90	89	10 sec.	0.173	0.267	0.464	0.56	0.38	0.244	0.706	0.468	
0		1-5mins	0.019	0.042	0.035	0.039	0.029	0.018	0.043	0.03	
110	110	10 sec.	0.211	0.336	0.579	0.701	0.471	0.301	0.866	0.575	
0		1-5mins	0.026	0.058	0.047	0.06	0.042	0.025	0.063	0.042	
130	131.8	10 sec.	0.25	0.404	0.69	0.846	0.563	0.357	1.032	0.687	
0		1-5mins	0.035	0.073	0.06	0.089	0.057	0.032	0.091	0.054	
150	150	10 sec.	0.283	0.456	0.782	0.967	0.639	0.401	1.169	0.776	
0		1-5mins	0.041	0.086	0.072	0.117	0.069	0.037	0.12	0.065	
190	190	10 sec.	0.338	0.545	0.948	1.215	0.785	0.483	1.437	0.943	
0		1-5mins	0.053	0.106	0.099	0.188	0.099	0.048	0.193	0.088	
210	216	10 sec.	0.395	0.631	1.1	1.453	0.923	0.545	1.67	1.089	
0		1-5mins	0.066	0.126	0.125	0.245	0.13	0.057	0.254	0.111	
230	222.2	10 sec.	0.423	0.677	1.164	1.598	1.01	0.574	1.809	1.15	
0		1-5mins	0.087	0.139	0.151	0.517	0.241	0.064	0.493	0.135	
0											
120											
0											
140											
0											

Mode of Failure	
Max Load (psf)	222.2
Screws were pulled out of the steel studs while going to 250 PSF. □	



Test#:	Q12-1	
Max Load	222.2	psf
Allowable Design Load (ASD) = Max Load / 2.5	88.9	psf
Deflection Service Load (ASD) = Allowable * 0.7	62.2	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.400	in
Wall Deflection @ Deflection Service Load (ASD)	0.0143	in
Panel Deflection @ Deflection Service Load (ASD)	0.3206	in
Max Load @ Wall Deflection Limit	222	psf
Max Load @ Panel Deflection Limit	78	psf



Target Load (psf)	Wall Deflection (= ga 6 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
30.3	0.022	0.156
60.0	0.026	0.316
89.0	0.024	0.462
110.0	0.028	0.565
131.8	0.030	0.675
150.0	0.032	0.768
190.0	0.042	0.954
216.0	0.032	1.125
222.2	0.024	1.235



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

Test: **Transverse Load - Negative Wind Load**  
 Client: Engage Building Products  
 Date: 07-Jan-25  
 Product: **QuickPanel Systems**  
 Test Method(s): ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

Test#: **QI2-2**

Project#: 0093  
 Technician(s): Ali  
 Reviewer: Chris  
 Location: 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

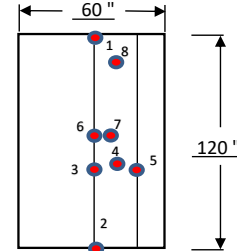
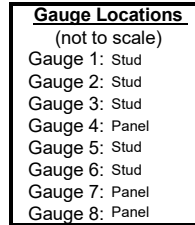
Configuration: 24" O.C. stiffeners, 16" O.C. studs  
 Framing: 2x6 steel stud, 33ksi  
 Fastener: #10-1x1-1/2 HWH  
 Sheathing: 1/2" Drywall  
 Air Seal: Double sided 3M Tape with Primer & Silicon

**Equipment:**

**Pressure Chamber**  
 Motor: Core Sensors Model: CS10 - 2400  
 Press. Controller: S/N - G205141344  
 Pressure Sensors:  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
 Phidget: S/N - 5015249240311

**Deflection Gauges (Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F174
Sensor 8:	S/N - F282



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	12:10	Temp:	20.4 C
Finish:	12:47	%RH	18

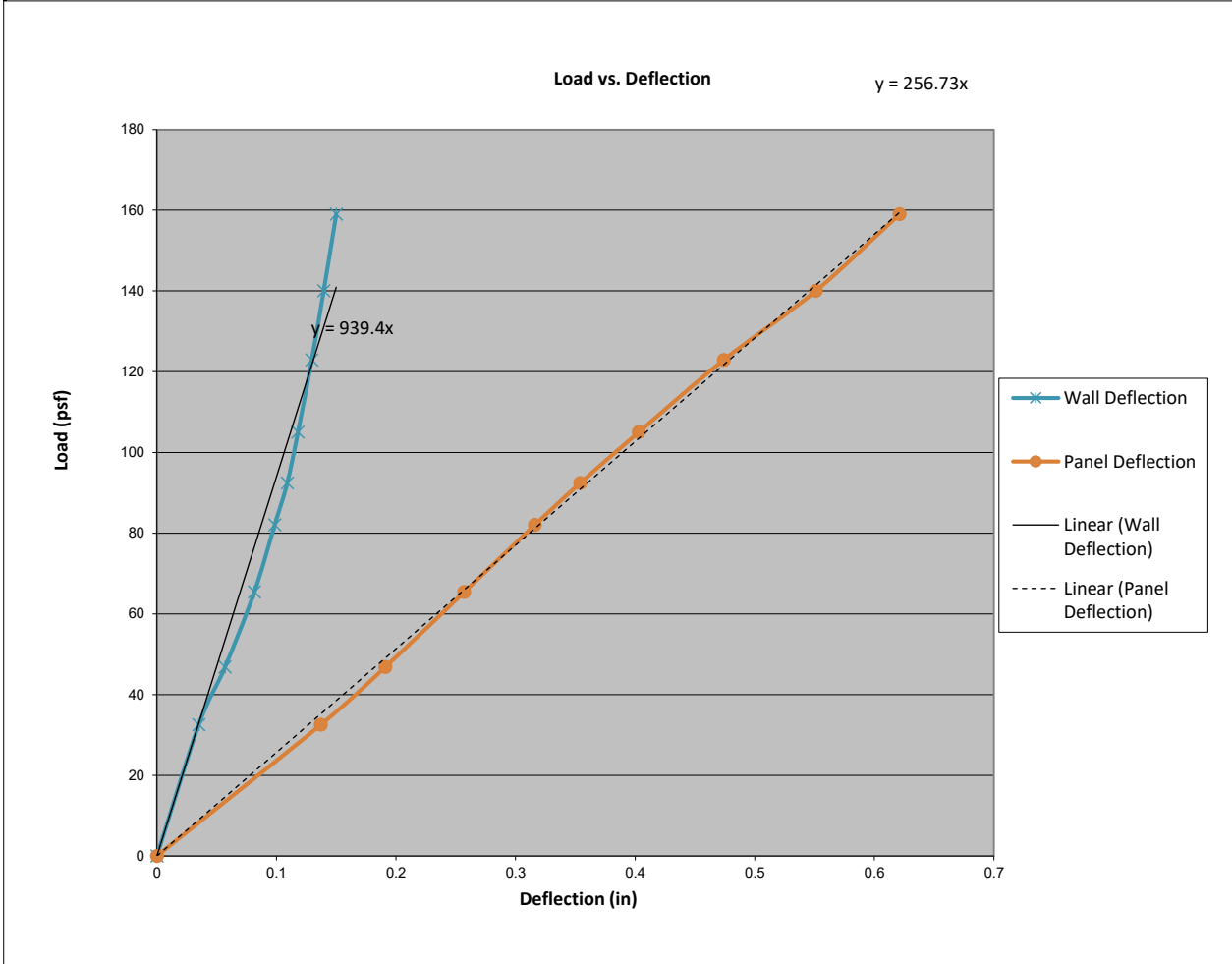
Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	24

Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	immed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	32.5	10 sec.	0.075	0.073	0.156	0.186	0.115	0.109	0.246	0.16	
0		1-5mins	0.002	0.004	0.004	0.003	0.003	0.004	0.003	0.004	
45	46.8	10 sec.	0.106	0.112	0.23	0.273	0.171	0.166	0.357	0.236	
0		1-5mins	0.006	0.011	0.011	0.012	0.009	0.01	0.012	0.012	
60	65.4	10 sec.	0.148	0.159	0.325	0.382	0.241	0.235	0.492	0.334	
0		1-5mins	0.015	0.022	0.022	0.023	0.017	0.019	0.024	0.022	
75	82	10 sec.	0.188	0.205	0.413	0.477	0.306	0.295	0.611	0.422	
0		1-5mins	0.024	0.03	0.03	0.034	0.025	0.029	0.037	0.031	
90	92.4	10 sec.	0.215	0.235	0.47	0.541	0.35	0.334	0.688	0.48	
0		1-5mins	0.032	0.035	0.037	0.042	0.031	0.036	0.044	0.039	
105	105	10 sec.	0.241	0.271	0.533	0.616	0.4	0.374	0.777	0.544	
0		1-5mins	0.039	0.042	0.045	0.034	0.039	0.043	0.053	0.047	
120	122.9	10 sec.	0.276	0.321	0.623	0.72	0.472	0.428	0.902	0.633	
0		1-5mins	0.049	0.052	0.056	0.051	0.05	0.052	0.07	0.058	
135	140	10 sec.	0.312	0.371	0.717	0.833	0.546	0.481	1.032	0.729	
0		1-5mins	0.058	0.064	0.068	0.072	0.06	0.062	0.088	0.069	
150	159	10 sec.	0.346	0.422	0.808	0.941	0.617	0.534	1.155	0.818	
0		1-5mins	0.067	0.075	0.083	0.095	0.073	0.073	0.112	0.082	
175	180.1	10 sec.	0.383	0.48	0.91	1.073	0.697	0.602	1.304	0.918	
		1-5mins	0.075	0.089	0.098	0.145	0.087	0.083	0.145	0.098	
200	205	10 sec.	0.434	0.578	1.06	1.263	0.812	0.694	1.502	1.066	
		1-5mins	0.085	0.119	0.128	0.2	0.113	0.101	0.203	0.125	

Mode of Failure		
Max Load (psf)	205.0	The densglass failed and ripped while going to 240 PSF



Test#:	Q12-2	
Max Load	205.0	psf
Allowable Design Load (ASD) = Max Load / 2.5	82.0	psf
Deflection Service Load (ASD) = Allowable * 0.7	57.4	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.400	in
Wall Deflection @ Deflection Service Load (ASD)	0.0633	in
Panel Deflection @ Deflection Service Load (ASD)	0.2239	in
Max Load @ Wall Deflection Limit	205	psf
Max Load @ Panel Deflection Limit	103	psf



Target Load (psf)	Wall Deflection (= ga 6 - ga 1 + ga 2)/2 (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
32.5	0.035	0.137
46.8	0.057	0.191
65.4	0.082	0.257
82.0	0.099	0.316
92.4	0.109	0.354
105.0	0.118	0.403
122.9	0.130	0.474
140.0	0.140	0.551
159.0	0.150	0.621
180.1	0.171	0.702
205.0	0.188	0.808



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

Test: **Transverse Load - Negative Wind Load**  
 Client: Engage Building Products  
 Date: 02-Jan-25  
 Product: **QuickPanel Systems**  
 Test Method(s): ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

Test#: **QI2-3**

Project#: 0093  
 Technician(s): Ali  
 Reviewer: Chris  
 Location: 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

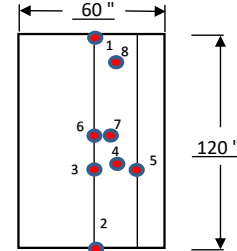
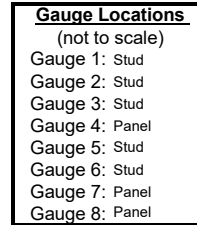
Configuration: 24" O.C. stiffeners, 16" O.C. studs  
 Framing: 2x6 steel stud, 33ksi  
 Fastener: #10-1x1-1/2 HWH  
 Sheathing: 1/2" Drywall  
 Air Seal: Double sided 3M Tape with Primer & Silicon

**Equipment:**

**Pressure Chamber**  
 Motor: Core Sensors Model: CS10 - 2400  
 Press. Controller: S/N - G205141344  
 Pressure Sensors:  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
 Phidget: S/N - 5015249240311

**Deflection Gauges (Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F17A
Sensor 8:	S/N - F282



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	1:27	Temp:	21 C
Finish:	2:15	%RH	17

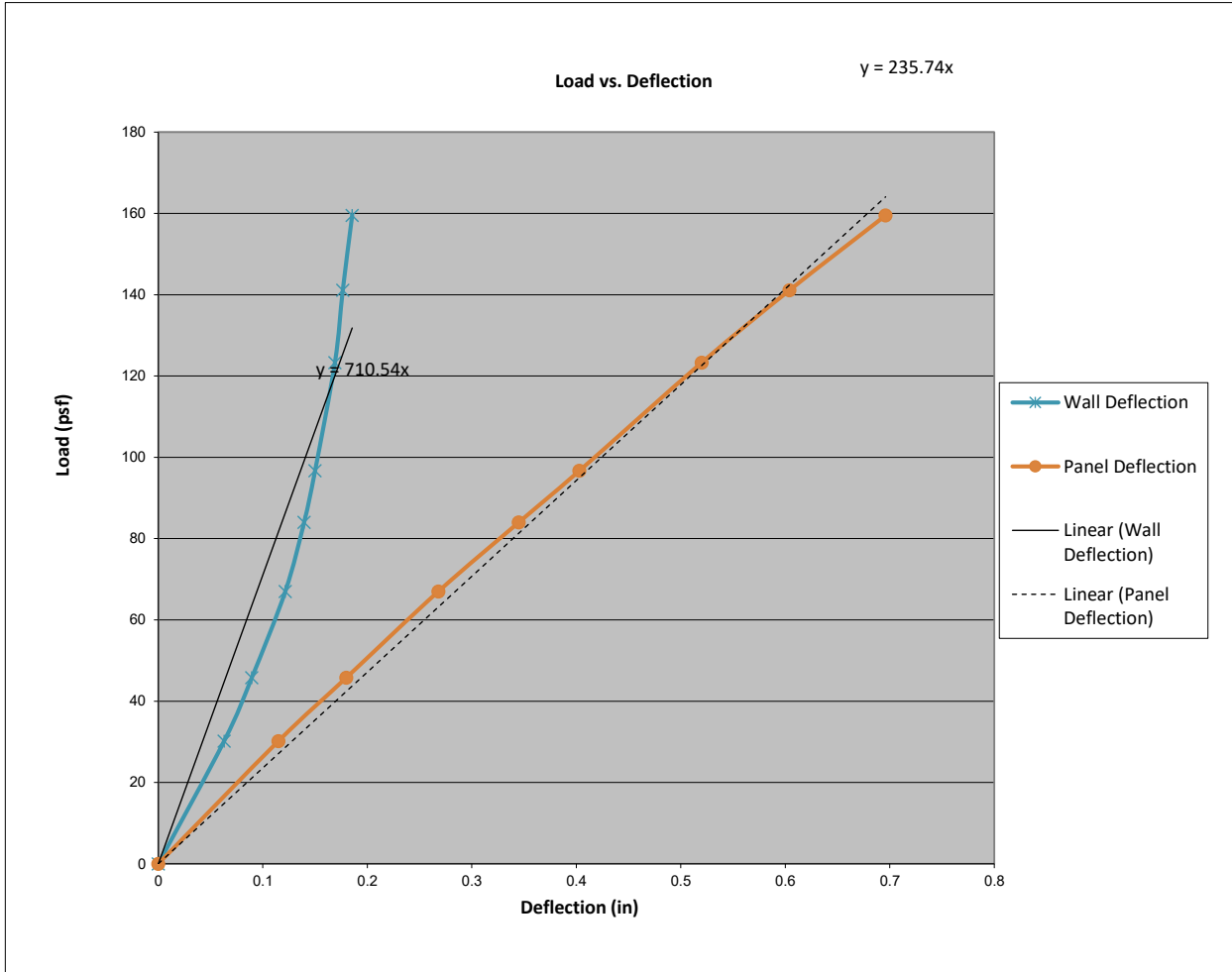
Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	24

Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	immed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	30.2	10 sec.	0.054	0.056	0.149	0.166	0.098	0.118	0.233	0.158	
0		1-5mins	0.001	0.001	0.001	0.001	0.001	0.003	0.001	0.001	
45	45.8	10 sec.	0.086	0.091	0.234	0.261	0.153	0.178	0.358	0.251	
0		1-5mins	0.004	0.005	0.006	0.006	0.004	0.006	0.005	0.005	
60	67	10 sec.	0.137	0.156	0.366	0.406	0.237	0.268	0.536	0.388	
0		1-5mins	0.016	0.019	0.019	0.02	0.015	0.019	0.022	0.018	
75	84	10 sec.	0.169	0.214	0.471	0.521	0.298	0.331	0.676	0.496	
0		1-5mins	0.024	0.035	0.039	0.032	0.025	0.028	0.033	0.032	
95	96.7	10 sec.	0.195	0.263	0.039	0.605	0.345	0.379	0.782	0.032	
0		1-5mins	0.031	0.049	0.039	0.028	0.034	0.037	0.049	0.032	
120	123.3	10 sec.	0.249	0.353	0.039	0.788	0.437	0.47	0.99	0.032	
0		1-5mins	0.048	0.074	0.039	0.062	0.051	0.05	0.084	0.032	
140	141.1	10 sec.	0.289	0.416	0.039	0.921	0.499	0.529	1.133	0.032	
0		1-5mins	0.063	0.09	0.039	0.081	0.062	0.06	0.107	0.032	
160	159.5	10 sec.	0.329	0.474	0.039	1.056	0.562	0.587	1.283	0.032	
0		1-5mins	0.076	0.11	0.039	0.117	0.076	0.073	0.142	0.032	
180	176.5	10 sec.	0.375	0.537	0.039	1.314	0.68	0.657	1.569	0.032	
0		1-5mins	0.082	0.117	0.039	0.251	0.129	0.1	0.289	0.032	
190	190.5	10 sec.	0.417	0.592	0.039	1.586	0.823	0.73	1.856	0.032	
0		1-5mins	0.093	0.128	0.039	0.435	0.199	0.132	0.495	0.032	
205	213.4	10 sec.	0.484	0.973	0.039	1.989	1.065	0.845	2.279	0.032	
0		1-5mins	0.106	0.151	0.039	0.73	0.421	0.166	0.836	0.032	

Mode of Failure		
Max Load (psf)	213.4	The Steel stud bent and twisted in the middle while going to 240 PSF.



Test#:	Q12-3	
Max Load	213.4	psf
Allowable Design Load (ASD) = Max Load / 2.5	85.4	psf
Deflection Service Load (ASD) = Allowable * 0.7	59.8	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.400	in
Wall Deflection @ Deflection Service Load (ASD)	0.0841	in
Panel Deflection @ Deflection Service Load (ASD)	0.2441	in
Max Load @ Wall Deflection Limit	213	psf
Max Load @ Panel Deflection Limit	98	psf



Target Load (psf)	Wall Deflection (= ga 6 - ga 1 + ga 2)/2 (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
30.2	0.063	0.115
45.8	0.090	0.180
67.0	0.122	0.268
84.0	0.140	0.345
96.7	0.150	0.403
123.3	0.169	0.520
141.1	0.177	0.604
159.5	0.186	0.696
176.5	0.201	0.912
190.5	0.226	1.126
213.4	0.117	1.434



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

**Test:** Transverse Load - Negative Wind Load  
**Client:** Engage Building Products  
**Date:** 06-Nov-24  
**Product:** QuickPanel Systems  
**Test Method(s):** ASTM E330/E330M-14, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

**Test#:** QI3-1

**Project#:** 0093  
**Technician(s):** Ali  
**Reviewer:** Chris  
**Location:** 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

**Configuration:** 12" O.C. stiffeners, 16" O.C. studs  
**Framing:** 2x6 steel stud, 50ksi  
**Fastener:** #10-1x1-1/2 HWH  
**Sheathing:** 1/2" Drywall  
**Air Seal:** Double sided 3M Tape with Primer

**Equipment:**

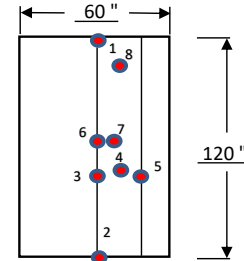
**Pressure Chamber**

Motor: Core Sensors Model: CS10 - 2400  
 Press. Controller: S/N - G205141344  
 Pressure Sensors:  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
 Phidget: S/N - 5015249240311

**Deflection Gauges( Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F174
Sensor 8:	S/N - F282

Gauge Locations	
(not to scale)	
Gauge 1:	Stud
Gauge 2:	Stud
Gauge 3:	Stud
Gauge 4:	Panel
Gauge 5:	Stud
Gauge 6:	Stud
Gauge 7:	Panel
Gauge 8:	Panel



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	12:30	Temp:	23.5 C
Finish:	1:35	%RH	19

Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	12

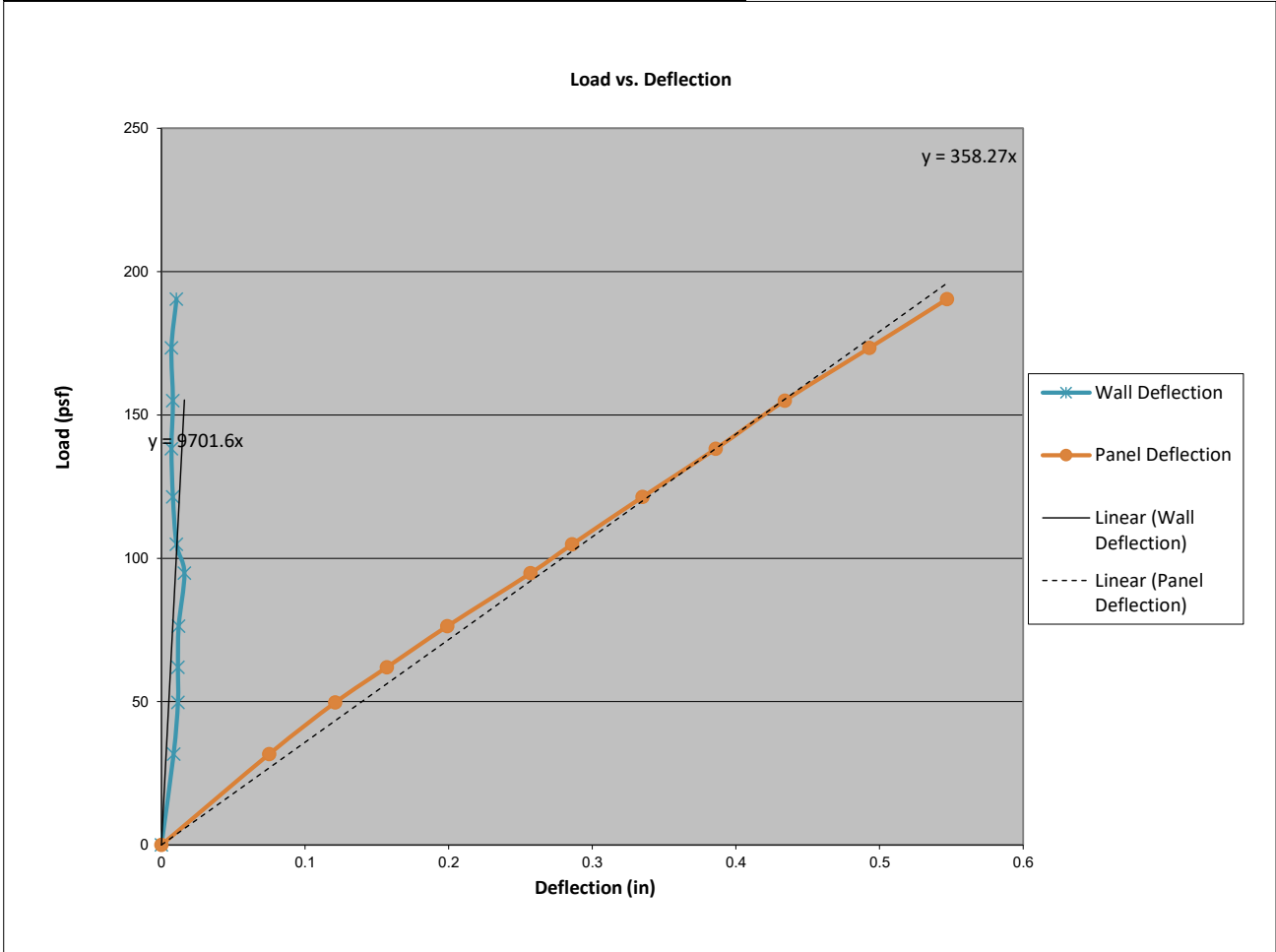
Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations	
0	0.0	imed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
0		1-5mins	Zero Deflection Gauges									
30	31.7	10 sec.	0.048	0.047	0.134	0.144	0.094	0.056	0.131	0.13		
0		1-5mins	0	0.001	0	0	0	0.001	0.001	0		
45	49.7	10 sec.	0.071	0.074	0.213	0.222	0.149	0.084	0.205	0.205		
0		1-5mins	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001		
60	62	10 sec.	0.088	0.097	0.272	0.279	0.189	0.104	0.261	0.259		
0		1-5mins	0.001	0.003	0.004	0.003	0.003	0.003	0.004	0.004		
75	76.3	10 sec.	0.113	0.129	0.346	0.353	0.243	0.133	0.332	0.331		
0		1-5mins	0.004	0.006	0.01	0.009	0.008	0.007	0.009	0.009		
90	94.8	10 sec.	0.133	0.171	0.445	0.45	0.312	0.168	0.425	0.42		
0		1-5mins	0.01	0.013	0.018	0.017	0.014	0.012	0.019	0.018		
105	104.9	10 sec.	0.16	0.195	0.5	0.505	0.35	0.188	0.474	0.47		
0		1-5mins	0.012	0.017	0.024	0.025	0.019	0.015	0.025	0.023		
120	121.4	10 sec.	0.187	0.235	0.592	0.59	0.41	0.219	0.554	0.553		
0		1-5mins	0.017	0.023	0.034	0.035	0.025	0.019	0.035	0.033		
135	138.2	10 sec.	0.216	0.278	0.689	0.684	0.475	0.254	0.64	0.644		
0		1-5mins	0.022	0.033	0.048	0.048	0.035	0.024	0.045	0.045		
150	155	10 sec.	0.243	0.319	0.792	0.774	0.54	0.289	0.723	0.735		
0		1-5mins	0.027	0.041	0.064	0.061	0.044	0.029	0.058	0.057		
165	173.4	10 sec.	0.276	0.368	0.915	0.882	0.617	0.329	0.822	0.843		
0		1-5mins	0.034	0.053	0.089	0.082	0.059	0.034	0.076	0.076		
185	190.4	10 sec.	0.304	0.413	1.035	0.984	0.689	0.369	0.916	0.947		
0		1-5mins	0.037	0.059	0.109	0.099	0.068	0.036	0.089	0.094		
200	211.4	10 sec.	0.342	0.468	1.208	1.129	0.786	0.419	1.038	1.093		
0		1-5mins	0.045	0.072	0.155	0.135	0.09	0.045	0.119	0.127		
230	240.2	10 sec.	0.396	0.569	1.839	1.521	1.006	0.503	1.307	1.402		
0		1-5mins	0.03	0.098	0.492	0.3	0.199	0.058	0.238	0.273		
250	249	10 sec.	0.44	0.71	3.048	2.15	1.599	0.596	1.738	1.889		
0		1-5mins	0.049	0.164	1.072	0.709	0.502	0.089	0.489	0.548		

Mode of Failure	
Max Load (psf)	249.0
The Steel stud bent and twisted in the middle while going to 240 PSF.	



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 STRUCTURAL & CIVIL CONSULTANTS

Test#:	QI3-1	
Max Load	249.0	psf
Allowable Design Load (ASD) = Max Load / 2.5	99.6	psf
Deflection Service Load (ASD) = Allowable * 0.7	69.7	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.200	in
Wall Deflection @ Deflection Service Load (ASD)	0.0067	in
Panel Deflection @ Deflection Service Load (ASD)	0.1820	in
Max Load @ Wall Deflection Limit	249	psf
Max Load @ Panel Deflection Limit	77	psf



Target Load (psf)	Wall Deflection (= ga 6 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - (ga 6) (in)
0.0	0.000	0.000
31.7	0.009	0.075
49.7	0.012	0.121
62.0	0.012	0.157
76.3	0.012	0.199
94.8	0.016	0.257
104.9	0.011	0.286
121.4	0.008	0.335
138.2	0.007	0.386
155.0	0.008	0.434
173.4	0.007	0.493
190.4	0.011	0.547
211.4	0.014	0.619
240.2	0.021	0.804
249.0	0.021	1.142



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

**Test:** Transverse Load - Negative Wind Load  
**Client:** Engage Building Products  
**Date:** 06-Nov-25  
**Product:** QuickPanel Systems  
**Test Method(s):** ASTM E330/E330M-14, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

**Test#:** QI3-2

**Project#:** 0093  
**Technician(s):** Ali  
**Reviewer:** Chris  
**Location:** 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

**Configuration:** 12" O.C. stiffeners, 16" O.C. studs  
**Framing:** 2x6 steel stud, 50 ksi  
**Fastener:** #10-1x1-1/2 HWH  
**Sheathing:** 1/2" Drywall  
**Air Seal:** Double sided 3M Tape with Primer

**Equipment:**

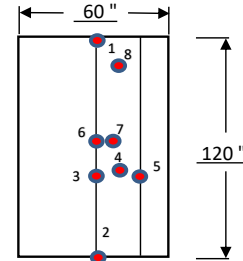
**Pressure Chamber**

Motor: Core Sensors Model: CS10 - 2400  
 Press. Controller: S/N - G205141344  
 Pressure Sensors:  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
 Phidget: S/N - 5015249240311

**Deflection Gauges( Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F174
Sensor 8:	S/N - F282

Gauge Locations	
(not to scale)	
Gauge 1:	Stud
Gauge 2:	Stud
Gauge 3:	Stud
Gauge 4:	Panel
Gauge 5:	Stud
Gauge 6:	Stud
Gauge 7:	Panel
Gauge 8:	Panel



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	11:34	Temp:	21.9
Finish:	12:35	%RH	25

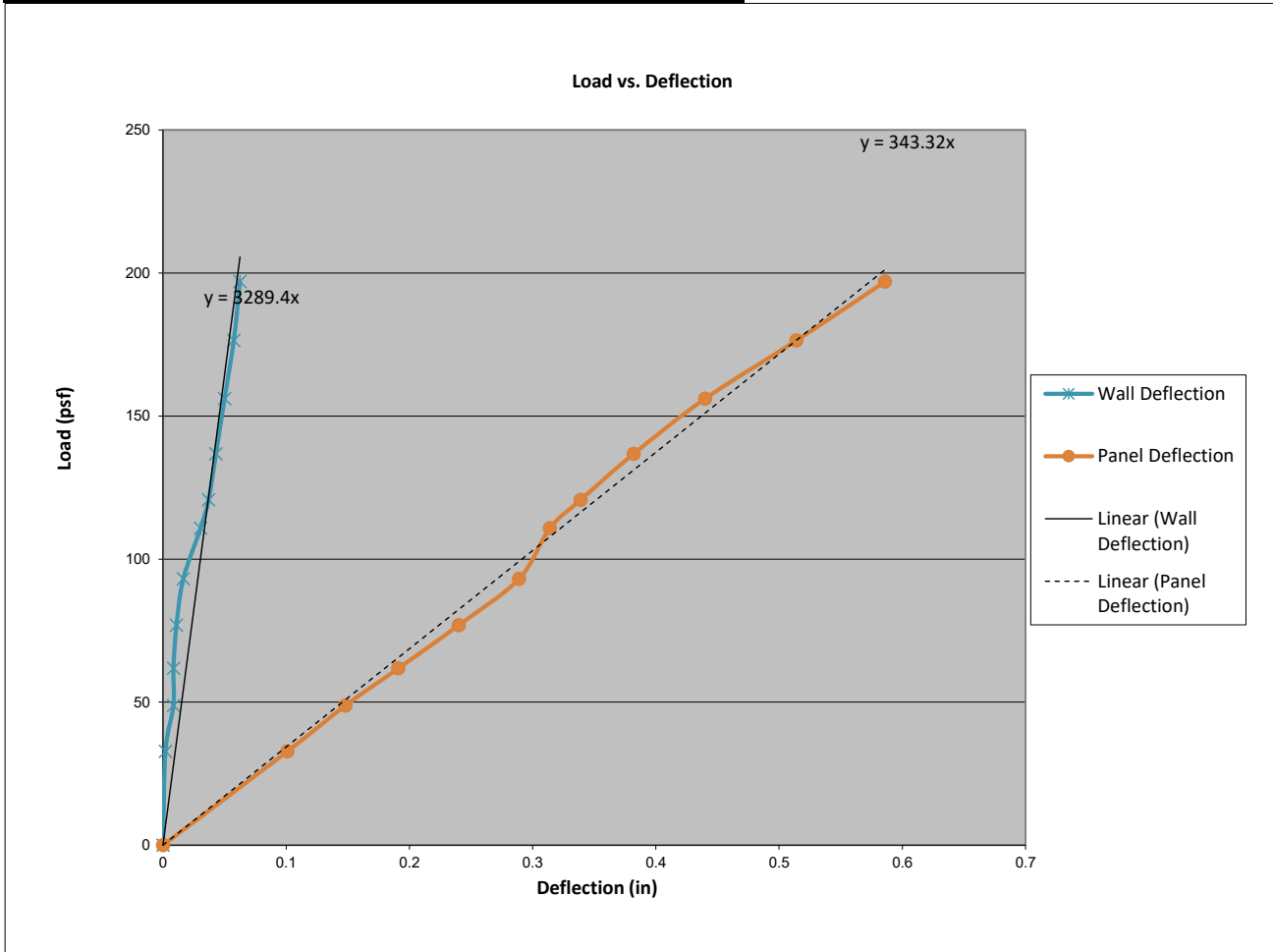
Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	12

Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	immed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	32.8	10 sec.	0.058	0.066	0.16	0.16	0.114	0.064	0.165	0.161	
0		1-5mins	0.003	0.003	0.005	0.006	0.004	0.003	0.007	0.006	
45	48.8	10 sec.	0.093	0.102	0.25	0.248	0.179	0.106	0.254	0.253	
0		1-5mins	0.01	0.009	0.012	0.013	0.009	0.01	0.015	0.015	
60	61.8	10 sec.	0.128	0.135	0.329	0.322	0.232	0.14	0.331	0.332	
0		1-5mins	0.02	0.014	0.02	0.021	0.015	0.017	0.026	0.025	
75	76.9	10 sec.	0.168	0.174	0.421	0.406	0.295	0.182	0.422	0.426	
0		1-5mins	0.032	0.02	0.03	0.032	0.022	0.027	0.036	0.037	
90	93.1	10 sec.	0.209	0.22	0.521	0.503	0.368	0.231	0.52	0.53	
0		1-5mins	0.045	0.027	0.042	0.04	0.031	0.039	0.051	0.051	
105	110.8	10 sec.	0.25	0.241	0.554	0.56	0.389	0.276	0.59	0.585	
0		1-5mins	0.062	0.032	0.052	0.052	0.037	0.053	0.065	0.065	
120	120.7	10 sec.	0.278	0.268	0.611	0.617	0.434	0.31	0.649	0.644	
0		1-5mins	0.073	0.038	0.061	0.06	0.045	0.062	0.075	0.076	
135	136.8	10 sec.	0.317	0.309	0.699	0.705	0.499	0.356	0.738	0.733	
0		1-5mins	0.087	0.048	0.077	0.076	0.06	0.078	0.094	0.094	
150	156.1	10 sec.	0.362	0.364	0.811	0.816	0.586	0.413	0.853	0.849	
0		1-5mins	0.103	0.057	0.1	0.101	0.079	0.093	0.117	0.118	
165	176.4	10 sec.	0.408	0.423	0.952	0.948	0.688	0.473	0.987	0.987	
0		1-5mins	0.118	0.07	0.125	0.123	0.098	0.109	0.142	0.143	
190	197	10 sec.	0.452	0.481	1.091	1.074	0.782	0.529	1.115	1.12	
0		1-5mins	0.134	0.083	0.155	0.151	0.118	0.121	0.174	0.175	
215	224	10 sec.	0.513	0.552	1.282	1.282	0.889	0.6	1.283	1.308	
0		1-5mins	0.154	0.093	0.204	0.195	0.149	0.142	0.219	0.223	
240	252	10 sec.	0.574	0.62	1.563	1.454	1.021	0.682	1.512	1.6	
0		1-5mins	0.171	0.097	0.294	0.263	0.189	0.159	0.291	0.313	
270	284.8	10 sec.	0.612	0.72	1.6	1.612	1.21	0.72	1.712	1.789	
0		1-5mins	0.182	0.121	0.764	0.543	0.345	0.196	0.568	0.733	

Mode of Failure	
Max Load (psf)	284.8
	Steel Studs Bent.



Test#:	QI3-2	
Max Load	284.8	psf
Allowable Design Load (ASD) = Max Load / 2.5	113.9	psf
Deflection Service Load (ASD) = Allowable * 0.7	79.7	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.200	in
Wall Deflection @ Deflection Service Load (ASD)	0.0242	in
Panel Deflection @ Deflection Service Load (ASD)	0.2470	in
Max Load @ Wall Deflection Limit	285	psf
Max Load @ Panel Deflection Limit	65	psf



Target Load (psf)	Wall Deflection (= ga 6 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - (ga 6) (in)
0.0	0.000	0.000
32.8	0.002	0.101
48.8	0.008	0.148
61.8	0.009	0.191
76.9	0.011	0.240
93.1	0.017	0.289
110.8	0.031	0.314
120.7	0.037	0.339
136.8	0.043	0.382
156.1	0.050	0.440
176.4	0.058	0.514
197.0	0.063	0.586
224.0	0.068	0.683
252.0	0.085	0.830
284.8	0.054	0.992



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

**Test:** Transverse Load - Negative Wind Load  
**Client:** Engage Building Products  
**Date:** 11/12/2024  
**Product:** QuickPanel Systems  
**Test Method(s):** ASTM E330/E330M-14, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

**Test#:** QI3-3

**Project#:** 0093  
**Technician(s):** Ali  
**Reviewer:** Chris  
**Location:** 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

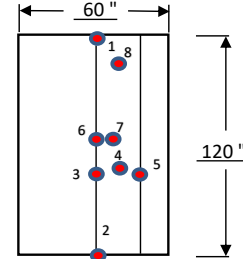
**Configuration:** 12" O.C. stiffeners, 16" O.C. studs  
**Framing:** 2x6 steel stud, 50 ksi  
**Fastener:** #10-1x1-1/2 HWH  
**Sheathing:** 1/2" Drywall  
**Air Seal:** Double sided 3M Tape with Primer

**Equipment:**

<b>Pressure Chamber</b>	<b>Deflection Gauges( Phidget potentiometers)</b>
Motor: Core Sensors Model: CS10 - 2400	Sensor 1: S/N - F29B
Press. Controller: S/N - G205141344	Sensor 2: S/N - 9BFA
Pressure Sensors:	Sensor 3: S/N - 87CE
+/- 2 kPa: p/n 1136	Sensor 4: S/N - F16B
+/- 7 kPa: p/n 1137	Sensor 5: S/N - F14E
50 kPa: p/n 1138	Sensor 6: S/N - F28I
Phidget: S/N - 5015249240311	Sensor 7: S/N - F174
	Sensor 8: S/N - F282

**Gauge Locations**  
(not to scale)

- Gauge 1: Stud
- Gauge 2: Stud
- Gauge 3: Stud
- Gauge 4: Panel
- Gauge 5: Stud
- Gauge 6: Stud
- Gauge 7: Panel
- Gauge 8: Panel



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	2:56	Temp:	21.4
Finish:	3:38	%RH	23

Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	12

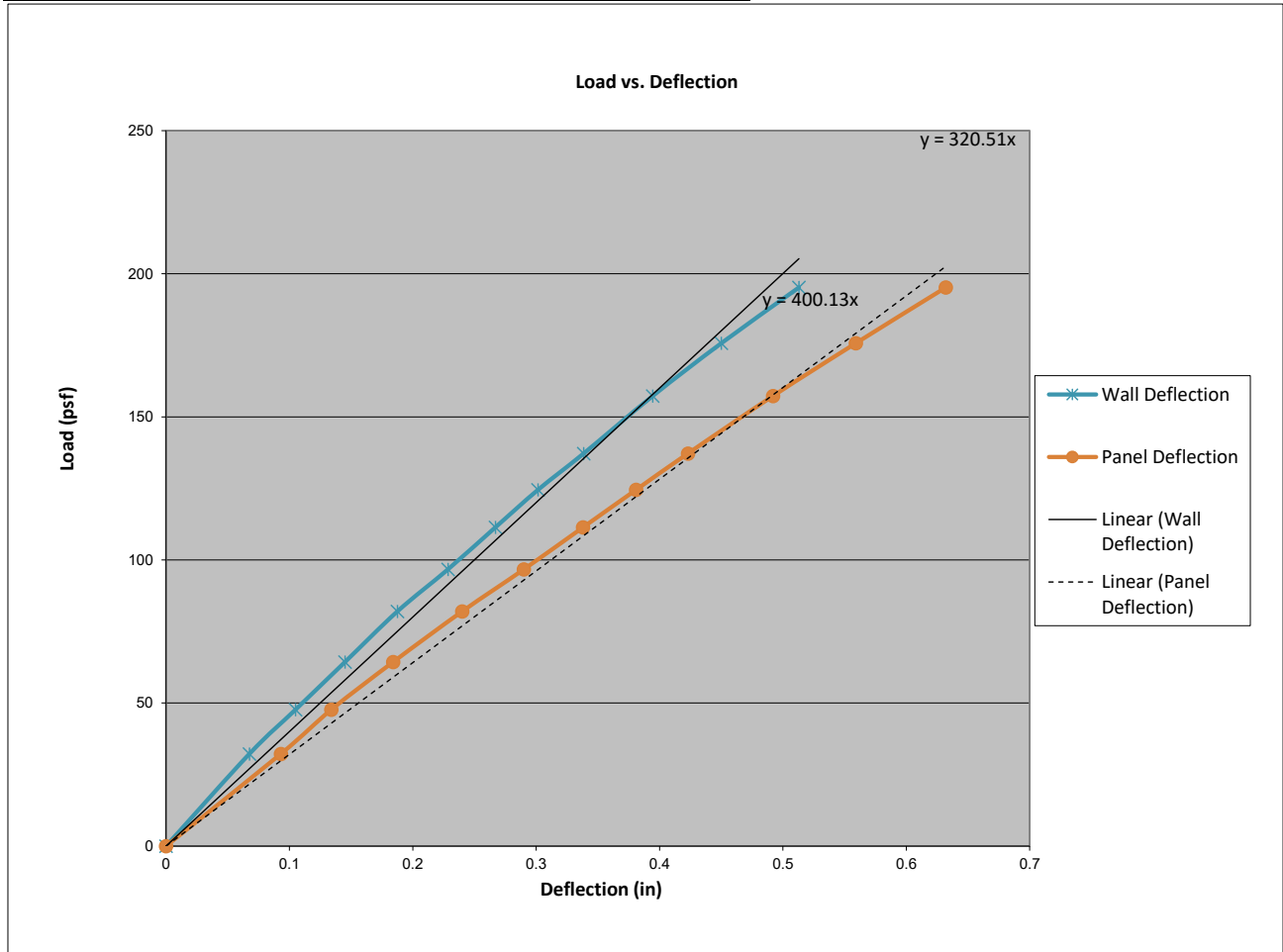
Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	imed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	32.2	10 sec.	0.065	0.058	0.129	0.142	0.103	0.056	0.149	0.136	
0		1-5mins	0.001	0.001	0	0	0.001	0.001	0.001	0.001	
45	47.7	10 sec.	0.087	0.087	0.192	0.209	0.154	0.083	0.217	0.202	
0		1-5mins	0.001	0.001	0	0.001	0.001	0.001	0.001	0.001	
60	64.3	10 sec.	0.111	0.117	0.259	0.283	0.208	0.109	0.293	0.272	
0		1-5mins	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.001	
75	82	10 sec.	0.138	0.157	0.335	0.366	0.267	0.138	0.378	0.35	
0		1-5mins	0.004	0.007	0.007	0.008	0.006	0.003	0.007	0.005	
90	96.7	10 sec.	0.167	0.196	0.41	0.442	0.321	0.168	0.458	0.423	
0		1-5mins	0.009	0.015	0.016	0.019	0.013	0.006	0.015	0.013	
105	111.4	10 sec.	0.192	0.236	0.481	0.517	0.376	0.197	0.535	0.494	
0		1-5mins	0.012	0.022	0.024	0.026	0.019	0.009	0.023	0.02	
120	124.5	10 sec.	0.213	0.268	0.542	0.585	0.423	0.222	0.603	0.555	
0		1-5mins	0.017	0.028	0.032	0.035	0.025	0.012	0.029	0.027	
135	137.2	10 sec.	0.236	0.299	0.606	0.65	0.472	0.248	0.671	0.619	
0		1-5mins	0.021	0.036	0.042	0.044	0.032	0.015	0.038	0.035	
150	157.3	10 sec.	0.269	0.346	0.702	0.752	0.544	0.286	0.778	0.715	
0		1-5mins	0.027	0.044	0.054	0.056	0.039	0.018	0.048	0.045	
165	175.7	10 sec.	0.304	0.39	0.797	0.852	0.613	0.323	0.882	0.808	
0		1-5mins	0.032	0.054	0.071	0.073	0.05	0.023	0.063	0.057	
190	195.2	10 sec.	0.346	0.44	0.906	0.963	0.693	0.368	1	0.916	
0		1-5mins	0.041	0.064	0.091	0.091	0.065	0.029	0.082	0.074	
215	222.7	10 sec.	0.407	0.511	1.058	1.16	0.8	0.429	1.156	1.071	
0		1-5mins	0.056	0.082	0.125	0.121	0.086	0.039	0.114	0.112	
240	247	10 sec.	0.477	0.58	1.209	1.278	0.915	0.497	1.328	1.231	
0		1-5mins	0.073	0.099	0.159	0.156	0.109	0.05	0.15	0.144	
270	282.1	10 sec.	0.601	0.687	1.437	1.518	1.084	0.605	1.581	1.462	
0		1-5mins	0.118	0.13	0.227	0.226	0.16	0.072	0.219	0.21	

Mode of Failure	
Max Load (psf)	282.1
Double Sided Tape failed where it was attached to the panel while going to 330PSF.	



**BOCA ENGINEERING CO. | SPAR**  
**STRUCTURAL & CIVIL CONSULTANTS**

Test#:	QI3-3	
Max Load	282.1	psf
Allowable Design Load (ASD) = Max Load / 2.5	112.8	psf
Deflection Service Load (ASD) = Allowable * 0.7	79.0	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.200	in
Wall Deflection @ Deflection Service Load (ASD)	0.2011	in
Panel Deflection @ Deflection Service Load (ASD)	0.2316	in
Max Load @ Wall Deflection Limit	262	psf
Max Load @ Panel Deflection Limit	68	psf



Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
32.2	0.068	0.093
47.7	0.105	0.134
64.3	0.145	0.184
82.0	0.188	0.240
96.7	0.229	0.290
111.4	0.267	0.338
124.5	0.302	0.381
137.2	0.339	0.423
157.3	0.395	0.492
175.7	0.450	0.559
195.2	0.513	0.632
222.7	0.599	0.727
247.0	0.681	0.831
282.1	0.793	0.976



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

**Test:** Transverse Load - Negative Wind Load  
**Client:** Engage Building Products  
**Date:** 11/7/2024  
**Product:** QuickPanel Systems  
**Test Method(s):** ASTM E330/E330M-14, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

**Test#:** QI4-1

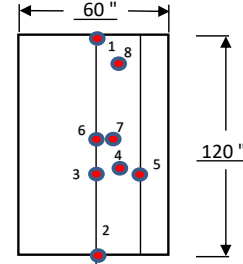
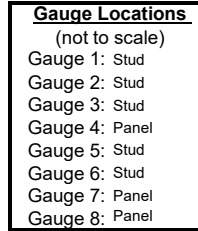
**Project#:** 0093  
**Technician(s):** Ali  
**Reviewer:** Chris  
**Location:** 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

**Configuration:** 24" O.C. stiffeners, 16" O.C. studs  
**Framing:** 2x6 steel stud, 50 ksi  
**Fastener:** #10-1x1-1/2 HWH  
**Sheathing:** 1/2" Drywall  
**Air Seal:** Double sided 3M Tape with Primer

**Equipment:**

<b>Pressure Chamber</b>	<b>Deflection Gauges( Phidget potentiometers)</b>
Motor: Core Sensors Model: CS10 - 2400	Sensor 1: S/N - F29B
Press. Controller: S/N - G205141344	Sensor 2: S/N - 9BFA
Pressure Sensors:	Sensor 3: S/N - 87CE
+/- 2 kPa: p/n 1136	Sensor 4: S/N - F16B
+/- 7 kPa: p/n 1137	Sensor 5: S/N - F14E
50 kPa: p/n 1138	Sensor 6: S/N - F28I
Phidget: S/N - 5015249240311	Sensor 7: S/N - F174
	Sensor 8: S/N - F282



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	1:16	Temp:	23.1
Finish:	1:55	%RH	23

Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	24

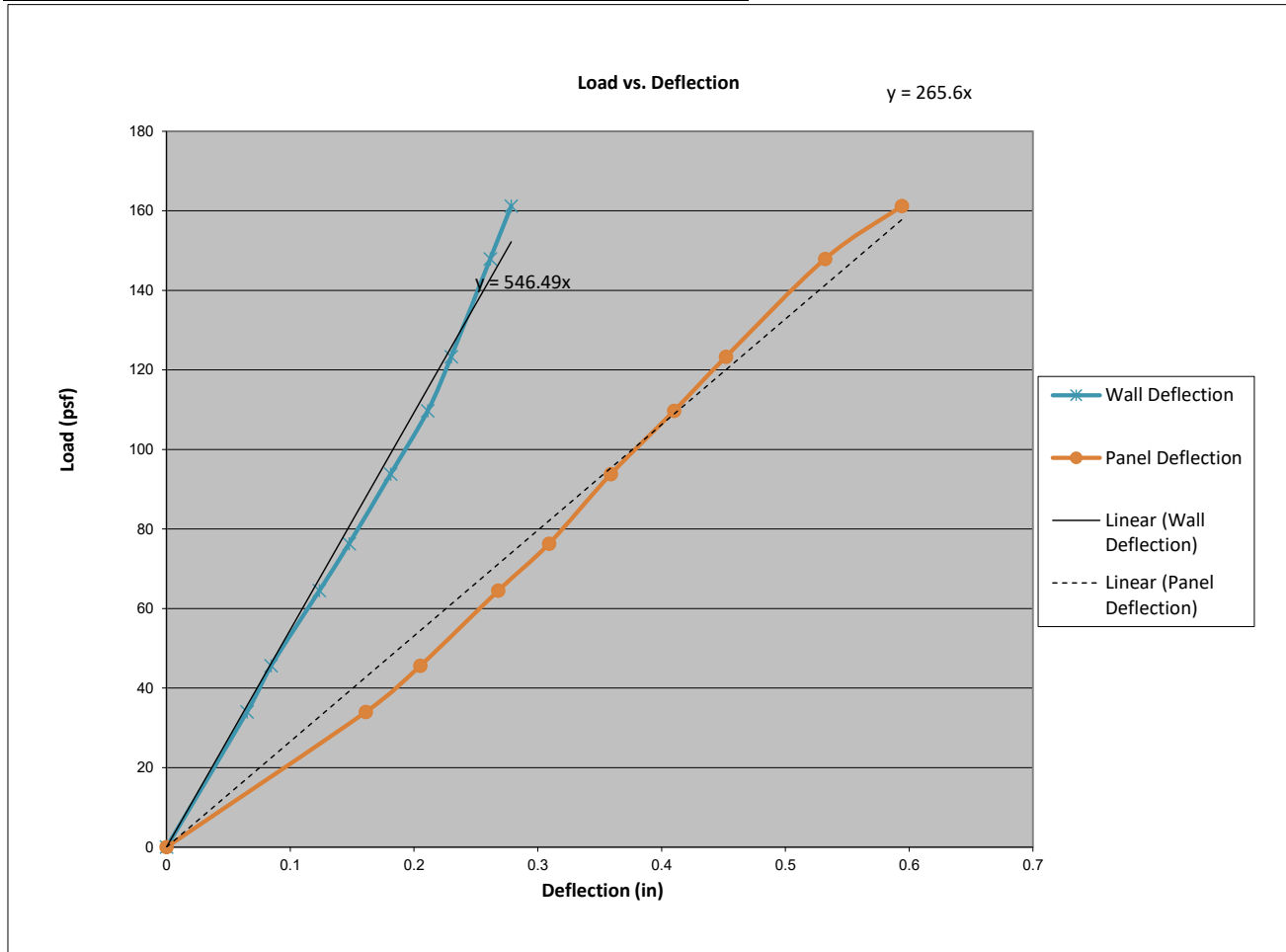
Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	imed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	34	10 sec.	0.066	0.082	0.17	0.221	0.14	0.139	0.3	0.178	
0		1-5mins	0.001	0.002	0.002	0.003	0.001	0	0.003	0.001	
45	45.6	10 sec.	0.082	0.109	0.224	0.288	0.186	0.18	0.385	0.235	
0		1-5mins	0.002	0.005	0.003	0.005	0.003	0.002	0.005	0.002	
60	64.5	10 sec.	0.105	0.142	0.305	0.39	0.252	0.247	0.515	0.321	
0		1-5mins	0.002	0.008	0.005	0.007	0.005	0.002	0.008	0.004	
75	76.3	10 sec.	0.12	0.163	0.359	0.459	0.294	0.289	0.598	0.376	
0		1-5mins	0.003	0.01	0.007	0.01	0.007	0.003	0.012	0.005	
90	93.8	10 sec.	0.14	0.19	0.432	0.546	0.353	0.346	0.705	0.451	
0		1-5mins	0.004	0.01	0.009	0.014	0.009	0.004	0.013	0.007	
105	109.7	10 sec.	0.157	0.207	0.497	0.627	0.402	0.393	0.803	0.518	
0		1-5mins	0.004	0.001	0.011	0.018	0.011	0.006	0.017	0.008	
130	123.3	10 sec.	0.174	0.23	0.553	0.696	0.446	0.432	0.884	0.576	
0		1-5mins	0.006	0.003	0.015	0.023	0.013	0.009	0.02	0.011	
145	147.9	10 sec.	0.204	0.277	0.662	0.832	0.533	0.502	1.034	0.691	
0		1-5mins	0.008	0.009	0.024	0.037	0.021	0.012	0.033	0.019	
160	161.2	10 sec.	0.224	0.307	0.729	0.922	0.586	0.544	1.138	0.762	Tap bubbled out
0		1-5mins	0.01	0.013	0.033	0.054	0.028	0.013	0.046	0.029	
180	206.3	10 sec.	0.292	0.396	0.971	1.23	0.759	0.668	1.455	1.018	
0		1-5mins	0.019	0.031	0.079	0.134	0.061	0.028	0.116	0.075	
220	233.1	10 sec.	0.338	0.457	1.136	1.45	0.874	0.753	1.677	1.208	
0		1-5mins	0.029	0.045	0.125	0.195	0.09	0.043	0.167	0.124	

Mode of Failure		
Max Load (psf)	233.1	Double sided tape split on the panel side and the stiffener, the screws on one side was also let go.



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Test#:	QI4-1	
Max Load	233.1	psf
Allowable Design Load (ASD) = Max Load / 2.5	93.2	psf
Deflection Service Load (ASD) = Allowable * 0.7	65.3	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.400	in
Wall Deflection @ Deflection Service Load (ASD)	0.1109	in
Panel Deflection @ Deflection Service Load (ASD)	0.2660	in
Max Load @ Wall Deflection Limit	233	psf
Max Load @ Panel Deflection Limit	98	psf



Target Load (psf)	Wall Deflection (= ga 6 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
34.0	0.065	0.161
45.6	0.085	0.205
64.5	0.124	0.268
76.3	0.148	0.309
93.8	0.181	0.359
109.7	0.211	0.410
123.3	0.230	0.452
147.9	0.262	0.532
161.2	0.279	0.594
206.3	0.324	0.787
233.1	0.356	0.924



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

Test: **Transverse Load - Negative Wind Load**  
 Client: Engage Building Products  
 Date: 11/6/2024  
 Product: **QuickPanel Systems**  
 Test Method(s): ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

Test#: **QI4-2**

Project#: 0093  
 Technician(s): Ali  
 Reviewer: Chris  
 Location: 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

Configuration: 24" O.C. stiffeners, 16" O.C. studs  
 Framing: 2x6 steel stud, 50 ksi  
 Fastener: #10-1x1-1/2 HWH  
 Sheathing: 1/2" Drywall  
 Air Seal: Double sided 3M Tape with Primer

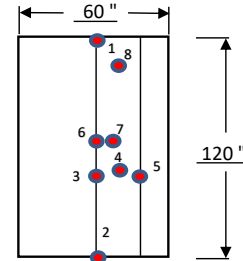
**Equipment:**

**Pressure Chamber**  
 Motor: Core Sensors Model: CS10 - 2400  
 Press. Controller: S/N - G205141344  
 Pressure Sensors:  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
 Phidget: S/N - 5015249240311

**Deflection Gauges( Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F174
Sensor 8:	S/N - F282

**Gauge Locations**  
 (not to scale)  
 Gauge 1: Stud  
 Gauge 2: Stud  
 Gauge 3: Stud  
 Gauge 4: Panel  
 Gauge 5: Stud  
 Gauge 6: Stud  
 Gauge 7: Panel  
 Gauge 8: Panel



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:	
Start:	2:40
Temp:	23.5
Finish:	3:20
%RH	19

Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	24

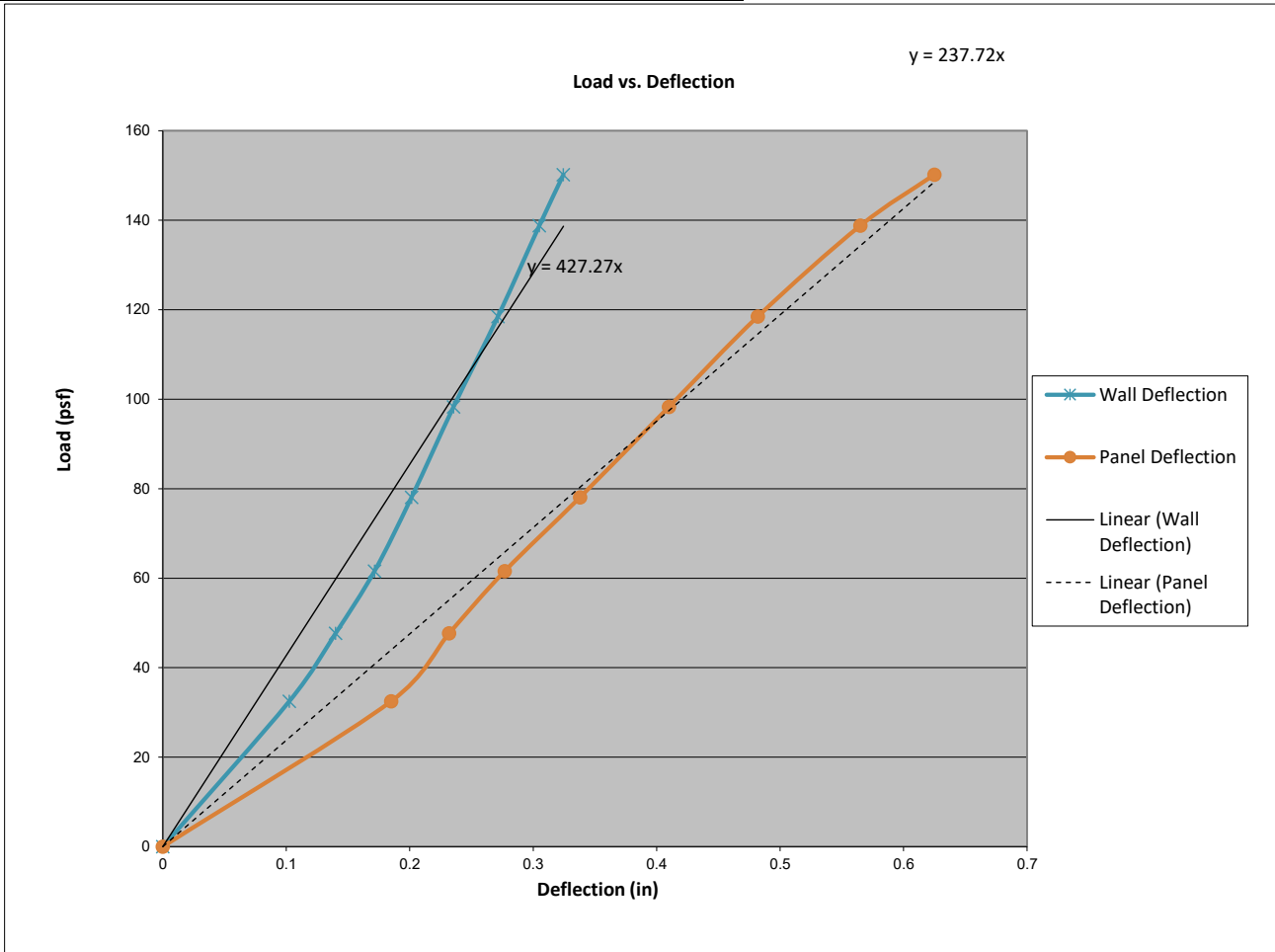
Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	immed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	32.5	10 sec.	0.057	0.058	0.152	0.283	0.105	0.16	0.345	0.155	
0		1-5mins	0.007	0.008	0.014	0.101	0.009	0.032	0.103	0.011	
45	47.7	10 sec.	0.086	0.092	0.228	0.376	0.161	0.229	0.461	0.235	
0		1-5mins	0.012	0.014	0.021	0.11	0.015	0.04	0.112	0.017	
60	61.6	10 sec.	0.116	0.125	0.303	0.463	0.214	0.292	0.569	0.315	
0		1-5mins	0.016	0.021	0.028	0.117	0.022	0.044	0.119	0.025	
75	78.1	10 sec.	0.146	0.165	0.391	0.566	0.28	0.357	0.695	0.409	
0		1-5mins	0.022	0.027	0.038	0.13	0.029	0.049	0.13	0.033	
90	98.3	10 sec.	0.184	0.213	0.505	0.694	0.363	0.434	0.844	0.528	
0		1-5mins	0.028	0.035	0.05	0.143	0.04	0.054	0.145	0.045	
115	118.5	10 sec.	0.219	0.266	0.623	0.829	0.445	0.514	0.996	0.655	
0		1-5mins	0.035	0.045	0.064	0.165	0.053	0.059	0.164	0.058	
130	138.8	10 sec.	0.255	0.319	0.749	0.972	0.531	0.592	1.157	0.794	
0		1-5mins	0.042	0.056	0.084	0.189	0.067	0.067	0.19	0.078	
145	150.2	10 sec.	0.277	0.35	0.827	1.068	0.582	0.638	1.263	0.882	
0		1-5mins	0.047	0.063	0.099	0.211	0.078	0.072	0.209	0.094	
165	165.4	10 sec.	0.268	0.328	0.792	0.208	0.572	0.622	1.207	0.844	
0		1-5mins	0.052	0.074	0.124	0.208	0.097	0.081	0.207	0.123	
180	181.1	10 sec.	0.316	0.376	1	0.208	0.69	0.759	1.207	1.079	
0		1-5mins	0.058	0.082	0.146	0.208	0.109	0.088	0.207	0.147	
200	202.5	10 sec.	0.369	0.396	1.201	0.229	0.759	0.801	1.455	1.09	
0		1-5mins	0.06	0.095	0.17	0.239	0.121	0.095	0.215	0.198	

Mode of Failure	
Max Load (psf)	202.5
Double sided tape let go from panel side and top cap going to 220 psf.	



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Test#:	Q14-2	
Max Load	202.5	psf
Allowable Design Load (ASD) = Max Load / 2.5	81.0	psf
Deflection Service Load (ASD) = Allowable * 0.7	56.7	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.400	in
Wall Deflection @ Deflection Service Load (ASD)	0.1258	in
Panel Deflection @ Deflection Service Load (ASD)	0.2514	in
Max Load @ Wall Deflection Limit	203	psf
Max Load @ Panel Deflection Limit	90	psf

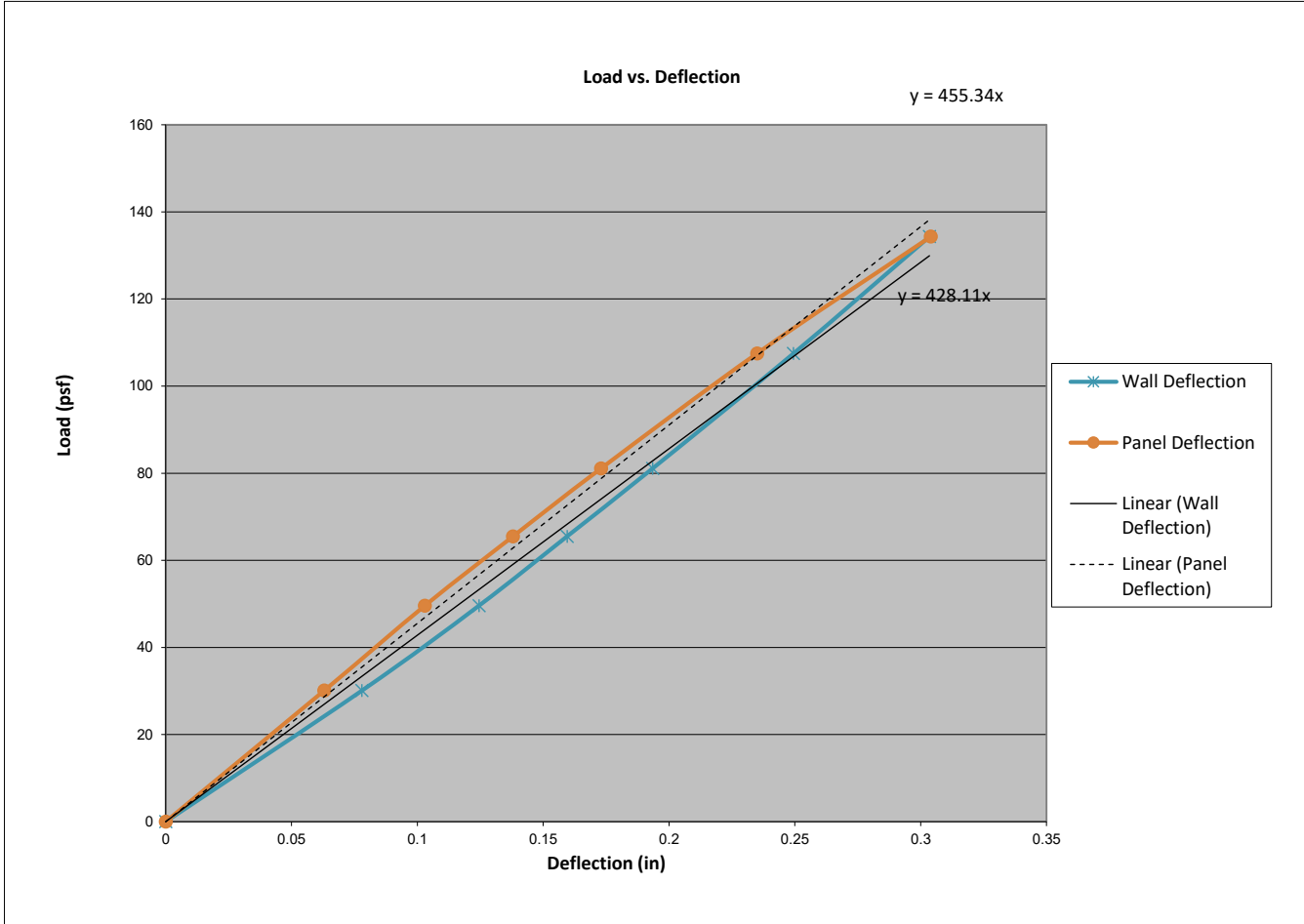


Target Load (psf)	Wall Deflection (= ga 6 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
32.5	0.103	0.185
47.7	0.140	0.232
61.6	0.172	0.277
78.1	0.202	0.338
98.3	0.236	0.410
118.5	0.272	0.482
138.8	0.305	0.565
150.2	0.325	0.625
165.4	0.324	0.585
181.1	0.413	0.448
202.5	0.419	0.654





Test#:	QI4-3	
Max Load	206.0	psf
Allowable Design Load (ASD) = Max Load / 2.5	82.4	psf
Deflection Service Load (ASD) = Allowable * 0.7	57.7	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.400	in
Wall Deflection @ Deflection Service Load (ASD)	0.1559	in
Panel Deflection @ Deflection Service Load (ASD)	0.1177	in
Max Load @ Wall Deflection Limit	206	psf
Max Load @ Panel Deflection Limit	196	psf



Target Load (psi)	Wall Deflection (= ga 6 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
30.1	0.078	0.063
49.6	0.125	0.103
65.5	0.160	0.138
81.1	0.194	0.173
107.5	0.250	0.235
134.3	0.304	0.304
172.4	0.369	0.421
206.0	0.667	0.202



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

**Test:** Transverse Load - Negative Wind Load  
**Client:** Engage Building Products  
**Date:** 12/6/2024  
**Product:** QuickPanel Systems  
**Test Method(s):** ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

**Test#:** QI5-1

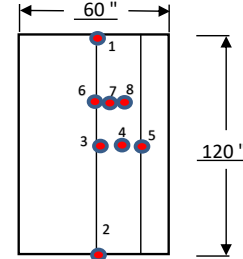
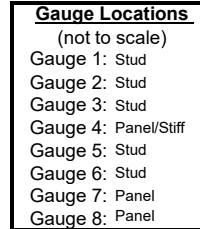
**Project#:** 0093  
**Technician(s):** Ali  
**Reviewer:** Chris  
**Location:** 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

**Configuration:** 60" O.C. stiffener, 16" O.C. studs  
**Framing:** 2x6 steel stud, 50 ksi  
**Fastener:** #10-1x1-1/2 HWH  
**Sheathing:** 1/2" Drywall  
**Air Seal:** Double sided 3M Tape with Primer

**Equipment:**

<b>Pressure Chamber</b>	<b>Deflection Gauges( Phidget potentiometers)</b>
Motor: Core Sensors Model: CS10 - 2400	Sensor 1: S/N - F29B
Press. Controller: S/N - G205141344	Sensor 2: S/N - 9BFA
Pressure Sensors:	Sensor 3: S/N - 87CE
+/- 2 kPa: p/n 1136	Sensor 4: S/N - F16B
+/- 7 kPa: p/n 1137	Sensor 5: S/N - F14E
50 kPa: p/n 1138	Sensor 6: S/N - F28I
Phidget: S/N - 5015249240311	Sensor 7: S/N - F174
	Sensor 8: S/N - F282



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		✓

Time/Temp/RH:			
Start:	1:12	Temp:	21.7
Finish:	1:43	%RH	20

Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	60

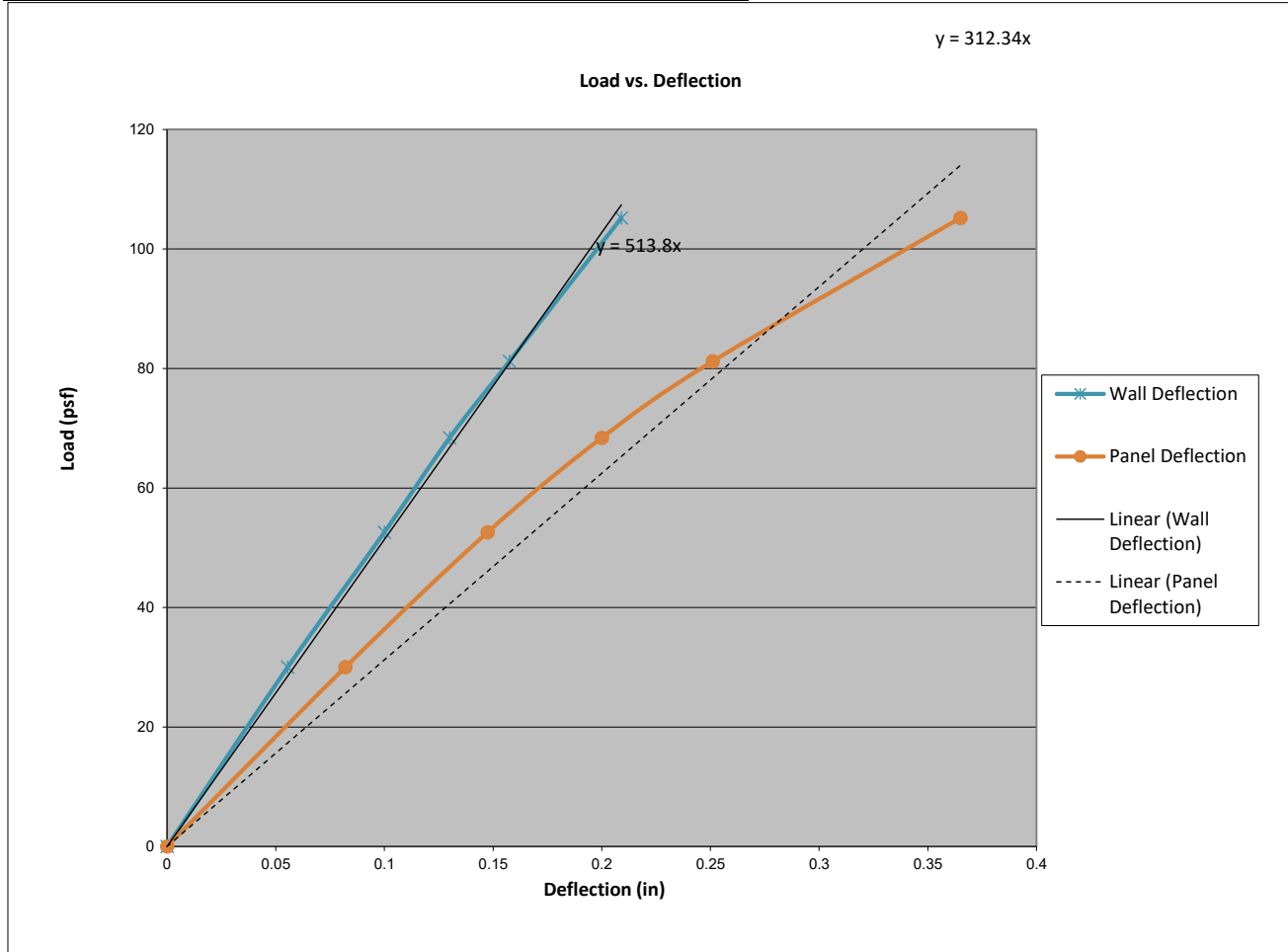
Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations	
0	0.0	immed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
0		1-5mins	Zero Deflection Gauges									
30	30	10 sec.	0.022	0.023	0.078	0.152	0.062	0.81	0.876	0.058		
0		1-5mins	0	0.001	0.001	0.001	0.001	0.002	0.002	0.001		
50	52.6	10 sec.	0.046	0.054	0.15	0.283	0.121	1.118	1.195	0.111		
0		1-5mins	0.006	0.01	0.008	0.011	0.008	0.021	0.021	0.007		
65	68.4	10 sec.	0.061	0.079	0.2	0.383	0.166	1.3	1.382	0.146		
0		1-5mins	0.009	0.018	0.015	0.023	0.014	0.049	0.05	0.012		
80	81.2	10 sec.	0.072	0.099	0.243	0.473	0.201	1.443	1.53	0.173		
0		1-5mins	0.012	0.022	0.02	0.035	0.019	0.072	0.075	0.015		
100	105.2	10 sec.	0.089	0.133	0.32	0.657	0.264	1.7	1.799	0.225		
0		1-5mins	0.015	0.03	0.028	0.073	0.026	0.14	0.15	0.02		
130	120	10 sec.	0.097	0.145	0.35	0.8	0.293	1.869	1.978	0.245		
0		1-5mins	0.017	0.035	0.039	0.099	0.045	0.201	0.221	0.03		
150	134.5	10 sec.	0.127	0.17	0.4	0.956	0.375	2.2	2.311	0.3		
0		1-5mins	0.02	0.042	0.054	0.129	0.055	0.335	0.349	0.035		

Mode of Failure	
<b>Max Load (psf)</b>	134.5
Double sided tape let go from panel side and top cap of stiffener.	



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Test#:	QI5-1	
Max Load	134.5	psf
Allowable Design Load (ASD) = Max Load / 2.5	53.8	psf
Deflection Service Load (ASD) = Allowable * 0.7	37.7	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	1.000	in
Wall Deflection @ Deflection Service Load (ASD)	0.0721	in
Panel Deflection @ Deflection Service Load (ASD)	0.1421	in
Max Load @ Wall Deflection Limit	135	psf
Max Load @ Panel Deflection Limit	135	psf



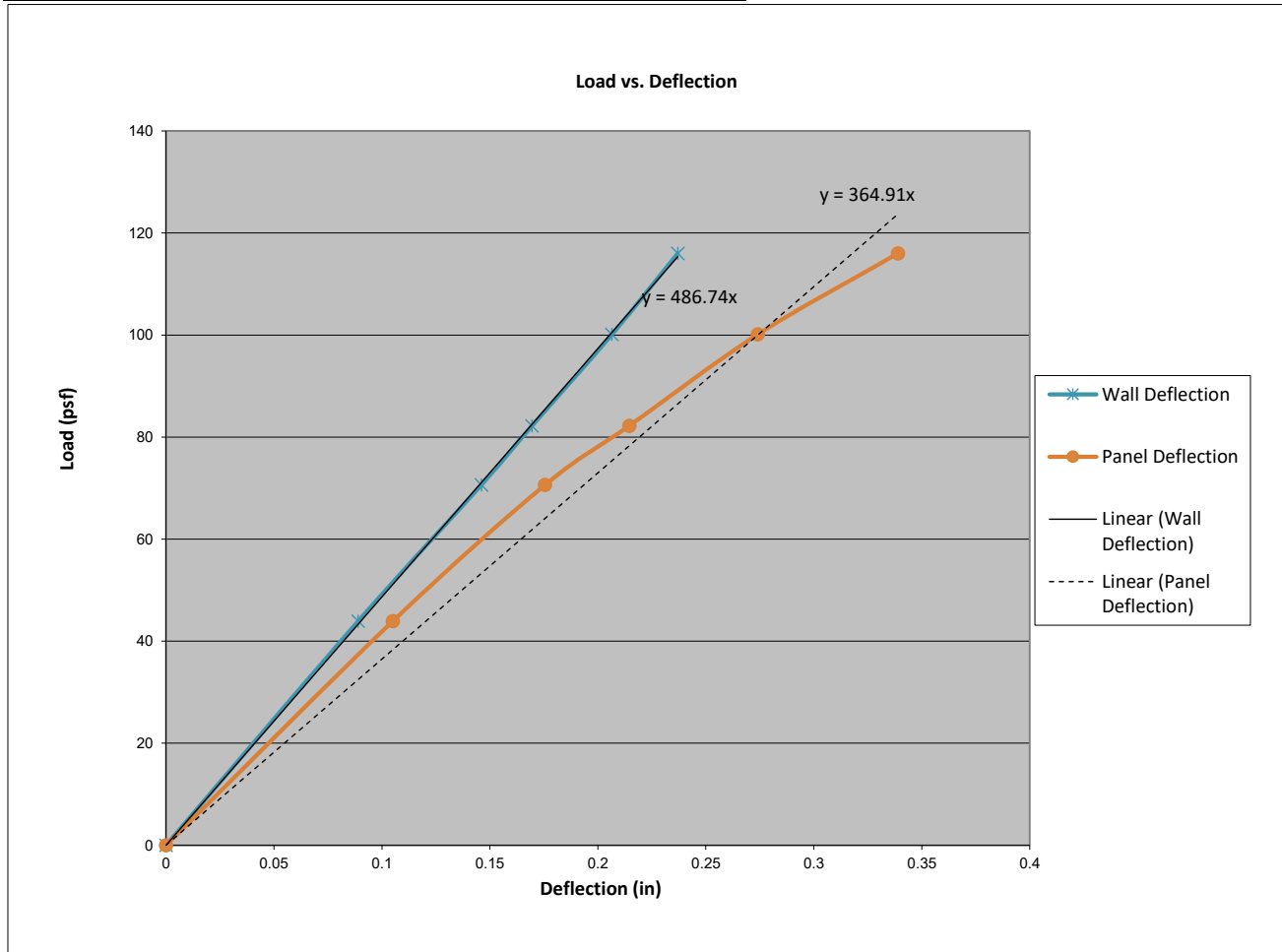
Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 4 - (ga 3 + ga 5)/2) (in)
0.0	0.000	0.000
30.0	0.056	0.082
52.6	0.100	0.148
68.4	0.130	0.200
81.2	0.158	0.251
105.2	0.209	0.365
120.0	0.229	0.479
134.5	0.252	0.569





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Test#:	QI5-2	
Max Load	150.1	psf
Allowable Design Load (ASD) = Max Load / 2.5	60.0	psf
Deflection Service Load (ASD) = Allowable * 0.7	42.0	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	1.000	in
Wall Deflection @ Deflection Service Load (ASD)	0.0848	in
Panel Deflection @ Deflection Service Load (ASD)	0.1394	in
Max Load @ Wall Deflection Limit	150	psf
Max Load @ Panel Deflection Limit	150	psf



Target Load (psf)	Wall Deflection (= ga 6 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 4 - (ga 3 + ga 5)/2) (in)
0.0	0.000	0.000
43.9	0.089	0.105
70.6	0.146	0.176
82.2	0.170	0.215
100.1	0.207	0.274
116.0	0.237	0.339
130.7	0.265	0.434
150.1	0.293	0.596

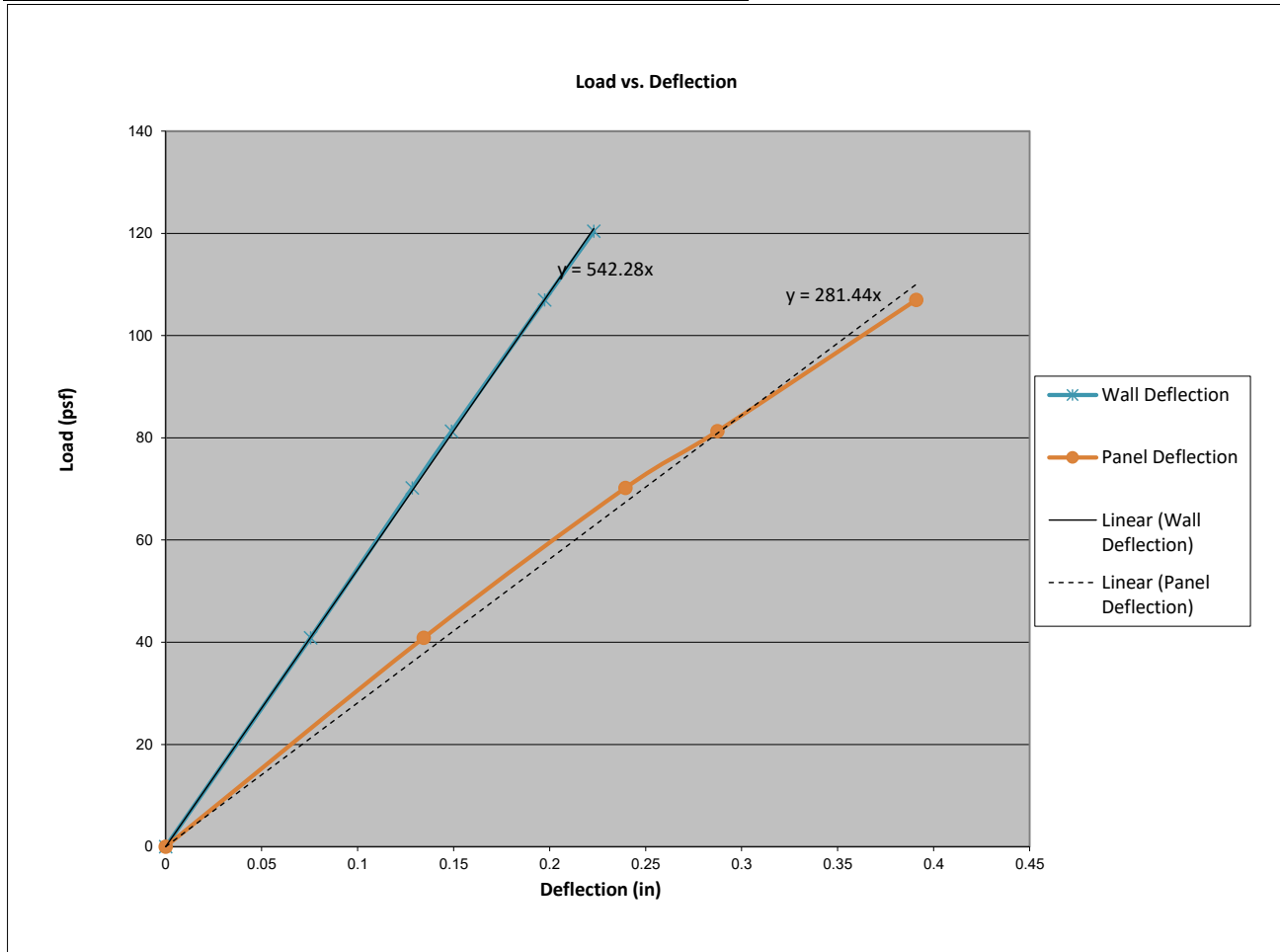




# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

Test#:	QI5-3	
Max Load	152.3	psf
Allowable Design Load (ASD) = Max Load / 2.5	60.9	psf
Deflection Service Load (ASD) = Allowable * 0.7	42.6	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	1.000	in
Wall Deflection @ Deflection Service Load (ASD)	0.0793	in
Panel Deflection @ Deflection Service Load (ASD)	0.1738	in
Max Load @ Wall Deflection Limit	152	psf
Max Load @ Panel Deflection Limit	152	psf



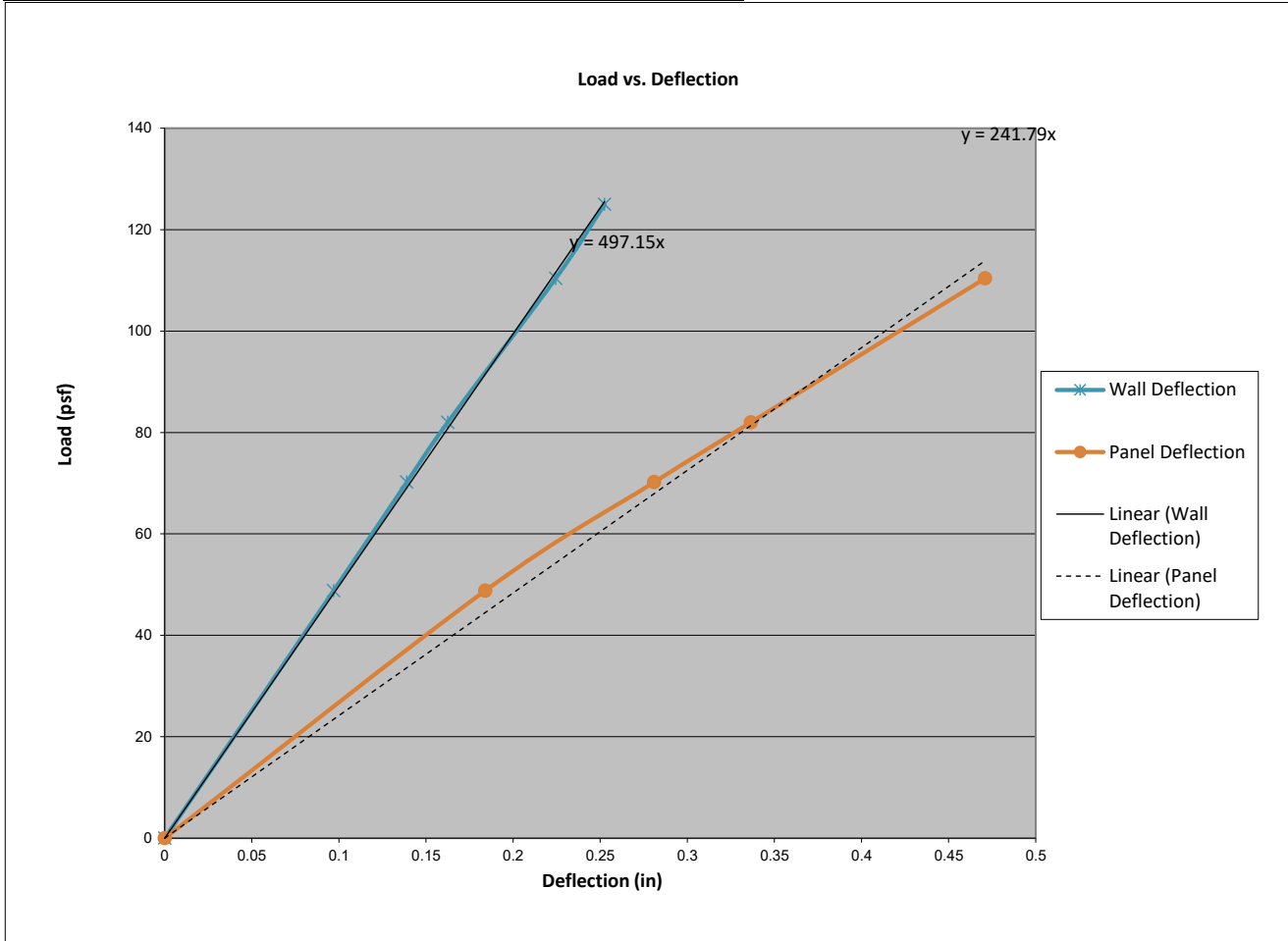
Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 4 - (ga 3 + ga 5)/2) (in)
0.0	0.000	0.000
40.9	0.076	0.135
70.2	0.129	0.240
81.3	0.149	0.288
107.0	0.198	0.391
120.4	0.223	0.457
135.2	0.252	0.561
152.3	0.287	0.701





**BOCA ENGINEERING CO. | SPAR**  
 STRUCTURAL & CIVIL CONSULTANTS

Test#:	QI6-1	
Max Load	145.0	psf
Allowable Design Load (ASD) = Max Load / 2.5	58.0	psf
Deflection Service Load (ASD) = Allowable * 0.7	40.6	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	1.000	in
Wall Deflection @ Deflection Service Load (ASD)	0.0823	in
Panel Deflection @ Deflection Service Load (ASD)	0.1849	in
Max Load @ Wall Deflection Limit	145	psf
Max Load @ Panel Deflection Limit	145	psf



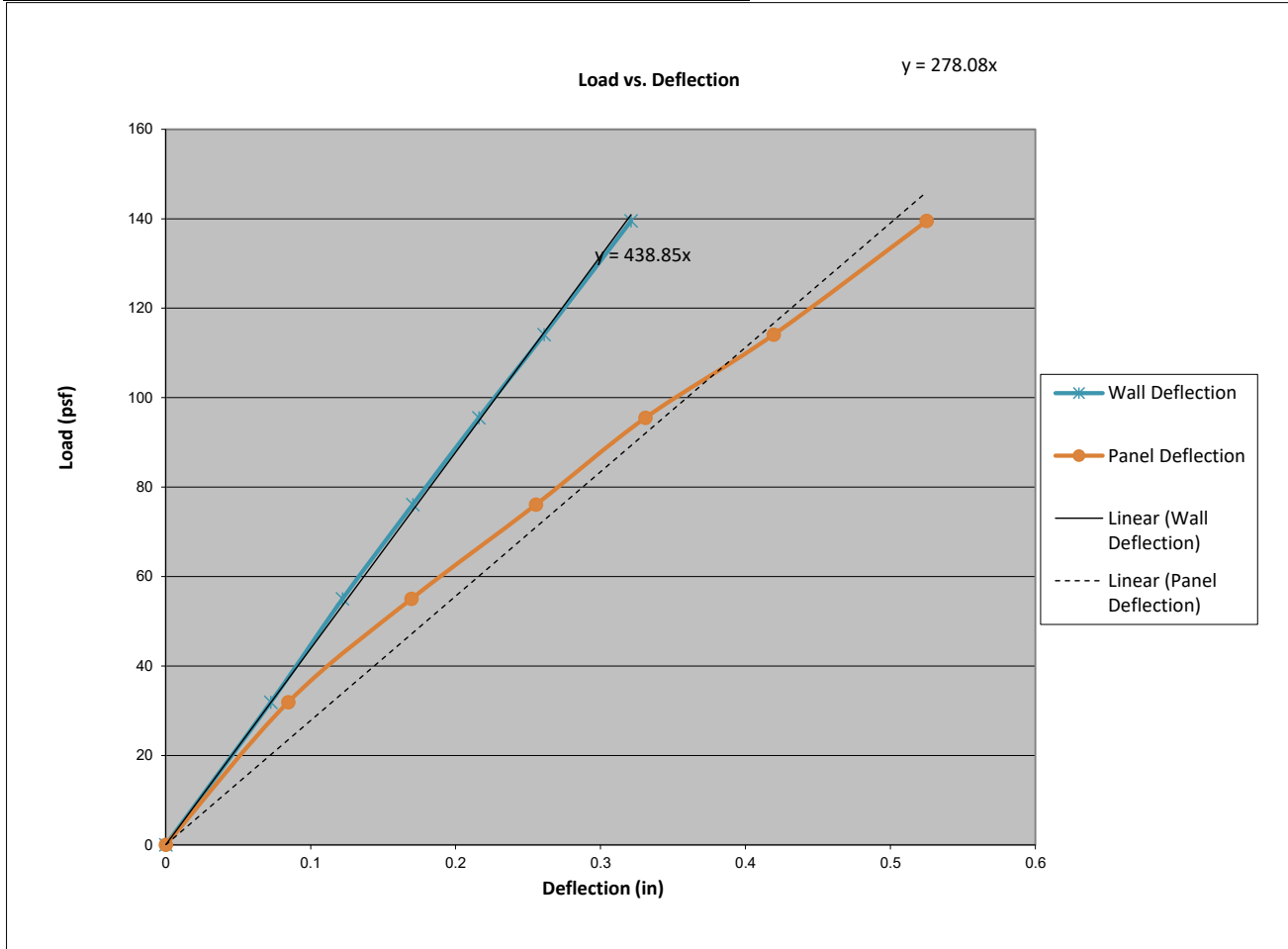
Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 4 - (ga 3 + ga 5)/2) (in)
0.0	0.000	0.000
48.8	0.097	0.184
70.2	0.139	0.281
82.0	0.163	0.337
110.4	0.225	0.471
125.0	0.253	0.566
145.0	0.299	0.726





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Test#:	QI6-2	
Max Load	150.1	psf
Allowable Design Load (ASD) = Max Load / 2.5	60.0	psf
Deflection Service Load (ASD) = Allowable * 0.7	42.0	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	1.000	in
Wall Deflection @ Deflection Service Load (ASD)	0.0958	in
Panel Deflection @ Deflection Service Load (ASD)	0.1511	in
Max Load @ Wall Deflection Limit	150	psf
Max Load @ Panel Deflection Limit	150	psf



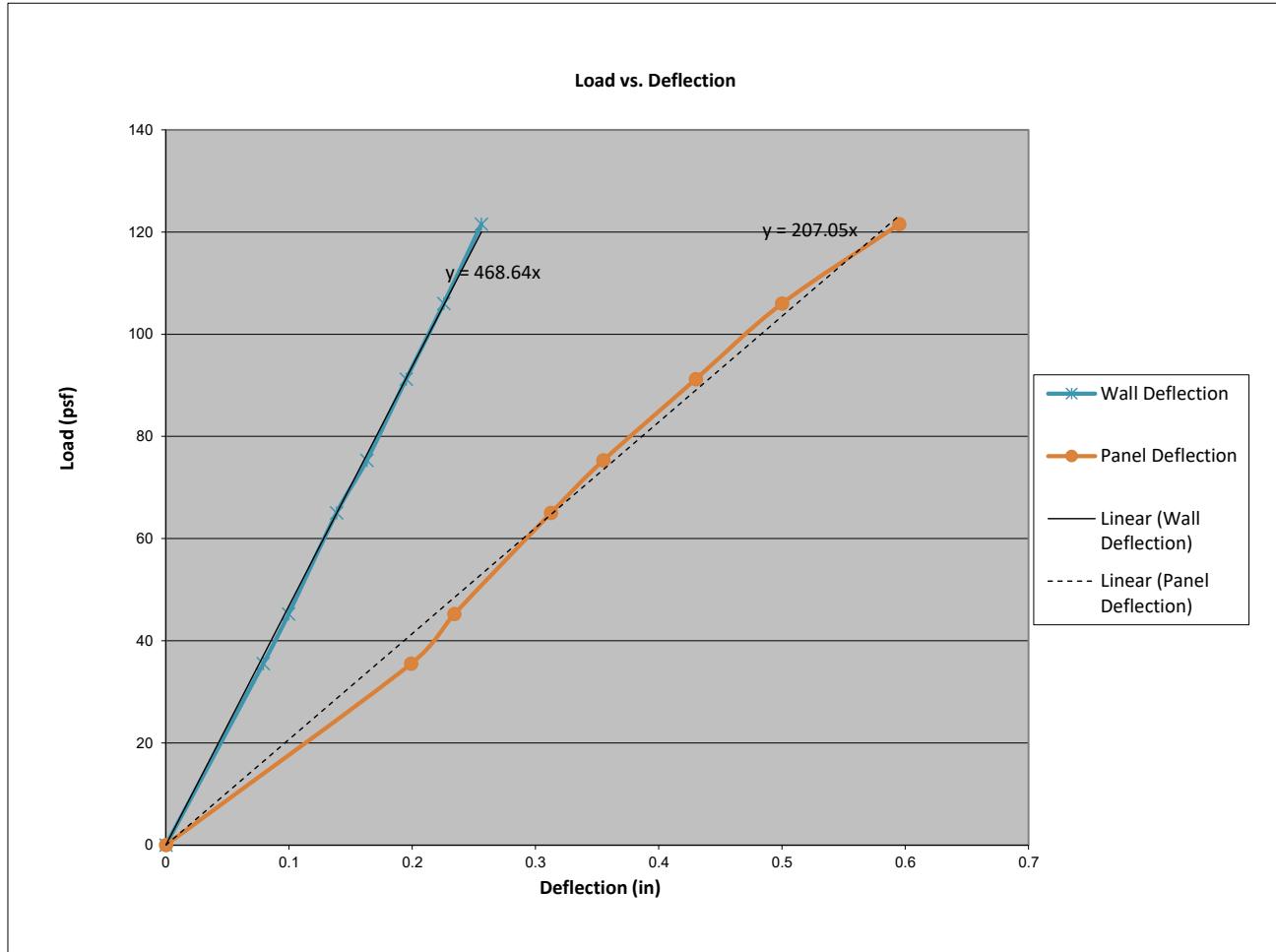
Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 4 - (ga 3 + ga 5)/2) (in)
0.0	0.000	0.000
31.9	0.073	0.085
55.0	0.122	0.170
76.1	0.171	0.256
95.5	0.216	0.331
114.1	0.261	0.420
139.5	0.321	0.525
150.1	0.356	0.597





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Test#:	QI6-3	
Max Load	140.7	psf
Allowable Design Load (ASD) = Max Load / 2.5	56.3	psf
Deflection Service Load (ASD) = Allowable * 0.7	39.4	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	1.000	in
Wall Deflection @ Deflection Service Load (ASD)	0.0845	in
Panel Deflection @ Deflection Service Load (ASD)	0.1891	in
Max Load @ Wall Deflection Limit	141	psf
Max Load @ Panel Deflection Limit	141	psf



Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 4 - (ga 3 + ga 5)/2) (in)
0.0	0.000	0.000
35.5	0.079	0.199
45.2	0.100	0.234
65.0	0.139	0.313
75.3	0.163	0.355
91.2	0.195	0.430
106.0	0.226	0.500
121.5	0.256	0.595
140.7	0.298	0.713



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

Test: **Transverse Load - Negative Wind Load**  
 Client: Engage Building Products  
 Date: 11/6/2024  
 Product: **QuickPanel Systems**  
 Test Method(s): ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

Test#: Q17-1

Project#: 0093  
 Technician(s): Ali  
 Reviewer: Chris  
 Location: 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**  
 Configuration: Stiffeners 5-1/4" O.C. from wall center, 16" O.C. studs  
 Framing: 2x6 steel stud, 50 ksi  
 Fastener: #10-1x1-1/2 HWH  
 Sheathing: 1/2" Drywall  
 Air Seal: Double sided 3M Tape with Primer

**Equipment:**

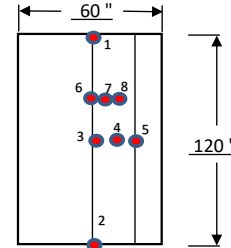
**Pressure Chamber**

Motor: Core Sensors Model: CS10 - 240C  
 Press. Controller: S/N - G205141344  
 Pressure Sensors:  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
 Phidget: S/N - 5015249240311

**Deflection Gauges ( Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F174
Sensor 8:	S/N - F282

Gauge Locations	
(not to scale)	
Gauge 1:	Stud
Gauge 2:	Stud
Gauge 3:	Stud
Gauge 4:	Panel/Stiff
Gauge 5:	Stud
Gauge 6:	Stud
Gauge 7:	Panel
Gauge 8:	Panel



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	9:14	Temp:	22.9
Finish:	10:09	%RH	21

Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	57.375

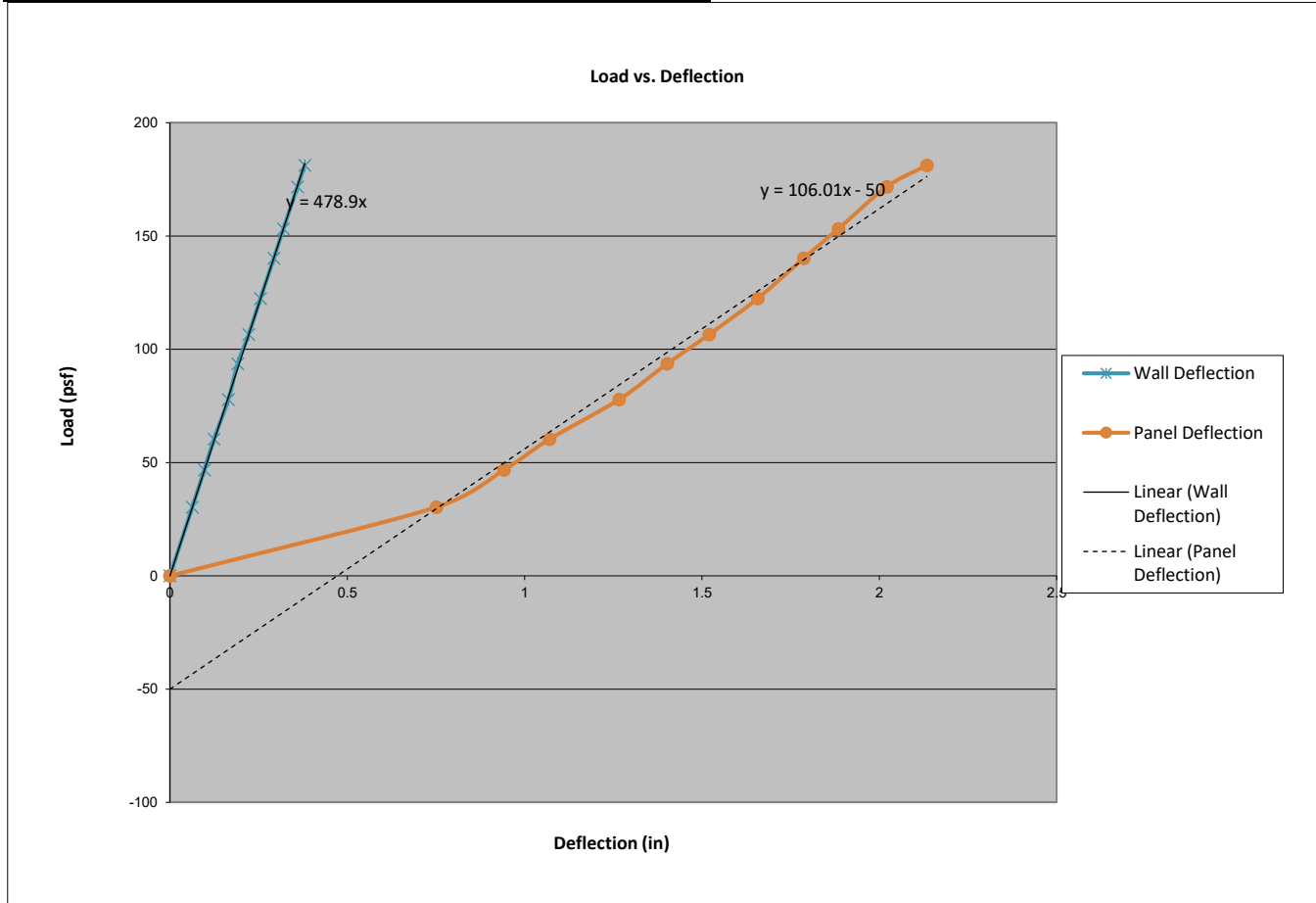
Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	immed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	30.3	10 sec.	0.032	0.034	0.096	0.085	0.068	0.062	0.813	0.729	
0		1-5mins	0.002	0.003	0.003	0.004	0.004	0.002	0.013	0.011	
45	46.8	10 sec.	0.049	0.059	0.151	0.144	0.11	0.1	1.042	0.943	
0		1-5mins	0.004	0.007	0.008	0.011	0.008	0.007	0.033	0.028	
60	60.3	10 sec.	0.064	0.08	0.196	0.196	0.146	0.13	1.2	1.099	
0		1-5mins	0.007	0.01	0.011	0.015	0.011	0.01	0.047	0.04	
75	77.8	10 sec.	0.08	0.107	0.258	0.262	0.192	0.17	1.436	1.322	
0		1-5mins	0.009	0.012	0.015	0.02	0.16	0.049	0.087	0.083	
90	93.6	10 sec.	0.085	0.129	0.298	0.314	0.227	0.236	1.638	1.54	
0		1-5mins	0.008	0.02	0.019	0.027	0.02	0.005	0.012	0.113	
105	106.5	10 sec.	0.096	0.15	0.345	0.369	0.261	0.263	1.783	1.654	
0		1-5mins	0.009	0.023	0.023	0.031	0.025	0.058	0.153	0.142	
120	122.4	10 sec.	0.107	0.175	0.396	0.43	0.297	0.295	1.952	1.806	
0		1-5mins	0.01	0.028	0.029	0.04	0.029	0.063	0.209	0.183	
135	140.2	10 sec.	0.119	0.201	0.453	0.496	0.335	0.329	2.116	1.965	
0		1-5mins	0.011	0.033	0.034	0.049	0.034	0.067	0.28	0.245	
150	153.2	10 sec.	0.128	0.222	0.495	0.549	0.364	0.354	2.239	2.082	
0		1-5mins	0.012	0.037	0.039	0.056	0.039	0.071	0.352	0.309	
165	171.7	10 sec.	0.142	0.253	0.557	0.624	0.405	0.389	2.41	2.249	
0		1-5mins	0.014	0.042	0.047	0.069	0.045	0.076	0.468	0.415	
180	181.2	10 sec.	0.15	0.268	0.589	0.67	0.428	0.41	2.544	2.379	Wall failed going to 200 PSF,
0		1-5mins	0.008	0.042	0.05	0.041	0.045	0.077	1.071	0.937	

Mode of Failure	
Max Load (psf)	181.2
Panel came out of QP-109 Top Cap from middle of test wall.	



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Test#:	QI7-1
Max Load	181.2 psf
Allowable Design Load (ASD) = Max Load / 2.5	72.5 psf
Deflection Service Load (ASD) = Allowable * 0.7	50.7 psf
Wall Deflection limit = L / 180 of wall height	0.667 in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.956 in
Wall Deflection @ Deflection Service Load (ASD)	0.1053 in
Panel Deflection @ Deflection Service Load (ASD)	0.6940 in
Max Load @ Wall Deflection Limit	181 psf
Max Load @ Panel Deflection Limit	70 psf

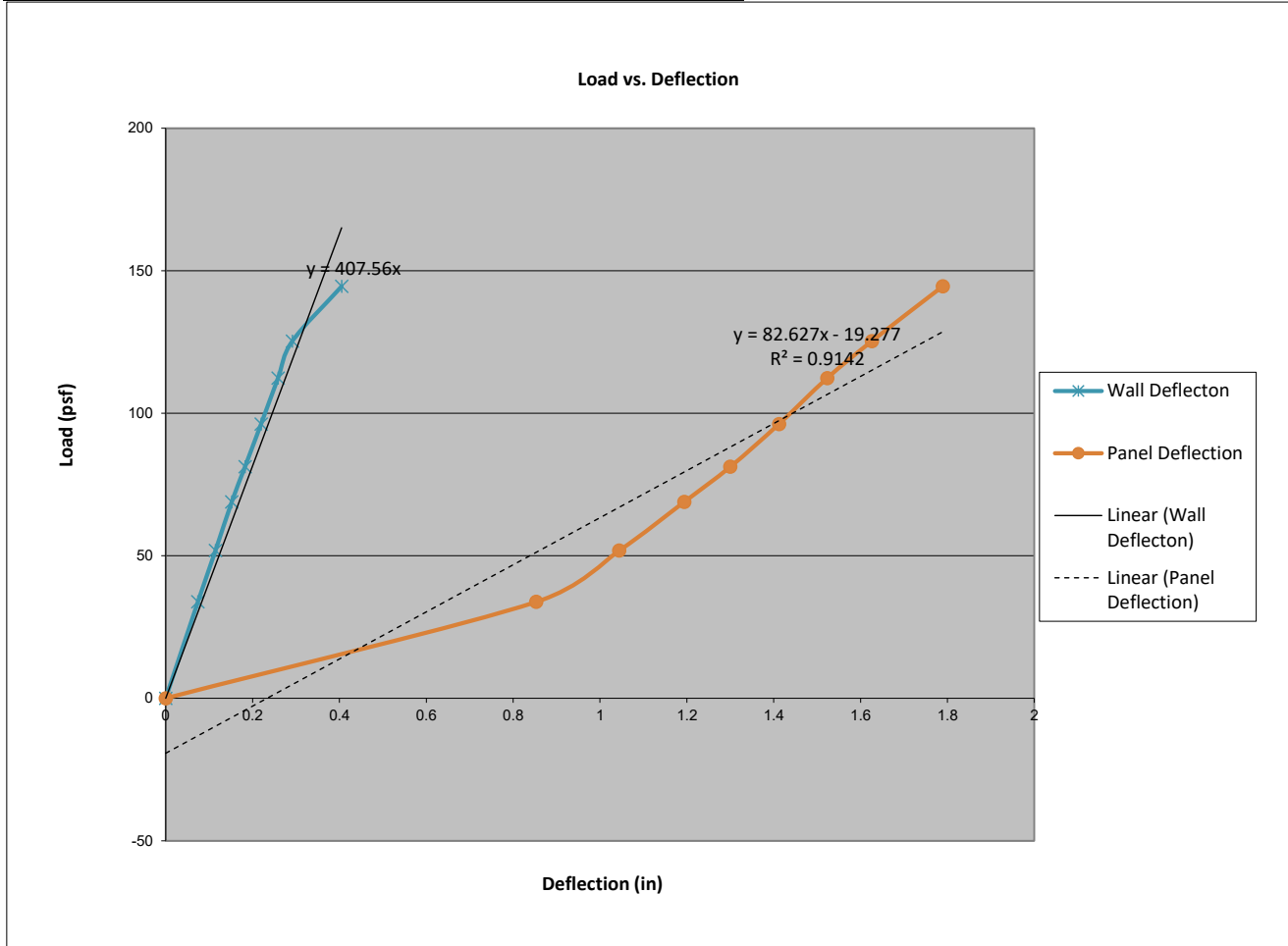


Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
30.3	0.063	0.751
46.8	0.097	0.942
60.3	0.124	1.070
77.8	0.165	1.266
93.6	0.191	1.402
106.5	0.222	1.520
122.4	0.255	1.657
140.2	0.293	1.787
153.2	0.320	1.885
171.7	0.360	2.021
181.2	0.380	2.134





Test#:	Q17-2	
Max Load	176.0	psf
Allowable Design Load (ASD) = Max Load / 2.5	70.4	psf
Deflection Service Load (ASD) = Allowable * 0.7	49.3	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.956	in
Wall Deflection @ Deflection Service Load (ASD)	0.1116	in
Panel Deflection @ Deflection Service Load (ASD)	0.7889	in
Max Load @ Wall Deflection Limit	176	psf
Max Load @ Panel Deflection Limit	60	psf



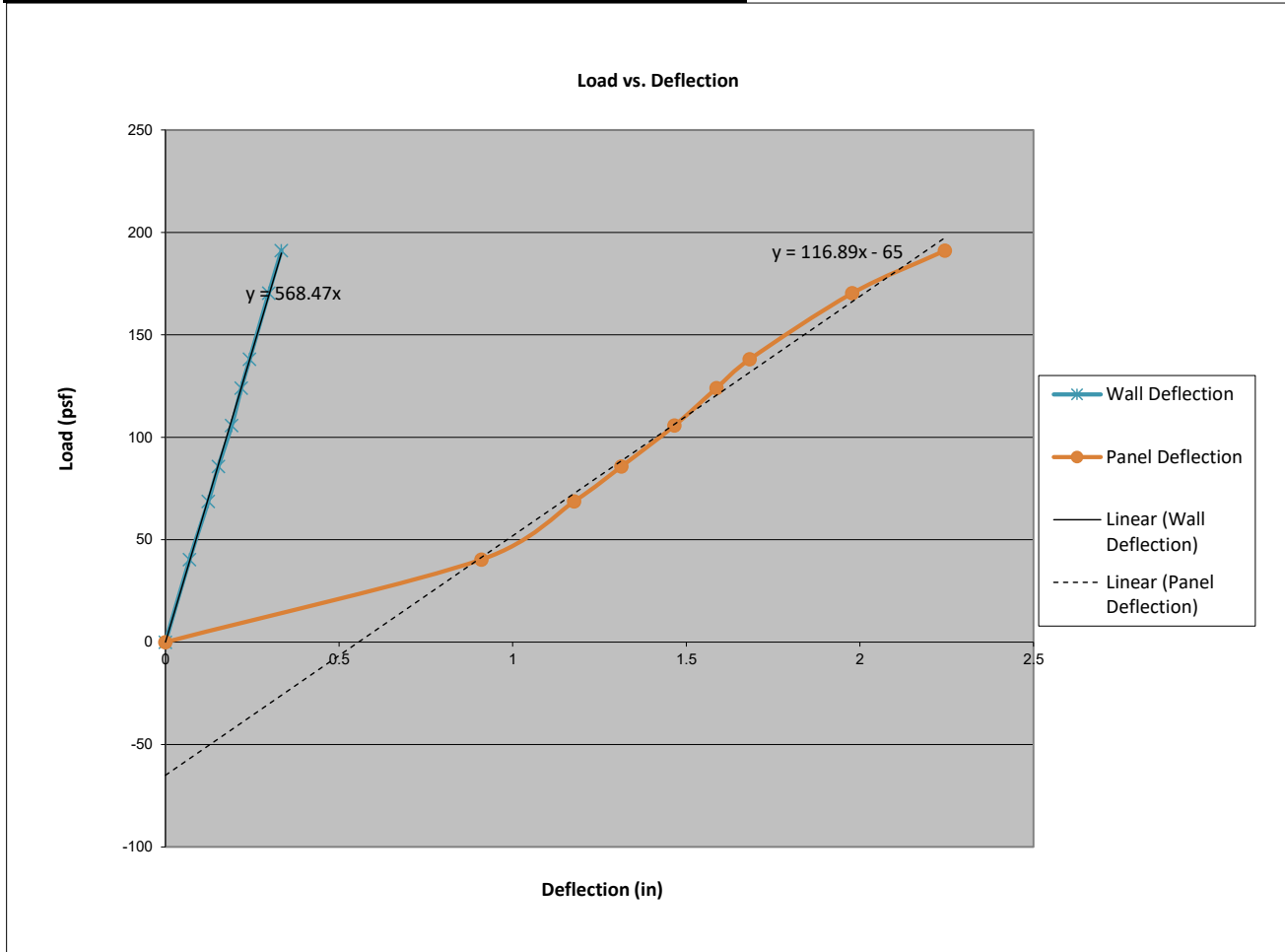
Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
33.8	0.074	0.853
51.8	0.115	1.044
68.9	0.152	1.194
81.2	0.183	1.300
96.2	0.220	1.412
112.3	0.259	1.523
125.3	0.292	1.626
144.5	0.405	1.789
155.8	0.440	1.891
169.2	0.483	2.007
176.0	0.506	2.083





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Test#:	Q17-3	
Max Load	191.1	psf
Allowable Design Load (ASD) = Max Load / 2.5	76.4	psf
Deflection Service Load (ASD) = Allowable * 0.7	53.5	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.956	in
Wall Deflection @ Deflection Service Load (ASD)	0.0948	in
Panel Deflection @ Deflection Service Load (ASD)	0.7516	in
Max Load @ Wall Deflection Limit	191	psf
Max Load @ Panel Deflection Limit	68	psf



Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 4 - (ga 3 + ga 5)/2) (in)
0.0	0.000	0.000
40.3	0.070	0.910
68.7	0.124	1.177
85.7	0.153	1.313
105.7	0.191	1.466
124.0	0.219	1.587
138.1	0.243	1.683
170.3	0.298	1.978
191.1	0.334	2.245



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

Test: **Transverse Load - Negative Wind Load**  
 Client: Engage Building Products  
 Date: 1/10/2025  
 Product: **QuickPanel Systems**  
 Test Method(s): ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

Test#: QI8-1

Project#: 0093  
 Technician(s): Ali  
 Reviewer: Chris  
 Location: 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

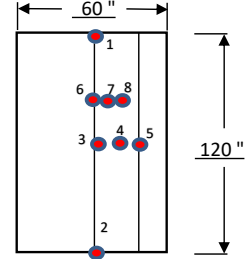
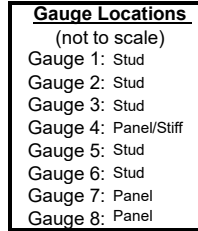
Configuration: 60" O.C., 16" O.C. studs  
 Framing: 2x6 steel stud, 33 ksi  
 Fastener: #10-1x1-1/2 HWH  
 Sheathing: 1/2" Drywall  
 Air Seal: Double sided 3M Tape with Primer & Silicone

**Equipment:**

**Pressure Chamber**  
 Motor: Core Sensors Model: CS10 - 2400  
 Press. Controller: S/N - G205141344  
 Pressure Sensors:  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
 Phidget: S/N - 5015249240311

**Deflection Gauges (Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F174
Sensor 8:	S/N - F282



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:	
Start:	3:25
Temp:	21.9
Finish:	3:44
%RH	20

Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	60

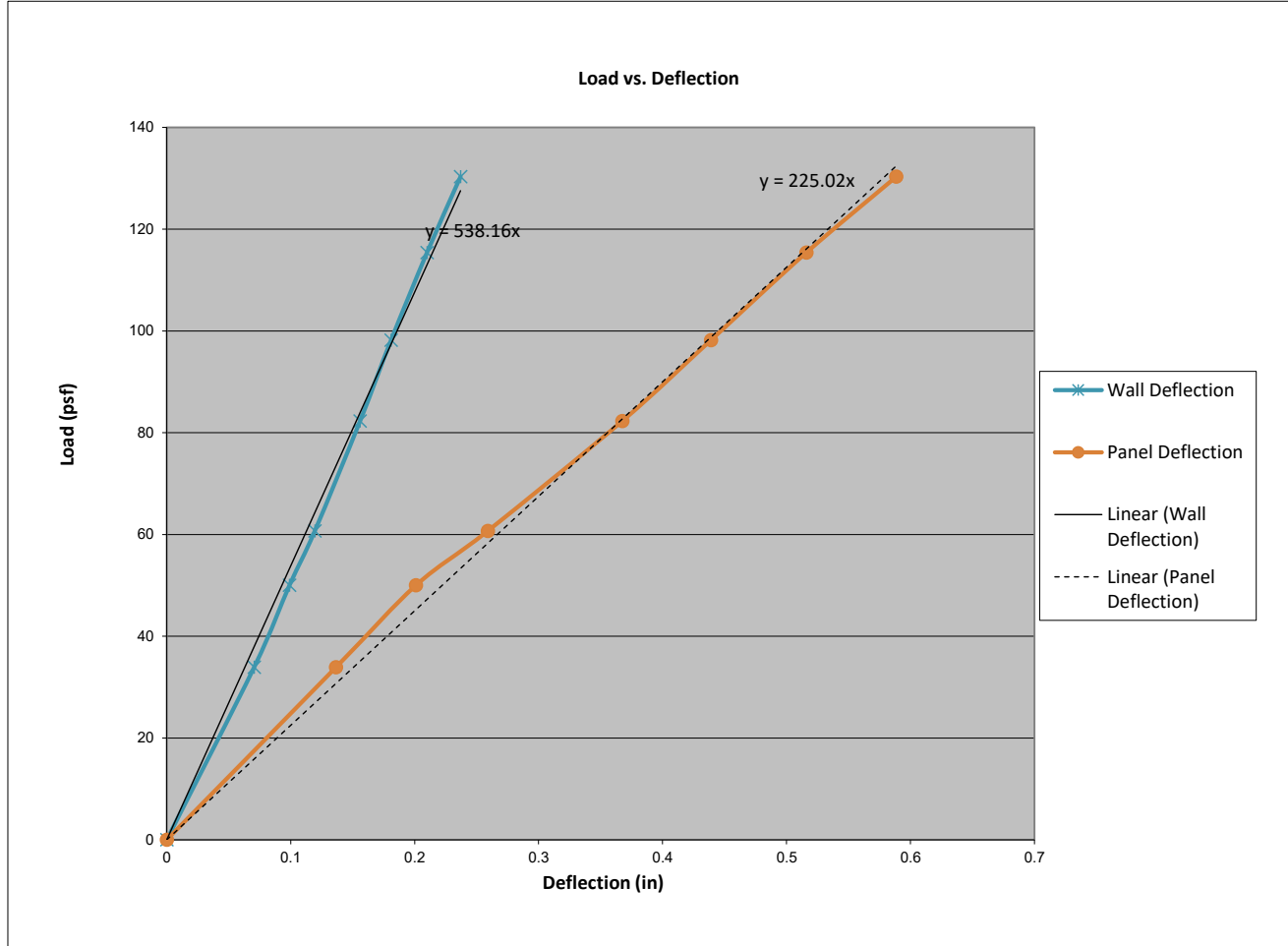
Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	immed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	33.9	10 sec.	0.039	0.046	0.113	0.238	0.09	0.775	0.874	0.072	
0		1-5mins	0.004	0.006	0.007	0.015	0.008	0.042	0.045	0.007	
45	50	10 sec.	0.065	0.077	0.17	0.354	0.136	0.974	1.084	0.114	
0		1-5mins	0.008	0.013	0.013	0.033	0.014	0.069	0.074	0.012	
60	60.7	10 sec.	0.085	0.102	0.213	0.451	0.171	1.125	1.241	0.147	
0		1-5mins	0.011	0.018	0.018	0.052	0.018	0.09	0.097	0.016	
80	82.3	10 sec.	0.118	0.144	0.287	0.624	0.226	1.359	1.465	0.204	
0		1-5mins	0.017	0.026	0.026	0.095	0.027	0.135	0.144	0.023	
100	98.2	10 sec.	0.141	0.173	0.338	0.742	0.268	1.514	1.648	0.244	
0		1-5mins	0.022	0.033	0.033	0.134	0.034	0.17	0.187	0.03	
120	115.4	10 sec.	0.167	0.201	0.394	0.866	0.306	1.666	1.809	0.288	
0		1-5mins	0.027	0.038	0.039	0.175	0.04	0.213	0.237	0.035	
130	130.3	10 sec.	0.19	0.224	0.444	0.98	0.339	1.8	1.946	0.326	
0		1-5mins	0.032	0.042	0.045	0.218	0.046	0.259	0.29	0.04	

Mode of Failure	
Max Load (psf)	130.3
Screws pulled out of steel studs.	



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Test#:	QI8-1	
Max Load	130.3	psf
Allowable Design Load (ASD) = Max Load / 2.5	52.1	psf
Deflection Service Load (ASD) = Allowable * 0.7	36.5	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	1.000	in
Wall Deflection @ Deflection Service Load (ASD)	0.0678	in
Panel Deflection @ Deflection Service Load (ASD)	0.1621	in
Max Load @ Wall Deflection Limit	130	psf
Max Load @ Panel Deflection Limit	130	psf



Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 4 - (ga 3 + ga 5)/2) (in)
0.0	0.000	0.000
33.9	0.071	0.137
50.0	0.099	0.201
60.7	0.120	0.259
82.3	0.156	0.368
98.2	0.181	0.439
115.4	0.210	0.516
130.3	0.237	0.589

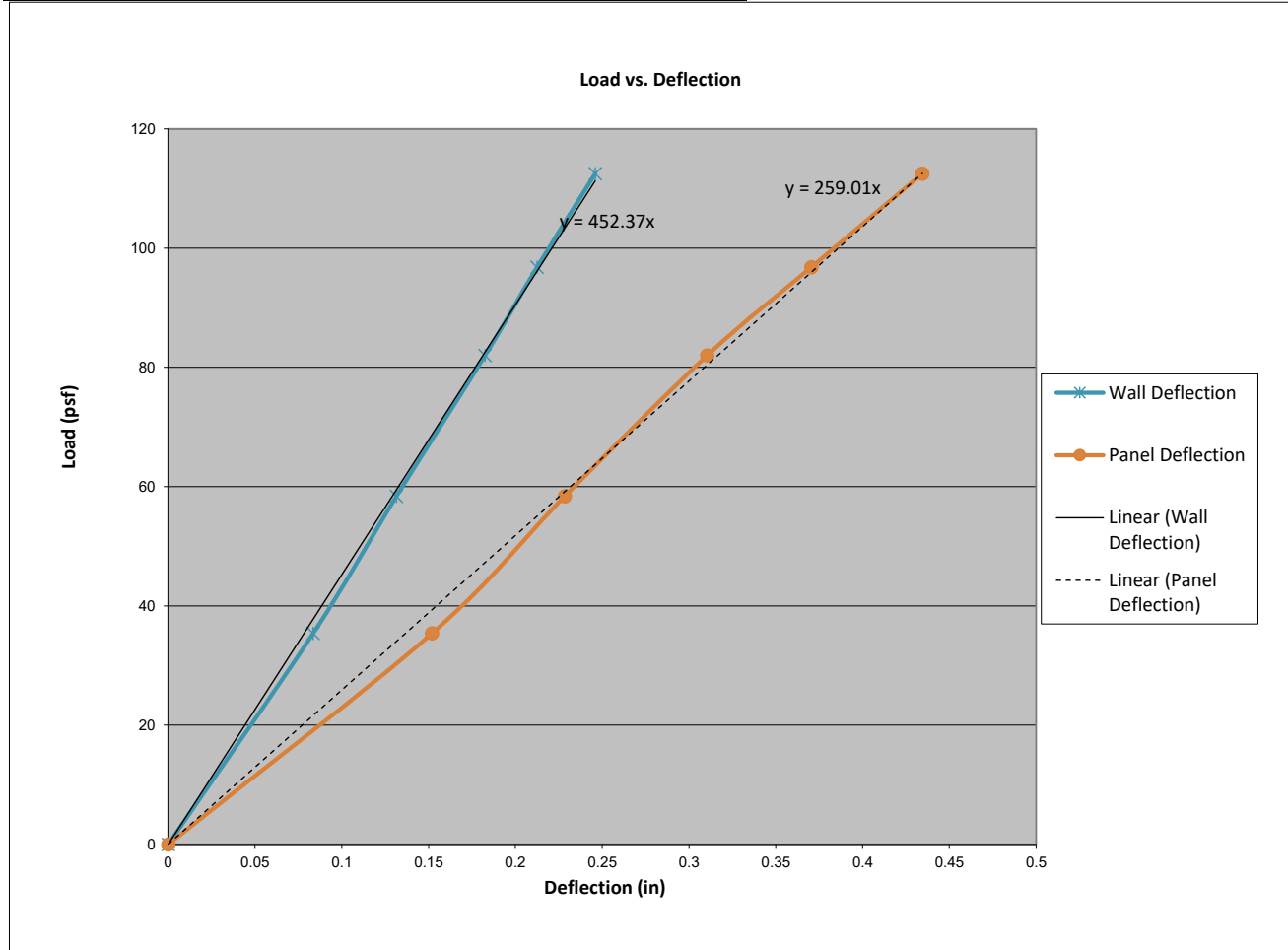




# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

Test#:	Q18-2	
Max Load	112.5	psf
Allowable Design Load (ASD) = Max Load / 2.5	45.0	psf
Deflection Service Load (ASD) = Allowable * 0.7	31.5	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	1.000	in
Wall Deflection @ Deflection Service Load (ASD)	0.0696	in
Panel Deflection @ Deflection Service Load (ASD)	0.1216	in
Max Load @ Wall Deflection Limit	113	psf
Max Load @ Panel Deflection Limit	113	psf



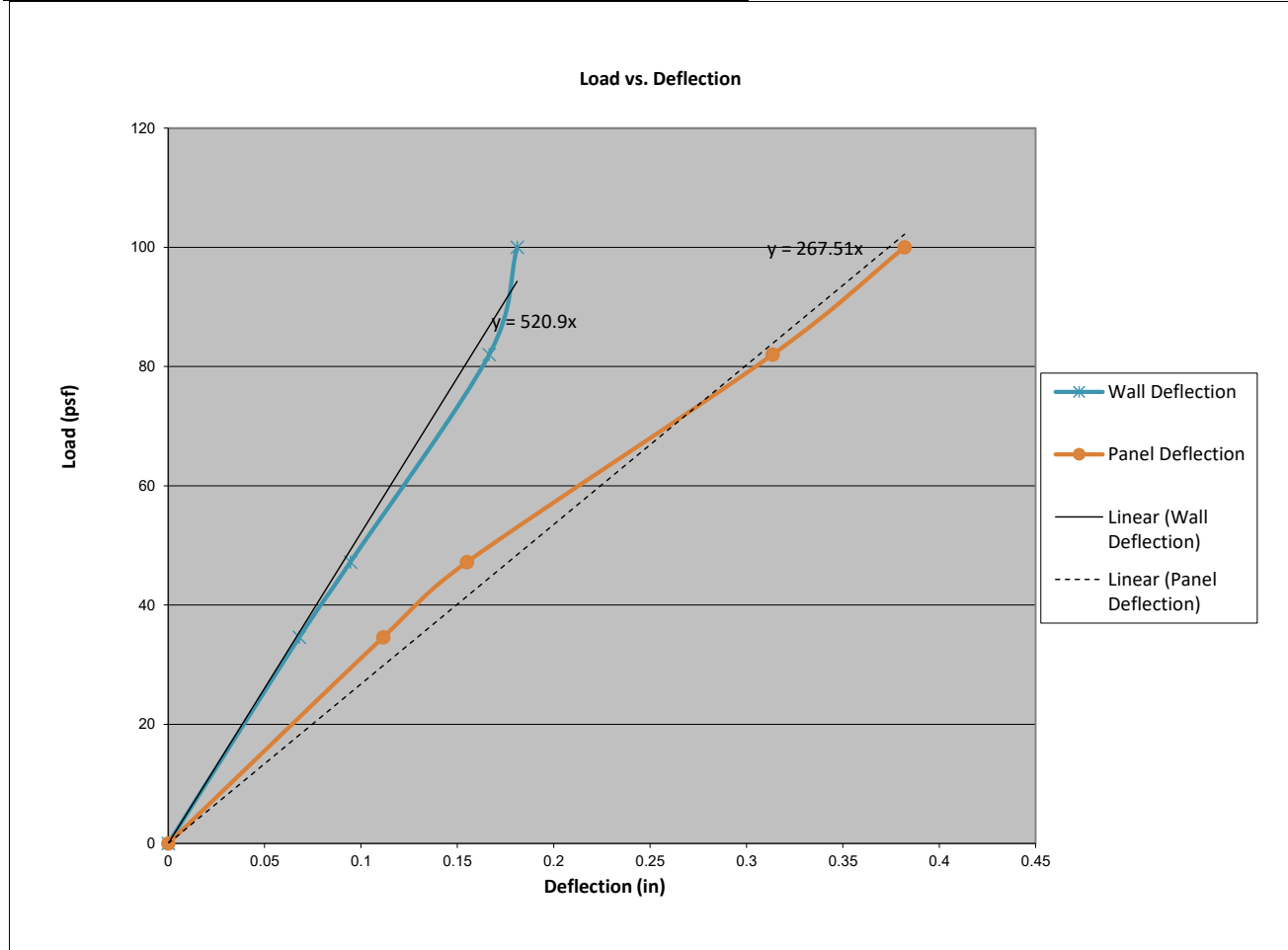
Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 4 - (ga 3 + ga 5)/2) (in)
0.0	0.000	0.000
35.4	0.084	0.152
58.4	0.132	0.229
82.0	0.183	0.311
96.8	0.213	0.371
112.5	0.246	0.435





**BOCA ENGINEERING CO. | SPAR**  
 STRUCTURAL & CIVIL CONSULTANTS

Test#:	QI8-3	
Max Load	121.0	psf
Allowable Design Load (ASD) = Max Load / 2.5	48.4	psf
Deflection Service Load (ASD) = Allowable * 0.7	33.9	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	1.000	in
Wall Deflection @ Deflection Service Load (ASD)	0.0655	in
Panel Deflection @ Deflection Service Load (ASD)	0.1358	in
Max Load @ Wall Deflection Limit	121	psf
Max Load @ Panel Deflection Limit	121	psf



Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 4 - (ga 3 + ga 5)/2) (in)
0.0	0.000	0.000
34.6	0.068	0.112
47.2	0.095	0.155
82.0	0.167	0.314
100.0	0.181	0.382
110.5	0.213	0.462
121.0	0.237	0.508



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

**Test:** Transverse Load - Negative Wind Load  
**Client:** Engage Building Products  
**Date:** 12/13/2024  
**Product:** QuickPanel Systems  
**Test Method(s):** ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

**Test#:** QI9-1

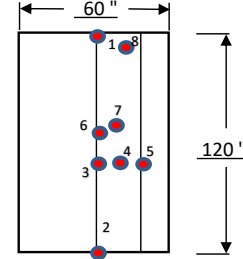
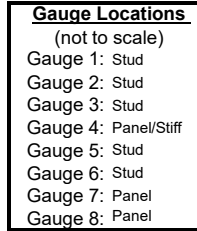
**Project#:** 0093  
**Technician(s):** Ali  
**Reviewer:** Chris  
**Location:** 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

**Configuration:** 12" O.C., 16" O.C. studs  
**Framing:** 2x6 steel stud, 33 ksi  
**Fastener:** #10-1x1-1/2 HWH  
**Sheathing:** 1/2" Drywall  
**Air Seal:** Double sided 3M Tape with Primer

**Equipment:**

<b>Pressure Chamber</b>	<b>Deflection Gauges (Phidget potentiometers)</b>
Motor: Core Sensors Model: CS10 - 2400	Sensor 1: S/N - F29B
Press. Controller: S/N - G205141344	Sensor 2: S/N - 9BFA
Pressure Sensors:	Sensor 3: S/N - 87CE
+/- 2 kPa: p/n 1136	Sensor 4: S/N - F16B
+/- 7 kPa: p/n 1137	Sensor 5: S/N - F14E
50 kPa: p/n 1138	Sensor 6: S/N - F28I
Phidget: S/N - 5015249240311	Sensor 7: S/N - F174
	Sensor 8: S/N - F282



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		✓

Time/Temp/RH:			
Start:	11:40	Temp:	21.9
Finish:	12:00	%RH	20

Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	12

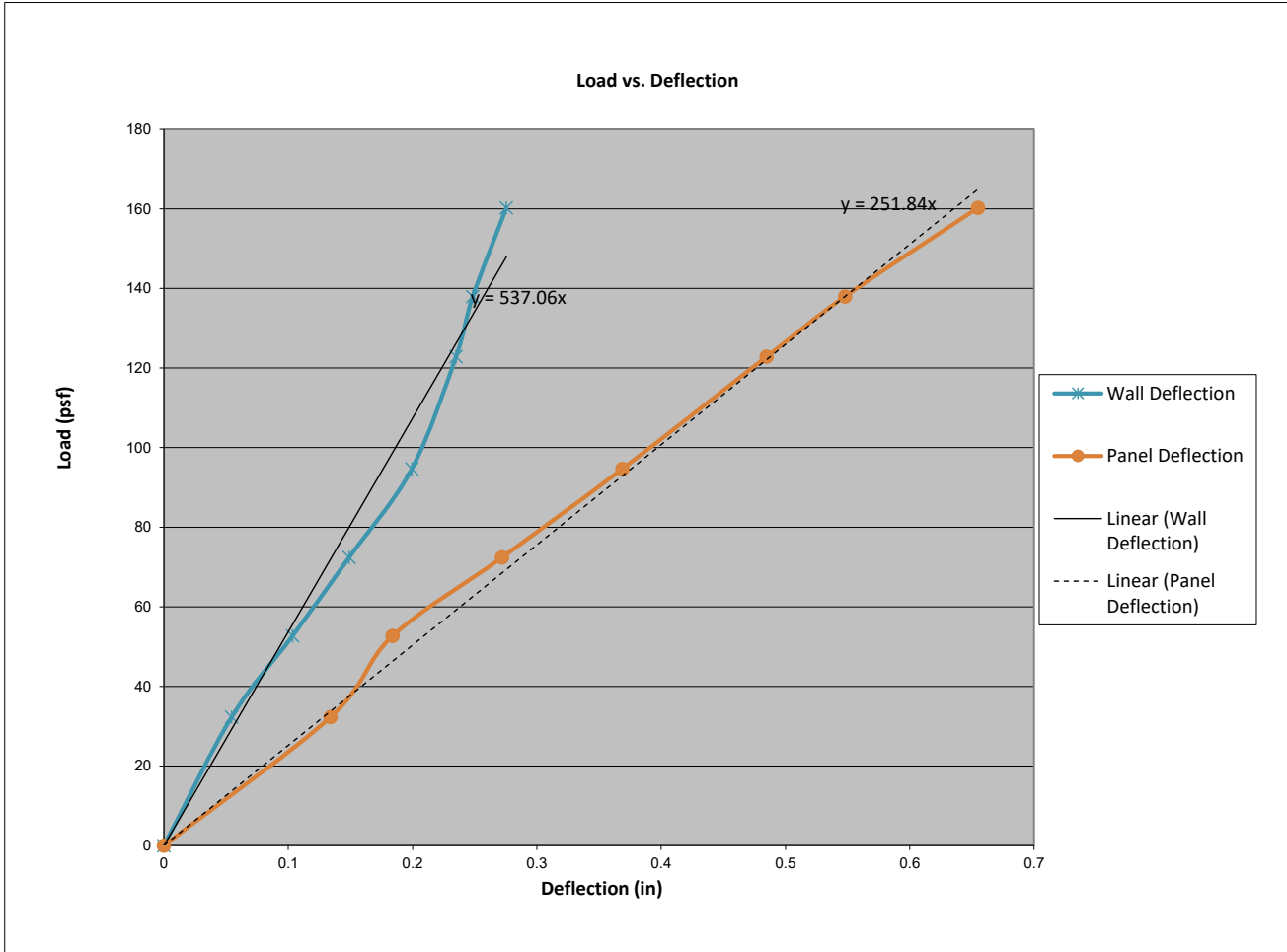
Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	imed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	32.3	10 sec.	0.075	0.078	0.158	0.167	0.131	0.03	0.164	0.162	
0		1-5mins	0.007	0.013	0.011	0.011	0.01	0.005	0.01	0.009	
45	52.7	10 sec.	0.121	0.164	0.293	0.303	0.246	0.112	0.296	0.291	
0		1-5mins	0.018	0.038	0.032	0.035	0.032	0.016	0.032	0.029	
65	72.4	10 sec.	0.181	0.257	0.434	0.448	0.368	0.167	0.439	0.431	
0		1-5mins	0.033	0.066	0.056	0.062	0.06	0.033	0.056	0.053	
80	94.7	10 sec.	0.246	0.363	0.596	0.617	0.504	0.228	0.597	0.592	
0		1-5mins	0.05	0.099	0.083	0.094	0.088	0.048	0.084	0.076	
100	122.9	10 sec.	0.322	0.486	0.782	0.809	0.639	0.296	0.781	0.77	
0		1-5mins	0.074	0.136	0.115	0.135	0.117	0.07	0.117	0.106	
130	138	10 sec.	0.355	0.548	0.87	0.901	0.7	0.325	0.873	0.856	
0		1-5mins	0.083	0.158	0.132	0.156	0.131	0.078	0.138	0.121	
160	160.3	10 sec.	0.412	0.655	0.131	1.065	0.809	0.376	1.031	0.12	
0		1-5mins	0.098	0.197	0.131	0.196	0.155	0.09	0.169	0.12	
180	182.1	10 sec.	0.469	0.753	0.131	1.215	0.907	0.421	1.173	0.12	
0		1-5mins	0.114	0.231	0.131	0.231	0.175	0.1	0.2	0.12	
210	217.7	10 sec.	0.598	0.936	0.131	1.478	1.083	0.51	1.438	120	
0		1-5mins	0.118	0.231	0.131	0.231	0.176	0.11	0.3	0.13	

Mode of Failure	
<b>Max Load (psf)</b>	<b>217.7</b>
Screws pulled out of steel studs.	



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Test#:	QI9-1	
Max Load	217.7	psf
Allowable Design Load (ASD) = Max Load / 2.5	87.1	psf
Deflection Service Load (ASD) = Allowable * 0.7	61.0	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.200	in
Wall Deflection @ Deflection Service Load (ASD)	0.1041	in
Panel Deflection @ Deflection Service Load (ASD)	0.2384	in
Max Load @ Wall Deflection Limit	218	psf
Max Load @ Panel Deflection Limit	51	psf



Target Load (psf)	Wall Deflection (= ga 5 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - (ga 6) (in)
0.0	0.000	0.000
32.3	0.055	0.134
52.7	0.104	0.184
72.4	0.149	0.272
94.7	0.200	0.369
122.9	0.235	0.485
138.0	0.249	0.548
160.3	0.276	0.655
182.1	0.296	0.752
217.7	0.316	0.928



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

**Test:** Transverse Load - Negative Wind Load  
**Client:** Engage Building Products  
**Date:** 12/12/2024  
**Product:** QuickPanel Systems  
**Test Method(s):** ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

**Test#:** QI9-2

**Project#:** 0093  
**Technician(s):** Ali  
**Reviewer:** Chris  
**Location:** 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

**Configuration:** 12" O.C., 16" O.C. studs  
**Framing:** 2x6 steel stud, 33 ksi  
**Fastener:** #10-1x1-1/2 HWH  
**Sheathing:** 1/2" Drywall  
**Air Seal:** Double sided 3M Tape with Primer

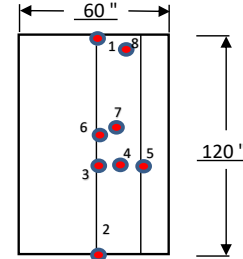
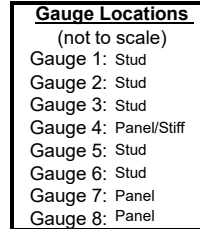
**Equipment:**

**Pressure Chamber**

**Motor:** Core Sensors Model: CS10 - 2400  
**Press. Controller:** S/N - G205141344  
**Pressure Sensors:**  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
**Phidget:** S/N - 5015249240311

**Deflection Gauges( Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F174
Sensor 8:	S/N - F282



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	10:47	Temp:	23.5
Finish:	11:40	%RH	18

Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	12

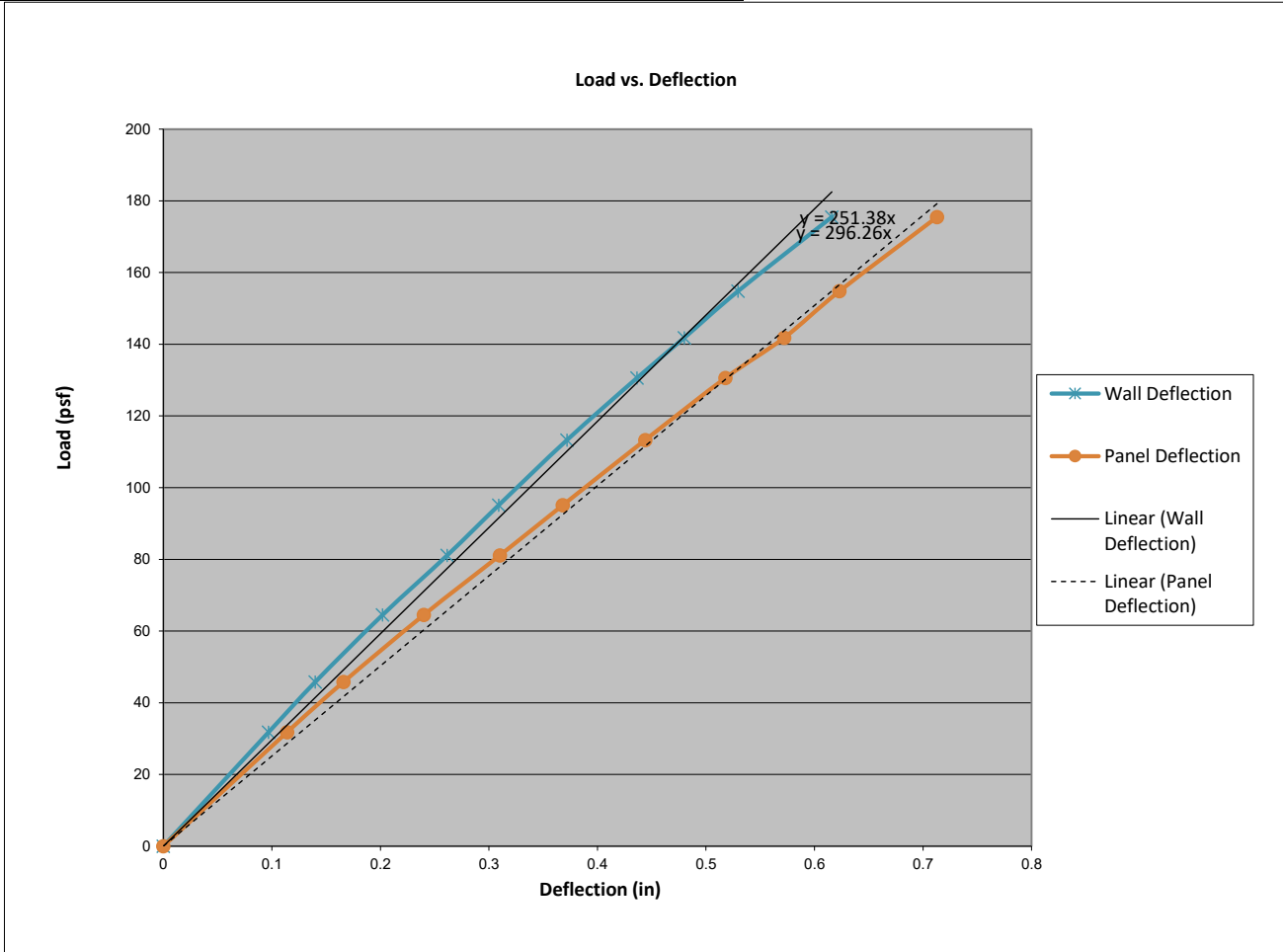
Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	imed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	31.8	10 sec.	0.078	0.07	0.171	0.175	0.118	0.067	0.181	0.17	
0		1-5mins	0.01	0.014	0.015	0.015	0.01	0.008	0.014	0.015	
45	45.8	10 sec.	0.111	0.109	0.25	0.253	0.174	0.094	0.26	0.249	
0		1-5mins	0.015	0.024	0.025	0.023	0.017	0.012	0.023	0.024	
65	64.5	10 sec.	0.148	0.168	0.36	0.358	0.247	0.127	0.367	0.36	
0		1-5mins	0.021	0.035	0.036	0.035	0.026	0.016	0.036	0.036	
80	81.1	10 sec.	0.181	0.22	0.462	0.453	0.313	0.156	0.466	0.46	
0		1-5mins	0.028	0.043	0.048	0.046	0.035	0.022	0.046	0.046	
95	95.1	10 sec.	0.209	0.265	0.546	0.537	0.37	0.18	0.548	0.543	
0		1-5mins	0.033	0.052	0.058	0.055	0.041	0.025	0.054	0.055	
110	113.3	10 sec.	0.241	0.319	0.652	0.641	0.442	0.213	0.657	0.649	
0		1-5mins	0.039	0.062	0.069	0.068	0.05	0.03	0.065	0.064	
125	130.6	10 sec.	0.271	0.366	0.755	0.744	0.509	0.242	0.76	0.748	
0		1-5mins	0.044	0.07	0.079	0.08	0.057	0.033	0.075	0.072	
140	141.8	10 sec.	0.293	0.399	0.826	0.815	0.554	0.265	0.837	0.819	
0		1-5mins	0.051	0.079	0.091	0.09	0.063	0.039	0.087	0.081	
155	154.8	10 sec.	0.315	0.43	0.902	0.889	0.601	0.289	0.912	0.894	
0		1-5mins	0.057	0.086	0.102	0.101	0.069	0.041	0.095	0.089	
170	175.5	10 sec.	0.359	0.479	1.035	1.015	0.683	0.33	1.043	1.032	
0		1-5mins	0.067	0.095	0.124	0.117	0.079	0.05	0.112	0.111	
190	190.1	10 sec.	0.399	0.519	1.154	1.132	0.753	0.367	1.163	1.165	
0		1-5mins	0.067	0.101	0.377	0.201	0.126	0.056	0.194	0.277	
205	209.8	10 sec.	0.439	0.652	1.545	1.691	1.045	0.424	1.715	2.05	
0		1-5mins	0.07	0.15	0.914	0.498	0.393	0.068	0.474	0.642	

Mode of Failure	
Max Load (psf)	209.8
Steel Studs were bent in the middle.	



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Test#:	QI9-2	
Max Load	209.8	psf
Allowable Design Load (ASD) = Max Load / 2.5	83.9	psf
Deflection Service Load (ASD) = Allowable * 0.7	58.7	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.200	in
Wall Deflection @ Deflection Service Load (ASD)	0.1896	in
Panel Deflection @ Deflection Service Load (ASD)	0.2256	in
Max Load @ Wall Deflection Limit	207	psf
Max Load @ Panel Deflection Limit	52	psf

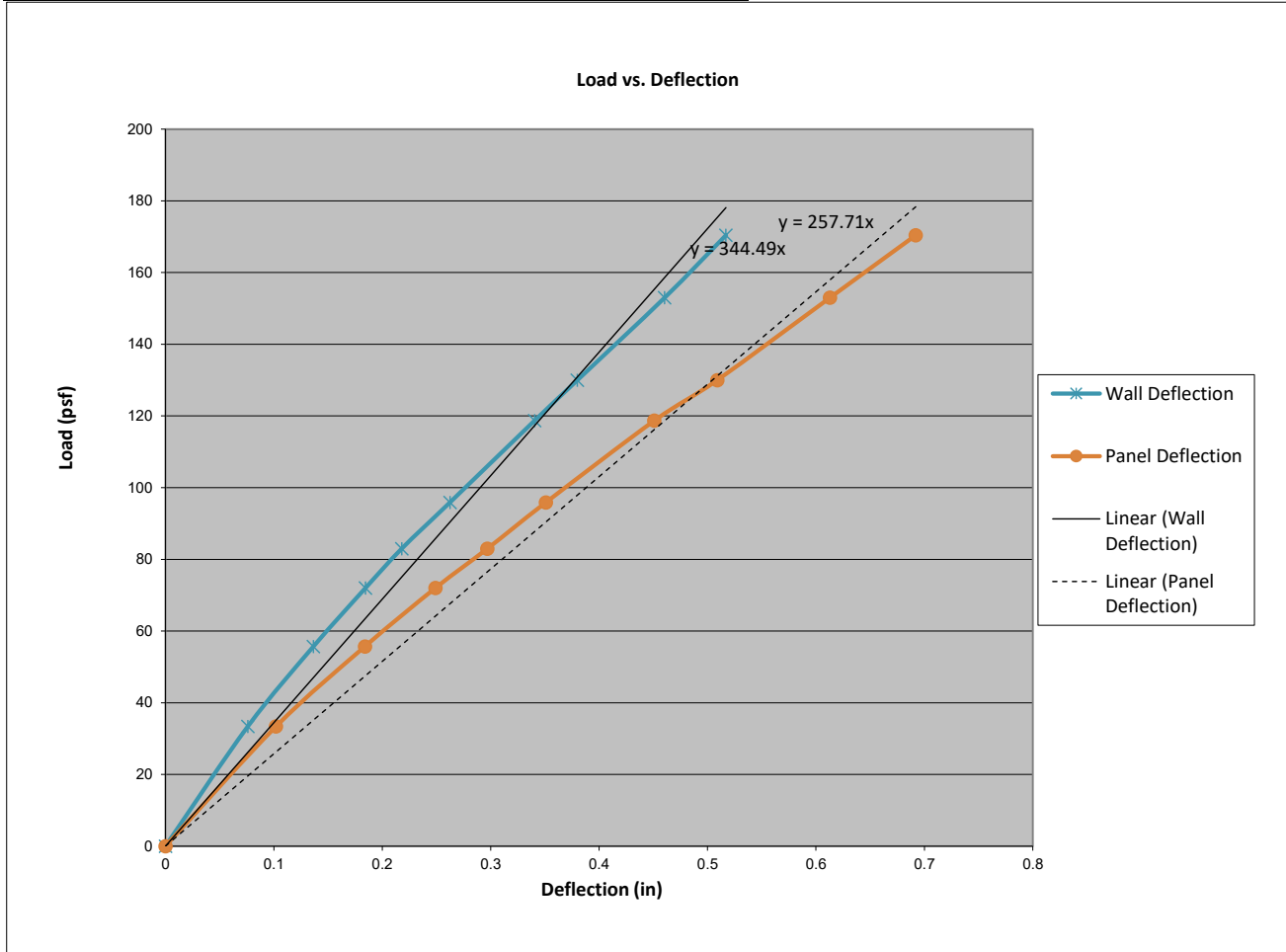


Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - (ga 6) (in)
0.0	0.000	0.000
31.8	0.097	0.114
45.8	0.140	0.166
64.5	0.202	0.240
81.1	0.262	0.310
95.1	0.309	0.368
113.3	0.372	0.444
130.6	0.437	0.518
141.8	0.480	0.572
154.8	0.530	0.623
175.5	0.616	0.713
190.1	0.695	0.796
209.8	1.000	1.291





Test#:	QI9-3	
Max Load	208.2	psf
Allowable Design Load (ASD) = Max Load / 2.5	83.3	psf
Deflection Service Load (ASD) = Allowable * 0.7	58.3	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.200	in
Wall Deflection @ Deflection Service Load (ASD)	0.1718	in
Panel Deflection @ Deflection Service Load (ASD)	0.2331	in
Max Load @ Wall Deflection Limit	208	psf
Max Load @ Panel Deflection Limit	50	psf



Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga7 - (ga 6) (in)
0.0	0.000	0.000
33.4	0.076	0.102
55.7	0.137	0.184
72.0	0.185	0.249
83.0	0.218	0.297
95.9	0.263	0.351
118.7	0.341	0.451
130.0	0.380	0.509
153.0	0.461	0.613
170.4	0.517	0.692
190.8	0.577	0.787
208.2	0.623	0.868



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

**Test:** Transverse Load - Negative Wind Load  
**Client:** Engage Building Products  
**Date:** 12/17/2024  
**Product:** QuickPanel Systems  
**Test Method(s):** ASTM E330/E330M-14, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

**Test#:** QI10-1

**Project#:** 0093  
**Technician(s):** Ali  
**Reviewer:** Chris  
**Location:** 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

**Configuration:** 24" O.C. stiffeners, 16" O.C. studs  
**Framing:** 2x6 steel stud, 50 ksi  
**Fastener:** #10-1x1-1/2 HWH  
**Sheathing:** 1/2" Drywall  
**Air Seal:** Double sided 3M Tape with Primer & Silicone

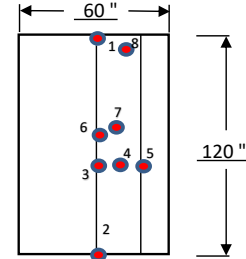
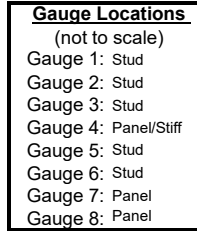
**Equipment:**

**Pressure Chamber**

Motor: Core Sensors Model: CS10 - 2400  
 Press. Controller: S/N - G205141344  
 Pressure Sensors:  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
 Phidget: S/N - 5015249240311

**Deflection Gauges (Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F174
Sensor 8:	S/N - F282



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	10:42	Temp:	21.2
Finish:	11:13	%RH	17

Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	24

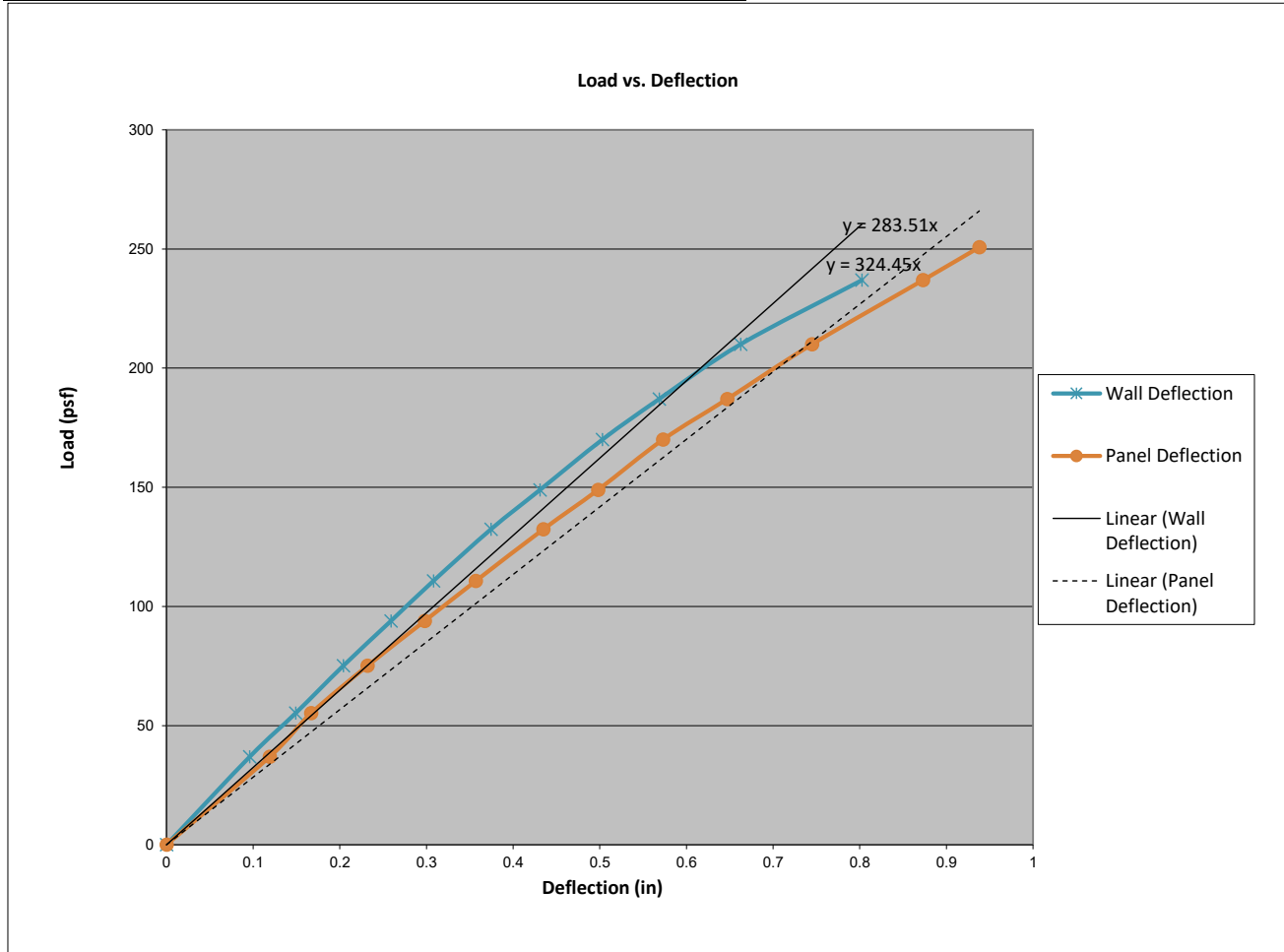
Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations
0	0.0	imed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15	15	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
0		1-5mins	Zero Deflection Gauges								
30	36.9	10 sec.	0.085	0.075	0.176	0.186	0.115	0.16	0.279	0.19	
0		1-5mins	0.005	0.007	0.007	0.007	0.005	0.005	0.008	0.006	
50	55.2	10 sec.	0.125	0.117	0.27	0.287	0.18	0.238	0.405	0.293	
0		1-5mins	0.011	0.015	0.015	0.015	0.011	0.01	0.017	0.014	
70	75.1	10 sec.	0.16	0.164	0.366	0.393	0.247	0.31	0.542	0.396	
0		1-5mins	0.015	0.023	0.023	0.023	0.019	0.015	0.026	0.023	
90	93.9	10 sec.	0.19	0.214	0.461	0.493	0.31	0.374	0.672	0.495	
0		1-5mins	0.019	0.033	0.032	0.032	0.028	0.02	0.036	0.032	
105	110.7	10 sec.	0.218	0.258	0.546	0.581	0.369	0.432	0.789	0.586	
0		1-5mins	0.023	0.041	0.042	0.045	0.036	0.025	0.046	0.041	
125	132.4	10 sec.	0.255	0.312	0.658	0.707	0.45	0.503	0.938	0.705	
0		1-5mins	0.03	0.051	0.057	0.061	0.05	0.034	0.062	0.054	
150	148.9	10 sec.	0.283	0.349	0.747	0.801	0.51	0.556	1.054	0.797	
0		1-5mins	0.035	0.058	0.07	0.078	0.062	0.042	0.081	0.067	
165	170	10 sec.	0.32	0.394	0.86	0.921	0.583	0.621	1.194	0.915	
0		1-5mins	0.043	0.067	0.091	0.103	0.077	0.051	0.104	0.085	
190	187	10 sec.	0.353	0.434	0.962	1.025	0.646	0.673	1.32	1.018	
0		1-5mins	0.05	0.075	0.113	0.132	0.091	0.063	0.129	0.106	
210	210	10 sec.	0.397	0.488	1.105	1.176	0.725	0.743	1.488	1.165	
0		1-5mins	0.061	0.087	0.146	0.191	0.112	0.076	0.17	0.137	
230	236.9	10 sec.	0.449	0.554	1.304	1.367	0.827	0.826	1.699	1.362	
0		1-5mins	0.072	0.102	0.203	0.25	0.14	0.097	0.235	0.194	
250	250.7	10 sec.	0.484	0.597	1.481	1.523	0.904	0.925	1.863	1.54	
0		1-5mins	0.084	0.115	0.304	0.342	0.181	0.118	0.337	0.304	
270	291.8	10 sec.	0.577	0.752	1.539	1.815	1.022	0.974	2.219	1.605	
0		1-5mins	0.099	0.195	0.292	0.447	0.193	0.155	0.481	0.283	
300	302.9	10 sec.	0.665	0.83	1.669	1.967	1.11	1.054	2.385	1.746	
0		1-5mins	0.134	0.23	0.346	0.507	0.226	0.204	0.551	0.339	

Mode of Failure	
Max Load (psf)	302.9
Steel Studs were bent in the middle.	



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Test#:	Q110-1	
Max Load	302.9	psf
Allowable Design Load (ASD) = Max Load / 2.5	121.2	psf
Deflection Service Load (ASD) = Allowable * 0.7	84.8	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.400	in
Wall Deflection @ Deflection Service Load (ASD)	0.2709	in
Panel Deflection @ Deflection Service Load (ASD)	0.3153	in
Max Load @ Wall Deflection Limit	209	psf
Max Load @ Panel Deflection Limit	108	psf



Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - (ga 6) (in)
0.0	0.000	0.000
36.9	0.096	0.119
55.2	0.149	0.167
75.1	0.204	0.232
93.9	0.259	0.298
110.7	0.308	0.357
132.4	0.375	0.435
148.9	0.431	0.498
170.0	0.503	0.573
187.0	0.569	0.647
210.0	0.663	0.745
236.9	0.803	0.873
250.7	0.941	0.938
291.8	0.875	1.245
302.9	0.922	1.331



# BOCA ENGINEERING CO. | SPAR

## STRUCTURAL & CIVIL CONSULTANTS

**Test:** Transverse Load - Negative Wind Load  
**Client:** Engage Building Products  
**Date:** 12/13/2024  
**Product:** QuickPanel Systems  
**Test Method(s):** ASTM E330/E330M-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

**Test#:** QI10-2

**Project#:** 0093  
**Technician(s):** Ali  
**Reviewer:** Chris  
**Location:** 101-4441 76 Ave. SE Calgary AB T2C2G8

**Installation:**

**Configuration:** 24" O.C. stiffeners, 16" O.C. studs  
**Framing:** 2x6 steel stud, 50 ksi  
**Fastener:** #10-1x1-1/2 HWH  
**Sheathing:** 1/2" Drywall  
**Air Seal:** Double sided 3M Tape with Primer & Silicone

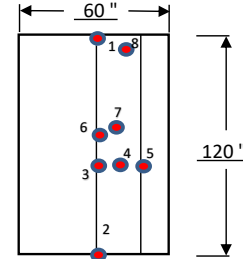
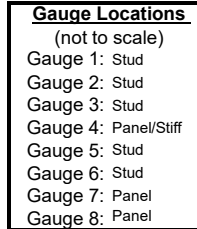
**Equipment:**

**Pressure Chamber**

Motor: Core Sensors Model: CS10 - 2400  
 Press. Controller: S/N - G205141344  
 Pressure Sensors:  
 +/- 2 kPa: p/n 1136  
 +/- 7 kPa: p/n 1137  
 50 kPa: p/n 1138  
 Phidget: S/N - 5015249240311

**Deflection Gauges (Phidget potentiometers)**

Sensor 1:	S/N - F29B
Sensor 2:	S/N - 9BFA
Sensor 3:	S/N - 87CE
Sensor 4:	S/N - F16B
Sensor 5:	S/N - F14E
Sensor 6:	S/N - F28I
Sensor 7:	S/N - F174
Sensor 8:	S/N - F282



	Description	Taken [✓]
Photo 1:	Before test, back of wall	✓
Photo 2:	Before test, front of wall	✓
Photo 3:	After test, back of wall	✓
Photo 4:	After test, front of wall	✓
Photo 5:		

Time/Temp/RH:			
Start:	2:04	Temp:	21.2
Finish:	2:44	%RH	20

Test Assembly		
Width (in)	Length (in)	Panel Anchor Spacing (in)
60.0	120.0	24

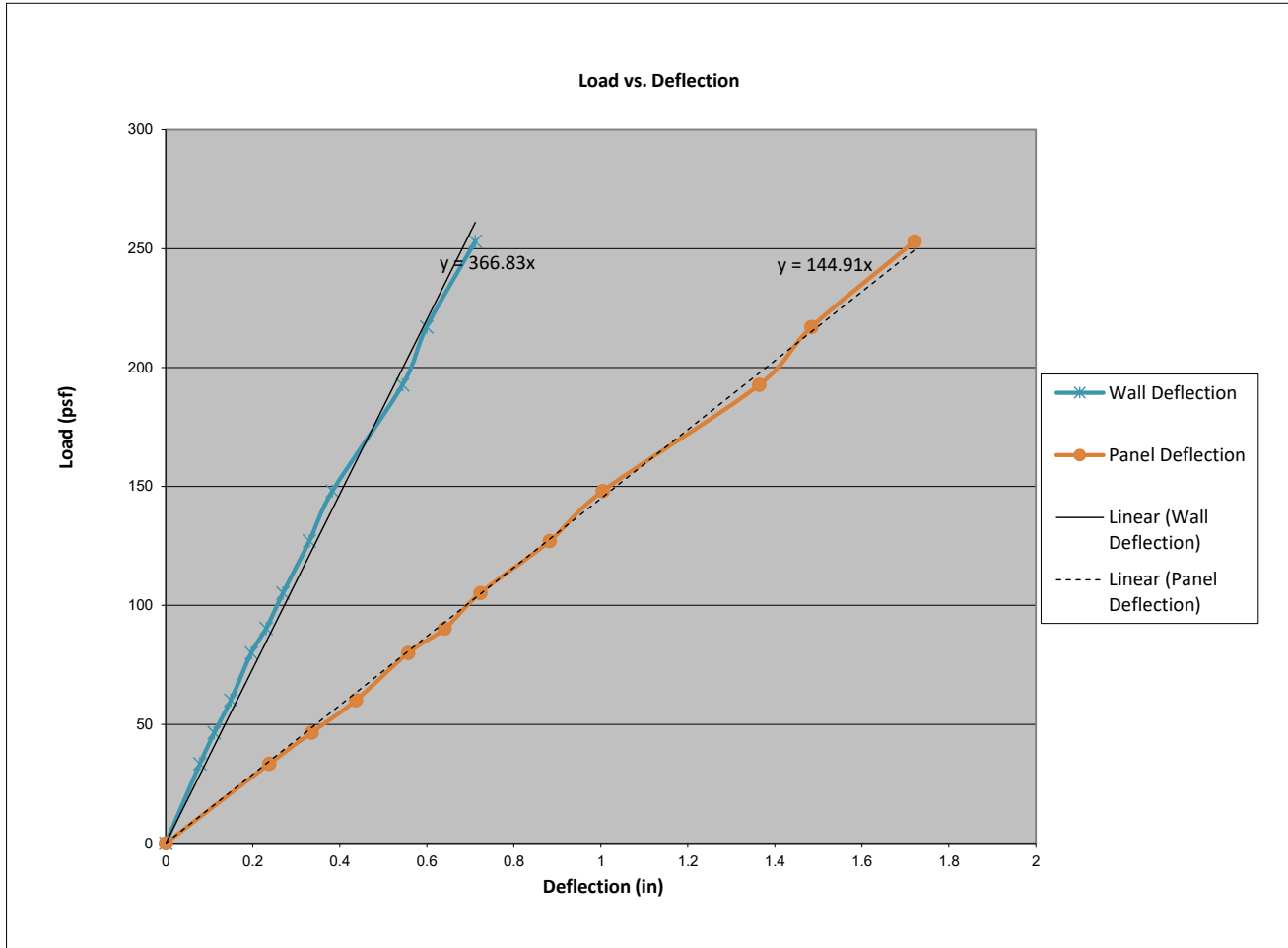
Target Load (psf)	Actual Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)	Gauge 6 (in.)	Gauge 7 (in.)	Gauge 8 (in.)	Observations	
0	0.0	imed.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
15	16	10 sec.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
0		1-5mins	Zero Deflection Gauges									
30	33.4	10 sec.	0.042	0.059	0.129	0.162	0.112	0.134	0.241	0.139		
0		1-5mins	0.003	0.007	0.007	0.007	0.005	0.003	0.007	0.006		
45	46.5	10 sec.	0.064	0.085	0.186	0.233	0.165	0.19	0.341	0.2		
0		1-5mins	0.006	0.013	0.013	0.014	0.011	0.006	0.017	0.013		
60	60.1	10 sec.	0.089	0.114	0.251	0.313	0.22	0.25	0.447	0.272		
0		1-5mins	0.01	0.021	0.022	0.023	0.019	0.01	0.025	0.022		
75	80	10 sec.	0.121	0.152	0.333	0.415	0.289	0.326	0.574	0.36		
0		1-5mins	0.016	0.028	0.03	0.034	0.027	0.017	0.038	0.03		
90	90.2	10 sec.	0.146	0.179	0.393	0.484	0.337	0.381	0.665	0.423		
0		1-5mins	0.022	0.033	0.037	0.041	0.034	0.024	0.047	0.037		
105	105.2	10 sec.	0.177	0.21	0.463	0.565	0.395	0.443	0.773	0.499		
0		1-5mins	0.041	0.047	0.061	0.072	0.058	0.05	0.078	0.062		
120	127	10 sec.	0.222	0.26	0.571	0.695	0.483	0.533	0.932	0.614		
0		1-5mins	0.041	0.047	0.061	0.072	0.058	0.05	0.078	0.062		
150	148	10 sec.	0.257	0.307	0.665	0.811	0.558	0.598	1.068	0.718		
0		1-5mins	0.051	0.056	0.076	0.091	0.072	0.064	0.1	0.077		
180	192.7	10 sec.	0.355	0.461	0.952	1.177	0.779	0.766	1.467	1.027		
0		1-5mins	0.077	0.098	0.137	0.196	0.126	0.103	0.202	0.141		
210	217	10 sec.	0.38	0.501	1.04	1.292	0.847	0.828	1.599	1.128		
0		1-5mins	0.084	0.11	0.156	0.222	0.141	0.115	0.23	0.159		
250	253	10 sec.	0.441	0.6	1.232	1.541	1.003	0.977	1.866	1.349		
0		1-5mins	0.098	0.14	0.205	0.298	0.185	0.145	0.314	0.215		
270	282.2	10 sec.	0.5	0.689	1.409	1.78	1.147	1.099	2.106	1.547		
0		1-5mins	0.113	0.167	0.257	0.37	0.23	0.176	0.391	0.276		
300	301	10 sec.	0.507	0.744	1.489	1.944	1.254	1.331	2.313	1.623		
0		1-5mins	0.112	0.201	0.318	0.472	0.302	0.431	0.522	0.339		

Mode of Failure	
Max Load (psf)	301.0
Panel stiffener ripped in two parts.	



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Test#:	Q110-2	
Max Load	301.0	psf
Allowable Design Load (ASD) = Max Load / 2.5	120.4	psf
Deflection Service Load (ASD) = Allowable * 0.7	84.3	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.400	in
Wall Deflection @ Deflection Service Load (ASD)	0.2355	in
Panel Deflection @ Deflection Service Load (ASD)	0.5687	in
Max Load @ Wall Deflection Limit	239	psf
Max Load @ Panel Deflection Limit	59	psf



Target Load (psi)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
33.4	0.079	0.238
46.5	0.112	0.335
60.1	0.150	0.437
80.0	0.197	0.557
90.2	0.231	0.641
105.2	0.270	0.723
127.0	0.330	0.882
148.0	0.383	1.004
192.7	0.544	1.364
217.0	0.600	1.484
253.0	0.712	1.721
282.2	0.815	1.930
301.0	0.864	1.882

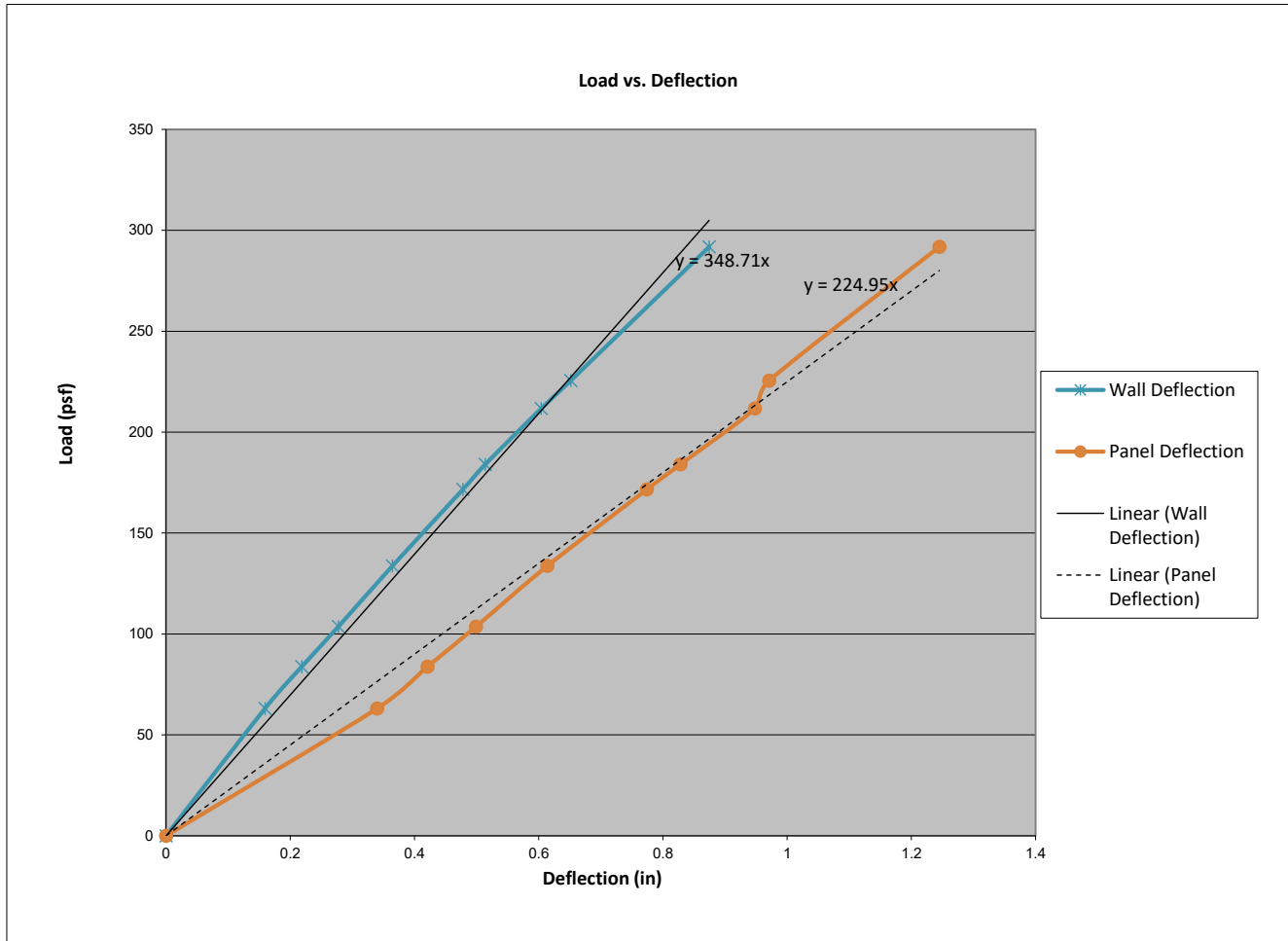




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## STRUCTURAL & CIVIL CONSULTANTS

Test#:	Q110-3	
Max Load	321.4	psf
Allowable Design Load (ASD) = Max Load / 2.5	128.6	psf
Deflection Service Load (ASD) = Allowable * 0.7	90.0	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	0.400	in
Wall Deflection @ Deflection Service Load (ASD)	0.2666	in
Panel Deflection @ Deflection Service Load (ASD)	0.3989	in
Max Load @ Wall Deflection Limit	225	psf
Max Load @ Panel Deflection Limit	90	psf

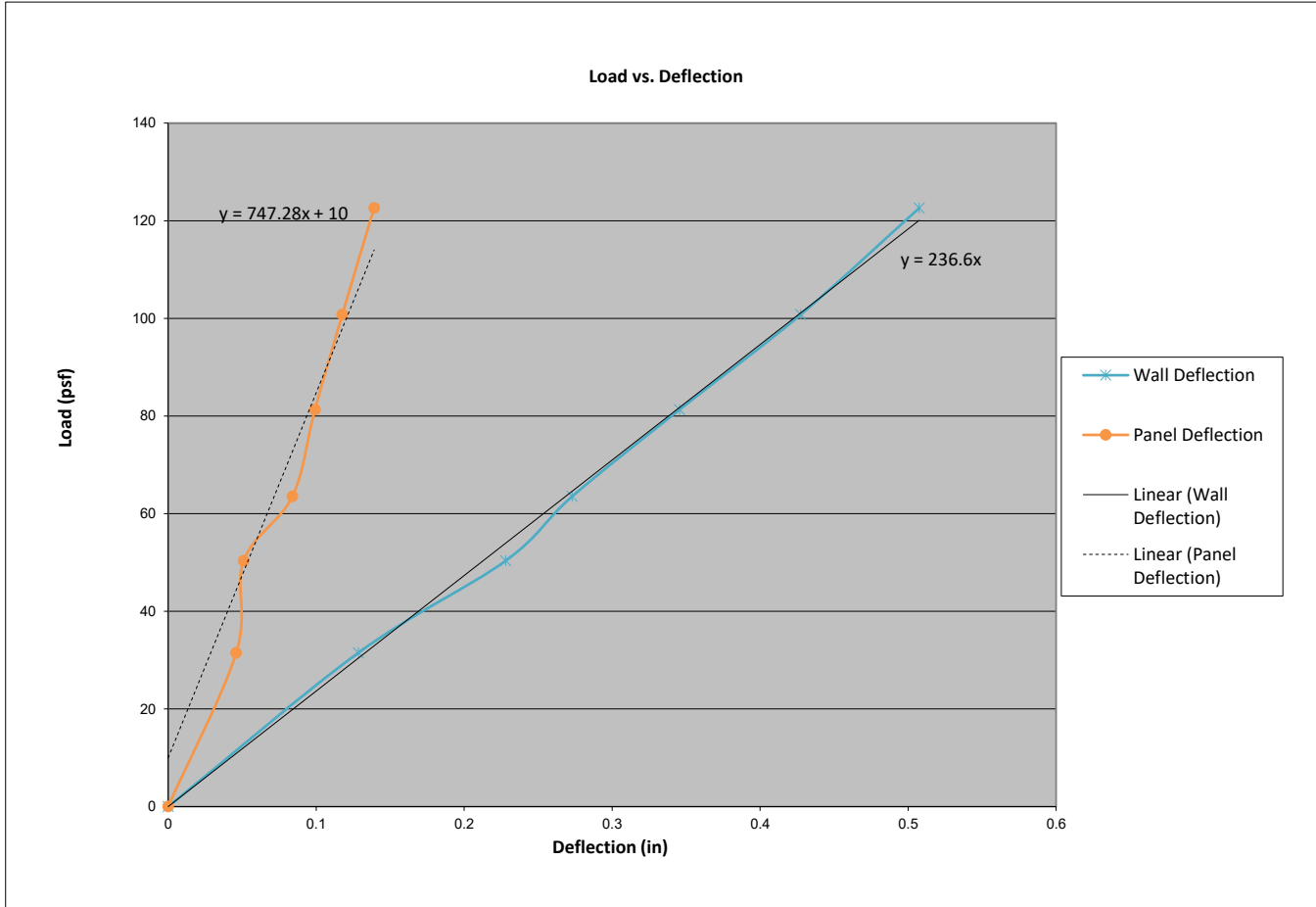


Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 7 - ga 6) (in)
0.0	0.000	0.000
63.1	0.160	0.340
83.8	0.219	0.421
103.6	0.278	0.499
133.7	0.365	0.614
171.6	0.478	0.774
184.0	0.514	0.828
211.7	0.604	0.948
225.5	0.652	0.971
291.8	0.875	1.245
302.9	0.922	1.331
321.4	1.006	1.425





Test#:	QI11-1
Max Load	148.0 psf
Allowable Design Load (ASD) = Max Load / 2.5	59.2 psf
Deflection Service Load (ASD) = Allowable * 0.7	41.4 psf
Wall Deflection limit = L / 180 of wall height	0.667 in
Panel Deflection limit = L / 60 of panel anchor span	0.400 in
Wall Deflection @ Deflection Service Load (ASD)	0.1784 in
Panel Deflection @ Deflection Service Load (ASD)	0.0433 in
Max Load @ Wall Deflection Limit	148 psf
Max Load @ Panel Deflection Limit	148 psf



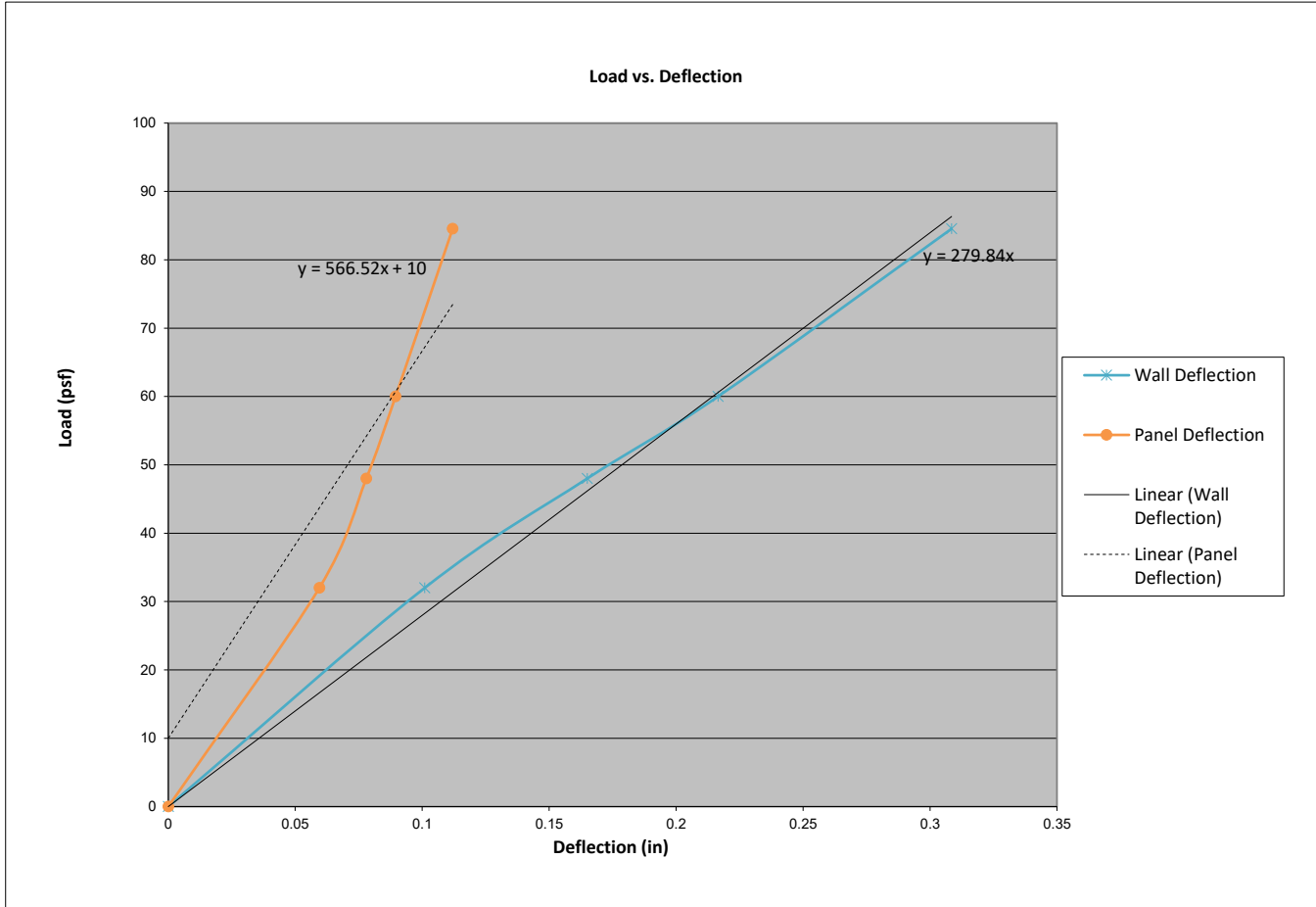
Target Load (psf)	Wall Deflection (= $\frac{ga_2 + ga_6}{2} - \frac{ga_3 + ga_4}{2}$ )	Panel Deflection (= $\frac{ga_1 + ga_5}{2} - \frac{ga_2 + ga_6}{2}$ )
0.0	0.000	0.000
31.5	0.129	0.046
50.3	0.228	0.051
63.5	0.273	0.084
81.3	0.346	0.099





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Test#:	QI11-2
Max Load	139.0 psf
Allowable Design Load (ASD) = Max Load / 2.5	55.6 psf
Deflection Service Load (ASD) = Allowable * 0.7	38.9 psf
Wall Deflection limit = L / 180 of wall height	0.667 in
Panel Deflection limit = L / 60 of panel anchor span	0.400 in
Wall Deflection @ Deflection Service Load (ASD)	0.1391 in
Panel Deflection @ Deflection Service Load (ASD)	0.0736 in
Max Load @ Wall Deflection Limit	139 psf
Max Load @ Panel Deflection Limit	139 psf



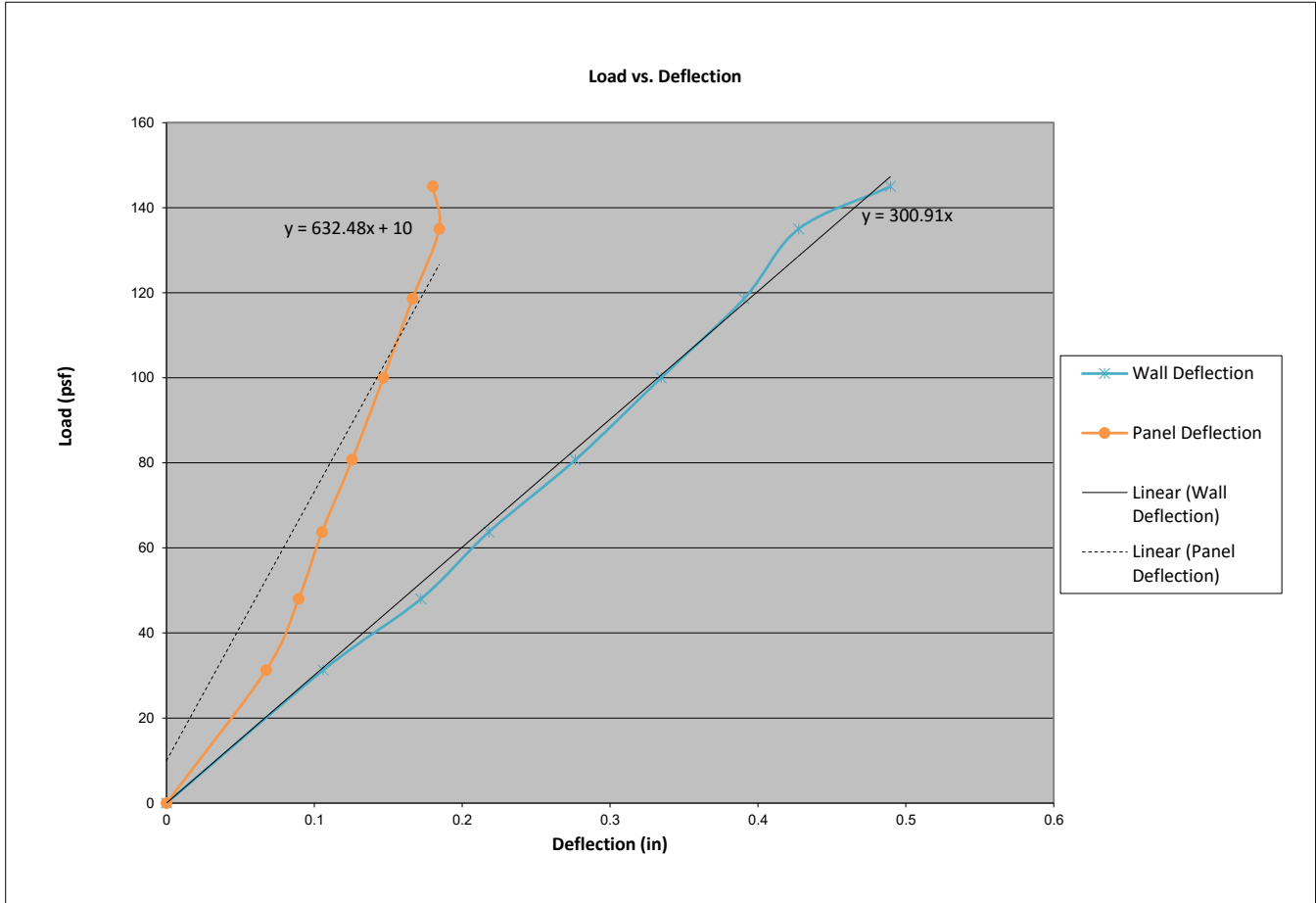
Target Load (psf)	Wall Deflection (= $\frac{ga_2 + ga_6}{2} - \frac{(ga_3 + ga_4)}{2}$ )	Panel Deflection (= $\frac{ga_1 + ga_5}{2} - \frac{(ga_2 + ga_6)}{2}$ )
0.0	0.000	0.000
32.0	0.101	0.060
48.0	0.165	0.078
60.0	0.217	0.089
84.5	0.309	0.112





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Test#:	QI11-3
Max Load	145.0 psf
Allowable Design Load (ASD) = Max Load / 2.5	58.0 psf
Deflection Service Load (ASD) = Allowable * 0.7	40.6 psf
Wall Deflection limit = L / 180 of wall height	0.667 in
Panel Deflection limit = L / 60 of panel anchor span	0.400 in
Wall Deflection @ Deflection Service Load (ASD)	0.1400 in
Panel Deflection @ Deflection Service Load (ASD)	0.0465 in
Max Load @ Wall Deflection Limit	145 psf
Max Load @ Panel Deflection Limit	145 psf

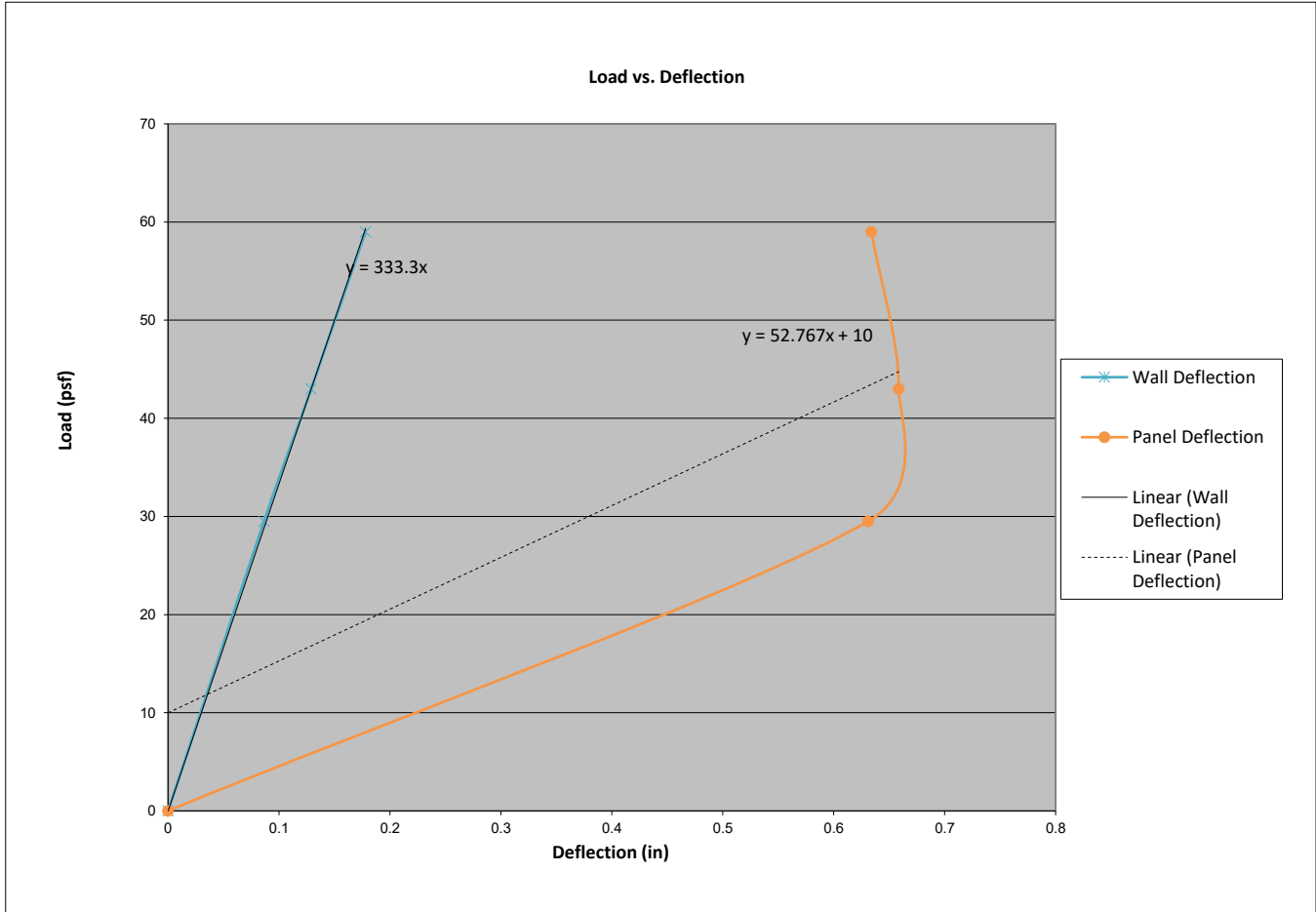


Target Load (psf)	Wall Deflection (= $\frac{ga_2 + ga_6}{2} - \frac{(ga_3 + ga_4)}{2}$ )	Panel Deflection (= $\frac{ga_1 + ga_5}{2} - \frac{(ga_2 + ga_6)}{2}$ )
0.0	0.000	0.000
31.3	0.106	0.067
48.0	0.172	0.089
63.8	0.218	0.105
80.7	0.277	0.126





Test#:	Q112-1
Max Load	92.0 psf
Allowable Design Load (ASD) = Max Load / 2.5	36.8 psf
Deflection Service Load (ASD) = Allowable * 0.7	25.8 psf
Wall Deflection limit = L / 180 of wall height	0.667 in
Panel Deflection limit = L / 60 of panel anchor span	2.000 in
Wall Deflection @ Deflection Service Load (ASD)	0.0779 in
Panel Deflection @ Deflection Service Load (ASD)	0.1713 in
Max Load @ Wall Deflection Limit	92 psf
Max Load @ Panel Deflection Limit	92 psf



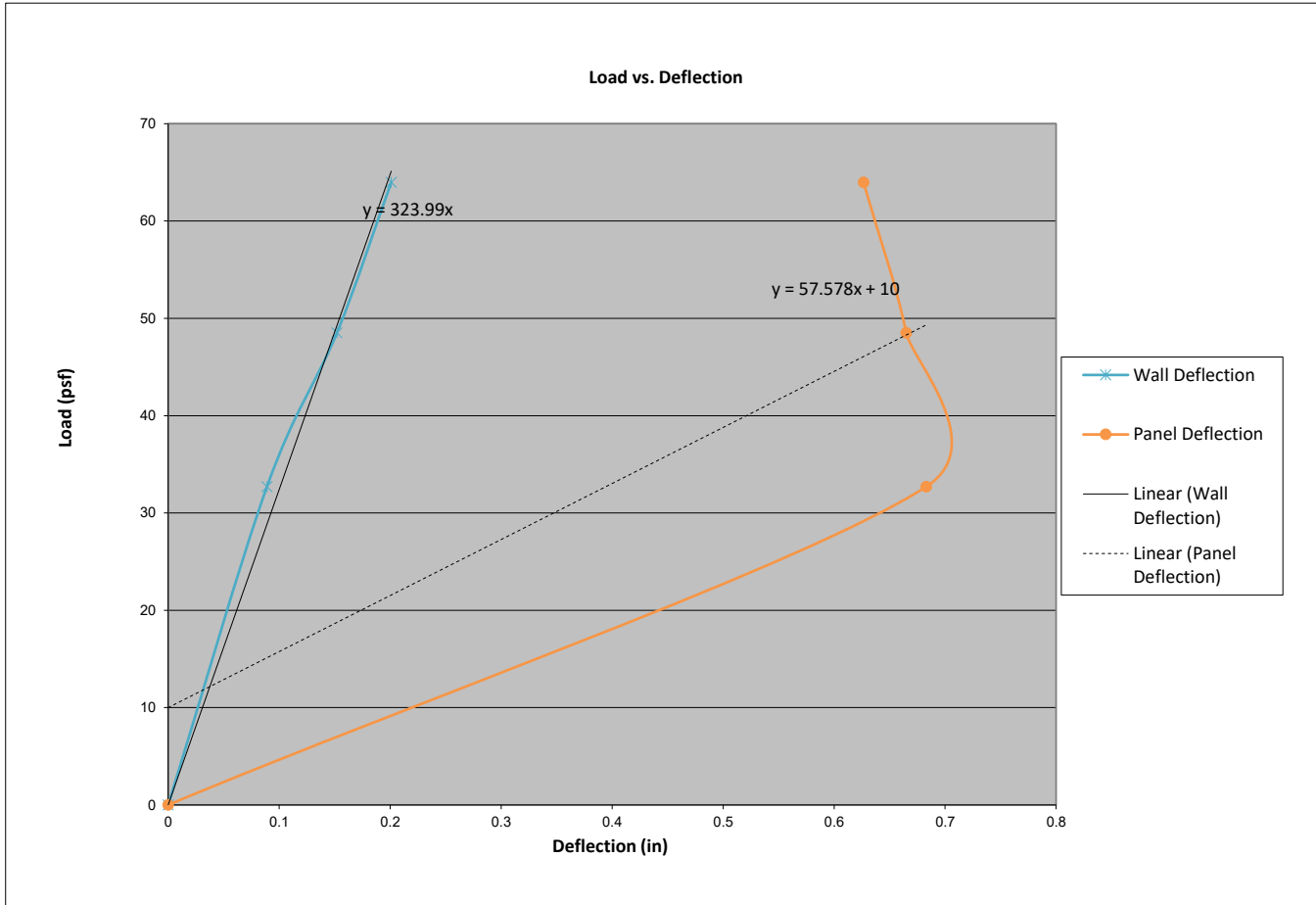
Target Load (psf)	Wall Deflection (= $ga_2 + ga_6$ )/2 - ( $ga_3 + ga_4$ )/2	Panel Deflection (= $ga_1 + ga_5$ )/2 - ( $ga_2 + ga_6$ )/2
0.0	0.000	0.000
29.5	0.087	0.631
43.0	0.129	0.659
59.0	0.178	0.634
76.3	0.233	0.592





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Test#:	QI12-2	
Max Load	92.1	psf
Allowable Design Load (ASD) = Max Load / 2.5	36.9	psf
Deflection Service Load (ASD) = Allowable * 0.7	25.8	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor span	2.000	in
Wall Deflection @ Deflection Service Load (ASD)	0.0807	in
Panel Deflection @ Deflection Service Load (ASD)	0.1843	in
Max Load @ Wall Deflection Limit	92	psf
Max Load @ Panel Deflection Limit	92	psf



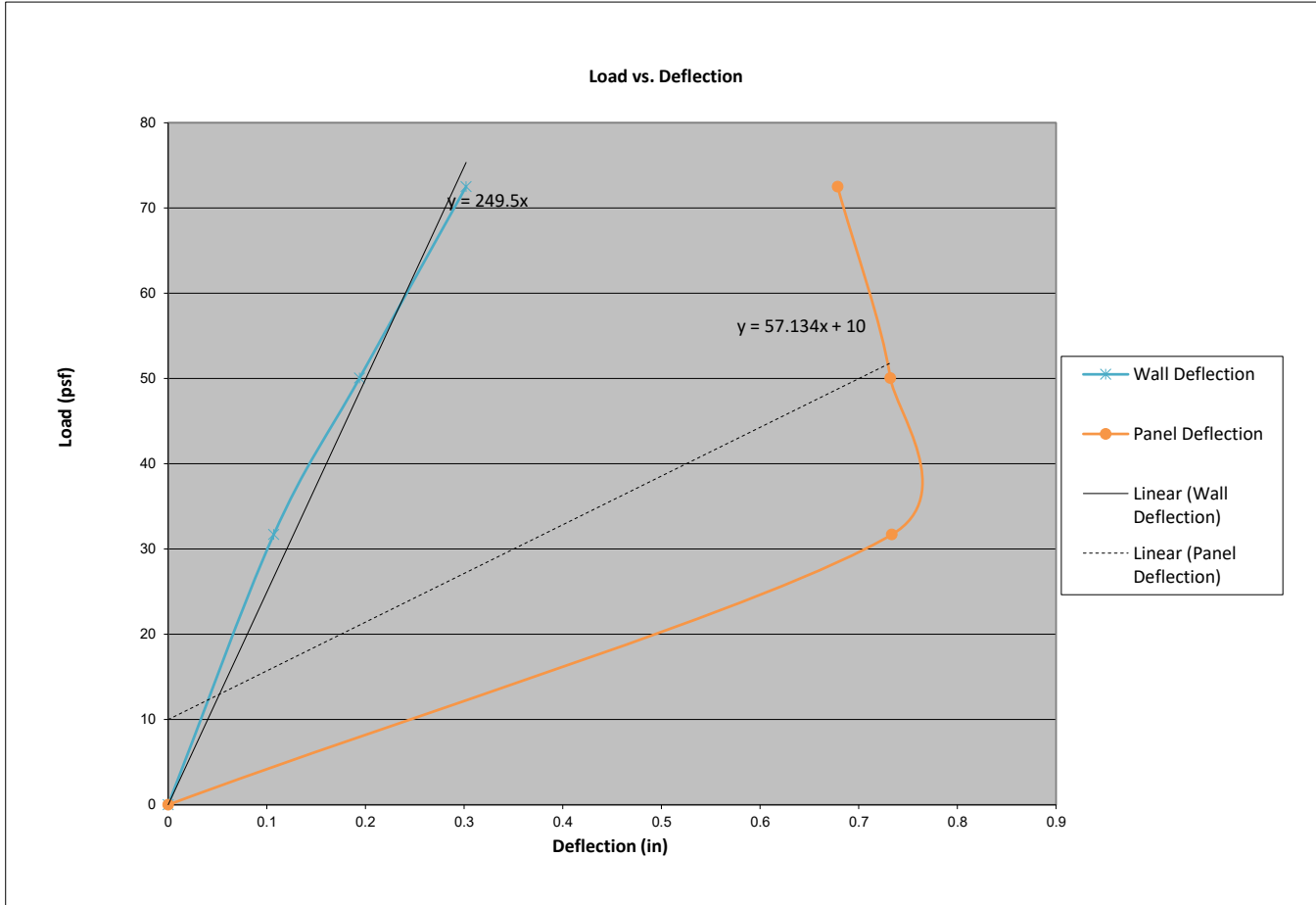
Target Load (psf)	Wall Deflection (= $\frac{ga_2 + ga_6}{2} - \frac{ga_3 + ga_4}{2}$ )	Panel Deflection (= $\frac{ga_1 + ga_5}{2} - \frac{ga_2 + ga_6}{2}$ )
0.0	0.000	0.000
32.7	0.089	0.683
48.5	0.152	0.665
64.0	0.201	0.627
73.9	0.235	0.597





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Test#:	QI12-3
Max Load	106.3 psf
Allowable Design Load (ASD) = Max Load / 2.5	42.5 psf
Deflection Service Load (ASD) = Allowable * 0.7	29.8 psf
Wall Deflection limit = L / 180 of wall height	0.667 in
Panel Deflection limit = L / 60 of panel anchor span	2.000 in
Wall Deflection @ Deflection Service Load (ASD)	0.1130 in
Panel Deflection @ Deflection Service Load (ASD)	0.2015 in
Max Load @ Wall Deflection Limit	106 psf
Max Load @ Panel Deflection Limit	106 psf



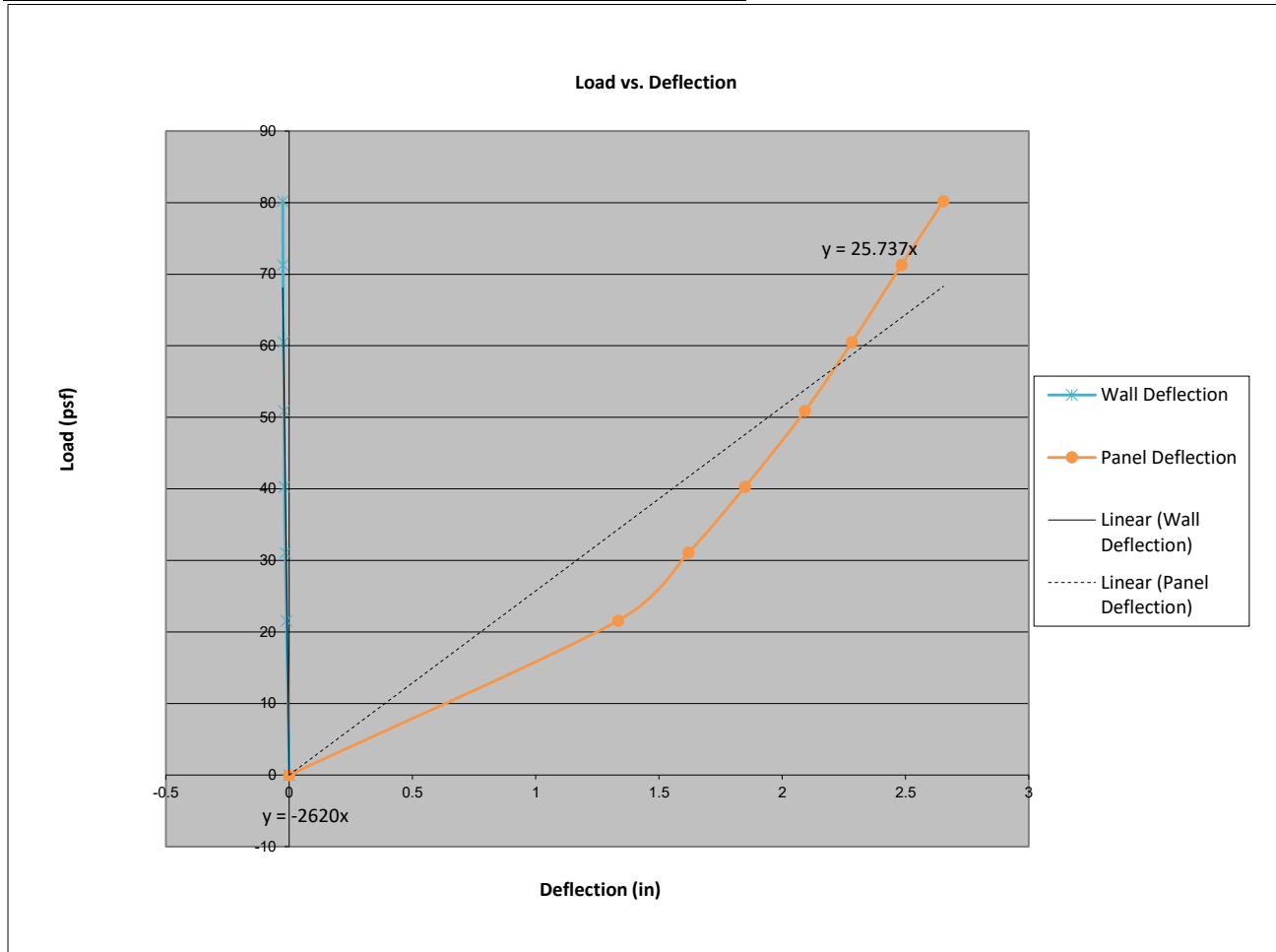
Target Load (psf)	Wall Deflection (= $\frac{ga_2 + ga_6}{2} - \frac{(ga_3 + ga_4)}{2}$ )	Panel Deflection (= $\frac{ga_1 + ga_5}{2} - \frac{(ga_2 + ga_6)}{2}$ )
0.0	0.000	0.000
31.7	0.107	0.734
50.1	0.194	0.732
72.5	0.302	0.679
90.6	0.321	0.697





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 STRUCTURAL & CIVIL CONSULTANTS

Test#:	<b>QG5-1</b>	
Max Load	102.5	psf
Allowable Design Load (ASD) = Max Load / 2.5	41.0	psf
Deflection Service Load (ASD) = Allowable * 0.7	28.7	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	2.000	in
Wall Deflection @ Deflection Service Load (ASD)	-0.0116	in
Panel Deflection @ Deflection Service Load (ASD)	1.1763	in
Max Load @ Wall Deflection Limit	103	psf
Max Load @ Panel Deflection Limit	49	psf



Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 4 - (ga 3 + ga 5)/2) (in)
0.0	0.000	0.000
21.6	-0.011	1.335
31.1	-0.016	1.620
40.3	-0.019	1.850
50.9	-0.021	2.093
60.5	-0.023	2.283
71.3	-0.025	2.484
80.2	-0.026	2.654
90.5	-0.026	2.838
102.5	-0.035	3.546



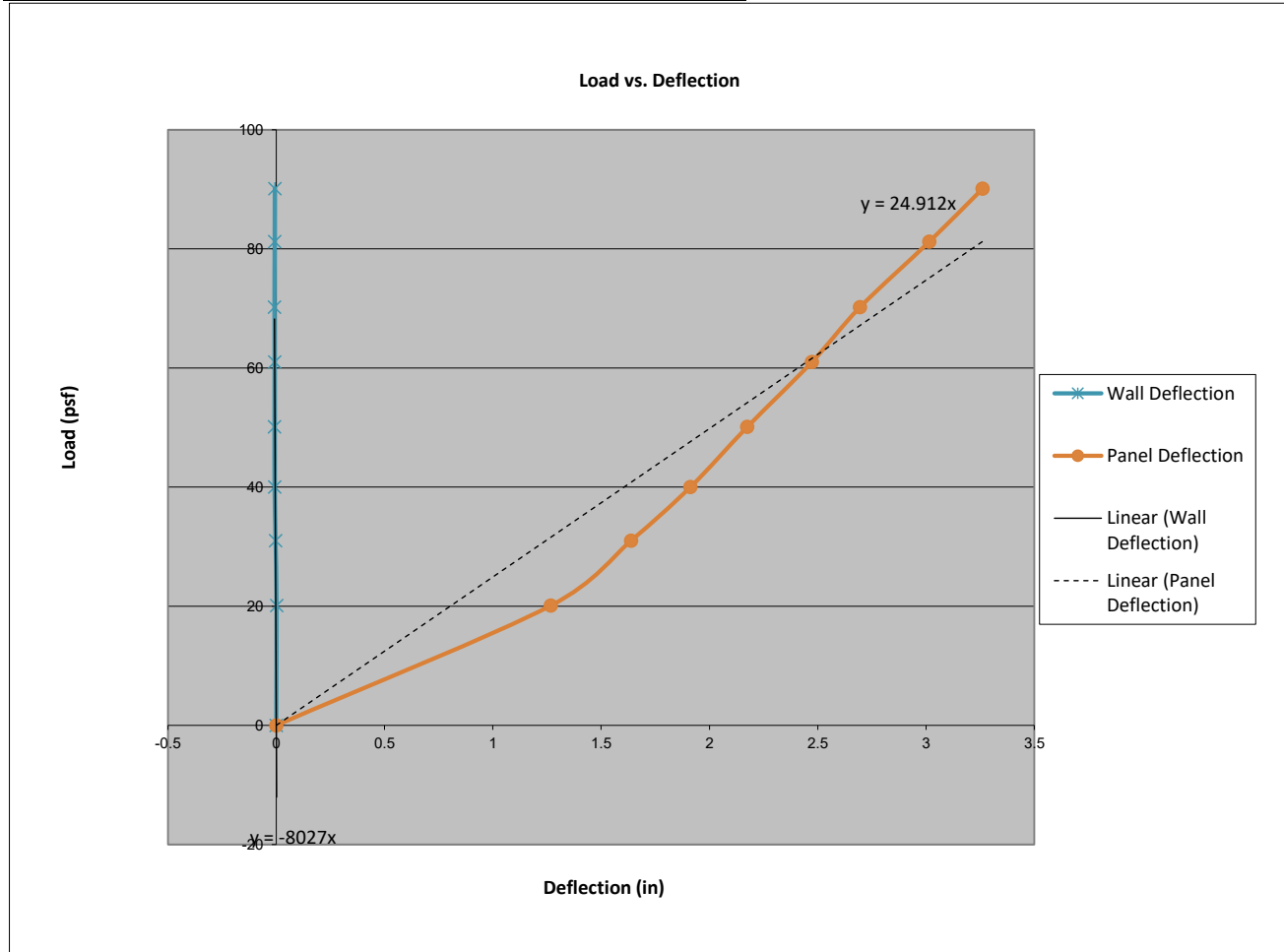






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STRUCTURAL & CIVIL CONSULTANTS

Test#:	<b>QG5-3</b>	
Max Load	110.2	psf
Allowable Design Load (ASD) = Max Load / 2.5	44.1	psf
Deflection Service Load (ASD) = Allowable * 0.7	30.9	psf
Wall Deflection limit = L / 180 of wall height	0.667	in
Panel Deflection limit = L / 60 of panel anchor (clip) span	2.000	in
Wall Deflection @ Deflection Service Load (ASD)	-0.0046	in
Panel Deflection @ Deflection Service Load (ASD)	1.3359	in
Max Load @ Wall Deflection Limit	110	psf
Max Load @ Panel Deflection Limit	46	psf



Target Load (psf)	Wall Deflection (= ga 3 - (ga 1 + ga 2)/2) (in)	Panel Deflection (= ga 4 - (ga 3 + ga 5)/2) (in)
0.0	0.000	0.000
20.1	0.002	1.267
31.0	-0.004	1.638
40.0	-0.008	1.912
50.1	-0.009	2.175
61.0	-0.008	2.473
70.2	-0.009	2.695
81.2	-0.008	3.015
90.1	-0.007	3.261
102.0	0.000	0.003
110.2	0.002	3.819