intertek
Total Quality. Assured.

EXTRUTECH PLASTICS, INC.
TEST REPORT

SCOPE OF WORK
TRANSVERSE (FLEXURAL) TESTING OF 8 IN THICK CONCRETE WALL PANEL SYSTEM

REPORT NUMBER
N2027.01-119-16 R0

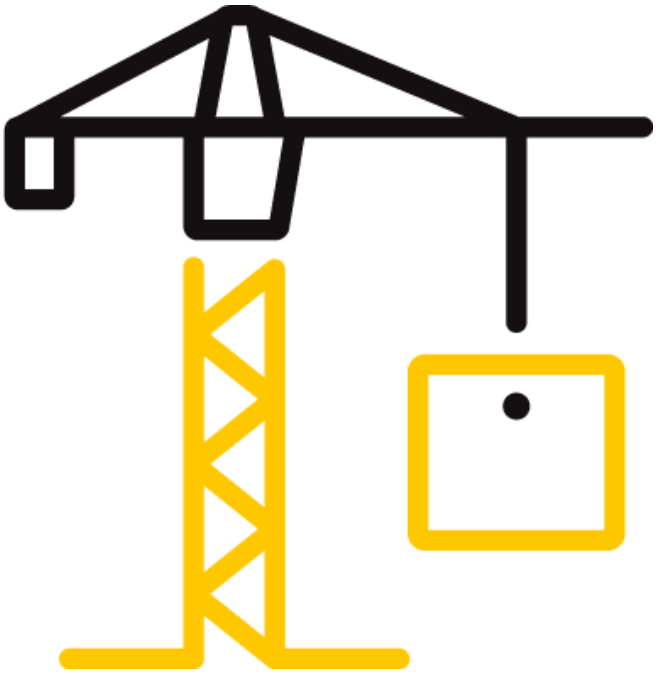
TEST DATES
02/16/22 - 02/18/22

ISSUE DATE
03/08/22

RECORD RETENTION END DATE
02/18/26

PAGES
19

DOCUMENT CONTROL NUMBER
ATI 00650 (07/24/17)
RT-R-AMER-Test-2799



130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR EXTRUTECH PLASTICS, INC.
Report No.: N2027.01-119-16 R0
Date: 03/08/22

REPORT ISSUED TO
EXTRUTECH PLASTICS, INC.
5902 W. Custer Street
Manitowoc, WI 54220

SECTION 1
SCOPE

Intertek Building & Construction (B&C) was contracted by Extrutech Plastics, Inc., Manitowoc, WI to perform transverse (flexural) testing in accordance with Section 12 of ASTM E72, on their 8 in thick concrete wall panel system. This report is in conjunction with Intertek Report No. G104776781, which includes sampling information. Results obtained are tested values and were secured by using the designated test methods. Testing was conducted at Intertek B&C test facility in York, PA.

Intertek B&C has demonstrated compliance with ISO/IEC International Standard 17025 and is consequently accredited as a Testing Laboratory (TL-144) by the International Accreditation Service, Inc. (IAS). Intertek B&C is accredited to perform all testing reported herein.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

For INTERTEK B&C:

COMPLETED BY:	V. Thomas Mickley, Jr., P.E.	**REVIEWED BY:**	Scott T. Gladfelter
TITLE:	Senior Staff Engineer	**TITLE:**	Project Engineer
SIGNATURE:	Digitally Signed by: Virgal Thomas Mickley, Jr.	**SIGNATURE:**	Digitally Signed by: Scott Gladfelter
DATE:	03/08/22	**DATE:**	03/08/22

VTM:stg/aas

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

SECTION 2
TEST METHODS

The wall panel specimens were evaluated in accordance with Section 12 of the following:

> **ASTM E72-15**, *Standard Test Methods of Conducting Strength Tests of Panels for Building Construction*

The concrete material was evaluated in accordance with the following:

> **ASTM C39/39M-21**, *Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens*

SECTION 3
MATERIAL SOURCE

The specimens were selected by Intertek B&C personnel. The specimens were tagged prior to shipment on 08/30/21, (Reference Intertek B&C Test Specimen Selection Report No. G104776781, dated 08/30/21).

Representative samples of the test specimens will be retained by Intertek B&C for a minimum of four years from the test completion date.

SECTION 4
LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
V. Thomas Mickley, Jr., P.E.	Intertek B&C
Scott T. Gladfelter	Intertek B&C
Robert G. Spayd	Intertek B&C

SECTION 5
TRANSVERSE LOAD TESTING OF WALL PANELS

RE: ASTM E72 - Section 12 - Transverse Load (Vertical)

General
The purpose of this testing was to evaluate the strength and stiffness of the wall panel system as installed in typical building construction. The flexural performance is used to calculate the allowable design load for wind pressure. The allowable transverse strength must be found through testing due to the uniqueness of the panel.

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR EXTRUTECH PLASTICS, INC.
Report No.: N2027.01-119-16 R0
Date: 03/08/22

Test Fixture
The test fixture consisted of a rigid steel support frame including wide flange columns and outriggers. The panel supports, located at the top and bottom of the wall panel, consisted of wide flange beams, steel tubes, 1 in diameter steel bars, 1/2 in thick by 4 in high Lexan plates and neoprene pads. The loading bars, located at 1/4 points, consisted of wide flange beams, steel tubes, 1 in diameter steel bars, 1/2 in thick by 4 in high Lexan plates and neoprene pads. 15k pancake load cells and hydraulic cylinders were positioned on the loading bars to apply a uniform load across the width of the panel. See photographs in Section 7 for test fixture.

Test Procedure
Three specimens were tested for flexural loading. The wall systems were installed into the fixture with no physical connections between the wall panels and fixture. Electronic linear displacement transducers were positioned at top, bottom and mid-point of each edge of the specimen (six transducers total) to measure lateral displacements of the wall. See photographs in Section 7 for test setup.

Testing was performed using the methods described by ASTM E72, Section 12. Each test sample was inspected prior to testing to verify size and general condition of the materials, assembly, and installation. No potentially compromising defects were observed prior to the tests. Each test began with the electronic linear displacement transducers being zeroed. The wall systems were then loaded in increments, each of which was held for a period of no less than five minutes. The load was then released for a period of no less than five minutes. This procedure was repeated until the maximum capacity of the test equipment (28,800 lbs) was achieved. Test specimens were loaded from rest to the specified increment in no less than 20 seconds. Lateral displacement, test load, and time were manually and electronically recorded throughout the test.

Specimen Description
The test specimens were constructed of two, 24 in wide by 144 in high by 8 in thick plastic wall forms interlocked together using plastic keys. The concrete forms were made from extruded plastic measuring 0.120 in thick at the exterior faces and 0.075 in thick along the interior walls. Two, #5 vertical reinforcing bars were placed in each 24 in wide form; one at each end (centered in the thickness). #5 horizontal reinforcing bars were spaced 16 in on-center starting 6-1/2 in from the bottom of the panel. The horizontal rebar went through pre-drilled holes in the forms. The joints of the horizontal and vertical rebar were not tied. The forms were filled with 4000 psi, air entrained, 1/2 in nominal stone concrete. The concrete was placed in 48 in max lift heights and mechanically consolidated using a vibrator.

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR EXTRUTECH PLASTICS, INC.
Report No.: N2027.01-119-16 R0
Date: 03/08/22

Test Results
Results are ultimate load capacity of individual specimens and should not be used as safe working values or allowable design load values.

Test Span: 135 in

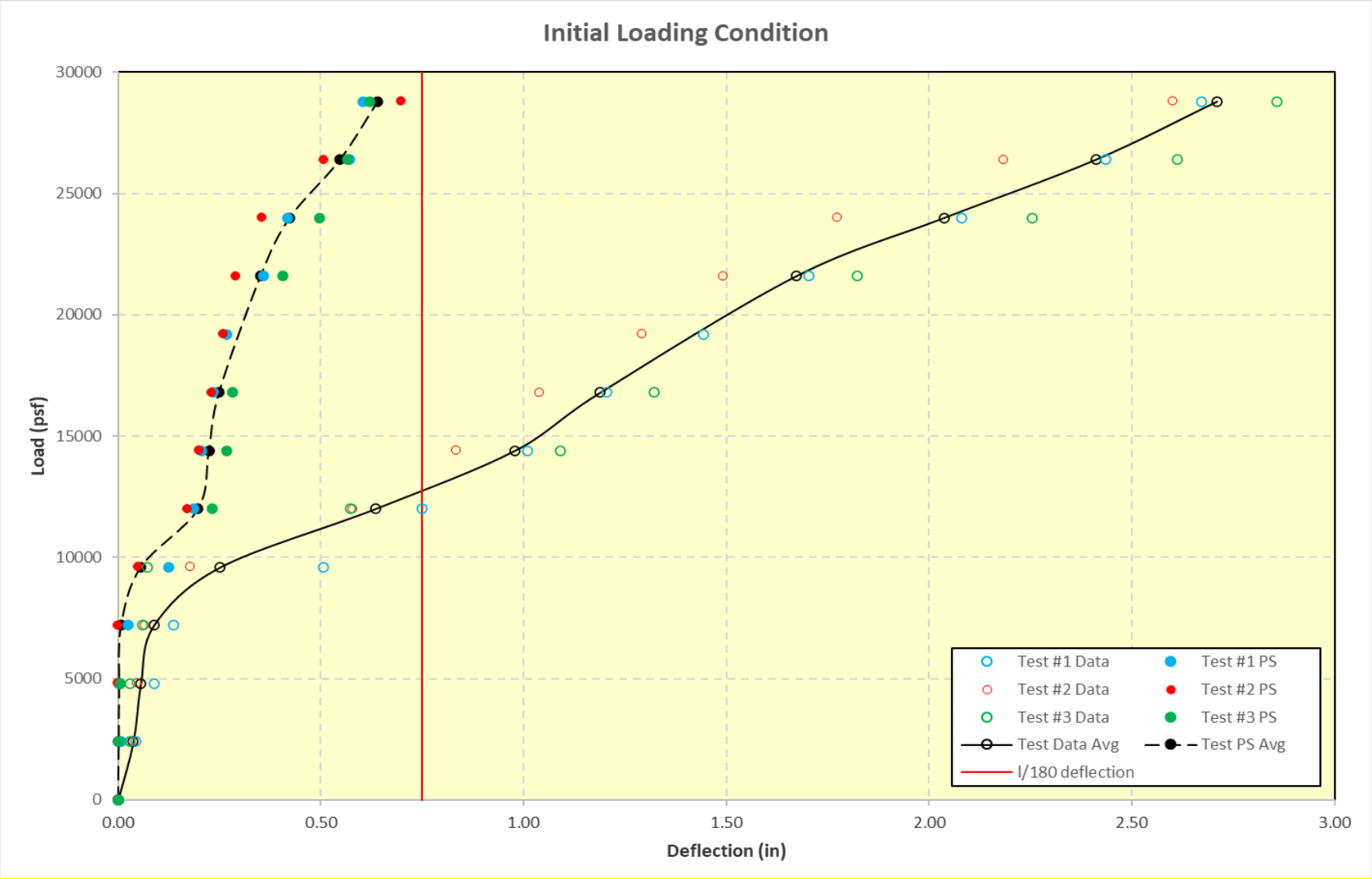
TARGET LOAD [1] (lbs)	INITIAL NET LATERAL DEFLECTION [2] (in)			
	SPECIMEN NO.			AVERAGE
	1	2	3	
0	0.00	0.00	0.00	0.00
2400	0.05	0.04	0.03	0.04
Permanent Set	0.01	0.00	0.00	0.00
4800	0.09	0.05	0.03 [5]	0.06
Permanent Set	0.00	0.00	0.01	0.00
7200	0.14 [5]	0.07	0.06	0.09
Permanent Set	0.03	0.00	0.00	0.01
9600	0.51	0.18 [5]	0.07	0.25
Permanent Set	0.13	0.05	0.00	0.06
12000	0.75 [6]	0.58	0.57	0.63
Permanent Set	0.19	0.17	0.23	0.20
14400	1.01	0.84 [6]	1.09 [6]	0.98
Permanent Set	0.21	0.20	0.27	0.22
16800	1.21	1.04	1.32	1.19
Permanent Set	0.24	0.23	0.28	0.25
19200	1.44	1.29	-- [3]	-- [4]
Permanent Set	0.27	0.26	-- [3]	-- [4]
21600	1.70	1.49	1.82	1.67
Permanent Set	0.36	0.29	0.41	0.35
24000	2.08	1.78	2.26	2.04
Permanent Set	0.42	0.36	0.50	0.42
26400	2.44	2.19	2.61	2.41
Permanent Set	0.57	0.51	0.57	0.55
28800	2.67	2.60	2.86	2.71
Permanent Set	0.61	0.70	0.62	0.64

[1] *Target load was the total load applied to the face of the panel; 1/2 of the target load was applied at each 1/4 point.*
[2] *Net deflection was the panel deflection relative to its ends.*
[3] *Incremental target load testing at 19200 lbs. not conducted for specimen No. 3.*
[4] *ASTM E72 requires three reading to calculate average.*
[5] *Point at which first cracks were observed.*
[6] *Point at which l/180 = 135 in / 180 = 0.75 in deflection limit was achieved or exceeded.*

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR EXTRUTECH PLASTICS, INC.
Report No.: N2027.01-119-16 R0
Date: 03/08/22



130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR EXTRUTECH PLASTICS, INC.
Report No.: N2027.01-119-16 R0
Date: 03/08/22

Test Span: 135 in

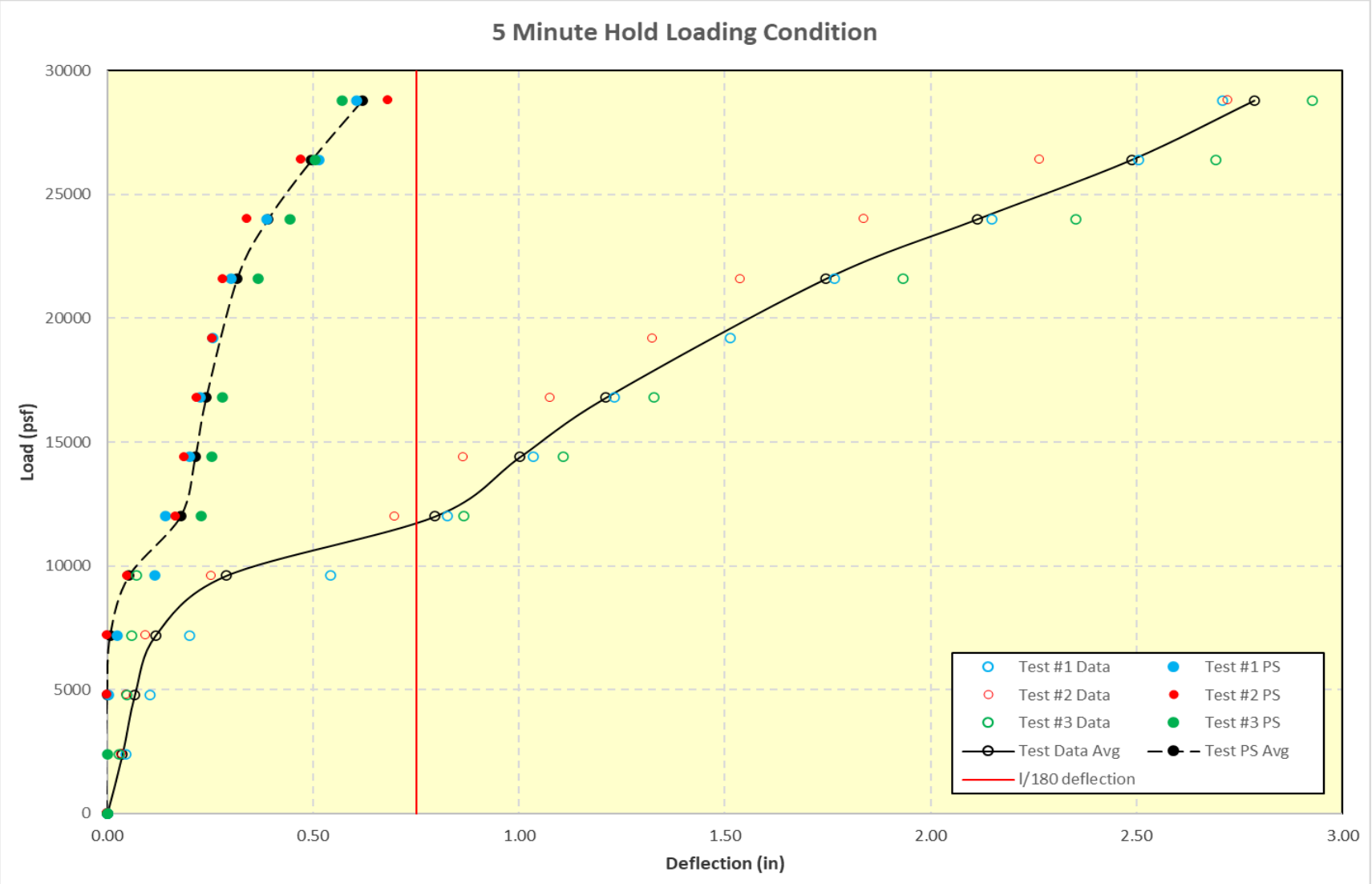
TARGET LOAD [1] (lbs)	5 MINUTE NET LATERAL DEFLECTION [2] (in)			
	SPECIMEN NO.			AVERAGE
	1	2	3	
0	0.00	0.00	0.00	0.00
2400	0.05	0.04	0.03	0.04
Permanent Set	0.00	0.00	0.00	0.00
4800	0.11	0.05	0.05 [5]	0.07
Permanent Set	0.00	0.00	0.00	0.00
7200	0.20 [5]	0.09	0.06	0.12
Permanent Set	0.03	0.00	0.00	0.01
9600	0.54	0.25 [5]	0.07	0.29
Permanent Set	0.12	0.05	0.00	0.05
12000	0.83 [6]	0.70	0.87 [6]	0.80
Permanent Set	0.14	0.17	0.23	0.18
14400	1.04	0.87 [6]	1.11	1.00
Permanent Set	0.20	0.19	0.26	0.21
16800	1.23	1.08	1.33	1.21
Permanent Set	0.23	0.22	0.28	0.24
19200	1.51	1.33	-- [3]	-- [4]
Permanent Set	0.26	0.26	-- [3]	-- [4]
21600	1.77	1.54	1.93	1.75
Permanent Set	0.30	0.28	0.37	0.32
24000	2.15	1.84	2.35	2.11
Permanent Set	0.39	0.34	0.45	0.39
26400	2.51	2.27	2.69	2.49
Permanent Set	0.52	0.47	0.51	0.50
28800	2.71	2.72	2.93	2.79
Permanent Set	0.61	0.68	0.57	0.62

[1] *Target load was the total load applied to the face of the panel; 1/2 of the target load was applied at each 1/4 point.*
[2] *Net deflection was the panel deflection relative to its ends.*
[3] *Incremental target load testing at 19200 lbs. not conducted for specimen No. 3.*
[4] *ASTM E72 requires three reading to calculate average.*
[5] *Point at which first cracks were observed.*
[6] *Point at which l/180 = 135 in / 180 = 0.75 in deflection limit was achieved or exceeded.*

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR EXTRUTECH PLASTICS, INC.
Report No.: N2027.01-119-16 R0
Date: 03/08/22



130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR EXTRUTECH PLASTICS, INC.
Report No.: N2027.01-119-16 R0
Date: 03/08/22

SECTION 6
COMPRESSION TESTING OF CONCRETE CYLINDERS

RE: ASTM C39

General
The purpose of this testing was to evaluate the compressive strength of the concrete used to fabricate the test panels.

Procedure
Compressive strength testing was performed using the methods described by ASTM C39. Compressive strength testing was performed in a Forney Compression Test Machine. The specimen was loaded in compression until failure occurred. See photographs in Section 7 for test setup.

Test Results

ASTM C39 - Compressive Strength [1]

SPECIMEN NO.	SPECIMEN DIMENSIONS (in)		AREA (in^2)	PEAK LOAD (lb_f)	COMPRESSIVE STRENGTH (psi)	DEVIATION FROM AVERAGE (%)	FRACTURE PATTERN
	HEIGHT	DIAMETER					
1	6	3	7.07	35270	4990	0.3	2
2	6	3	7.07	35060	4960	-0.3	2
				Average:	**4975**		

[1] *Specimen were tested at the conclusion of the transverse testing at an age of 108 days.*

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

SECTION 7
PHOTOGRAPHS

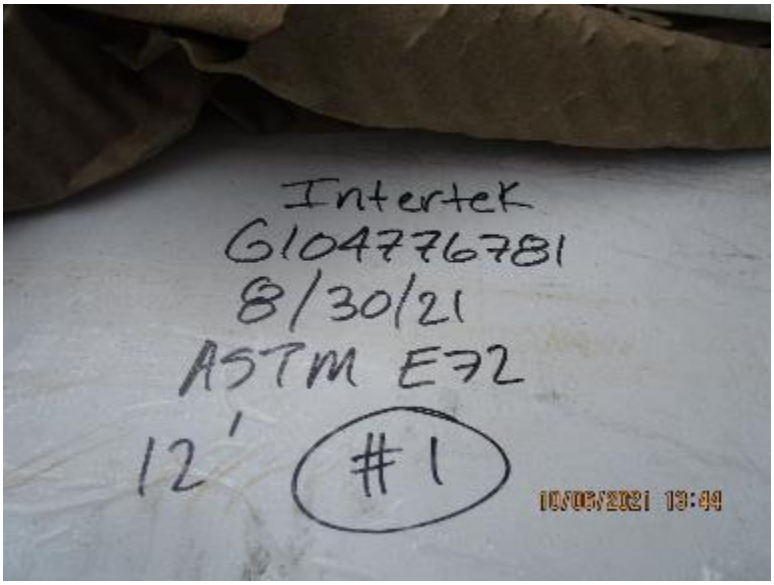


Photo No. 1
Sample Marking

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR EXTRUTECH PLASTICS, INC.
Report No.: N2027.01-119-16 R0
Date: 03/08/22

Photo No. 2
Transverse Load Test Setup - Loaded Side

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR EXTRUTECH PLASTICS, INC.
Report No.: N2027.01-119-16 R0
Date: 03/08/22

Photo No. 3
Transverse Load Test Setup - Support Side

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR EXTRUTECH PLASTICS, INC.
Report No.: N2027.01-119-16 R0
Date: 03/08/22

Photo No. 4
Transverse Load Test Under Load

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

Photo No. 5
Transverse Load Test Panel Cracking

Photo No. 6
Transverse Load Test Panel Cracking

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR EXTRUTECH PLASTICS, INC.
Report No.: N2027.01-119-16 R0
Date: 03/08/22

Photo No. 7
Concrete Cylinder Compression Testing Setup

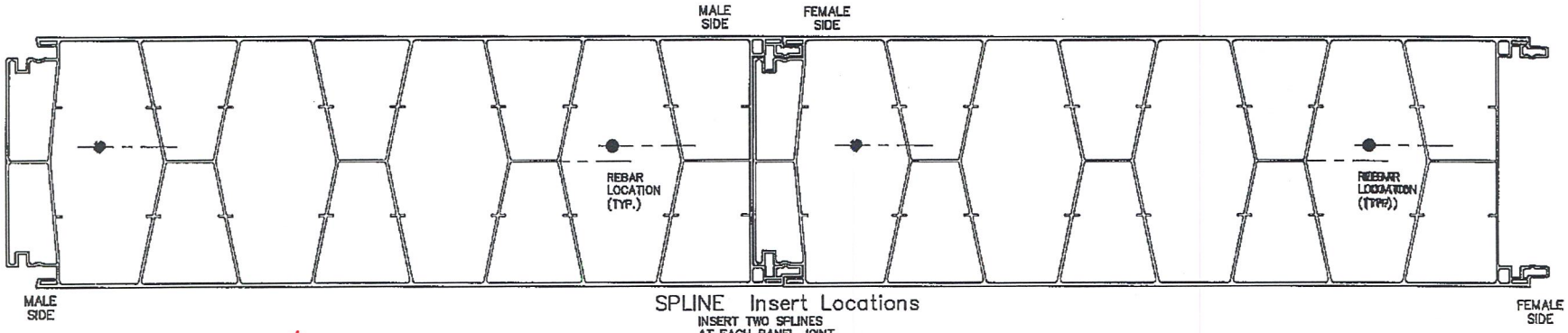
Photo No. 8
Concrete Cylinder Compression Testing Failure

130 Derry Court
York, Pennsylvania 17406

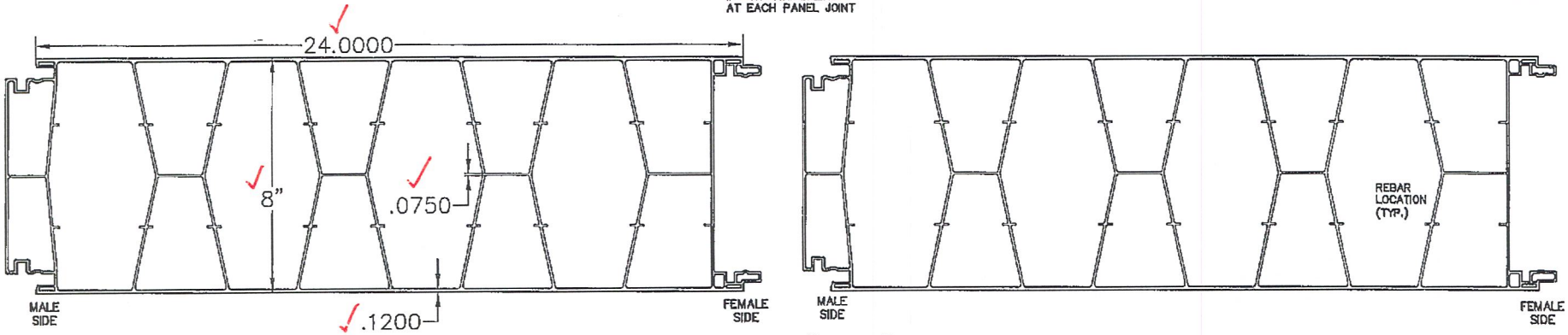
Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

SECTION 8
DRAWINGS

The "As-Built" drawings for the 8 in thick concrete wall panel system which follow have been reviewed by Intertek B&C and are representative of the project reported herein. Project construction was verified by Intertek B&C per the drawings included in this report. Any deviations are documented herein or on the drawings.



SPLINE Insert Locations
INSERT TWO SPLINES AT EACH PANEL JOINT



ITEM # P824 – 8"x 24" FORM PANEL

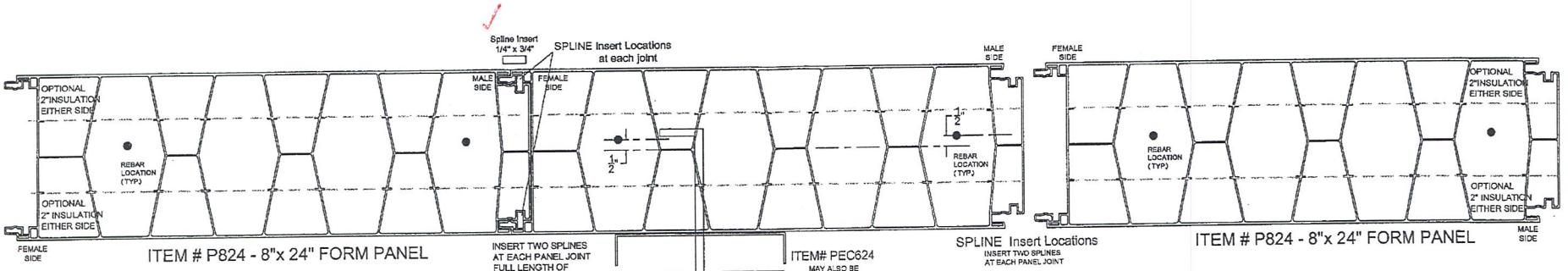
EXTRUTECH PLASTICS, INC.
5902 West Custer Street
Manitowoc, WI 54220

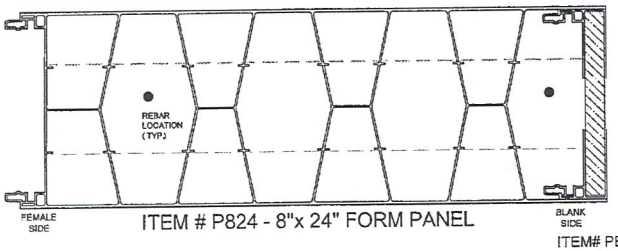
intertek

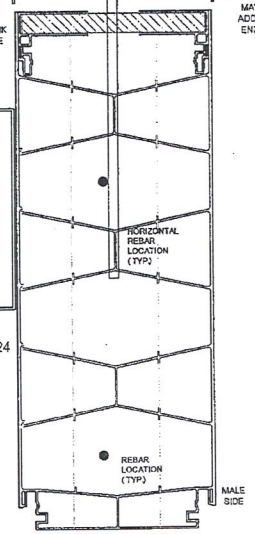
Test sample complies with these details.
Deviations are noted.

Report # N2027.01-119-16

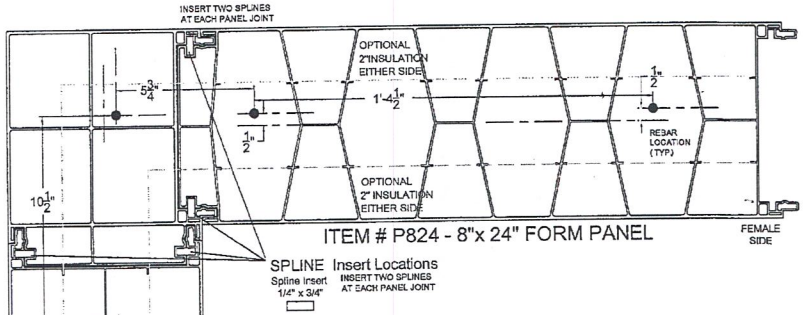
Date 3-2-22 Tech vtm

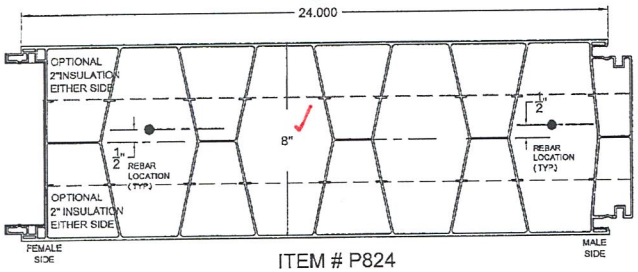






ITEM# PEC624
MAY ALSO BE ADDED TO CAP END OF WALL



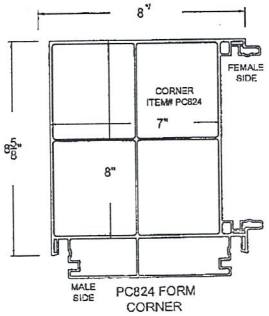


ITEM # P824
8"x24" FORM PANEL
EXTRUTECH PLASTICS, INC.
5902 West Custer Street
Manitowoc, WI 54220

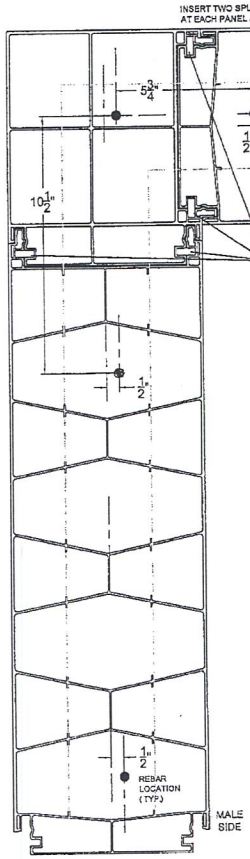
NOTES:

SPLINE LOCATIONS
INSERT TWO SPLINES AT EACH PANEL JOINT FULL LENGTH OF PANEL

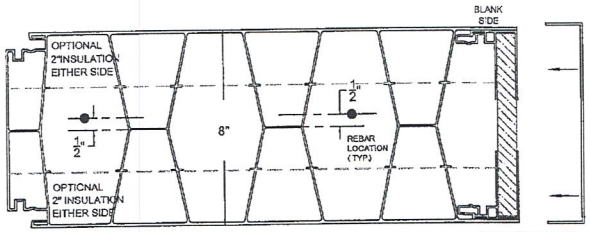
CONCRETE RECOMENDATION
REBAR - Every 18" (Vertical & Horizontal)
BRACING - Every 8' - 12' Ft. 2x6 against Panels
2x4 for Bracing
CONCRETE - 6 Slump - W/Plasticizer added
Pea Size Stone
4000 PSI - 7 Bag Mix
POUR LIFTS of 3'Ft - 4' Ft ONLY



PC824 FORM CORNER



ITEM # P824
8"x24" FORM PANEL



ITEM# PEC824
MAY ALSO BE ADDED TO CAP END OF WALL

CUSTOM PANEL LENGTH
ITEM# P824 FORM PANEL

EXTRUTECH PLASTICS, INC.
5902 West Custer Street
Manitowoc, WI 54220

intertek

Test sample complies with these details.
Deviations are noted.

Report # N2027.01-119-16

Date 3-2-22 Tech vfm

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

SECTION 9
REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	03/08/22	N/A	Original Report Issue