WESTERN FIRE CENTER, INC.
2204 Parrott Way, Kelso, Washington 98626
Phone: 360-423-1400 | Fax: 360-423-5003

Fire Performance of ASTM E119 Evaluation of a Symmetric, Load-Bearing Wall Assembly

Indicative testing conducted in accordance with the test methodology described in ASTM E119, Standard Test Methods for Fire Tests of Building Construction and Materials

Conducted For:

Schnell Home s.r.l.
Via Borghetto, 2B - zona Ind. San Liberio
61030 Montemaggiore al Metauro (PU) Italia

WFCi Report #12160ar5

Test Date: October 14, 2013

Original Report Issued: October 25, 2013

Revision Issued: July 21, 2015

ACCREDITED
TL - 180

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INTRODUCTION

This report documents the fire resistance test of symmetric, load-bearing wall assembly for QAI of Port Moody, BC Canada on behalf of Schnell Group. The wall assembly featured a foam core with symmetric concrete finishing. Testing was performed on October 14, 2013, and was conducted in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*. This assembly was intended to pass the fire resistance criteria for a one-hour duration.

SUMMARY OF TEST METHOD

Testing was performed using a vertical fire resistance test configuration employing the fire endurance conditions and standard time-temperature curve described in ASTM E119-12, *Standard Test Methods for Fire Tests of Building Construction and Materials*. The exposed surface of the assemblies was subjected to the standard E119 time-temperature curve, with temperature measurements taken inside the natural gas furnace using 9 thermocouples (TC_F) connected to a computerized data acquisition system. TC_F locations were symmetrically disposed and distributed to show the temperature near (within 6") the exposed face of the test assembly.

Here are the following criteria to which these tests were judged, according to ASTM E119:

- Wall assembly will have sustained the applied load for the indicated time (1-hr, in this instance) without passage of flame or gases hot enough to ignite cotton waste
- Wall assembly will have not developed an opening that permits the projection of water from the hose stream beyond the unexposed surface (applicable for hose-stream portion of the test)
- Transmission of heat through the wall will not have risen the temperature on its unexposed side more than 139°C (average) above its initial temperature, or if a temperature higher than 30% (181°C) of the specified limit occurs at any one point (single-point) on the unexposed side of the assembly.

SAMPLE DESCRIPTION

Associates of the client constructed the 10'×10'×6 ¾" (3 m × 3 m × 170 mm) wall assembly on July 29-31, 2013 in accordance with manufacturing instructions. Both the fire-resistance and hose-stream portions of the E119 tests were designed to be used on the same wall (e.g., no hose-stream retest wall). The client witness report is included in Appendix A – Witness Report and Appendix B: Material Control.

Foam Core

Panels were made of 3.15" (80 mm) undulated expanded polystyrene (EPS) foam core (Figure 1) with wire mesh (AC15 Panel Wall Schnell Group, dated October 15, 2012) on each side of the foam with ¼" standoff. The spacing between each wire was 3.15" (80 mm) vertically and 2.95" (75 mm) horizontally. Two 3'11¼"×9'10" panels and one 1'8"×9'10" panel were mounted vertically in the sample holder. Mesh was crimped to joint adjacent panels at every 12".

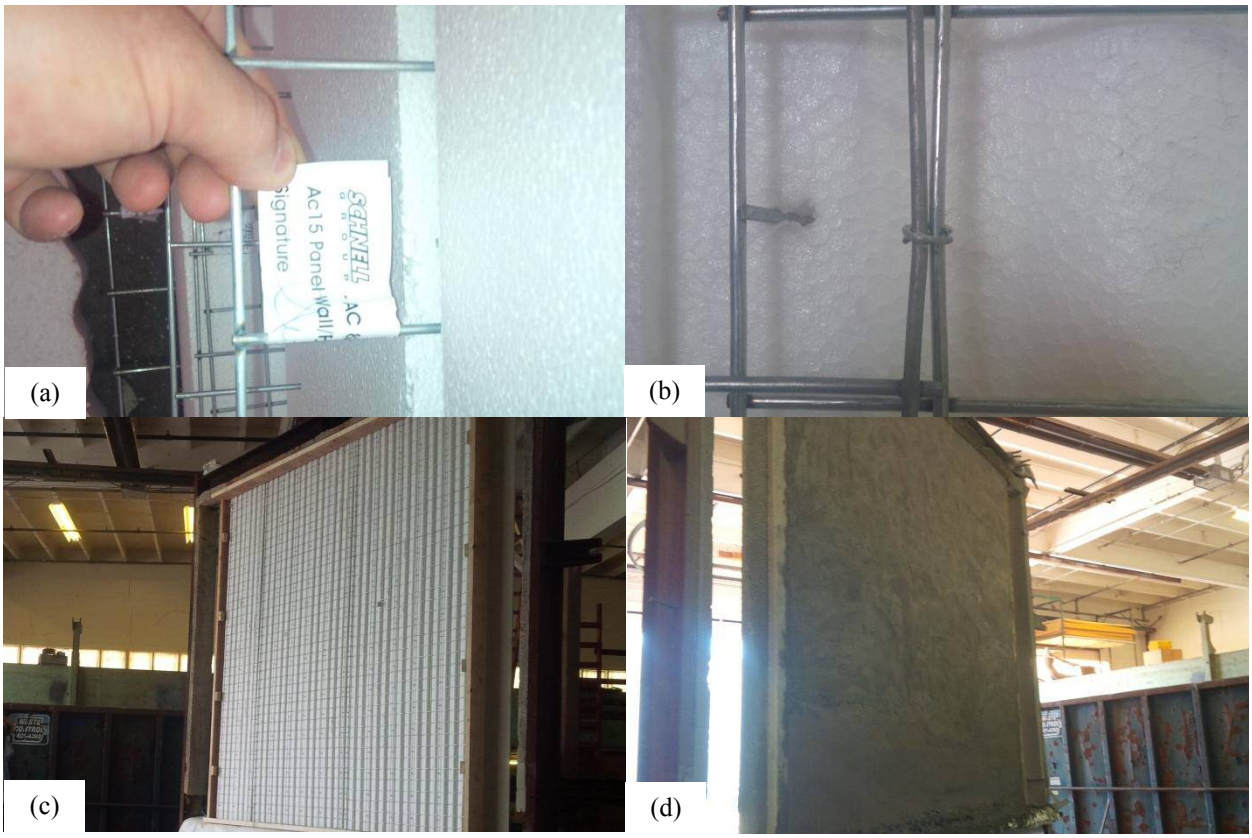

Figure 1. Assembly construction showing (a) identification, (b) mesh overlap and crimp,(c) installed foam, and (d) complete assembly.

Finish Concrete

Concrete layers totaling a nominal 1¾" thickness were shot onto each side of the foam core. This was achieved by continuous passes until the desired thickness was achieved (i.e., no cure time between passes). The 1¾" thickness was also applied to each side of the assembly. Concrete was supplied by Specialty Concrete of Kelso, WA. A schematic of the assembly is shown in Figure 2.

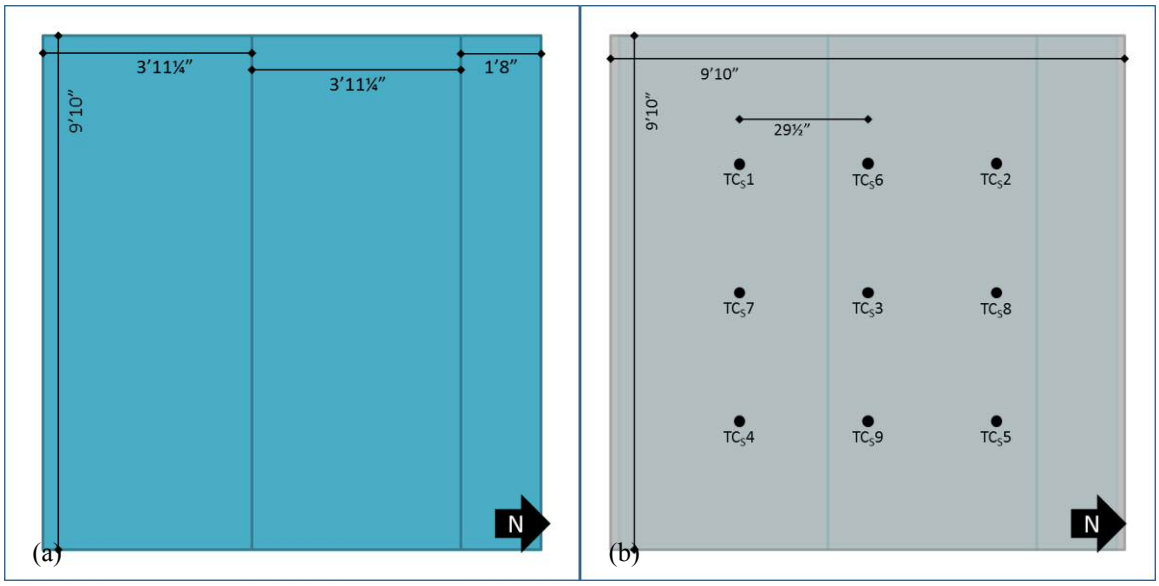

Figure 2. Assembly schematics showing (a) foam panels and (b) concrete layer with TC_S.

Temperature

TC_S1-5 were placed at the center and quarter points of the unexposed side of the assembly, while the remaining TC_S6-9 were placed along the horizontal and vertical centerlines. The average of the nine TC_S was used to compute the heat transmission test performance. TC_S locations are found in Figure 2b.

Loading and Deflection

A superimposed load of 7056 lb_f/ft (10,500 kg/m) was specified by the client. Due to a loading calculation error at the time of testing, the laboratory set the design load to be 8969 lb_f/ft, approximately 25% higher than what it was supposed to be. The load was applied to the test assembly through a series of hydraulic rams positioned below the wall, equidistant along the bottom beam. The set point for the ram pressure (1693 psi for the erroneous design load), based on the initial weight (estimate) of the test assembly (Table 1) was maintained constant throughout testing. The actual ram pressure was measured during the tests, and the average in shown in Table 1.

Two linear vertical displacement transducers (LVDT) were placed below each side of the fire resistance wall assembly (approximately 1' from wall edge), measuring vertical movement of the assembly. The initial vertical deflection due to the load was 0.6" (before the fire test). Horizontal deflection was also measured at the fire resistance assembly mid-height at each quarter point along the assembly.

Table 1. Load parameters for wall assembly.

Loading Parameter	Assembly		Units
	Design	Actual	
Hydraulic ram pressure	1353	1698	psi
Length of sill plate	118		in
Width of sill plate	6.5		in
Weight of test assembly	3759		lb
Number of rams	5		-

Area of rams	55.2		in^2
Weight of beam	1350		lb
Upward forces	74,663	93,730	lb_f
Downward forces	5279		lb_f
Load on wall	69,384	88,451	lb_f
Load per linear foot	7056	8995	lb_f/ft
Load per sill plate area	90.5	115.3	lb_f/in^2

TEST RESULTS

Testing of the fire resistance wall and hose stream wall assemblies took place on October 14, 2013. The assembly was fixed in place within the sample holder and insulated on the perimeter edges with ceramic wool insulation. The furnace temperature, sample temperatures, LVDT, and furnace pressure, were continuously monitored at 1 Hz until test termination. Ram pressure was measured every 3 minutes. Also, horizontal deflection was measured every 5 minutes for the first 15 min of the test. These data, as well as additional photographs during and after, are presented in the below.

Fire Resistance Test

Test Date & Time: 10/14/13, 10:15 AM

Furnace: Large-scale vertical exposure E119 furnace – 1-hr exposure with hose-stream

Laboratory Conditions: 13°C, 52% RH

Witnesses: Lucia Manna (Schnell), Pierluigi Pettinari (Schnell)

Table 2. Observations for one-hour fire resistance wall test.

Test Time (hr:mm:ss)		**Event**
00:00		Start test (Figure 3a)
07:30		No significant change to exposed face
15:00		Large pop – large section (~60%) of spalled, exposed face – approximately 1" in some sections (Figure 3b)
19:00		Popping sounds from assembly
22:30		2nd large pop – more spalling – ~75% of exposed face now spalled – approximately 1 ½" in some sections
26:40		Cracks in unexposed surface – water dripping (Figure 3c)
33:00		Hole in exposed concrete (Figure 3d) – no flaming – foam possibly pooled at the bottom of assembly
35:00		Smoking at unexposed perimeter
44:00		Flames at exposed bottom perimeter (lazy) (Figure 3e)
1:00:55		Terminate test

Figure 3. Wall assembly during fire resistance test showing (a) beginning of test – 2 min, (b) spalled face – 16 min, (c) dripping water – 27 min, (d) surface hole – 34 min, (e) bottom flaming – 44 min, and (f) assembly following test.

The test was terminated 1 h 0 m 55 s, ensuring that sufficient energy had been applied to the assembly. No flames passed through the assembly at that time, giving a wall rating of 61 min, rounding to the nearest integral minute. Thus, this fulfilled the requirement of flames or gases hot enough to ignite cotton waste for the 1-hr period.

Temperature Data

The furnace temperature followed the standard time-temperature curve as shown in Figure 4a. A comparison of the area under the time-temperature curve with the standard is also shown in Figure 4b. There was some variation just after the large pop due to spalling which took a little while to equilibrate, but the area is comparable (1.8%) and is well below the 10% recommended for a 1-hr test.

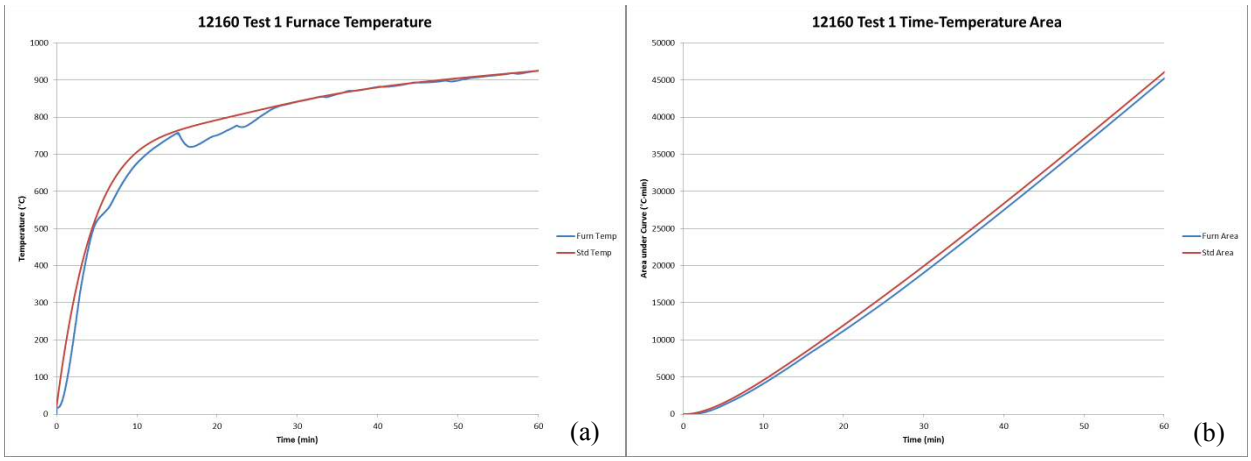

Figure 4. Furnace comparison with standard showing (a) temperature and (b) area under the curve.

The temperature profiles for this sample are grouped as unexposed TC_S as shown in Figure 5. The average of TC_S1-9 did not supersede the average finish temperature threshold (139°C + ambient [13°C] = 152°C) nor the single-point threshold (181°C + ambient [13°C] = 194°C), with the final average value being 36°C. Therefore, this assembly passed the heat transmission requirement for the duration of the test.

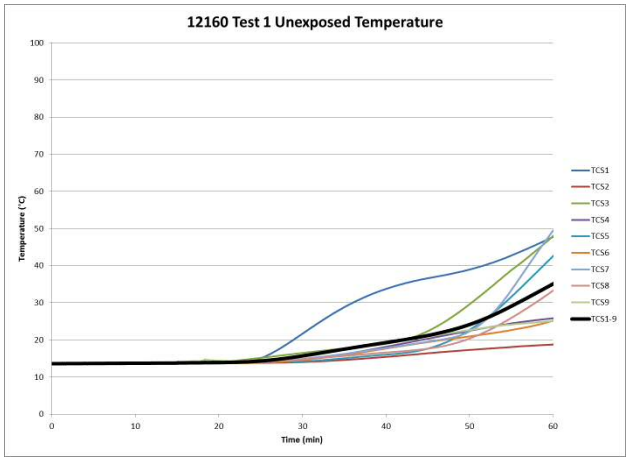

Figure 5. Sample temperatures showing unexposed TC_S.

Deflection Data

Horizontal deflection measurements were taken every five minutes at three locations along the horizontal midline on the unexposed sample surface to monitor horizontal movement and/or buckling of the sample. It can be seen in Figure 6a that the center horizontal deflection (toward the furnace) reached up to reached a value of ¾" by 15 min when measurements were terminated after the large pop for personnel safety. The vertical deflection showed some increase at the time of the large spalling with nominal growth thereafter with a final value of 0.17" (Figure 6b).

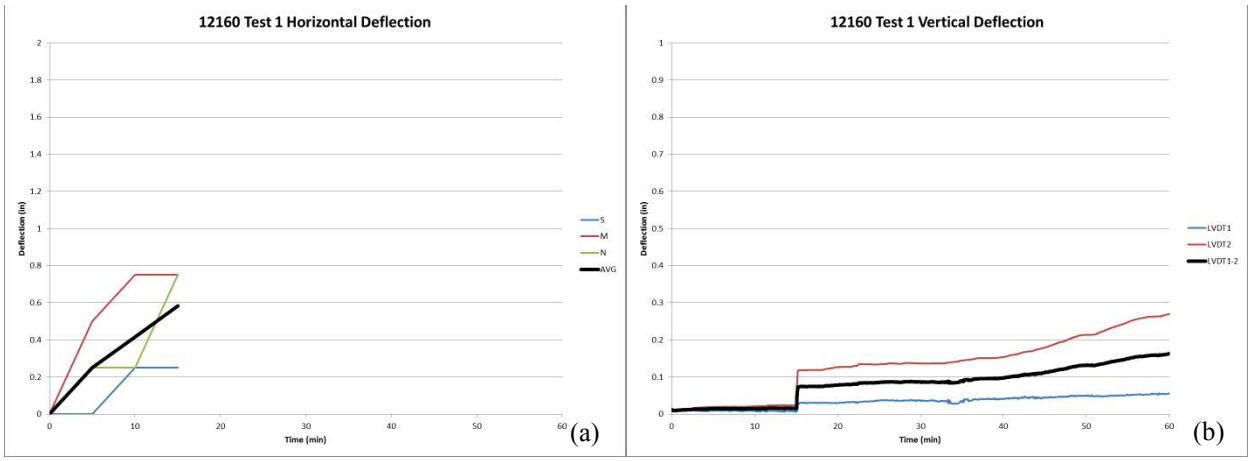

Figure 6. One-hour test exposure showing (a) horizontal deflection and (b) vertical displacement.

Hose Stream Test

Directly following the fire resistance portion of the test, the assembly was backed away from the furnace to perform the hose stream portion. For this portion, a water hose stream was applied at a pressure of 30 psi for 1 min (1 min/100 ft^2 for 1-hr resistance, ASTM E2226, *Standard Practice for Application of Hose Stream*). Hose stream application began 4 min following removal from the furnace. Photographs are shown in Figure 7.

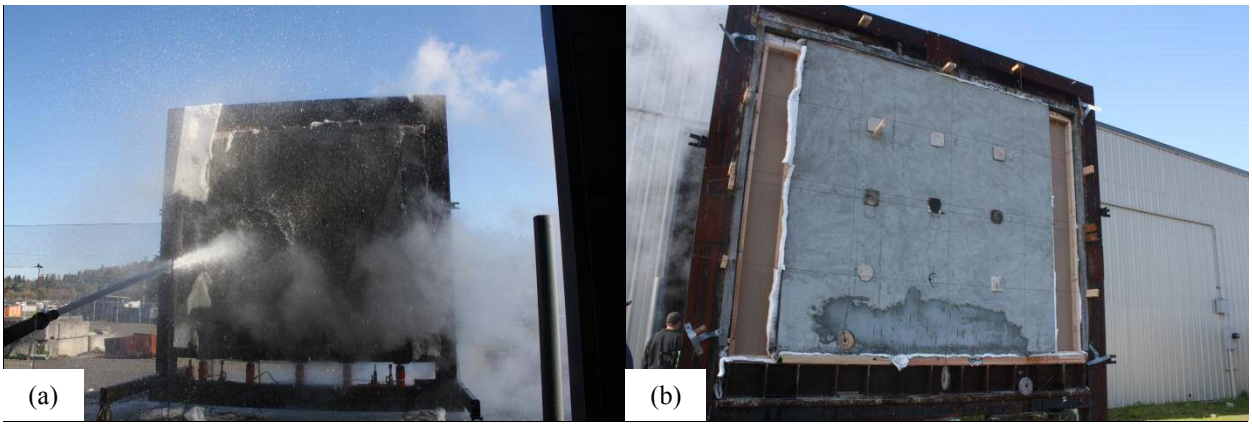

Figure 7. Hose-stream application showing (a) hose application and (b) unexposed surface.

During the hose stream test, some concrete on the exposed surface spalled away, but did not penetrate significantly into the cavity and through the unexposed layer. Therefore, no opening allowed for penetration of water from the applied hose stream beyond the unexposed surface, therefore passing the hose stream requirement.

Qualitative Discussion

Following both the fire resistance and hose stream portions of the test, an analysis of the assembly showed that significant portions of concrete and spalled away (up to 2") during the tests. A couple of holes had formed, each approximately 5 in^2 (Figure 8). The foam layer in the cavity had melted during the fire resistance portion and pooled up on the bottom of the assembly.

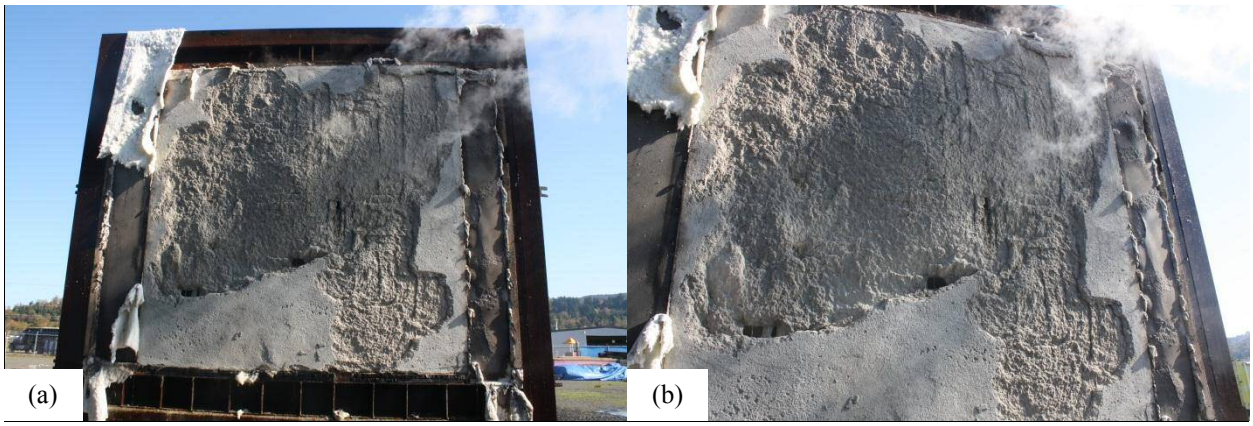

Figure 8. Assembly follow test showing (a) exposed face and (b) closer view.

CONCLUSION

The symmetric, load-bearing wall assembly as detailed above passed all requirements for the 1-hr fire endurance test, according to ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*. The fire resistance wall had a finish rating of 61 min, rounding to the nearest integral minute. The wall assembly did not allow flames to pass through the wall assembly for the 1-hr test, nor did the average unexposed temperature supersede 139°C + ambient or a single-point temperature supersede 181°C + ambient. The assembly sustained the designed load plus 25% for the duration of the test. In addition, the wall assembly was subjected to a hose-stream following the fire resistance test for 1 min, and did not develop an opening that permits the projection of water from the hose stream beyond the unexposed surface.

SIGNATURES

Testing performed by,

Mike White

Laboratory Manager

Reviewed and Approved by,

Brent M. Pickett, Ph.D.

Technical Director

WESTERN FIRE CENTER AUTHORIZES THE CLIENT NAMED HEREIN TO REPRODUCE THIS REPORT ONLY IF REPRODUCED IN ITS ENTIRETY.

The test specimen identification is as provided by the client, and WFCi accepts no responsibility for any inaccuracies therein. WFCi did not select the specimen and has not verified the composition, manufacturing techniques, or quality assurance procedures.

Version	Date Issued	Document Number	Comments/Changes
Original	October 25, 2013	12160a	-
Revision 1	December 18, 2013	12160ar1	Change in client name from QAI to Schnell. Inclusion of extra figure. Updated appendix (witness report).
Revision 2	February 28, 2014	12160ar2	Changed client name from Schnell Wire System S.r.l. to Schnell Home s.r.l.
Revision 3	February 20, 2015	12160ar3	Made minor corrections to report including some metric conversions – updated witness report
Revision 4	July 13, 2015	12160ar4	Addition of raw data and clarification of test setup
Revision 5	July 21, 2015	12160ar5	Revision of Appendix B: Material Control provided by client

APPENDIX A – WITNESS REPORT

QAI LABORATORIES
CERTIFICATION TESTING INSPECTION

VANCOUVER, BC
LOS ANGELES, CA
TULSA, OK
WASHINGTON, DC

WWW.QAI.ORG

CLIENT: Schnell Wire Systems s.r.l.
via Borghetto 2B-Zona Industrial
San Liberio
61030 Montemaggiore al.
Metauro Italy

Sampling Project Report: RJ2196-ERev1	Revision Date: February 18, 2015

Quality Auditing Institute Ltd. (QAI), an International Accreditation Service, Inc. (IAS) accredited independent third party inspection agency (AA-723), has conducted onsite witnessing of test samples constructed for fire-resistance-rated construction at Western Fire Center, Inc. (WFCI) accredited testing laboratory in Kelso, Washington State (TL-180). This witnessing was to document test sample construction of Schnell Wire Systems s.r.l. wall panels constructed for testing 1-hour load bearing fire-resistance in accordance with ASTM E119-12 *Standard Test Methods for Fire Tests of Building Construction and Materials* (ASTM E119).

QAI personnel Matt Lansdowne, P.Eng. witnessed the onsite sample construction July 29 thru July 31st, 2013 at WFCI test facility located at 2204 Parrot Way, Kelso Washington State. The following outlines the details of the noted test wall samples constructed for testing by Western Fire Center, Inc., on October 14, 2013.

SAMPLE CONSTRUCTION DETAILS

The samples were noted to be corrugated expanded polystyrene cores of approximately 3.15 inch thickness measured from bottom of wave to surface of above wave, with total thickness outside to outside of high point on wave of 4 inches. Wire mesh welded through connection pins penetrated the expanded polystyrene core. The noted wire mesh connected and welded to each expanded polystyrene face, created a composite panel. These panels were witnessed to be produced by Schnell Wire Systems, s.r.l., Italy.

These panels were placed adjacent, and the panels connected by overlapping the wire mesh on adjacent panels, and connection with steel clamps spaced every 12 inches on center, to create a 10 ft x 10 ft panel assembly, which was erected into the test frame at Western Fire Center. After installation into the test frame, contractors applied 4,000 psi shot crete through several continuous passes, to achieve a total concrete panel face thickness of 1 ¾ inches nominal depth. This depth was measured with a depth gauge during concrete installation to ensure the appropriate depth was achieved.

QAI observed each test panel contained a label outlining the panels inspection date of October 15, 2012. These labels were signed by A. Mosallam, Professor, PhD, P.E., Professor at University of Irvine, California. An example photograph of these labels is included.

Concrete was supplied by Specialty Concrete Ltd. located in Kelso, Washington State.

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WWW.QAI.ORG
info@qai.org

The below outlines the mix design used to achieve the sought 4,000 psi concrete applied to the noted Schnell Wire Systems s.r.l. ASTM E119 test samples.

Table 1. Schnell Wire Systems s.r.l. Concrete Mix Design for ASTM E119 Test Samples at WFCI

COMPONENT	AMOUNT (lbs)
Type II Portland Cement	564
Sand	1245
3/8 inch Pea Gravel	1650
Water	541
TOTAL WEIGHT	**4000**

During application of the concrete, additional water was added manually to achieve the desired concrete viscosity for application to the noted wall assemblies.

Cylinders were taken from the concrete batch used in the Schnell Wire Systems s..r.l. test wall construction by QAI. These cylinders were tested in accordance with ASTM C 39 *Standard Test Method for Compressive Strength of Cylindrical Specimens* (ASTM C39) 29 days of curing. These results are shown in Table 2 below.

Table 2. Schnell Wire Systems s.r.l. ASTM E119 Wall Test Sample Concrete Cylinder Compressive Strength Test Data

CYLINDER NO.	MAXIMUM LOAD (lbs)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURED	DIAMETER OF CYLINDER (inches)	X-SECTION AREA (inches^2)
1	40,470	5,730	II	3.00	7.07
2	40,430	5,720	II	3.00	7.07
3	39,990	5,670	II	3.00	7.07
4	42,530	6,020	II	3.00	7.07
5	39,390	5,570	II	3.00	7.07

The following photographs outline the panels prior to testing and application of the concrete during test sample preparation.

PHOTOGRAPHS TEST SPECIMEN PREPARATION

Photo 1. Schnell EPS / Wire Mesh Panels Used in Test Wall Assembly

Photo 2. Example of Label Applied to Panels Used in Test Wall Construction

Photo 3. Additional Example of Label Applied to Panels Used in Test Wall Construction Including Signature

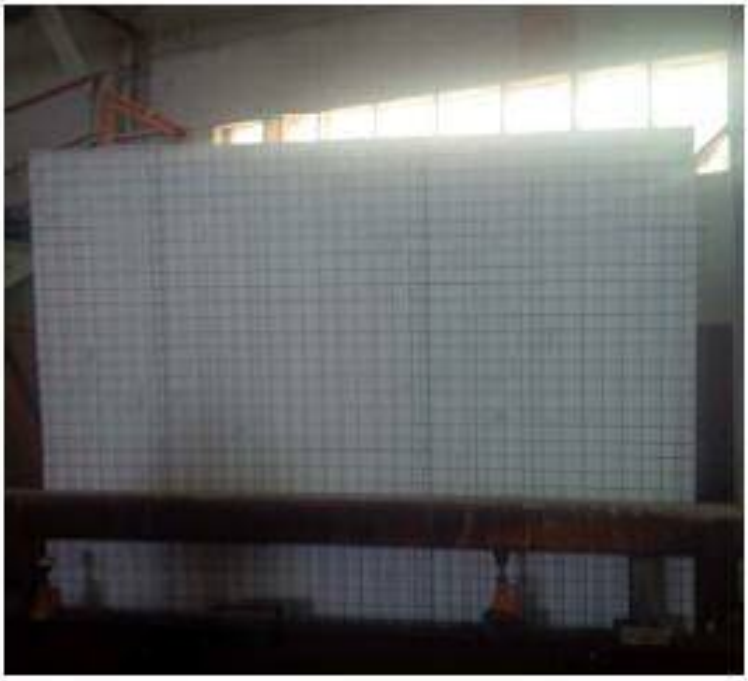

Photo 4. Test Samples Connected Prior to Being Installed in Test Frame

Photo 5. Steel Clamp Joining Adjacent Panel Example at Wire Mesh Overlap

Photo 6 Schnell Wire Systems s.r.l. Wall Sample Installed in Test Fixture Prior to Concrete Application

Photo 7. Schnell Wire Systems s.r.l. Test Wall Sample Concrete Application

Photo 8. Schnell Wire Systems s.r.l. Test Wall Sample Concrete Application

Photo 9. Schnell Wire Systems s.r.l. Test Wall Sample Finishing

Photo 10. Schnell Wire Systems s.r.l. Finished Test Wall

TEST ASEMBLY CONSTRUCTED

The following outlines the dimensions of the test assembly constructed for Schnell Wire Systems, s.r.l. ASTM E119 test wall assembly.

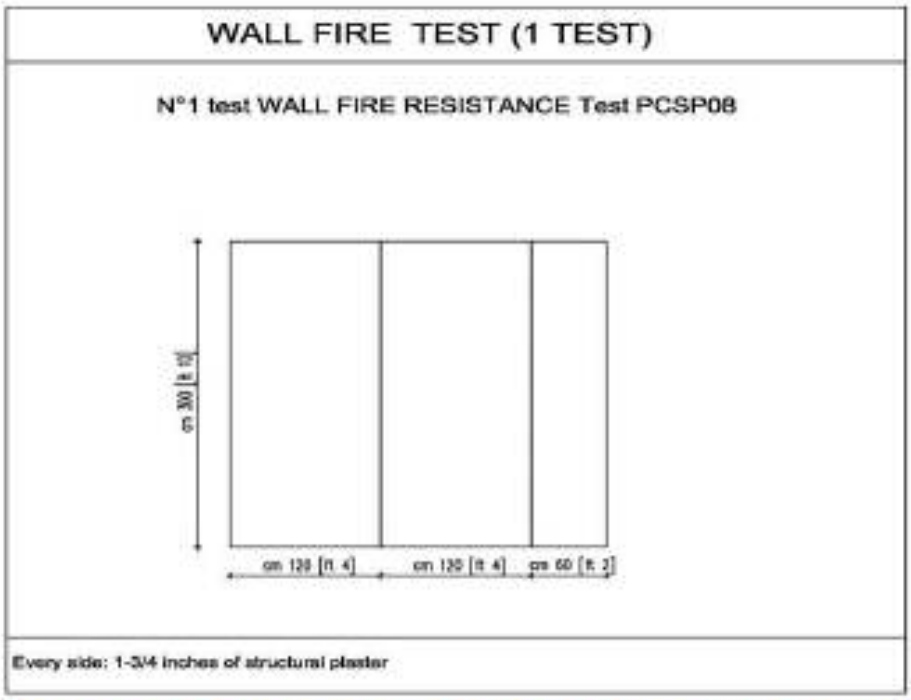

Figure 1. Panel Dimensions and Size of Schnell Wire Systems, s.r.l. ASTM E119 Test Wall Assembly

If there are any questions regarding the following, please contact the undersigned below.

Signed for and on behalf of
QAI Laboratories Ltd.

Matt Lansdowne, P.Eng., M.Sc.
Business Manager – Building Products

Revision 1 02/18/2015: Updated sample description page 1 for further clarity on EPS thickness of test samples.

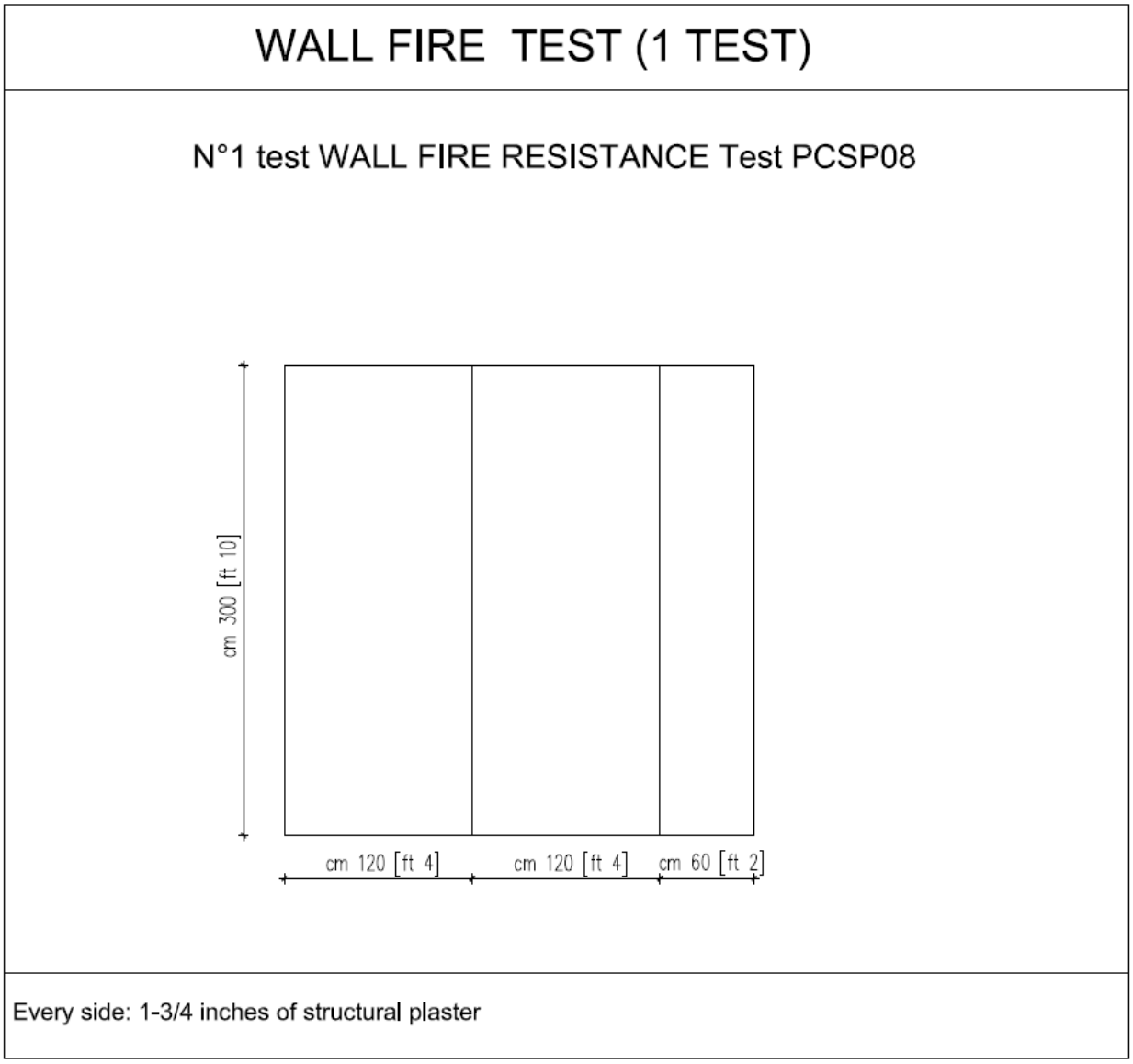

Figure A 1. Clearer drawing from QAI report (Figure 1).

APPENDIX B: MATERIAL CONTROL

AFFIDAVIT FOR

MATERIALS SAMPLING FOR THE FIRE EVALUATION TESTS OF SCHNELL HOME S.R.L. EXPANDED POLYSTYRENE (EPS) SANDWICH PANELS

All the Schnell Home S.R.L. Expanded Polystyrene (EPS) Sandwich Panels used for fabricating the floor and Wall specimens that were shipped to directly to Western Fire Center, Inc. (WFCI) were randomly sampled by Prof. Ayman Mosallam representing UCI IAS accredited facility TR318 at the Schnell Home S.R.L. warehouse in Fano., Italy for the fulfillment of the ICC-ES AC 85 section 3.1 requirement to ensure that all the panels are truly representative of the standard Schnell Home S.R.L. manufactured product for which recognition is being sought. The inspection and selection process was performed on October 15, 2012 at the manufacturer facility in Italy. All the randomly selected panels were inspected for overall dimensions, steel wires mil certificates, steel wire diameters for both face grids and through-the-thickness connectors, EPS density and fire-retardant properties, the total thickness of each panel, as well as the spacing of all face grids. Each randomly sampled panel was inspected, labeled and signed by the inspector (see Figure 1) and all labeled panels were ready for direct shipping to Western Fire Center, Inc. (WFCI), USA.

IAS TR318 Accredit Lab Representative: *Ayman S. Mosallam, Ph.D., P.E., Fellow ASCE*

Signature: 

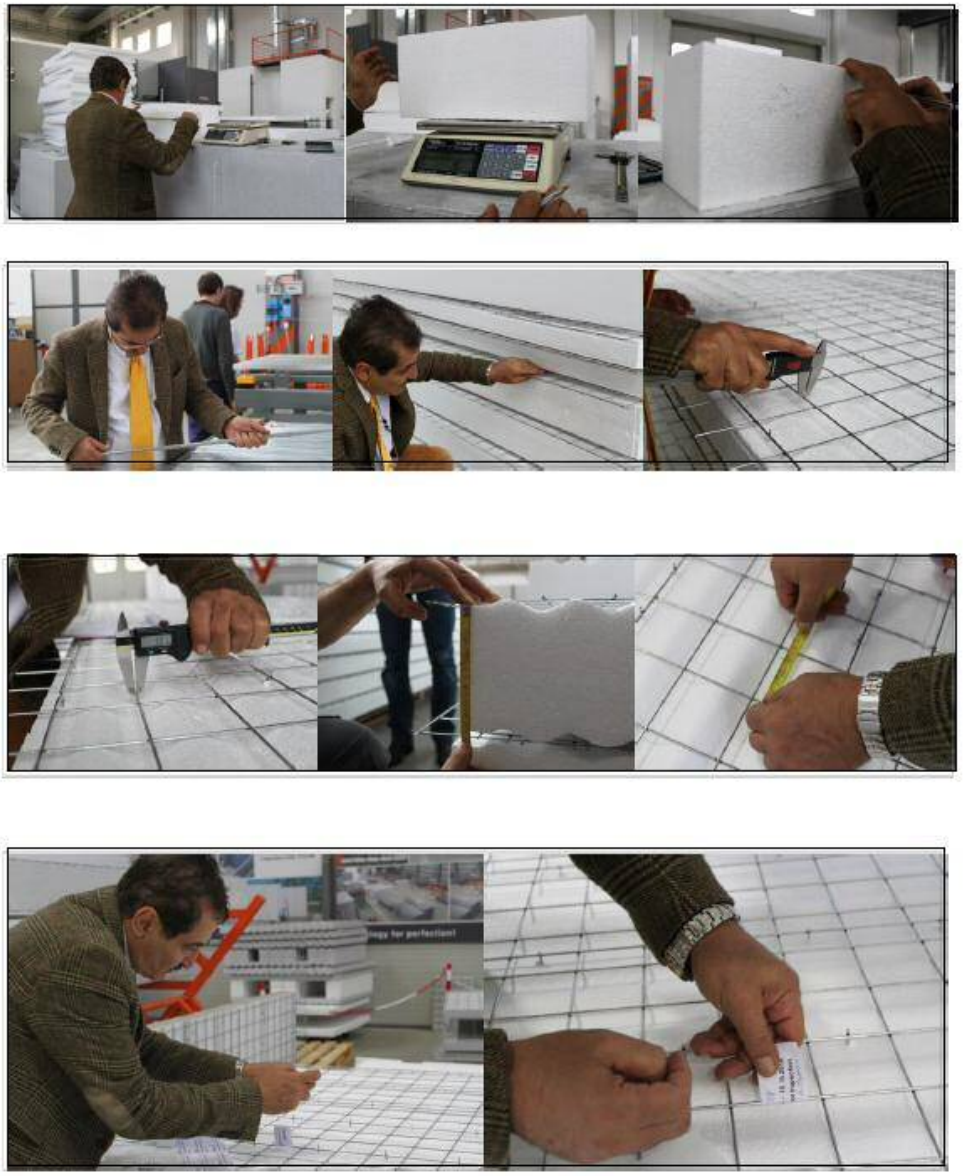

Figure (1): Inspection and Representative Selection Procedures at Applicant's Facility in Fano, Italy

SCHNELL HOME (INNOVATIVE BUILDING EQUIPMENT)	**Acceptance Control Plan**	*Rif. FPC* IL 001-A_00

Description: E-welded mesh / Concrewall Panels — *Code:* 440.40958

Commessa:	*Phase:*	*Resp. attuazione :*
MAGAZZINO E TESS MECCANICI USA	Acceptance of the raw material (steel)	Production

N°	PARAMETERS TO CHECK	Special Client	Measure tool	Frequency Sample
1	Q.ty (nr. coils) as ordered Q.ty(Kg) as weighed		Visual	*Every lot*
2	Absence of damages / Presence of brand and label		Visual	*Every lot*
3	Validity of the qualification certificate and presance of indication of weldability and ref. to DN		Visual	*Every lot*
4	Diameter of the wire: tolerance for section: ± 4%		Vernier caliper	*Every lot*
5				

REACTION in case of NOCONFORMITY:

Stop the lot + inform the supplier

Elaborated by:	*Distributed to:*
RGQ	**Production** MARCO GAMBINI

IL_001-A_SH_Piano Controllo Accettazione_rev00-EN.xls — PdC Accettazione

SCHNELL HOME
INNOVATIVE BUILDING EQUIPMENT

QC Form
Acceptance Control Plan

Commessa: MAGAZZINO TEST MECCANICI USA

Rif. FPC: IL 001-A_00

Rif. FPC del	Phase
	Acceptance of the raw material (steel)

Responsable:

Production MARCO GAMBINI

Description:	Code
E-welded mesh / Concrewall Panels	440.40958

N.	CHARACTERISTICS	SAMPLES	Signature	Date/ Hour									
1	Q.ty (nr. coils) as ordered Q.ty(Kg) as weighed	*The whole lot*		23/09/2011									
2	Absence of damages / Presence of brand and label	*The whole lot*	OK										
3	Validity of the qualification certificate and presance of indication of weldability and ref. to DN	*The whole lot*	OK										
4	Diameter of the wire: tolerance for section: ± 4%	*1 block each 5 (or fraction of 5) for every diameter*	OK										
5													

IL_001-A_SH_Piano Controllo Accettazione_rev00-EN.xls

SdC Accettazione

METALLURGICA LEDRENSE soc.coop.
PRODUZIONE TRAFILATO E ZINCATO
Loc. Tiarno di Sopra - Via Ampola, 14
38060 LEDRO – TN
Tel. 0464 596061 - Fax 0464 596045

AZIENDA CON SISTEMA
DI GESTIONE QUALITÀ
CERTIFICATO DA DNV
= ISO 9001 =

CERTIFICATO DI COLLAUDO 3.1

RIF.d.d.t 817 del 13/09/2011

CLIENTE	SCHNELL WIRE SYSTEM SRL

Numero certificato / Certificate number	Data / Date	Riferimeto interno / Internal reference	Data / Date	Materiale / material	Misure materiale / Dimensional material
476	13/09/2011	476	13/09/2011	FILO ZINCATO	3,00 mm

COMPOSIZIONE CHIMICA / CHEMICAL COMPOSITION

%C	%Mn	%Si	%P	%S	%CR	%Ni	%Mo	%Cu
0,062	0,570	0,190	0,016	0,022	0,040	0,130	0,030	0,250

%Ti	%AL	%V	%N	%Sn	%B
0,001	0,000	0,001	0,006	0,018	0,000

CARATTERISTICHE MECCANICHE / MECHANICAL PROPERTY

Rm N/mm²	Fm daN	ReH N/mm²	A %	Quantita' Zn/All.
772,420	2520,000	708,542	10,000	63 grammi/m2

Norme di riferimento	Uni En 10223-3
	Uni En 10244-2

Data / Date 13/09/2011	Controllato / Controlled	Approvato / Approved
	METALLURGICA LEDRENSE SOCIETÀ COOPERATIVA Via Ampola 14 38060 LEDRO (TN) Partita IVA 00464600222	METALLURGICA LEDRENSE SOCIETÀ COOPERATIVA Via Ampola 14 38060 LEDRO (TN) Partita IVA 00464600222

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SCHNELL HOME – INNOVATIVE BUILDING EQUIPMENT	**Acceptance Control Plan**	*Rif. FPC* IL 001-A_00

Description: **E-welded mesh / Concrewall Panels** *Code:* 1237297

Commessa:	*Phase:*	*Resp. attuazione :*
TEST MECCANICI USA	**Acceptance of the raw material (polystyrene)**	**Production**

N°	PARAMETERS TO CHECK	Special Client	Measure tool	Frequency samples
6	Quantity (nr. blocks) as ordered		Visual	*Every lot*
7	Absence of damages / Presence of brand and label		Visual	*Every lot*
8	Validity of the certificate of conformance with ESR-1788 and ref. to DN		Visual	*Every lot*
9	Density as ordered (Type I of ESR 1788)		Balance	*Every lot*
10	Dimensions (LXPXH) as ordered: tolerance: ± 2 cm		Tape measure	*Every lot*

REACTION in case of NOCONFORMITY:

Stop the lot + inform the supplier

Elaborated by:	*Distribuited to:*
RGQ	**Production** MARCO GAMBINI

IL_001-A_SH_Piano Controllo Accettazione_rev00-EN.xls PdC Accettazione

SCHNELL HOME INNOVATIVE BUILDING EQUIPMENT

QC Form
Acceptance Control Plan

Commessa:	Rif. FPC
TEST MECCANICI USA	IL 001-A_00

Rif. FPC del	Phase
	Acceptance of the raw material (polystyrene)

Responsable:
Production MARCO GAMBINI

Description:	Code
E-welded mesh / Concrewall Panels	1237297

Signature: [signature]

Date / Hour: 04/08/1[illegible]

N.	CHARACTERISTICS	SAMPLES	
6	Quantity (nr. blocks) as ordered	*The whole lot*	OK
7	Absence of damages / Presence of brand and label	*The whole lot*	OK OK
8	Validity of the certificate of conformance with ESR-1788 and ref. to DN	*The whole lot*	OK
9	Density as ordered	*The whole lot*	OK
10	Dimensions (LXPXH) as ordered: tolerance: ± 2 cm	*1 block each 5 (or fraction of 5) for every density*	OK

IL_001-A_SH_Piano Controllo Accettazione_rev00-EN.xls

SdC Accettazione

APPENDIX C: ADDITIONAL FIGURES

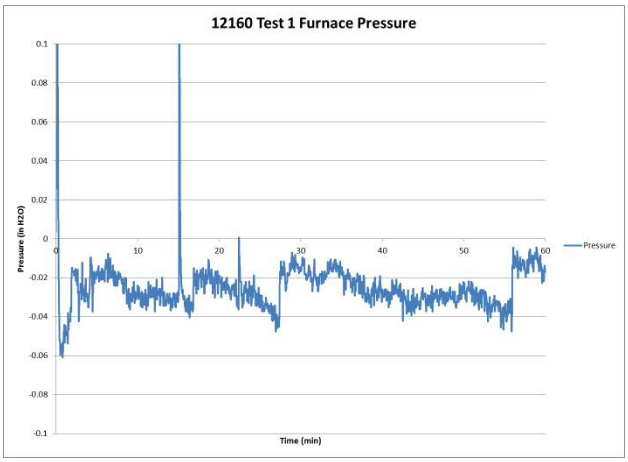

Figure C 1. Furnace pressure during test.

APPENDIX D: RAW DATA

Time (n	TC_S1	TC_S2	TC_S3	TC_S4	TC_S5	TC_S6	TC_S7	TC_S8	TC_S9	TC_S1-9	Furn Ten	Std Tem	Furn Are	Std Area	Furn Pre	Ram Pre	$LVDT_1$	$LVDT_2$	$LVDT_{1-2}$
0	13.5	13.6	13.5	13.6	13.7	13.5	13.8	13.6	13.6	13.6	17.2	23.4	0	0	0.055	1697	0.009	0.014	0.012
1	13.5	13.6	13.6	13.6	13.8	13.5	13.8	13.6	13.7	13.6	60.6	172.8	14	80	-0.044	1697	0.009	0.013	0.011
2	13.5	13.6	13.6	13.6	13.8	13.5	13.8	13.6	13.7	13.6	185.1	294.4	119	295	-0.017	1697	0.011	0.015	0.013
3	13.5	13.6	13.6	13.7	13.8	13.5	13.8	13.6	13.7	13.7	341.4	392.9	367	619	-0.023	1697	0.010	0.018	0.014
4	13.6	13.6	13.6	13.6	13.8	13.6	13.8	13.7	13.7	13.7	452.7	472.4	749	1033	-0.031	1704	0.009	0.019	0.014
5	13.6	13.7	13.6	13.7	13.8	13.5	13.9	13.6	13.7	13.7	519.6	536.2	1224	1517	-0.019	1711	0.010	0.020	0.015
6	13.5	13.7	13.6	13.7	13.9	13.6	13.9	13.7	13.7	13.7	543.9	587.2	1740	2059	-0.016	1704	0.009	0.020	0.015
7	13.6	13.7	13.6	13.7	13.9	13.6	13.9	13.7	13.7	13.7	576.4	627.8	2282	2647	-0.02	1697	0.009	0.020	0.014
8	13.6	13.7	13.6	13.7	13.9	13.6	13.9	13.7	13.7	13.7	615.8	660.2	2861	3271	-0.022	1690	0.009	0.020	0.015
9	13.6	13.7	13.6	13.7	13.9	13.6	13.9	13.7	13.7	13.7	648.8	685.9	3477	3924	-0.033	1682	0.009	0.020	0.015
10	13.6	13.7	13.7	13.7	13.9	13.6	13.9	13.7	13.7	13.7	675.6	706.3	4124	4599	-0.024	1682	0.009	0.022	0.015
11	13.6	13.7	13.7	13.7	13.9	13.6	13.9	13.7	13.8	13.7	697.4	722.7	4794	5293	-0.028	1682	0.010	0.022	0.016
12	13.6	13.7	13.7	13.8	13.9	13.6	14.0	13.7	13.8	13.8	715.1	735.9	5483	6002	-0.03	1678	0.010	0.024	0.017
13	13.6	13.7	13.7	13.8	13.9	13.6	14.0	13.7	13.8	13.8	729.8	746.7	6189	6723	-0.02	1673	0.008	0.024	0.016
14	13.6	13.7	13.7	13.8	13.9	13.6	14.0	13.7	13.8	13.8	744.0	755.7	6910	7454	-0.03	1668	0.010	0.024	0.017
15	13.6	13.7	13.7	13.8	14.0	13.6	14.0	13.7	13.8	13.8	757.6	763.5	7644	8193	-0.029	1682	0.006	0.024	0.015
16	13.6	13.7	13.7	13.9	14.0	13.7	14.1	13.8	14.2	13.8	727.2	770.2	8370	8939	-0.031	1711	0.031	0.119	0.075
17	13.6	13.7	13.8	13.8	14.0	13.7	14.1	13.7	14.3	13.9	720.7	776.4	9075	9691	-0.02	1711	0.031	0.119	0.075
18	13.7	13.7	13.8	13.9	14.0	13.7	14.1	13.8	14.4	13.9	730.4	782.1	9783	10450	-0.015	1711	0.031	0.119	0.075
19	13.7	13.7	13.9	13.9	14.0	13.7	14.1	13.8	14.6	13.9	743.2	787.5	10504	11214	-0.016	1726	0.031	0.123	0.077
20	13.7	13.7	14.0	13.9	14.0	13.7	14.1	13.8	14.4	13.9	751.8	792.7	11235	11983	-0.019	1721	0.030	0.127	0.078
21	13.7	13.8	14.2	13.9	14.1	13.7	14.1	13.9	14.3	14.0	761.8	797.9	11975	12758	-0.026	1716	0.032	0.128	0.080
22	13.8	13.8	14.4	13.9	14.0	13.7	14.1	13.9	14.3	14.0	772.3	803.0	12725	13538	-0.024	1711	0.033	0.130	0.082
23	14.0	13.8	14.6	13.9	14.1	13.8	14.2	13.9	14.4	14.1	773.3	808.0	13483	14323	-0.033	1711	0.033	0.135	0.084
24	14.4	13.8	14.9	14.0	14.1	13.9	14.2	14.0	14.5	14.2	781.4	813.1	14242	15112	-0.032	1711	0.035	0.134	0.085
25	15.1	13.8	15.2	14.0	14.1	13.9	14.2	14.1	14.6	14.3	796.1	818.1	15014	15907	-0.029	1711	0.037	0.134	0.086
26	16.1	13.9	15.5	14.0	14.1	14.0	14.3	14.2	14.8	14.5	810.6	823.1	15801	16707	-0.034	1711	0.038	0.136	0.087
27	17.3	13.9	15.7	14.1	14.1	14.1	14.3	14.3	15.1	14.8	823.4	828.0	16602	17512	-0.046	1711	0.036	0.137	0.086
28	18.6	13.9	16.0	14.3	14.2	14.2	14.5	14.5	15.3	15.1	831.5	832.9	17413	18322	-0.015	1711	0.037	0.138	0.088
29	20.2	14.0	16.3	14.4	14.2	14.4	14.7	14.6	15.6	15.4	836.4	837.7	18230	19136	-0.011	1682	0.038	0.138	0.088
30	21.7	14.0	16.5	14.6	14.3	14.6	14.9	14.8	15.9	15.7	841.8	842.3	19052	19956	-0.017	1690	0.037	0.137	0.087
31	23.2	14.1	16.8	14.9	14.4	14.9	15.2	15.0	16.2	16.1	846.0	846.9	19879	20780	-0.014	1697	0.037	0.137	0.087
32	24.7	14.2	17.0	15.2	14.5	15.1	15.4	15.1	16.5	16.4	850.9	851.2	20711	21608	-0.024	1701	0.035	0.137	0.086
33	26.2	14.4	17.3	15.5	14.7	15.4	15.7	15.3	16.9	16.8	855.3	855.5	21548	22441	-0.021	1704	0.036	0.138	0.087
34	27.5	14.5	17.5	15.8	14.9	15.6	16.0	15.5	17.1	17.2	855.9	859.5	22386	23277	-0.013	1708	0.028	0.141	0.085
35	28.8	14.6	17.7	16.2	15.1	16.0	16.2	15.7	17.5	17.5	862.3	863.4	23229	24118	-0.018	1711	0.034	0.144	0.089
36	30.0	14.8	17.9	16.5	15.3	16.3	16.5	15.9	17.8	17.9	868.3	867.2	24077	24963	-0.021	1702	0.036	0.147	0.091
37	31.1	14.9	18.2	16.9	15.5	16.6	16.9	16.1	18.1	18.3	871.1	870.7	24931	25811	-0.021	1692	0.040	0.151	0.095

Time (n	TC_S1	TC_S2	TC_S3	TC_S4	TC_S5	TC_S6	TC_S7	TC_S8	TC_S9	TC_S1-9	Furn Ten	Std Tem	Furn Are	Std Area	Furn Pre	Ram Pre	$LVDT_1$	$LVDT_2$	$LVDT_{1-2}$
38	32.1	15.1	18.4	17.3	15.7	17.0	17.2	16.3	18.4	18.6	873.4	874.1	25786	26663	-0.028	1682	0.041	0.151	0.096
39	33.0	15.3	18.7	17.7	15.9	17.3	17.5	16.4	18.8	18.9	877.5	877.3	26645	27518	-0.034	1687	0.041	0.151	0.096
40	33.7	15.4	19.0	18.2	16.0	17.7	17.8	16.6	19.1	19.3	881.4	880.4	27508	28376	-0.026	1692	0.041	0.154	0.098
41	34.4	15.6	19.4	18.6	16.2	18.0	18.2	16.8	19.5	19.6	881.9	883.3	28373	29237	-0.028	1697	0.044	0.159	0.102
42	35.1	15.8	19.9	19.0	16.5	18.4	18.5	17.0	19.8	20.0	883.7	886.1	29239	30101	-0.03	1697	0.044	0.164	0.104
43	35.7	16.0	20.6	19.5	16.7	18.7	18.8	17.2	20.2	20.4	886.9	888.8	30107	30968	-0.039	1697	0.045	0.169	0.107
44	36.2	16.2	21.4	19.9	17.1	19.1	19.2	17.4	20.6	20.8	891.3	891.3	30979	31837	-0.032	1702	0.046	0.174	0.110
45	36.6	16.4	22.4	20.3	17.7	19.4	19.5	17.7	20.9	21.2	893.3	893.7	31856	32709	-0.031	1707	0.046	0.180	0.113
46	37.0	16.6	23.6	20.8	18.4	19.7	19.9	18.0	21.3	21.7	893.4	896.1	32732	33583	-0.027	1711	0.046	0.188	0.117
47	37.4	16.8	24.9	21.2	19.2	20.1	20.2	18.4	21.6	22.2	894.7	898.4	33610	34460	-0.031	1711	0.047	0.195	0.121
48	37.9	17.0	26.3	21.6	20.2	20.4	20.7	18.9	22.0	22.8	897.2	900.6	34489	35339	-0.032	1711	0.050	0.203	0.126
49	38.4	17.1	27.9	22.1	21.3	20.7	21.3	19.6	22.3	23.4	896.2	902.7	35369	36220	-0.034	1711	0.049	0.211	0.130
50	39.0	17.3	29.6	22.5	22.8	21.0	22.3	20.4	22.7	24.2	898.9	904.8	36250	37103	-0.025	1702	0.050	0.214	0.132
51	39.6	17.5	31.4	22.9	24.2	21.3	23.7	21.3	23.0	25.0	903.3	906.9	37134	37988	-0.032	1692	0.048	0.215	0.131
52	40.3	17.6	33.2	23.3	25.8	21.6	25.5	22.3	23.3	25.9	906.7	909.0	38023	38875	-0.028	1682	0.048	0.223	0.136
53	41.0	17.8	35.0	23.7	27.6	21.9	27.7	23.4	23.6	26.9	908.9	911.0	38914	39764	-0.033	1682	0.050	0.233	0.141
54	41.8	17.9	36.9	24.1	29.5	22.3	30.3	24.6	23.9	27.9	911.4	913.0	39807	40656	-0.032	1690	0.051	0.240	0.146
55	42.8	18.1	38.8	24.5	31.6	22.7	33.5	26.0	24.1	29.1	913.5	915.0	40703	41549	-0.034	1697	0.052	0.248	0.150
56	43.7	18.3	40.5	24.8	33.7	23.1	36.6	27.3	24.3	30.3	915.9	917.0	41601	42444	-0.015	1697	0.053	0.256	0.154
57	44.6	18.4	42.3	25.1	35.9	23.5	39.9	28.7	24.5	31.4	918.0	919.0	42502	43342	-0.017	1697	0.052	0.260	0.156
58	45.6	18.5	44.1	25.4	38.1	24.0	43.1	30.2	24.7	32.6	918.1	921.1	43402	44241	-0.007	1690	0.055	0.263	0.159
59	46.7	18.6	46.0	25.6	40.4	24.6	46.4	31.7	24.9	33.9	922.2	923.1	44306	45142	-0.008	1682	0.055	0.265	0.160
60	47.8	18.8	47.9	25.8	42.6	25.2	49.5	33.3	25.1	35.1	925.0	925.1	45213	46046	-0.016	1682	0.056	0.270	0.163
61	48.7	18.9	49.8	26.1	44.6	25.9	52.3	34.8	25.2	36.3	927.0	927.0	46046	46876	-0.008	1682	0.061	0.276	0.169