TEST REPORT

REPORT NUMBER: 3083303SAT – 002 REV1
ORIGINAL ISSUE DATE: February 20, 2008
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EVALUATION CENTER
Intertek Testing Services NA, Inc.
16015 Shady Falls Road
Elmendorf, TX 78112

RENDERED TO

Emmedue S.P.A.
Via Toniolo, 39/b
Z.I. Bellocchi
61032 Fano (PU), Italy

PRODUCT EVALUATED: 4’ x 8’ and 4’ x 14’ Single Panel PSM80 Wall Systems
EVALUATION PROPERTY: ICC – AC 15, Section 4.2.2.3, ASTM E 72 - 05, Section 11 (**Flexural Load**)

Report of Testing 4’ x 8’ and 4’ x 14’ Single Polystyrene PSM80 wall panels for compliance with the applicable requirements of the following criteria: *ICC – AC 15, Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems, under the general guidelines of ASTM E 72 - 05, Standard Test Methods of Conducting Strength Tests of Panels for Building Construction*

1 Table of Contents

2 Introduction

Intertek Testing Services NA, Inc. (Intertek) has conducted testing for Emmedue S.P.A on 4' x 8' and 4' x 14' Single Polystyrene PSM80 structural wall panels. The test method consisted of the transverse-flexural load under third-point loading. Emmedue wall systems are based on a series of foam polystyrene panels and electro-welded steel wire meshes, whose shapes have been specially designed to apply structural plaster during panel installation (Ref, 1, p. 3). These systems are capable of multiple applications, such as quick installation and high thermal and sound capabilities (Ref 1, p. 3). The purpose of these tests is to evaluate flexural load structural applications according to Section 4.2.2.3 of ICC – AC 15, under the general guidelines of *ASTM E 72 - 05, Conducting Strength Tests of Panels for Building Construction*. The results of each test are presented in tabular and graphical form. In total, six specimens were tested under the above loading configuration to measure the deflection and failure characteristics of each of the wall systems. This evaluation began November 16, 2007 and was completed November 30, 2007.

NOTE: This report is only for the transverse-flexural tests performed. Refer to report numbers **3083303SAT - 001, - 003, - 004, - 005, - 006, - 007, and - 008** (designated **REV1, except 008**) for the rest of the testing completed for this project.

3 Test Samples

3.1. SAMPLE SELECTION

Samples were randomly selected on July 1, 2007 by Intertek representative Matt Lansdowne, EIT, at the Emmedue S.P.A manufacturing facility, located at Via Toniolo 39/b, Z.I. Bellocchi, 61032 Fano (PU), Italy. Samples were received at Intertek – San Antonio on August 28, 2007.

The subject test specimens are traceable samples selected from the manufacturer's facility. Intertek selected the specimens and has verified the composition, manufacturing techniques and quality assurance procedures.

Refer to the Pre-Test Inspection Report, dated July 1 – 2, 2007, located in the Appendix.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The Emmedue Single Panel PSM80 consists of a foam polystyrene core reinforced with a galvanized steel wire mesh connected on both sides of the foam using corrugated steel bars. The steel bars and mesh are electro-welded together for strength. There are approximately 82 connectors per square meter of foam surface. Below is a list of specifications of the PSM80 panels (Ref 1, p. 7). The numbers below where converted from metric to inch-pounds from the Emmedue Operator's Handbook.

Galvanized Steel Wire Mesh

1) Longitudinal wires with diameter of 0.121 inches spaced every 2.56 inches
2) Transversal wires with diameter of 0.099 inches spaced every 2.56 inches

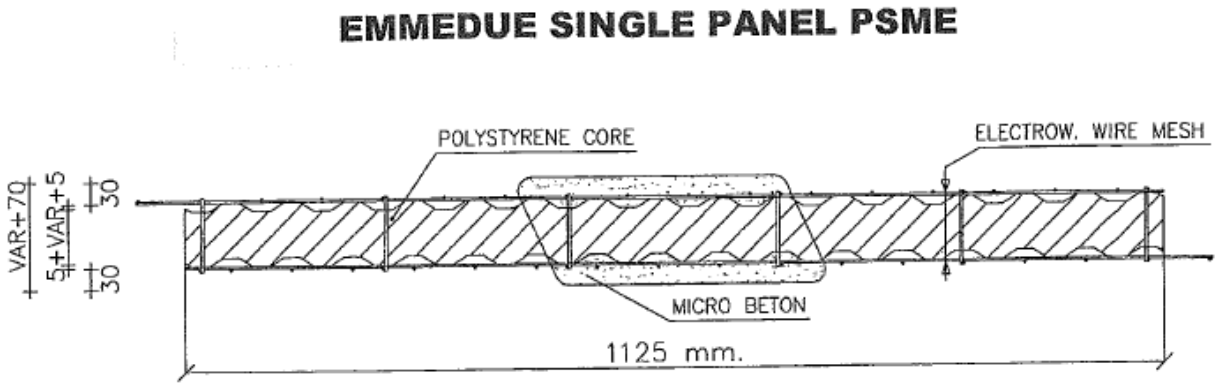


Figure 1: Emmedue Single Panel PSM80 Details (Ref. 1, p.7)

Polystyrene Slab Density: 15 Kg/m^3 (0.936 lb/ft^3)
Polystyrene Slab Thickness: 4”

The Emmedue building system comprises of different wall, floor, and roof arrangements that are finished on-site using sprayed mortar. Although different techniques exist for spray mortar, the mortar mix used for this project consisted of Portland® Cement, sand, and water. The client recommends an average quantity of plaster (or mortar) of about 1 inch sprayed per side. These panels are generally used for buildings of no more than 4 stories high, in seismic areas, for floor slabs and covering slabs whose spans are 4 m (13.12 ft) at maximum (Ref. 1, p. 7).

For these tests, a mortar mix design was provided in order to meet the required wall structural plaster specifications. The mortar mixing ratio (by weight) was provided as followed:

Portland® Cement:	100 lbs
Sand:	280 lbs
Water:	5.0 gallons

The above numbers were provided by the client during sample construction. As indicated by the Emmedue Operator’s Handbook (Ref. 1, p 27), the quantity of water should vary as humidity and temperature changes are observed. Accordingly, modifications to the mixing ratio were made as indicated by the weather conditions during mortar spraying. In all cases, the minimum compressive mortar strength (f’c) was 2500 psi at 28 days curing time. These results were verified by performing mortar cylinder core tests at 7 and 28 days as per ACI 506.2, for each batch made. Additional mortar cylinder core tests were also performed within 48 hours of the completion of each set of three full-scale tests, as per AC 15, Section 4.2.2.3.

From the mortar cylinder core testing results obtained, it was found that no mortar core was lower than 2500 psi at 28 days. Refer to report number **3083303SAT – 008** for a complete listing of all mortar core tests performed.

4 Testing and Evaluation Methods

4.1. Construction of Wall Assemblies

Six transverse-flexural walls were tested and all were constructed in the same manner. Construction of the 4' x 8' and 4' x 14' walls consisted the following:

1) Single Panel PSM80
2) 1/8" Rebar tie wire
3) 1x8 #1 yellow pine lumber cut down to 6" wide
4) #8 x 2" wood deck screws
5) Mortar mixture (Portland® Cement, sand, and water)

All of the samples had to be constructed at the Intertek-San Antonio facility. Panel assembly first consisted of constructing a wooden frame around the perimeter of the PSM80 panel using #8 x 2" wood deck screws and 1x8 #1 yellow pine lumber joists cut down to 6" wide. The perimeter frame served two purposes: 1) as a support to assure that each wall was even and plumb before mortar spraying, and 2) as a guide for applied proper mortar thickness. For the 8 foot walls, the 1/8" rebar tire wire was installed 32" from the top and bottom around the panel and frame in order to hold the two pieces together. For the 14 foot walls, the rebar tie wire was installed at 48" from top and bottom. Refer to Figures 2 and 3 for more details.

Figure 2: Finished wood frames with 4' x 8' panels ready for spray mortar application

Figure 3: Lumber support frame (1x8 cut down to exactly 6" wide)

The walls were then sprayed with a mortar mixture of sand, water, and Portland® Cement on both sides using a plaster sprayer for walls provided by the client. Mortar specifications included sand particles with less than 0.20" size and a slump of 2", at the appropriate ratio (refer to Section 3.2, Sample and Assembly Description, for mixing ratio). The three ingredients were mixed using a concrete mixer. A compressor capable of adjustment was used in order to assure the client recommended 90 psi application pressure. Two layers of sprayed mortar were applied to each side until the desired mortar thickness of 1" (+/- ¼") was achieved. The walls were then smoothed out as much as possible using mortar trowels or any other straight smooth device. Refer to Figures 4 through 7 for details.

Figures 4 and 5: Mortar mixing and spraying application on 4' x 14' wall assemblies, respectively

Figure 6: Smoothing out mortar after spraying

Figure 7: Finished 4’ x 8’ PSM80 wall panels

The walls were allowed to cure for at least 28 days prior to testing. Both transverse-flexural wall configurations (4’ x 8’ and 4’ x 14’) tested were equal in construction techniques.

Note: The transverse-flexural walls were identical to the axial-compressive and flexural-compressive walls.

4.2. ICC-AC 15 and ASTM E 72 - 05 Testing Procedures

Transverse-Flexural Load Procedure (Third Point Loading)

The test rig consisted of a steel rigid A-frame, specimen supports, steel support rollers and bearings, and a hydraulic cylinder. The setup procedure consisted of positioning concrete specimen supports at the given span length (L) for each wall specimen. These concrete supports were made of solid 7 ½" x 7 ½" x 15 ½" concrete blocks. A total of three concrete blocks were positioned at each end of the support span length. Once the blocks were laid out at the proper distance, two 1" diameter x 50" long steel rollers and two 3" wide x 50" long x ¼" thick steel bearing plates were positioned at the proper support span length (L) on top of each row of blocks. For the 8 foot walls, the support span was 93 inches and for the 14 foot walls, the support span was 165 inches.

Once the roller end bearings were positioned, the walls were carried and lifted in place using a forklift and lifting straps. Each wall was then lowered in place on top of the roller bearings. Adjustments were made accordingly to the wall and roller bearings in order to obtain the appropriate support span. Refer to Figures 8 and 9 for details.

Figures 8 and 9: Flexural Test setup (4' x 8') and 3" wide roller end bearing

After adjusting the wall, the loading bearings were positioned on top of the wall. The purpose of these bearings was to evenly distribute the load through two points under third-point loading conditions. The bearings were positioned 31 inches apart for the 8 foot walls and 55 inches for the 14 foot walls. These two loading bearings were of the same specifications as the end reaction bearings. A loading I-beam was then positioned perpendicular to the loading bearings exactly at the midpoint of the wall (24 inches in width). A calibrated load cell was then installed on top of the loading beam. The head of the hydraulic cylinder was then lowered until it touched the top of the load cell. This assured proper alignment of all the components, as well as holding the wall in place. Refer to Figures 10 and 11 for details.

Figures 10 and 11: Third-Point loading setup (top view) and top loading bearing location

The deflection measurement gauges consisted of six spring loaded 4" low voltage displacement transducers capable of 0.001 inch resolution. Transducer data is logged and stored via a data acquisition unit. The transducers are supported using mechanical adjustable arms with a magnetic base that connect to a rigid steel bar which are attached to two cinder blocks. The blocks rest on the concrete floor of the laboratory.

All testing was performed according to Section 4.2.2.3 of ICC – AC 15, under the general guidelines of ASTM E 72 - 05, Section 11 loading procedure. Once the wall specimen was properly installed on the frame, two linear transducers (with 0.001 inch resolution) were placed centrally along the lateral dimension of the specimen at opposite sides of the specimen along the short dimension (width) no more than 2" from the specimen edge. Four transducers were placed on each corner of the specimen at 1 ½" in from the side and at 1 ½" in from the end to measure the uplift of the wall as it is loaded.

A pre-load (not to exceed 10% of the ultimate load) was applied to the wall specimen. With the pre-load applied to the specimen, an initial reading is made. All set load readings are taken at this pre-load reading, which is labeled as the "zero" mark. Once this measurement is made, the load is increased slightly which in turn applies an initial load to the specimen. The load is applied for 5 minutes during which time deflection measurements are made as a function of time (as soon as it is practical after initial loading and at the end of the 5 minute period). After the 5 minute period, the load is decreased to the "zero" load (a.k.a. the predetermined pre-load) for 5 minutes during which time deflection measurements are made as a function of time (as soon as it is practical after initial un-loading, and at the end of the 5 minute period). The process is repeated in increments of "n" of initial load (n = 2, 3, 4,…) until a predetermined number of data points is obtain to effectively plot a load-deflection curve. Once the appropriate number of points is reached, the instruments are removed and the test specimen is loaded to failure. Refer to Figure 11 for details.

Figure 11: Transverse test setup for 4' x 14' walls (overall view)

Refer to Appendix C for transverse-flexural test photos.

4.2.1. ICC – AC 15 and ASTM E 72 - 05 Notes

These tests were performed in accordance to ICC- AC 15 and under the general guidelines of ASTM E72 – 05. As per ICC – AC 15, six specimens were tested, using two different configurations and/or heights. The tested specimens consisted of equal widths (4 feet), equal thicknesses (6 inches), and two different height configurations (8 feet and 14 feet).

According to AC 15, Section 4.2.2.3, three mortar cylinder cores shall be tested within 48 hours of the completion of each set of full-scale tests. This procedure was performed for each set of constructed walls, in addition to 7 and 28 day mortar cores for each batch of mortar mixed. For example, if a set of walls required two applications of sprayed mortar on each side, then six mortar cylinder cores were made for each batch of sprayed mortar (tested at 7 and 28 days for each batch). The mortar cores were made under the general guidelines of *ACI 506.2 – 95, Specification for Shotcrete*. Under the ACI 506.2 code, Section 1.6.1.1, the preparation of the shotcrete mortar cylinder core panels was to be made according to *ASTM C 1140, Preparing and Testing Specimens from Shotcrete Test Panels*. According to ASTM C 1140, Section 5, "…the forms for making shotcrete mortar cores shall be made of wood or steel construction and sufficiently rigid to prevent dislodging of the shotcrete through vibration or deformation." The forms were constructed of 1x6 #1 yellow pine lumber, 2x4 #2 yellow pine lumber, ¾" plywood, and #8 x 1 ½" wood deck screws. The interior dimensions of the forms constructed were **24" wide x 24" long x 3 ½" deep**, as indicated in Section 5 of ASTM C 1140. One form was constructed for each time a new batch of mortar was made. From each form, a total of approximately 25 cores could be made at one time. Refer to Figure 12 for details.

Figure 12: Wooden form for mortar core sampling

Once the wooden form was made, the mortar was sprayed into the form until it covered the entire 3 ½" depth. The mortar was allowed to settle naturally with no help of any mechanical means (concrete vibrator, mixing rod, etc.). The top of the form was then smoothed out with a trowel (or any other suitable straight smoothing device) and was then moved indoors and allowed to cure for a minimum of 24 hours. Each sprayed form was properly labeled and sealed using plastic sheathing and shrink wrap to maintain the proper moisture. Refer to Figures 13 through 18 for details.

Figures 13 and 14: Application of sprayed mortar into wooden forms

Figures 15 and 16: Smoothing of mortar in wooden form

Figures 17 and 18: Mortar form labeling and sealing with plastic sheathing

After a minimum curing time of 24 hours, the forms were transported to an outside core testing facility and cored for the number of samples indicated. Coring was made using a specialized coring drill with a diamond bit. Once the samples were cored, they were properly labeled, measured, weighed, sulfur capped, and stored in a 100% humidity moisture room until tested. Refer to Figures 19 through 24 for more details.

Figure 19: Drilling of mortar cores

Figure 20: Mortar cores after drilling

Figures 21 and 22: Labeling, weighing, and sulfur capping of mortar cores


Figures 23 and 24: Cylinder core testing machine and placement of cores into apparatus

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

Transverse-Flexural Test Results

In total, six transverse-flexural tests were performed. Below is a list of the test parameters:

Wall lengths:	96.0 inches and 168 inches
Wall width:	48.0 inches
Nominal wall thickness:	6.0 inches (+/- ¼")
Initial pre-load:	Approx 1130 lbs (stand-by pressure of hydraulic pump)
Support Span (L):	93 inches (8 foot wall) and 165 inches (14 foot wall)
End Bearings:	3.0 inches
Load Bearings:	3.0 inches

The results obtained for the flexural-transverse tests are tabulated as followed:

Specimen ID	Date Tested	Age of Wall (days)	*Ultimate Load (lbs)	Average (lbs)	Average within 15%?	Allowable Load (lbs)
4X8T1	11/16/07	50	*6580	6257	YES	6257
4X8T2	11/16/07	50	*6580			
4X8T3	11/19/07	53	*5610			
4X14T1	11/29/07	58	*3070	3050	YES	3050
4X14T2	11/30/07	59	*3290			
4X14T3	11/30/07	59	*2790			

***NOTE:** The loads reported are for the hydraulic cylinder only and **DO NOT** take account for the weight of each wall. All flexural tests were performed in the horizontal position.

The Allowable Load for each set of three walls was calculated under the guidelines of AC 15, Section 4.3, Paragraph 2, which states the following:

"The average maximum strength from each set of tests may be the average ultimate value, provided the ultimate value for each test is within 15 percent of the average. Otherwise, the lowest ultimate value shall be used."

Refer to Appendix A for Load vs. Deflection curves for all transverse-flexural tests.

Transverse testing was performed according to Section 4.2.2.3 of ICC – AC 15, under the general guidelines of Section 11 of ASTM E 72-05. Each of the targeted deflection loads (L/360, L/240, L/180, L/120) were calculated by dividing the support span (L) by each load increment. The mid-span mean for each wall was calculated by subtracting the average of the outer four dials from the lateral (middle) dials:

Mid-Span Mean = Average Lateral (Middle) Dials – Average Outer Dials

The Stiffness (EI) for each wall was calculated from the maximum deflection equation of a simply-supported beam under third-point loading conditions. The maximum deflection used in the calculation was the maximum deflection recorded at the last target load obtained.

Stiffness EI = [23 * P * (L^3)] / (648 * Max Deflection)

Statistical analysis calculations were computed using the linear regression analysis method included in Microsoft Excel® (command “LINEST”).

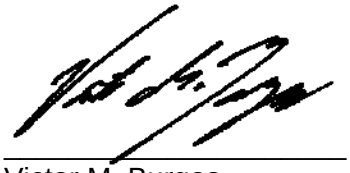
A CD copy of all the assembly, setup, and test photos will be provided to the client.

6 Conclusion

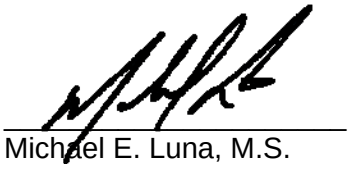
Intertek Testing Services NA, Inc. (Intertek) has conducted testing for Emmedue on 4' x 8' and 4' x 14' Single Polystyrene PSM80 structural wall panels. The test method consisted of the transverse-flexural load under third-point loading. The purpose of these tests was to evaluate flexural load structural applications according to Section 4.2.2.3 of ICC – AC 15, under the general guidelines of *ASTM E 72 - 05, Conducting Strength Tests of Panels for Building Construction*. The results of each test were presented in tabular and graphical form. In total, six specimens were tested under the above loading configuration to measure the deflection and failure characteristics of each of the wall systems. This evaluation began November 16, 2007 and was completed November 30, 2007.

The conclusions of this test report may be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

INTERTEK TESTING SERVICES NA, INC

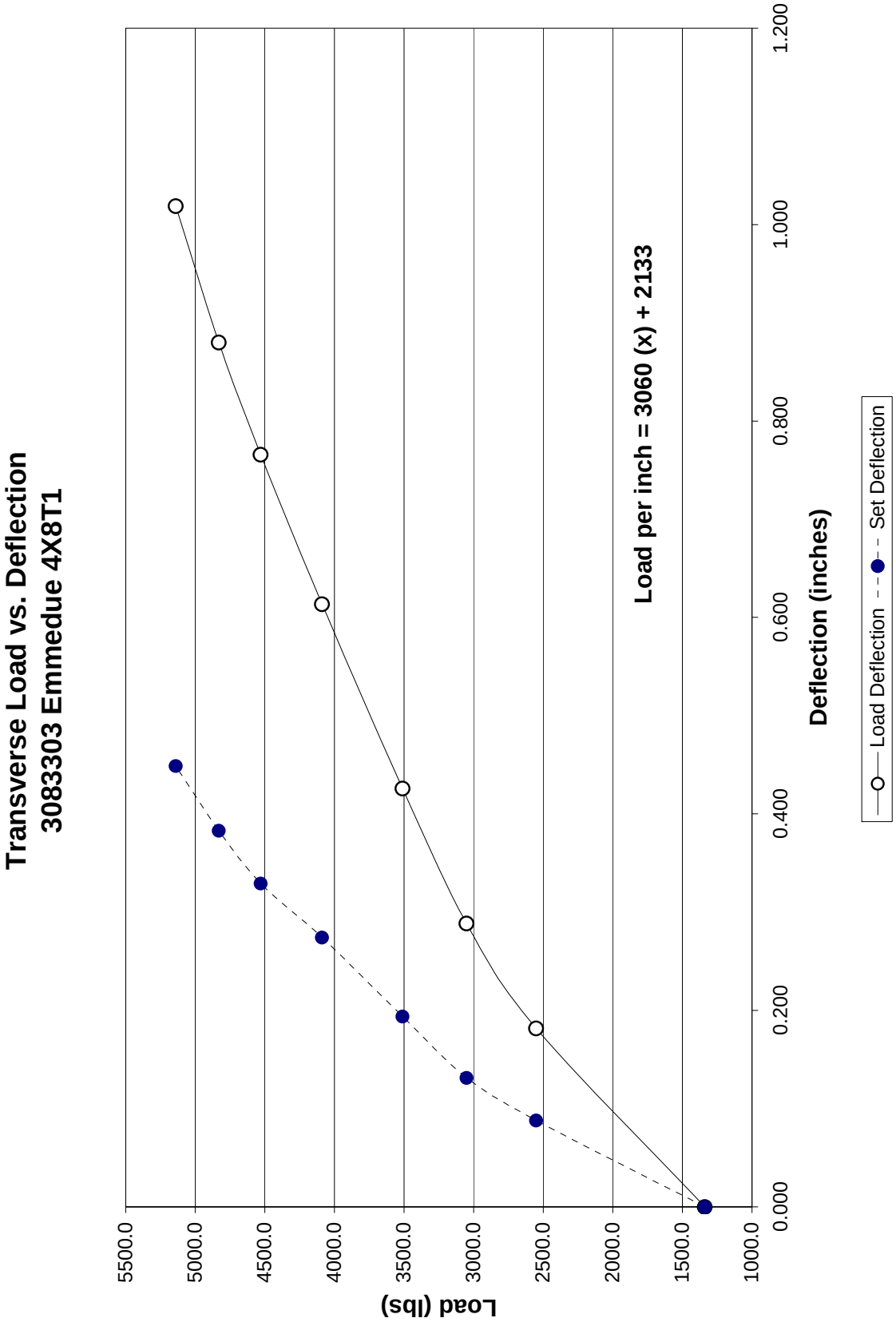
Reported by: 

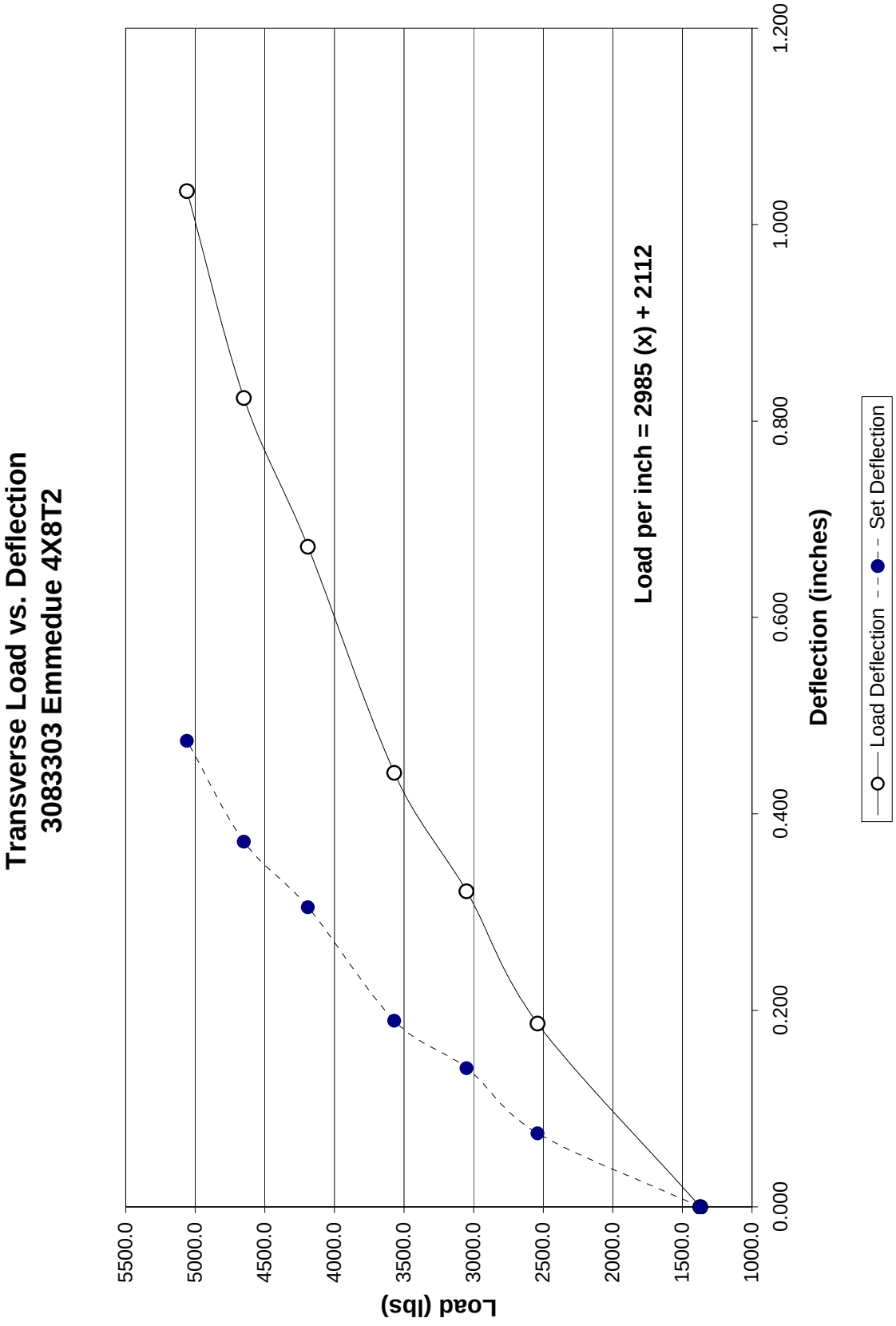
Victor M. Burgos
Test Engineer

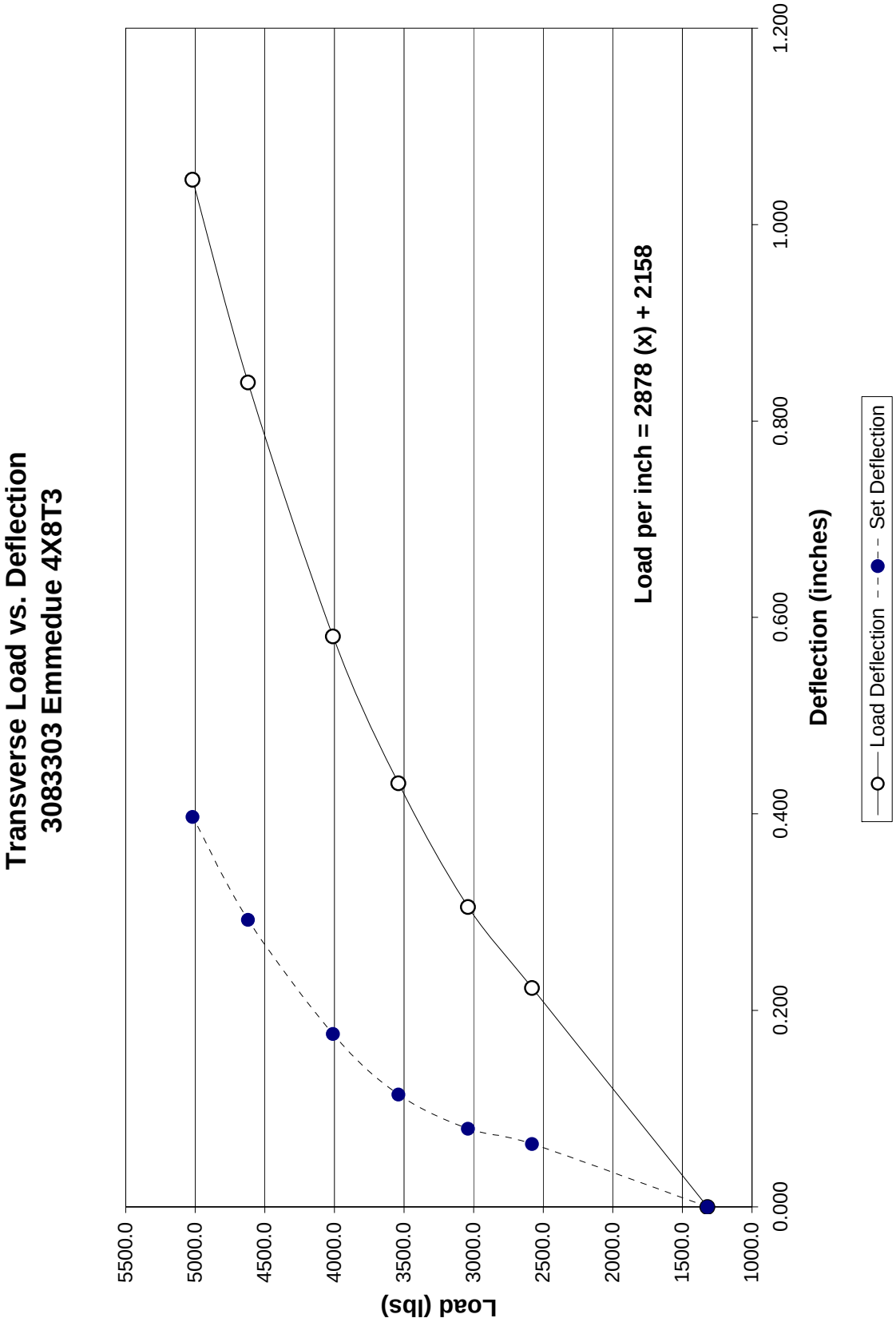
Reviewed by: 

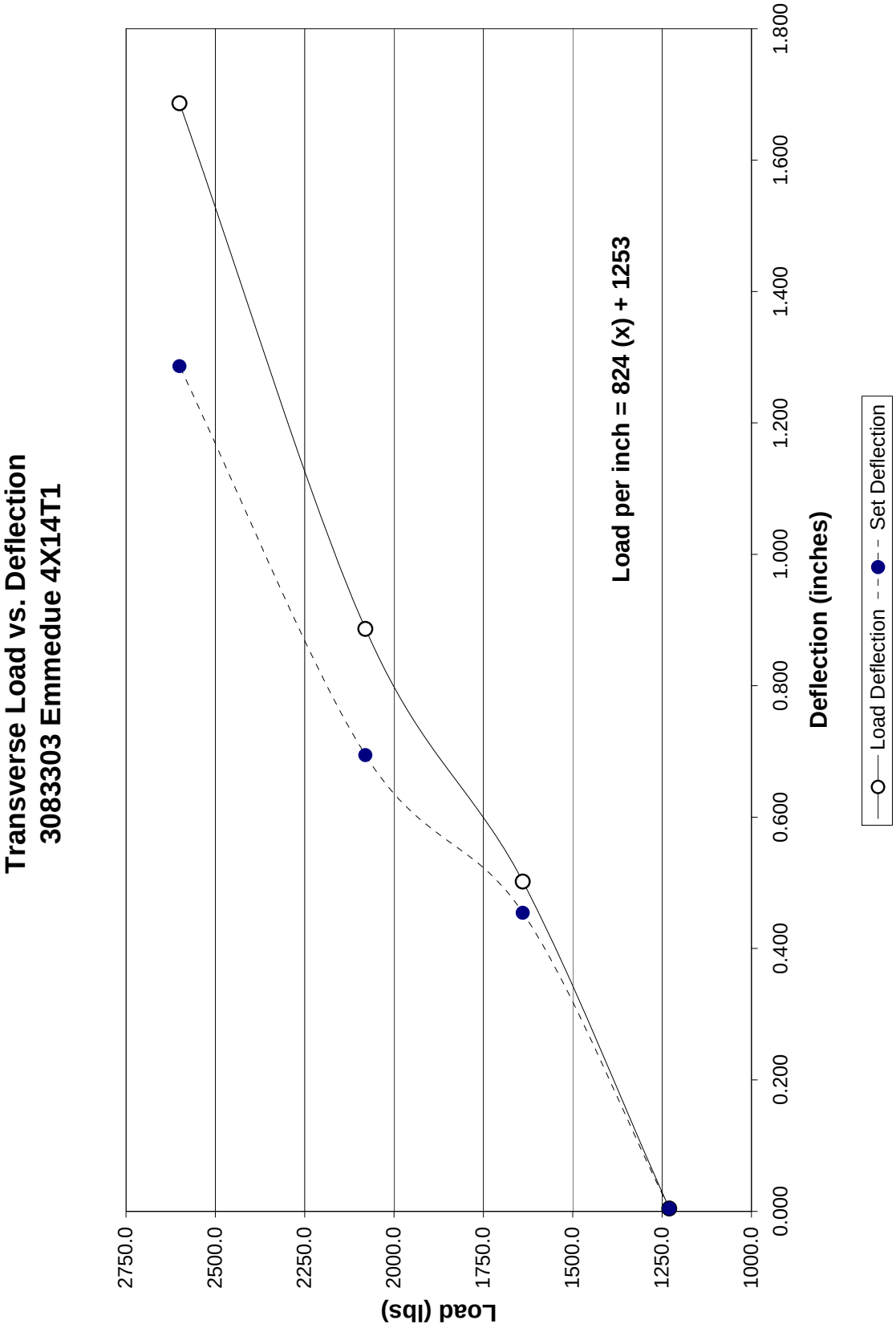
Michael E. Luna, M.S.
General Manager

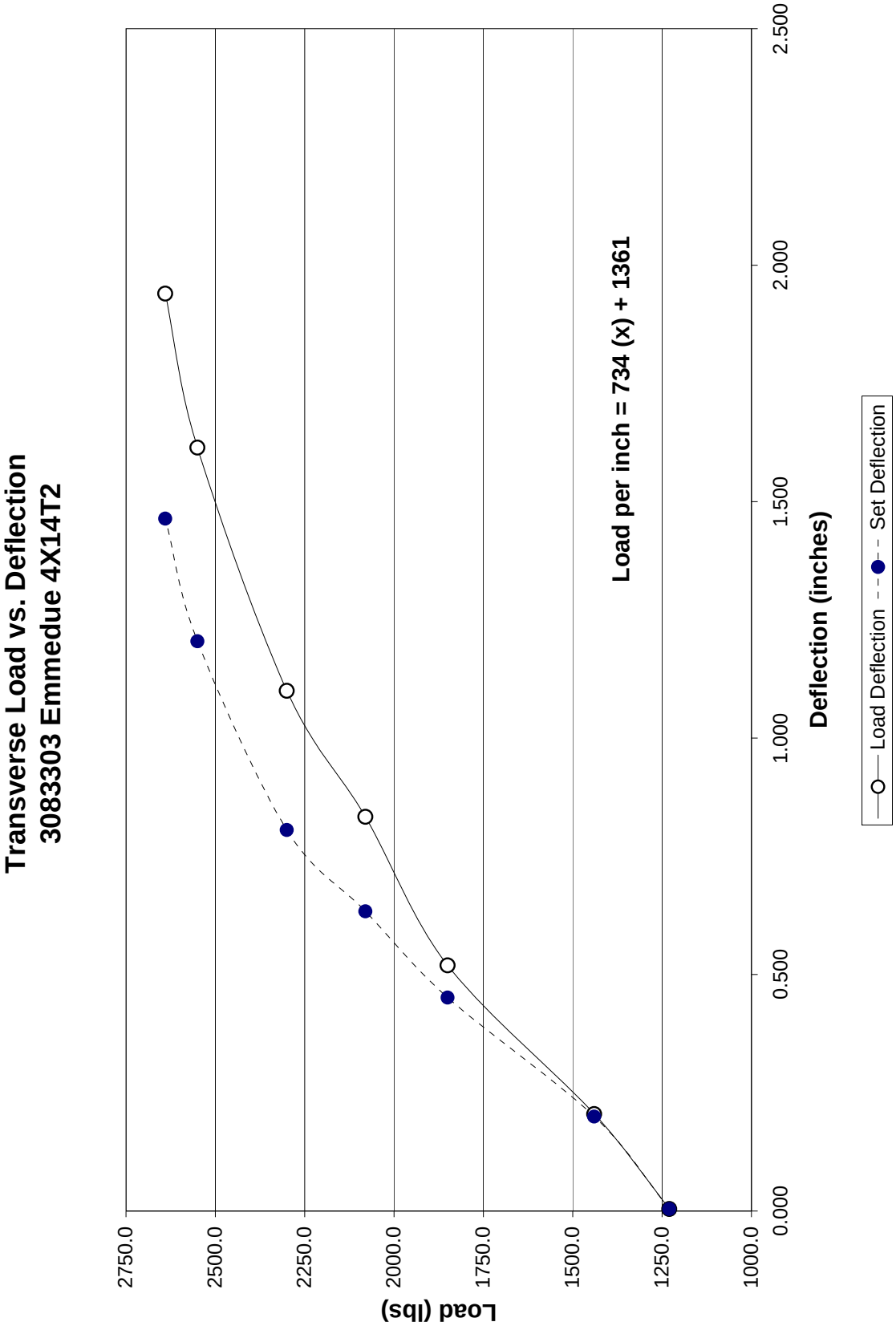
APPENDIX A
Graphs

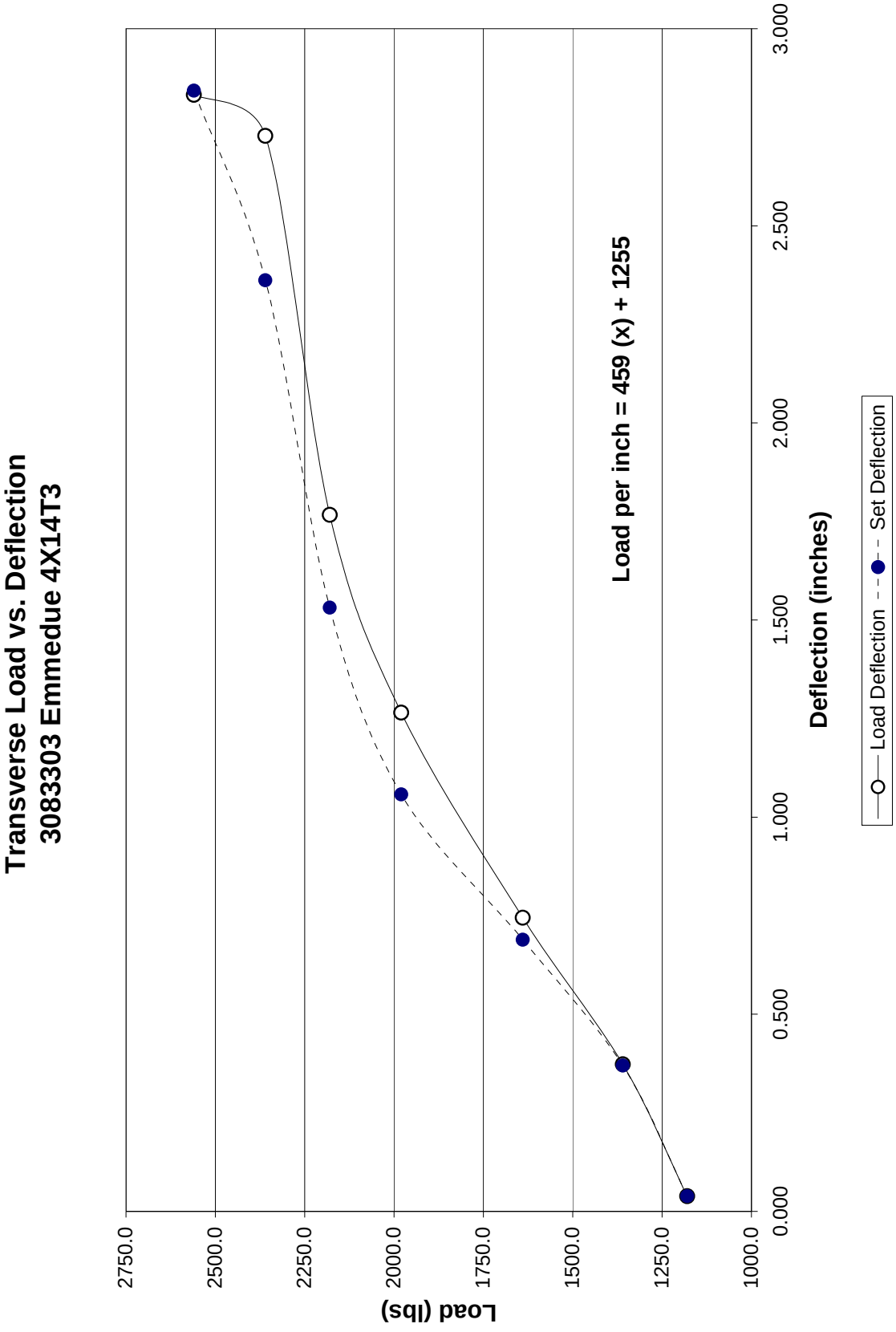

Transverse Load vs. Deflection
3083303 Emmedue 4X8T1
Load per inch = 3060 (x) + 2133
Load (lbs)
5500.0
5000.0
4500.0
4000.0
3500.0
3000.0
2500.0
2000.0
1500.0
1000.0
0.000
0.200
0.400
0.600
0.800
1.000
1.200
Deflection (inches)
Load Deflection
Set Deflection


Transverse Load vs. Deflection
3083303 Emmedue 4X8T2
Load per inch = 2985 (x) + 2112
Load (lbs)
5500.0
5000.0
4500.0
4000.0
3500.0
3000.0
2500.0
2000.0
1500.0
1000.0
0.000
0.200
0.400
0.600
0.800
1.000
1.200
Deflection (inches)
Load Deflection
Set Deflection


Transverse Load vs. Deflection
3083303 Emmedue 4X8T3
Load per inch = 2878 (x) + 2158
Load (lbs)
5500.0
5000.0
4500.0
4000.0
3500.0
3000.0
2500.0
2000.0
1500.0
1000.0
0.000
0.200
0.400
0.600
0.800
1.000
1.200
Deflection (inches)
Load Deflection
Set Deflection


Transverse Load vs. Deflection
3083303 Emmedue 4X14T1
Load per inch = 824 (x) + 1253
Load (lbs)
2750.0
2500.0
2250.0
2000.0
1750.0
1500.0
1250.0
1000.0
0.000
0.200
0.400
0.600
0.800
1.000
1.200
1.400
1.600
1.800
Deflection (inches)
Load Deflection
Set Deflection


Transverse Load vs. Deflection
3083303 Emmedue 4X14T2
Load per inch = 734 (x) + 1361
Load (lbs)
2750.0
2500.0
2250.0
2000.0
1750.0
1500.0
1250.0
1000.0
0.000
0.500
1.000
1.500
2.000
2.500
Deflection (inches)
Load Deflection
Set Deflection


Transverse Load vs. Deflection
3083303 Emmedue 4X14T3
Load per inch = 459 (x) + 1255
Load (lbs)
2750.0
2500.0
2250.0
2000.0
1750.0
1500.0
1250.0
1000.0
0.000
0.500
1.000
1.500
2.000
2.500
3.000
Deflection (inches)
Load Deflection
Set Deflection

APPENDIX B
Test Data

Intertek

Test: **Transverse Flexural Load - Specimen Horizontal**
Project #: **3083303**
Date: 11/16/2007
Eng. Initials:
Client: **Emmedue S.P.A**
Product ID: **M2_4X8T1**
Product: Single Polystyrene PSM80 4' x 8' x 6" Transverse 1 Structural Wall Panel
Eng/Tech(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.3 Wall Flexural Tests in accordance with the general guidelines of ASTM E 72-05
Wall Area (in^2): 32.00
Pre-Load (lbs) 1340
Age of Wall: 50 days (at test date)
Load Method: Third-Poing Loading
Bearing Type: 1 inch diameter steel rollers resting on 3 inch wide steel bearing plates (1/4" thick), located on all four points For third-point loading, bearings were spaced out 31 inches apart

Support Span		Panel		
(in)	(ft)	Width (ft)	Length (ft)	Thickness (in)
93	7.750	4.0	8.0	6.000

		Outer Corner Measurements				Lateral Measurements		
Piston Load (lbs)	Time	Trans 1 (in.)	Trans 2 (in.)	Trans 3 (in.)	Trans 4 (in.)	Trans 5 (in.)	Trans 6 (in.)	Midspan Mean (in.)
1340	immed.	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**
2550	immed.	0.000	0.004	0.002	0.006	0.172	0.172	**0.169**
2550	~5min	0.000	0.005	0.001	0.007	0.184	0.186	**0.182**
1470	immed.	0.000	0.003	0.000	0.003	0.090	0.090	**0.089**
1480	~5min	0.000	0.002	0.001	0.002	0.090	0.089	**0.088**
3060	immed.	-0.001	0.006	0.001	0.011	0.278	0.281	**0.275**
3050	~5min	-0.002	0.007	0.001	0.012	0.292	0.294	**0.289**
1460	immed.	-0.002	0.003	-0.001	0.002	0.138	0.135	**0.136**
1440	~5min	-0.002	0.003	0.000	0.003	0.133	0.131	**0.131**
3510	immed.	-0.003	0.008	0.000	0.014	0.407	0.409	**0.404**
3510	~5min	-0.003	0.009	0.000	0.014	0.430	0.432	**0.426**
1430	immed.	-0.003	0.003	-0.001	0.002	0.201	0.198	**0.199**
1430	~5min	-0.003	0.004	-0.001	0.002	0.195	0.193	**0.194**
4080	immed.	-0.004	0.011	-0.002	0.014	0.566	0.567	**0.562**
4090	~5min	-0.004	0.012	-0.002	0.014	0.616	0.620	**0.614**
1430	immed.	-0.004	0.005	-0.004	0.006	0.284	0.284	**0.283**
1430	~5min	-0.004	0.005	-0.004	0.006	0.275	0.275	**0.274**
4540	immed.	-0.007	0.013	-0.001	0.016	0.734	0.729	**0.726**
4530	~5min	-0.007	0.013	-0.001	0.016	0.773	0.769	**0.766**
1420	immed.	-0.008	0.005	-0.001	0.014	0.340	0.336	**0.336**
1430	~5min	-0.007	0.005	-0.002	0.014	0.334	0.330	**0.329**
4840	immed.	-0.007	0.014	-0.001	0.019	0.850	0.839	**0.838**
4830	~5min	-0.008	0.014	0.000	0.019	0.892	0.881	**0.880**
1430	immed.	-0.008	0.008	-0.002	0.014	0.404	0.398	**0.398**
1430	~5min	-0.008	0.008	-0.002	0.014	0.389	0.384	**0.383**
5140	immed.	-0.008	0.016	-0.002	0.021	0.978	0.963	**0.964**
5140	~5min	-0.009	0.016	-0.002	0.024	1.038	1.015	**1.019**
1410	immed.	-0.009	0.010	-0.003	0.017	0.474	0.465	**0.466**
1420	~5min	-0.009	0.010	-0.003	0.017	0.456	0.449	**0.449**

ULTIMATE FAILURE DATA		
5600	Hold 2 min	Pop heard, no visible cracks or damage
6260	Hold 2 min	Additional popping and cracking heard, no visible damage
6580	**Panel Failure**	Wall no longer able to hold load. Failure occurred approx 35 seconds into holding load Complete horizontal shear failure approximately 28 inches from right bearing end Horizontal failure is categorized as the length of the panel width (4 ft) Cracks visible between 18" and 32" on mortar underneath panel at location of shear failure No other visible damage present

Additional Notes: *The loads reported are the piston force only and **DO NOT** take account the weight of each wall specimen
*At Load = 3510 lbs, some popping head while taking wall to this target load. No visible damage present
*At Load = 4090 lbs, additional popping and cracking heard. No visible damage present
*Positive numbers indicate transducers extending **outward**; Negative numbers indicate transducers extending **inward**
*The wall stiffness (EI) was calculated from the maximum deflection equation of a simply supported beam under third-point loading conditions
*Ruben Caputo, Emmedue consultant, present during testing

Load (lbs)	Load (lbs-ft)	Load Defl. (in)	Load Defl. (ft)	Set Defl. (in)
1340.0	5360.0	0.000	0.0000	0.000
2550.0	10200.0	0.182	0.0152	0.088
3050.0	12200.0	0.289	0.0241	0.131
3510.0	14040.0	0.426	0.0355	0.194
4090.0	16360.0	0.614	0.0511	0.274
4530.0	18120.0	0.766	0.0638	0.329
4830.0	19320.0	0.880	0.0734	0.383
5140.0	20560.0	1.019	0.0849	0.449

Note: Transducers 1 through 4 measured the outer deflections. Transducers 5 through 6 measured the lateral deflections.

Transducer 1: Upper left
Transducer 2: Upper right
Transducer 3: Lower left
Transducer 4: Lower right
Transducer 5: Midspan top
Transducer 6: Midspan bottom

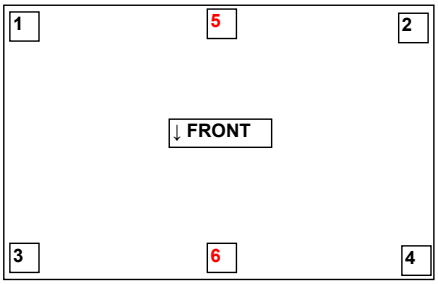
Stiffness (Flexural Rigidity) EI (lbs-ft^2)	**595192**
Max Load (lbs)	**6580**

Intertek

Client: Emmedue S.P.A
Project No: M2_4X8T1
Product: Single Polystyrene PSM80 4' x 8' x 6" Transverse 1 Structural Wall Panel
Technician(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.3 Wall Flexural Tests in accordance with the general guidelines of ASTM E 72-05
Load achieved within 1 minute

Support Span		Panel		
(in)	(ft)	Width (ft)	Length (ft)	Thickness (in)
93	7.750	4.00	8.00	6.000

Deflection Limit (L/x)	Load (lbs-in)
L/ 120	4503.37
L/ 180	3713.10
L/ 240	3317.97
L/ 360	2922.84



Linear Regression Analysis

3059.09063	2132.5701
127.70622	84.6267097
0.99136144	97.5666474
573.800059	5
5462146.6	47596.2534

Equation of Best Fit Line

Load (lbs-in) = Defl. (in) x 3059.09 + 2132.57

Intertek

Test: **Transverse Flexural Load - Specimen Horizontal**
Project #: **3083303**
Date: 11/16/2007
Eng. Initials:
Client: **Emmedue S.P.A**
Product ID: **M2_4X8T2**
Product: Single Polystyrene PSM80 4' x 8' x 6" Transverse 2 Structural Wall Panel
Eng/Tech(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.3 Wall Flexural Tests in accordance with the general guidelines of ASTM E 72-05
Wall Area (in^2): 32.00
Pre-Load (lbs) 1370
Age of Wall: 50 days (at test date)
Load Method: Third-Poing Loading
Bearing Type: 1 inch diameter steel rollers resting on 3 inch wide steel bearing plates (1/4" thick), located on all four points
For third-point loading, bearings were spaced out 31 inches apart

Support Span		Panel		
(in)	(ft)	Width (ft)	Length (ft)	Thickness (in)
93	7.750	4.0	8.0	6.000

		Outer Corner Measurements				Lateral Measurements		
Piston Load (lbs)	**Time**	**Trans 1 (in.)**	**Trans 2 (in.)**	**Trans 3 (in.)**	**Trans 4 (in.)**	**Trans 5 (in.)**	**Trans 6 (in.)**	**Midspan Mean (in.)**
1370	immed.	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**
2540	immed.	-0.002	0.011	0.012	0.002	0.179	0.184	**0.176**
2540	~5min	-0.002	0.011	0.012	0.001	0.190	0.195	**0.187**
1390	immed.	-0.002	0.005	0.009	0.002	0.080	0.082	**0.078**
1380	~5min	-0.002	0.005	0.009	0.001	0.077	0.079	**0.075**
3050	immed.	-0.003	0.012	0.021	0.004	0.307	0.306	**0.298**
3050	~5min	-0.003	0.012	0.021	0.004	0.329	0.331	**0.321**
1390	immed.	-0.003	0.003	0.012	0.004	0.151	0.150	**0.146**
1370	~5min	-0.003	0.003	0.012	0.004	0.146	0.145	**0.141**
3570	immed.	-0.006	0.011	0.042	0.006	0.415	0.425	**0.407**
3570	~5min	-0.006	0.011	-0.002	0.006	0.439	0.450	**0.442**
1400	immed.	-0.006	0.000	0.000	0.005	0.192	0.203	**0.198**
1380	~5min	-0.007	0.000	0.000	0.006	0.184	0.195	**0.190**
4100	immed.	-0.006	0.011	0.007	0.004	0.631	0.634	**0.628**
4190	~5min	-0.006	0.010	0.007	0.003	0.674	0.677	**0.672**
1410	immed.	-0.008	-0.002	0.003	0.002	0.314	0.320	**0.318**
1390	~5min	-0.008	-0.002	0.003	0.002	0.301	0.307	**0.305**
4630	immed.	-0.007	0.008	0.011	0.003	0.781	0.784	**0.779**
4650	~5min	-0.007	0.008	0.012	0.004	0.828	0.828	**0.824**
1430	immed.	-0.009	-0.002	0.007	-0.001	0.390	0.394	**0.394**
1410	~5min	-0.010	-0.002	0.007	0.000	0.368	0.373	**0.372**
5060	immed.	-0.009	0.003	0.015	0.005	0.978	0.977	**0.974**
5060	~5min	-0.008	0.004	0.015	0.005	1.038	1.038	**1.034**
1450	immed.	-0.010	-0.002	0.009	0.000	0.496	0.500	**0.499**
1420	~5min	-0.010	-0.002	0.009	0.000	0.472	0.476	**0.475**

ULTIMATE FAILURE DATA		
5580	Hold 2 min	No change, no visible damage
6120	Hold 2 min	Slight popping heard at 1 minute into load, no visible damage
6550	Hold 2 min	No cracking or popping, no visible damage
6580	**Panel Failure**	Wall no longer able to hold load. Failure occurred approx 10 seconds into holding load Complete horizontal shear failure approximately 30 inches from right bearing end Horizontal failure is categorized as the length of the panel width (4 ft) Cracks visible between 18" and 34" on mortar underneath panel at location of shear failure Top mortar cap horizontal shearing from foam at both ends of wall

Additional Notes: *The loads reported are the piston force only and **DO NOT** take account the weight of each wall specimen
*At Load = 3570 lbs, Transducer #3 was readjusted due to slippage. New set reading now 0.059 inches
*At Load = 4650 lbs, formation of mortar surface cracks on botton RHS bearing, extending the entire 4 ft length at location
On the LHS bearing, the lower cracks extended approximately 2 ft (photos taken)
*Positive numbers indicate transducers extending **outward**; Negative numbers indicate transducers extending **inward**
*The wall stiffness (EI) was calculated from the maximum deflection equation of a simply supported beam under
third-point loading conditions
*Ruben Caputo, Emmedue consultant, present during testing

Load (lbs)	Load (lbs-ft)	Load Defl. (in)	Load Defl. (ft)	Set Defl. (in)
1370.0	5480.0	0.000	0.0000	0.000
2540.0	10160.0	0.187	0.0156	0.075
3050.0	12200.0	0.321	0.0268	0.141
3570.0	14280.0	0.442	0.0368	0.190
4190.0	16760.0	0.672	0.0560	0.305
4650.0	18600.0	0.824	0.0686	0.372
5060.0	20240.0	1.034	0.0862	0.475

Note: Transducers 1 through 4 measured the outer deflections. Transducers 5 through 6 measured the lateral deflections.

Transducer 1: Upper left
Transducer 2: Upper right
Transducer 3: Lower left
Transducer 4: Lower right
Transducer 5: Midspan top
Transducer 6: Midspan bottom

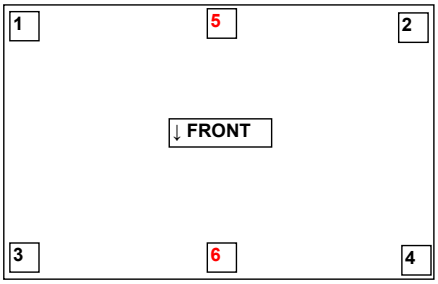
Stiffness (Flexural Rigidity) EI (lbs-ft^2]	**572313**
Max Load (lbs)	**6580**

Intertek

Client: Emmedue S.P.A
Project No: M2_4X8T2
Product: Single Polystyrene PSM80 4' x 8' x 6" Transverse 2 Structural Wall Panel
Technician(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems
Section 4.2.2.3 Wall Flexural Tests in accordance with the general guidelines of ASTM E 72-05
Load achieved within 1 minute

Support Span		**Panel**		
(in)	(ft)	Width (ft)	Length (ft)	Thickness (in)
93	7.750	4.00	8.00	6.000

Deflection Limit (L/x)	**Load (lbs-in)**
L/ 120	4425.50
L/ 180	3654.32
L/ 240	3268.73
L/ 360	2883.13



Linear Regression Analysis

2985.22861	2111.95049
180.56821	117.322685
0.98557627	129.544475
273.320752	4
4586806.25	67127.0837

Equation of Best Fit Line

Load (lbs-in) = Defl. (in) x 2985.23 + 2111.95

Test: **Transverse Flexural Load - Specimen Horizontal**
Project #: **3083303**
Date: 11/19/2007
Eng. Initials:
Client: **Emmedue S.P.A**
Product ID: **M2_4X8T3**
Product: Single Polystyrene PSM80 4' x 8' x 6" Transverse 3 Structural Wall Panel
Eng/Tech(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.3 Wall Flexural Tests in accordance with the general guidelines of ASTM E 72-05
Wall Area (in^2): 32.00
Pre-Load (lbs) 1320
Age of Wall: 53 days (at test date)
Load Method: Third-Poing Loading
Bearing Type: 1 inch diameter steel rollers resting on 3 inch wide steel bearing plates (1/4" thick), located on all four points
For third-point loading, bearings were spaced out 31 inches apart

Support Span		Panel		
(in)	(ft)	Width (ft)	Length (ft)	Thickness (in)
93	7.750	4.0	8.0	6.000

		Outer Corner Measurements				Lateral Measurements		
Piston Load (lbs)	Time	Trans 1 (in.)	Trans 2 (in.)	Trans 3 (in.)	Trans 4 (in.)	Trans 5 (in.)	Trans 6 (in.)	Midspan Mean (in.)
1320	immed.	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**
2640	immed.	-0.001	0.000	0.001	-0.001	0.218	0.227	**0.223**
2580	~5min	-0.001	0.000	0.001	-0.001	0.218	0.228	**0.223**
1480	immed.	-0.001	0.000	0.000	0.003	0.063	0.071	**0.066**
1480	~5min	0.000	0.000	0.000	0.003	0.061	0.069	**0.064**
3050	immed.	-0.001	0.000	0.000	-0.001	0.289	0.300	**0.295**
3040	~5min	-0.001	0.000	0.000	0.000	0.299	0.311	**0.305**
1480	immed.	-0.001	0.000	0.000	0.004	0.080	0.093	**0.086**
1480	~5min	-0.001	0.000	0.000	0.003	0.074	0.087	**0.080**
3550	immed.	-0.002	0.000	-0.001	-0.002	0.407	0.414	**0.411**
3540	~5min	-0.002	0.000	0.000	-0.001	0.427	0.434	**0.431**
1470	immed.	-0.002	-0.001	0.017	0.005	0.120	0.132	**0.121**
1470	~5min	-0.001	0.000	0.017	0.006	0.114	0.126	**0.114**
4020	immed.	-0.001	0.000	0.017	-0.003	0.532	0.539	**0.532**
4010	~5min	-0.001	-0.001	0.017	-0.004	0.580	0.587	**0.581**
1500	immed.	-0.001	-0.001	0.016	0.004	0.193	0.205	**0.194**
1470	~5min	-0.002	-0.001	0.016	0.005	0.174	0.187	**0.176**
4640	immed.	-0.002	-0.001	0.017	-0.009	0.786	0.786	**0.785**
4620	~5min	-0.001	-0.001	0.017	-0.009	0.840	0.842	**0.840**
1510	immed.	-0.002	-0.001	0.016	0.001	0.316	0.332	**0.320**
1480	~5min	-0.001	-0.001	0.016	0.002	0.288	0.304	**0.292**
5030	immed.	-0.002	0.000	0.017	-0.012	0.968	0.965	**0.965**
5020	~5min	-0.002	-0.001	0.017	-0.011	1.047	1.046	**1.046**
1520	immed.	-0.001	-0.001	0.015	-0.003	0.423	0.438	**0.428**
1480	~5min	-0.002	-0.001	0.015	-0.003	0.392	0.407	**0.397**

ULTIMATE FAILURE DATA		
5200	Hold 2 min	No change, no visible damage
5610	**Panel Failure**	Wall no longer able to hold load. Failure occurred approx 1:41 seconds into holding load Complete horizontal shear failure approximately 32.5 inches from right bearing end (at bearing location) Horizontal failure is categorized as the length of the panel width (4 ft) Cracks visible between 28" and 34" on mortar underneath panel at location of shear failure Top mortar cap horizontal shearing from RHS end of wall (closest to breaking point)

Additional Notes: *The loads reported are the piston force only and **DO NOT** take account the weight of each wall specimen
*At Load = 3540 lbs, possible slippage of Transducer #3 at set reading due to uneven surface contact
*At Load = 4010 lbs, some cracking and popping heard. No visible damage present
*At Load = 4620 lbs, some cracking and popping heard while taking wall to target load, no visible damage present
*Positive numbers indicate transducers extending **outward**; Negative numbers indicate transducers extending **inward**
*The wall stiffness (EI) was calculated from the maximum deflection equation of a simply supported beam under third-point loading conditions
*Ruben Caputo, Emmedue consultant, present during testing

Load (lbs)	Load (lbs-ft)	Load Defl. (in)	Load Defl. (ft)	Set Defl. (in)
1320.0	5280.0	0.000	0.0000	0.000
2580.0	10320.0	0.223	0.0186	0.064
3040.0	12160.0	0.305	0.0254	0.080
3540.0	14160.0	0.431	0.0360	0.114
4010.0	16040.0	0.581	0.0484	0.176
4620.0	18480.0	0.840	0.0700	0.292
5020.0	20080.0	1.046	0.0872	0.397

Note: Transducers 1 through 4 measured the outer deflections. Transducers 5 through 6 measured the lateral deflections.

Transducer 1: Upper left
Transducer 2: Upper right
Transducer 3: Lower left
Transducer 4: Lower right
Transducer 5: Midspan top
Transducer 6: Midspan bottom

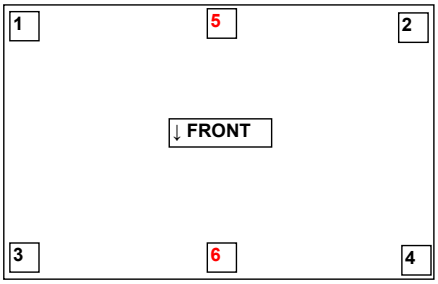
Stiffness (Flexural Rigidity) EI (lbs-ft^2]	**545616**
Max Load (lbs)	**5610**

Intertek

Client: Emmedue S.P.A
Project No: M2_4X8T3
Product: Single Polystyrene PSM80 4' x 8' x 6" Transverse 3 Structural Wall Panel
Technician(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.3 Wall Flexural Tests in accordance with the general guidelines of ASTM E 72-05
Load achieved within 1 minute

Support Span		**Panel**		
(in)	(ft)	Width (ft)	Length (ft)	Thickness (in)
93	7.750	4.00	8.00	6.000

Deflection Limit (L/x)	**Load (lbs-in)**
L/ 120	4388.74
L/ 180	3645.25
L/ 240	3273.50
L/ 360	2901.75



Linear Regression Analysis

2878.039	2158.25843
247.327755	158.531321
0.97130745	176.410125
135.409034	4
4214001.2	124482.129

Equation of Best Fit Line

Load (lbs-in) = Defl. (in) x 2878.04 + 2158.26

Test: **Transverse Flexural Load - Specimen Horizontal**
Project #: **3083303**
Date: 11/29/2007
Eng. Initials:
Client: **Emmedue S.P.A**
Product ID: **M2_4X14T1**
Product: Single Polystyrene PSM80 4' x 14' x 6" Transverse 1 Structural Wall Panel
Eng/Tech(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.3 Wall Flexural Tests in accordance with the general guidelines of ASTM E 72-05
Wall Area (in^2): 56.00
Pre-Load (lbs) 1230
Age of Wall: 57 days (at test date)
Load Method: Third-Poing Loading
Bearing Type: 1 inch diameter steel rollers resting on 3 inch wide steel bearing plates (1/4" thick), located on all four points
For third-point loading, bearings were spaced out 55 inches apart

Support Span		Panel		
(in)	(ft)	Width (ft)	Length (ft)	Thickness (in)
165	13.750	4.0	14.0	6.000

		Outer Corner Measurements				Lateral Measurements		
Piston Load (lbs)	Time	Trans 1 (in.)	Trans 2 (in.)	Trans 3 (in.)	Trans 4 (in.)	Trans 5 (in.)	Trans 6 (in.)	Midspan Mean (in.)
1230	immed.	0.000	0.000	0.000	0.000	0.005	0.004	**0.005**
1620	immed.	-0.002	-0.005	0.000	-0.001	0.411	0.424	**0.419**
1640	~5min	0.000	-0.008	0.001	0.005	0.490	0.513	**0.502**
1460	immed.	0.000	-0.008	0.000	0.005	0.467	0.482	**0.475**
1390	~5min	0.000	-0.008	0.001	0.006	0.447	0.462	**0.455**
2050	immed.	0.000	-0.010	0.000	0.006	0.767	0.798	**0.784**
2080	~5min	0.000	-0.012	0.001	0.008	0.867	0.905	**0.887**
1480	immed.	-0.002	-0.012	0.000	0.010	0.705	0.740	**0.724**
1430	~5min	-0.002	-0.012	0.001	0.011	0.677	0.711	**0.695**
2560	immed.	-0.013	-0.018	0.001	0.009	1.421	1.474	**1.453**
2600	~5min	-0.012	-0.021	0.001	0.010	1.652	1.710	**1.687**
1540	immed.	-0.014	-0.022	-0.008	0.011	1.298	1.348	**1.331**
1440	~5min	-0.014	-0.022	-0.008	0.012	1.254	1.303	**1.287**

ULTIMATE FAILURE DATA		
2780.0	Hold 2 min	Wall deflecting more, no cracks or pops, no visible damage
2800.0	Hold 15 sec	Wall continuing to deflect, no additional visible damage
3020	Hold 5 sec	No cracks or pops, no visible damage
3070	**Panel Failure**	Wall no longer able to hold load. Failure occurred at 1:02 seconds into holding load, sudden crack Complete horizontal shear failure approximately 78 inches from right bearing end (close to wall midspan) Shear failure includes both mortar coats, wire mesh, and foam Horizontal failure is categorized as the length of the panel width (4 ft) No other visible damage present

Additional Notes: *The loads reported are the piston force only and **DO NOT** take account the weight of each wall specimen
*Target loads of L/180 and L/120 surpassed due to wall continuing to deflect
An attempt was made to add an additional target load, however, wall continued to deflect, and it was decided not to compromise the wall any further since it was the first 14 ft wall to be tested
*At Load = 2080 lbs, wall showing very little settling during set load
*Positive numbers indicate transducers extending **outward**; Negative numbers indicate transducers extending **inward**
*The wall stiffness (EI) was calculated from the maximum deflection equation of a simply supported beam under third-point loading conditions

Load (lbs)	Load (lbs-ft)	Load Defl. (in)	Load Defl. (ft)	Set Defl. (in)
1230.0	4920.0	0.005	0.0004	0.005
1640.0	6560.0	0.502	0.0419	0.455
2080.0	8320.0	0.887	0.0739	0.695
2600.0	10400.0	1.687	0.1406	1.287

Note: Transducers 1 through 4 measured the outer deflections. Transducers 5 through 6 measured the lateral deflections.

Transducer 1: Upper left
Transducer 2: Upper right
Transducer 3: Lower left
Transducer 4: Lower right
Transducer 5: Midspan top
Transducer 6: Midspan bottom

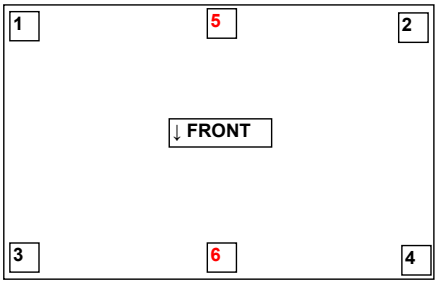
Stiffness (Flexural Rigidity) EI (lbs-ft^2]	**540677**
Max Load (lbs)	**3070**

Intertek

Client: Emmedue S.P.A
Project No: M2_4X14T1
Product: Single Polystyrene PSM80 4' x 14' x 6" Transverse 1 Structural Wall Panel
Technician(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.3 Wall Flexural Tests in accordance with the general guidelines of ASTM E 72-05
Load achieved within 1 minute

Support Span		Panel		
(in)	(ft)	Width (ft)	Length (ft)	Thickness (in)
165	13.750	4.00	14.00	6.000

Deflection Limit (L/x)	Load (lbs-in)
L/ 120	2385.79
L/ 180	2008.27
L/ 240	1819.51
L/ 360	1630.74



Linear Regression Analysis

823.681565	1253.22401
64.4493513	63.5059674
0.98790341	79.2451416
163.335878	2
1025715.42	12559.5849

Equation of Best Fit Line

Load (lbs-in) = Defl. (in) x 823.68 + 1253.22

Test: **Transverse Flexural Load - Specimen Horizontal**
Project #: **3083303**
Date: 11/30/2007
Eng. Initials:
Client: **Emmedue S.P.A**
Product ID: **M2_4X14T2**
Product: Single Polystyrene PSM80 4' x 14' x 6" Transverse 2 Structural Wall Panel
Eng/Tech(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.3 Wall Flexural Tests in accordance with the general guidelines of ASTM E 72-05
Wall Area (in^2): 56.00
Pre-Load (lbs) 1230
Age of Wall: 58 days (at test date)
Load Method: Third-Poing Loading
Bearing Type: 1 inch diameter steel rollers resting on 3 inch wide steel bearing plates (1/4" thick), located on all four points
For third-point loading, bearings were spaced out 55 inches apart

Support Span		Panel		
(in)	(ft)	Width (ft)	Length (ft)	Thickness (in)
165	13.750	4.0	14.0	6.000

		Outer Corner Measurements				Lateral Measurements		
Piston Load (lbs)	**Time**	**Trans 1 (in.)**	**Trans 2 (in.)**	**Trans 3 (in.)**	**Trans 4 (in.)**	**Trans 5 (in.)**	**Trans 6 (in.)**	**Midspan Mean (in.)**
1230	immed.	0.000	0.000	0.000	0.000	0.006	0.003	**0.005**
1440	immed.	0.001	-0.001	-0.005	0.002	0.122	0.126	**0.125**
1440	~5min	0.001	0.000	0.003	0.005	0.203	0.212	**0.205**
1410	immed.	0.001	0.000	0.004	0.005	0.200	0.207	**0.201**
1390	~5min	0.001	0.000	0.005	0.005	0.199	0.207	**0.200**
1820	immed.	0.001	0.000	0.008	0.014	0.471	0.491	**0.475**
1850	~5min	0.001	0.000	0.160	0.016	0.552	0.576	**0.520**
1560	immed.	0.000	0.000	0.133	0.016	0.470	0.494	**0.445**
1500	~5min	0.000	0.000	0.033	0.016	0.452	0.475	**0.451**
2070	immed.	0.000	0.000	0.047	0.017	0.721	0.755	**0.722**
2080	~5min	0.000	-0.001	0.044	0.027	0.829	0.873	**0.834**
1610	immed.	0.000	-0.002	0.046	0.028	0.664	0.707	**0.667**
1540	~5min	0.000	-0.002	0.062	0.028	0.635	0.677	**0.634**
2270	immed.	0.000	-0.002	0.050	0.028	0.995	1.040	**0.998**
2300	~5min	0.000	-0.003	0.054	0.028	1.096	1.144	**1.100**
1630	immed.	0.000	-0.004	0.048	0.028	0.853	0.900	**0.858**
1550	~5min	0.000	-0.004	0.075	0.028	0.807	0.855	**0.806**
2520	immed.	0.000	-0.003	0.040	0.029	1.415	1.464	**1.423**
2550	~5min	0.000	-0.004	0.037	0.029	1.606	1.655	**1.615**
1620	immed.	0.000	-0.006	0.039	0.021	1.240	1.291	**1.252**
1560	~5min	-0.001	-0.006	0.050	0.022	1.196	1.246	**1.205**
2620	immed.	0.000	-0.005	0.032	0.023	1.775	1.831	**1.791**
2640	~5min	0.000	-0.005	0.043	0.023	1.928	1.983	**1.940**
1620	immed.	-0.001	-0.006	0.040	0.018	1.497	1.543	**1.507**
1560	~5min	-0.002	-0.006	0.038	0.018	1.454	1.499	**1.464**

ULTIMATE FAILURE DATA		
2830.0	Hold 2 min	No cracks or pops, no visible damage
3250.0	Hold 15 sec	Wall continuing to deflect, no additional visible damage
3280	Hold 5 sec	Load continuing to increase, no visible damage
3290	**Panel Failure**	Wall no longer able to hold load. Failure occurred suddenly as load continued to increase Complete horizontal shear failure approximately 75 inches from right bearing end (close to wall midspan) Shear failure includes both mortar coats, wire mesh, and foam Horizontal failure is categorized as the length of the panel width (4 ft) No other visible damage present

Additional Notes: *The loads reported are the piston force only and **DO NOT** take account the weight of each wall specimen
*At Load = 1850 lbs, one loud pop heard, Transducer #3 showing significant movement, no visible damage at that location
*At Load = 2080 lbs, Transducer #3 stabalized, checked for slippage (all OK), wall showing very little settling during load set
*At Load = 2550 lbs, wall continuing to deflect, settling minimal
*Positive numbers indicate transducers extending **outward**; Negative numbers indicate transducers extending **inward**
*The wall stiffness (EI) was calculated from the maximum deflection equation of a simply supported beam under third-point loading conditions

Load (lbs)	Load (lbs-ft)	Load Defl. (in)	Load Defl. (ft)	Set Defl. (in)
1230.0	4920.0	0.005	0.0004	0.005
1440.0	5760.0	0.205	0.0171	0.200
1850.0	7400.0	0.520	0.0433	0.451
2080.0	8320.0	0.834	0.0695	0.634
2300.0	9200.0	1.100	0.0917	0.806
2550.0	10200.0	1.615	0.1346	1.205
2640.0	10560.0	1.940	0.1617	1.464

Note: Transducers 1 through 4 measured the outer deflections. Transducers 5 through 6 measured the lateral deflections.

Transducer 1: Upper left
Transducer 2: Upper right
Transducer 3: Lower left
Transducer 4: Lower right
Transducer 5: Midspan top
Transducer 6: Midspan bottom

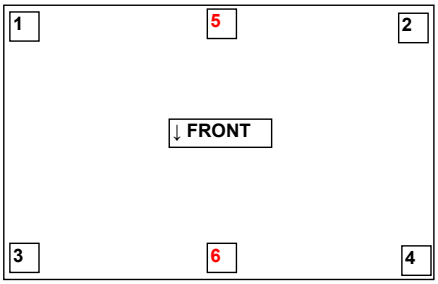
Stiffness (Flexural Rigidity) EI (lbs-ft^2)	**418879**
Max Load (lbs)	**3290**

Intertek

Client: Emmedue S.P.A
Project No: M2_4X14T2
Product: Single Polystyrene PSM80 4' x 14' x 6" Transverse 2 Structural Wall Panel
Technician(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.3 Wall Flexural Tests in accordance with the general guidelines of ASTM E 72-05
Load achieved within 1 minute

Support Span		Panel		
(in)	(ft)	Width (ft)	Length (ft)	Thickness (in)
165	13.750	4.00	14.00	6.000

Deflection Limit (L/x)	Load (lbs-in)
L/ 120	2370.09
L/ 180	2033.66
L/ 240	1865.44
L/ 360	1697.23



Linear Regression Analysis

734.032399	1360.79519
74.2815625	82.2841641
0.95129038	130.058906
97.6491343	5
1651766.26	84576.5953

Equation of Best Fit Line

Load (lbs-in) = Defl. (in) x 734.03 + 1360.80

Intertek

Test: **Transverse Flexural Load - Specimen Horizontal**
Project #: **3083303**
Date: 11/30/2007
Eng. Initials:
Client: **Emmedue S.P.A**
Product ID: **M2_4X14T3**
Product: Single Polystyrene PSM80 4' x 14' x 6" Transverse 3 Structural Wall Panel
Eng/Tech(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.3 Wall Flexural Tests in accordance with the general guidelines of ASTM E 72-05
Wall Area (in^2): 56.00
Pre-Load (lbs) 1180
Age of Wall: 58 days (at test date)
Load Method: Third-Poing Loading
Bearing Type: 1 inch diameter steel rollers resting on 3 inch wide steel bearing plates (1/4" thick), located on all four points
For third-point loading, bearings were spaced out 55 inches apart

Support Span		Panel		
(in)	(ft)	Width (ft)	Length (ft)	Thickness (in)
165	13.750	4.0	14.0	6.000

		Outer Corner Measurements				Lateral Measurements		
Piston Load (lbs)	Time	Trans 1 (in.)	Trans 2 (in.)	Trans 3 (in.)	Trans 4 (in.)	Trans 5 (in.)	Trans 6 (in.)	Midspan Mean (in.)
1180	immed.	0.000	0.000	0.000	0.000	0.042	0.036	**0.039**
1330	immed.	-0.002	-0.001	0.000	0.000	0.291	0.293	**0.293**
1360	~5min	-0.002	-0.001	-0.001	0.000	0.368	0.376	**0.373**
1250	immed.	-0.002	-0.002	-0.002	0.000	0.365	0.372	**0.370**
1260	~5min	-0.002	-0.002	-0.004	0.000	0.365	0.372	**0.370**
1590	immed.	-0.004	-0.002	-0.004	0.000	0.557	0.565	**0.563**
1640	~5min	-0.005	-0.003	-0.004	0.000	0.737	0.747	**0.745**
1520	immed.	-0.005	-0.004	-0.004	0.000	0.713	0.721	**0.721**
1450	~5min	-0.005	-0.004	0.000	0.000	0.683	0.691	**0.689**
1910	immed.	-0.005	-0.004	0.000	0.000	1.066	1.069	**1.070**
1980	~5min	0.006	-0.005	0.027	-0.001	1.273	1.271	**1.265**
1600	immed.	0.006	-0.006	0.024	-0.001	1.139	1.134	**1.131**
1460	~5min	0.007	-0.006	0.038	-0.002	1.071	1.064	**1.058**
2130	immed.	0.007	-0.006	0.026	-0.002	1.513	1.508	**1.504**
2180	~5min	0.004	-0.006	0.017	-0.002	1.773	1.768	**1.767**
1670	immed.	0.001	-0.008	0.050	-0.006	1.651	1.643	**1.638**
1490	~5min	0.002	-0.009	0.048	-0.008	1.544	1.536	**1.532**
2310	immed.	-0.003	-0.008	0.048	-0.008	2.252	2.241	**2.239**
2360	~5min	-0.010	-0.009	0.045	-0.008	2.760	2.706	**2.729**
1570	immed.	-0.014	-0.013	0.057	-0.015	2.444	2.428	**2.432**
1480	~5min	-0.014	-0.014	0.063	-0.015	2.375	2.359	**2.362**
2460	immed.	-0.015	-0.016	0.047	-0.016	2.913	2.754	**2.833**
2560	~5min	-0.025	-0.017	0.062	-0.018	2.913	2.753	**2.833**
1610	immed.	-0.030	-0.029	0.046	-0.030	2.913	2.754	**2.844**
1490	~5min	-0.028	-0.031	0.050	-0.030	2.913	2.754	**2.843**

ULTIMATE FAILURE DATA		
2650	Hold 2 min	No change, no visible damage
2790	**Panel Failure**	Wall no longer able to hold load. Failure occurred approx 1 - 2 seconds into holding load, sudden crack Complete horizontal shear failure approximately 80 inches from right bearing end (close to wall midspan) Shear failure includes both mortar coats, wire mesh, and foam Horizontal failure is categorized as the length of the panel width (4 ft) No other visible damage present

Additional Notes: *The loads reported are the piston force only and **DO NOT** take account the weight of each wall specimen
*L/360 and L/120 were surpassed during testing due to wall continuing to deflect under load
*At Load = 1640 lbs, popping heard, wall continuing to deflect, as evident by movement of lateral Transducers 5 and 6
*At Load = 1980 lbs, movement of Transducer #3, evidence of a crack and mortar crushing at that location (photos taken)
*At Load = 2180 lbs, wall continuing to deflect and not hold load consistently. Cracks formations underneath wall on mortar at 71.5", 75", 81", and 98" from RHS end. Cracks extended entire width (4 ft) of wall
*At Load = 2560 lbs, lateral Transducers 5 and 6 did not move further, lateral movement reamined constant
*Positive numbers indicate transducers extending **outward**; Negative numbers indicate transducers extending **inward**
*The wall stiffness (EI) was calculated from the maximum deflection equation of a simply supported beam under third-point loading conditions

Load (lbs)	Load (lbs-ft)	Load Defl. (in)	Load Defl. (ft)	Set Defl. (in)
1180.0	4720.0	0.039	0.0033	0.039
1360.0	5440.0	0.373	0.0311	0.370
1640.0	6560.0	0.745	0.0621	0.689
1980.0	7920.0	1.265	0.1055	1.058
2180.0	8720.0	1.767	0.1473	1.532
2360.0	9440.0	2.729	0.2274	2.362
2560.0	10240.0	2.833	0.2361	2.843

Note: Transducers 1 through 4 measured the outer deflections. Transducers 5 through 6 measured the lateral deflections.

Transducer 1: Upper left
Transducer 2: Upper right
Transducer 3: Lower left
Transducer 4: Lower right
Transducer 5: Midspan top
Transducer 6: Midspan bottom

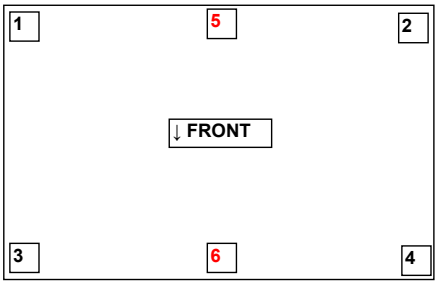
Stiffness (Flexural Rigidity) EI (lbs-ft^2)	**186249**
Max Load (lbs)	**2790**

Intertek

Client: Emmedue S.P.A
Project No: M2_4X14T3
Product: Single Polystyrene PSM80 4' x 14' x 6" Transverse 3 Structural Wall Panel
Technician(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.3 Wall Flexural Tests in accordance with the general guidelines of ASTM E 72-05
Load achieved within 1 minute

Support Span		Panel		
(in)	(ft)	Width (ft)	Length (ft)	Thickness (in)
165	13.750	4.00	14.00	6.000

Deflection Limit (L/x)	Load (lbs-in)
L/ 120	1886.02
L/ 180	1675.65
L/ 240	1570.47
L/ 360	1465.29



Linear Regression Analysis

458.978075	1254.9227
43.8951535	75.8273589
0.95626804	118.64313
109.332867	5
1538990.47	70380.9617

Equation of Best Fit Line

Load (lbs-in) = Defl. (in) x 458.98 + 1254.92

APPENDIX C

Test Photographs

Note: Only a small number of photos were selected for this report. A CD copy of all the project photos will be provided to the client

4X8T3 (Setup and Failure Modes)

Figure 1A: Rear view of wall

Figure 2A: Transverse-flexural transducer locations

Figure 3A: 4X8T3 Failure mode

Figure 4A: 4X8T3 Failure mode (close-up)

4X14T3 (Setup and Failure Modes)

Figure 5A: 4X14T3 Setup

Figures 6A: Lateral transducer setup

Figure 7A: 4X14T3 Failure mode

Figure 8A: Failure mode (close-up)

Intertek ETL SEMKO

PRE-TEST INSPECTION REPORT

Inspection Date: July 1-2, 2007 Intertek Inspector: Matt Lansdowne, EIT

Inspector's Tel: (604) 520 - 3321 Inspector's Email: matt.lansdowne@intertek.com

Product Name: Emmedue Structurally Insulated Panels

Project #: 3083303 Production Lot #: 07/01-02/07 # of Samples: See back page

General Instruction(s): Please complete ALL sections of this report. When information is not applicable, indicate "NA" and provide an explanation. Installation Instructions and MSDS sheets are required. Attach to this form, other product information, which is critical for follow-up inspections and ongoing certification. Please use the enclosed page for manufacturer's shipment.

	Owner/Distributor	Manufacturer (If Different From Owner/Distributor)
Company Name:	**Emmedue S.P.A.**	**SAME AS OWNER**
Address:	Via Toniolo 39/b Z.I. Bellocchi 61032 Fano (PU) Italy	
Tel:	(0039) 0721 855650 / 1	Fax:
Email:	(0039) 0721 854030	
Contact Person:	Omero Bassotti	

FORMULATION (attach material specification sheet(s) or "Certificate of Analysis")

Material	Approved Supplier(s)	Specification	% Content
EPS	ISOPAK Adratica Spa	15AE (It. Gov. Standard)	No Grind
EPS	Sulpol		
Steel Coil	MEttallurgica Ledrense	2.4mm diam., 3.00mm diam., 2.50mm diam.	3.0mm Yield 793 N/mm2 2.5mm Yield 712N/mm2
Adhesive	DA.FO.TEC	ABATECK D40/R	Use to join under length EPS panels

MANUFACTURING PROCESS (attach flowchart and/or details)

EPS and Steel Coil received, COA inspected to ensure quality, moved into inventory. Hotwires are set to Dimension using automated system, operator checks manually to ensure. EPS cut to size. Metal wire is Checked COA and diam. (calibrated caliper), monthly yield, ultimate, and elongation checked with calibrated tensile equipment. Steel wire loaded in to automated system. Unrolled and straightened, passed through welder that joins vertical and horizontal steel columns in preset grid pattern. Steel grid and EPS block taken To automated joiner. The EPS has steel grid laid on bottom surface and top surface. Joiner welds two grid Surfaces together. Inspector verifies welds are present . If > 3% welds missing, manual welding done.

PRODUCT DESCRIPTION: See Next Page

OTHER COMMENTS

Emmedue buys completed component parts. Uses proprietary automated equipment to cut and weld

Components together forming completed EPS Steel Grid System. This system is taken onsite, where Customers follow Emmedue installation instructions to apply shot crete exterior facings.

Intertek Testing Services NA Ltd.
Inspector: Matt Lansdowne, EIT
Email: matt.lansdowne@intertek.com

Phone: (604) 520-3321 ext. 112

EMMEDUE TEST SAMPLE SIZES
July 1-2, 2007

Type of test	Normative	Type of panel	Lengths	Height	Final thickness	Quantity of tests
Load Bearing Wall	ASMT E 119	PSM 80	10'	10'	6"	2
Floor/Roof Fire Test	ASMT E 119	PSM 80	10'	10'	6"	2
Wall Compression	AC15 4.2.2.2	PSM 80	4'	8'	6"	5
	ASTM E 72	PSM 80	4'	14'	6"	5
Wall Flexural	AC15 4.2.2.3	PSM 80	4'	8'	6"	5
	ASTM E 72	PSM 80	4'	14'	6"	4
Wall Flexural-Compression	AC15 4.2.2.4	PSM 80	4'	8'	6"	5
	ASTM E 72	PSM 80	4'	14'	6"	5
Wall Shear	AC15 4.2.2.5	PSM 80	8'	8'	6"	5
	ASTM E 72	PSM 80	8'	14'	6"	4
Floor/Roof Flexural	AC15 4.2.2.6 ASTM E 455	PSM 80	4'	8'	7"	5
		PSM 80	4'	12'	7"	6
		PSM 150	4'	8'	9.5"	6
		PSM 150	4'	12'	9.5"	6
Floor/Roof Diaphragm	AC15 4.2.2.7	PSM 80	4'	8'	6"	5
	ASTM E 455	PSM 80	4'	12'	6"	5
					Total panel	75

2/07/07.

List of Calibrated Instrumentation Used for Testing

Description	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
Load Cell	41A	1100639	4/17/07	4/17/08
LVDT	JEC-AG	L9233000	3/1/07	3/1/08
LVDT	JEC-AG	L9233400	3/1/07	3/1/08
LVDT	JEC-AG	L9300600	3/1/07	3/1/08
LVDT	JEC-AG	L9300700	3/1/07	3/1/08
LVDT	JEC-AG	L9301000	3/1/07	3/1/08
LVDT	JEC-AG	L9301100	3/1/07	3/1/08
LVDT	JEC-AG	L9233500	3/1/07	3/1/08
DAQ Cart	N/A	99LE004	5/27/07	11/27/08
DAQ Cart Recalibration	N/A	99LE004	11/27/07	5/27/08
Stopwatch	14-649-9	61809410	8/15/07	8/15/08
3000 psi pressure gauge	N/A	298967	5/18/07	5/18/08

REFERENCES

1) Emmedue Advanced Building Systems Operator's Manual, Rev. 02 or 3/19/2004, pp. 2-7, 15-16.
2) Acceptance Criteria for Sandwich Panels, ICC – AC 04, Effective July 1, 2007, Section 4.4.1, p. 5.
3) Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems, ICC – AC 15, Effective July 1, 2007.

REVISION SUMMARY

DATE	SUMMARY
January 5, 2009	Section 3.2 (Sample and Assembly Description); galvanized steel wire mesh diameters changed to 0.099 inches (transverse) and 0.121 inches (longitudinal)
February 20, 2008	Original Report Issue Date