

**ICC-ES Evaluation Report****ESR-1553**

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**DIVISION: 03—CONCRETE**  
**Section: 03410—Plant-Precast Structural Concrete****REPORT HOLDER:****SUPERIOR WALLS OF AMERICA, LTD.**  
937 EAST EARL ROAD  
NEW HOLLAND, PENNSYLVANIA 17557  
(800) 452-9255  
[www.superiorwalls.com](http://www.superiorwalls.com)**EVALUATION SUBJECT:****SUPERIOR WALLS R-5 PRECAST CONCRETE  
FOUNDATION WALLS****ADDITIONAL LISTEES:****SUPERIOR WALLS BY ADVANCED CONCRETE  
SYSTEMS, INC.**  
55 ADVANCED LANE  
MIDDLEBURG, PENNSYLVANIA 17842**SUPERIOR WALLS BY COLLIER FOUNDATION  
SYSTEMS, INC.**  
1500 ELLSWORTH AVENUE, SUITE 210  
HEIDELBERG, PENNSYLVANIA 15106**GREAT LAKES SUPERIOR WALLS**  
4555 134<sup>TH</sup> AVENUE  
HAMILTON, MICHIGAN 49419**SUPERIOR WALLS OF THE TWIN CITIES**  
580 SCHOMMER DRIVE  
HUDSON, WISCONSIN 54016-1458**SUPERIOR WALLS BY PRECAST SYSTEMS, LLC**  
5877 BULLITT ROAD  
GREENCASTLE, PENNSYLVANIA 17225**SUPERIOR WALLS BY PRECAST CONCRETE  
SOLUTIONS**  
300 SOUTH MARTIN LUTHER KING DRIVE  
SPRINGFIELD, ILLINOIS 62703**SUPERIOR WALLS OF THE HUDSON VALLEY**  
68 VIOLET AVENUE  
POUGHKEEPSIE, NEW YORK 12601**SUPERIOR WALLS OF UPSTATE NEW YORK**  
7574 EAST MAIN ROAD  
LIMA, NEW YORK 14485**SUPERIOR WALLS OF THE TRI-STATE**  
3425 GRANT DRIVE  
LEBANON, OHIO 45036**SUPERIOR WALLS BY WEAVER PRECAST**  
824 EAST MAIN STREET  
EPHRATA, PENNSYLVANIA 17522**1.0 EVALUATION SCOPE****Compliance with the following codes:**

- 2009 *International Building Code*® (2009 IBC)
- 2009 *International Residential Code*® (2009 IRC)
- 2006 *International Building Code*® (2006 IBC)
- 2006 *International Residential Code*® (2006 IRC)
- 2003 *International Building Code*® (2003 IBC)
- 2003 *International Residential Code*® (2003 IRC)

**Properties evaluated:**

- Structural
- Fire-resistance rating
- Surface burning characteristics
- Thermal barrier
- Dampproofing

**2.0 USES**

The Superior Walls R-5 Precast Concrete Foundation Walls (including basement walls) are used to support wood frame construction.

**3.0 DESCRIPTION**

Superior Walls R-5 walls are insulated precast concrete foundation walls, used as an alternative to masonry or cast-in-place concrete foundation walls. The foundation walls are formed from 5,000 psi (34.4 MPa) normal-weight concrete which contains synthetic fibers. Superior Walls R-5 walls consist of a 1<sup>3</sup>/<sub>4</sub>-inch (44 mm) face shell integrally cast with 10<sup>1</sup>/<sub>4</sub>-inch-wide (260 mm) top and bottom concrete beams. Concrete studs, measuring 2<sup>1</sup>/<sub>4</sub> inches (57 mm) by 6<sup>3</sup>/<sub>4</sub> inches (171 mm) with <sup>3</sup>/<sub>4</sub>-inch-thick (19 mm) pressure-treated wood nailers (for interior finish fastening) attached at 24 inches (610 mm) on center, are cast separately and keyed to the face shell with 30d galvanized ring-shank nails. One-inch-diameter (25.4 mm) chase openings are provided at 24 inches (610 mm) on center in the concrete studs for plumbing and electrical wiring. One-inch-thick (25.4 mm) foam plastic insulation (Rigid Cellular Polystyrene) is applied to the inside face of the face shell and separates the face shell from the studs.

Panels are available in heights of 4 feet (1219 mm), 8 feet 2 inches (2489 mm), 9 feet (2743 mm) and 10 feet (3048 mm), with corresponding weights of 170, 300, 315 and 340 lb./lin. ft. (253, 446, 469 and 506 kg/m), respectively. The panels are available in various lengths. The construction and structural details noted in this report are for walls having a minimum length of 4 feet (1219 mm). Walls shorter than 4 feet (1219 mm) have not been evaluated and are outside the scope of this report. See Figures 1 and 2.

#### 4.0 DESIGN AND INSTALLATION

##### 4.1 Design Details:

Backfill material must comply with Table 1610.1 of the IBC, with an active lateral pressure not exceeding 60 lbf/ft<sup>3</sup> (961.2 kg/m<sup>3</sup>) for the 4-foot-, 8-foot-2-inch- and 9-foot-tall (1219, 2489 and 2743 mm) Superior Walls; 45 lbf/ft<sup>3</sup> (720.9 kg/m<sup>3</sup>) for 10-foot-tall (3048 mm) Superior Walls; and a combined (ledger plus wall loads above the foundation wall) maximum allowable axial load of 5500 lbf/ft (80265 N/m).

Use of Superior Walls R-5 walls with a brick ledge is limited to an allowable load of 2900 lbf/ft (4315 kg/m) on the brick ledge, which is to be considered as part of the allowable load of the wall noted in this section.

Above-grade foundation stem wall applications in which negative transverse loads (such as leeward side wind pressure) in accordance with the applicable code are developed, must be limited to applications where the negative design wind pressure does not exceed 80 psf (3.83 kN/m<sup>2</sup>). Above-grade foundation stem wall applications in which positive transverse wind loads, in accordance with the applicable code, are developed must be limited to applications where the allowable wind pressure does not exceed 155 psf (7.42 kN/m<sup>2</sup>).

The allowable racking shear load on the Superior R-5 foundation walls is limited to a maximum of 380 lbf/lin. ft. (5550 N/m). Construction using the Superior Walls R-5 system is limited to those Seismic Design Categories specified in Section 5.7.

Use of Superior Walls R-5 with beam pockets utilizing two support studs is limited to applications where the maximum load applied to the beam pocket does not exceed 16,000 lbf (71 200 N) for a 10-foot-high (3048 mm) panel and 13,000 lbf (57 800 N) for shorter heights. Other beam pocket configurations are outside the scope of this report.

Beam pockets must be designed and constructed in accordance with the details, dimensions and specific loading limitations given in the engineered design drawings. See Figure 3 for typical beam pocket details.

Design of the footing supporting Superior Walls R-5 must be in accordance with the applicable code. The footing must extend below the frost line of the locality, as required by the applicable code.

**Exception:** For jurisdictions adopting the IRC, installation of Superior Walls R-5 walls on gravel footings is permitted as noted in Section R401.2, provided the construction details comply with Section R403.2 and the details noted in Table 1 of this report.

The capacity of the bolted connection at the top and bottom of the panels, using  $1/2$ -inch-by- $2 1/2$ -inch (12.7 mm by 63.5 mm) hex head bolts through the bond beams and a  $1/2$ -inch-by- $5 1/2$ -inch (12.7 mm by 140 mm) hex head bolt through the footing beams, to transfer loads induced by lateral loads in the plane of the wall, is limited to 1500 lbf (6675 N). See Figure 4 for typical details.

Details involving openings in the foundation walls have not been evaluated and are beyond the scope of this report.

The Superior R-5 walls must be laterally supported at the top and bottom of the panels.

##### 4.2 Fire-resistance-rated Wall Construction:

With the addition of two layers of  $5/8$ -inch (15.9 mm) Type X gypsum wallboard complying with ASTM C 36 or C 1396, attached to the wood nailers in accordance with the applicable code, Superior Walls R-5 walls with a maximum allowable axial compressive load of 3,000 lbf/ft (43779 N/m) have a two-hour fire-resistance rating.

##### 4.3 Dampproofing:

Superior Walls R-5 walls have been evaluated as an alternative method of providing foundation wall dampproofing; therefore, no additional dampproofing is required.

##### 4.4 Thermal Barrier:

An independent thermal barrier, separating the 1-inch-thick (25.4 mm) foam plastic from the interior of the building, is not required, based on testing conducted in accordance with UBC Standard 26-3.

##### 4.5 Installation Details:

Superior Walls R-5 walls must be installed in accordance with this report and the design details and calculations, as noted in Section 5.5 of this report.

Construction details noted in Superior Walls documents such as the *Builder Guideline Booklet*, dated January 2006, have not been evaluated and are beyond the scope of this report.

#### 5.0 CONDITIONS OF USE

The Superior Walls R-5 Precast Concrete Foundation Walls described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Superior Walls R-5 walls must be manufactured, identified and installed in accordance with this report and the information required in Section 5.5 of this report.
- 5.2 Where underground water investigation, required by the applicable code, indicates that a hydrostatic pressure condition exists, the foundation wall must be waterproofed in accordance with the applicable code. Evaluation of the waterproofing material is outside the scope of this report.
- 5.3 Connection of adjacent Superior Walls R-5 walls must be inspected to verify application of the sealant and bolts in accordance with the submitted design drawings.
- 5.4 Soil capacity of the site must be consistent with the requirements of the applicable code. For jurisdictions adopting the IRC, the soil capacity of the site, in lieu of a complete geotechnical evaluation, must be assumed to have the load-bearing values specified in IRC Table R401.4.1.
- 5.5 Design calculations and drawings must be submitted to the code official for approval. The documents must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. The design calculations and details must address, at a minimum, the following:

- Details of waterproofing, if applicable.
  - Depth of footing and footing specifications consistent with this report.
  - Investigation of resistance to overturning and uplift forces.
  - Details for lateral support of the top and bottom of Superior Walls R-5 walls.
  - Verification that the loading requirements at the jobsite do not exceed the allowable loads and details (including the foundation details) noted in Section 4.1 of this report. The calculations must include verification that the combined loading conditions, such as out-of-plane and vertical loads, do not exceed the allowable loads noted in this report.
- 5.6** Installation must be done by Superior Walls–certified installers.
- 5.7** Superior Walls R-5 walls used as lateral force-resisting systems are limited to Seismic Design Category A or B under the IBC, or to Seismic Design Category A, B or C under the IRC.
- 5.8** Superior Walls must be manufactured at the locations noted under “Additional Listees” in this report, in accordance with the Superior Walls of America, Ltd., Quality Assurance Manual, dated June 2005, and with inspections by PFS Corporation (AA-652).

**6.0 EVIDENCE SUBMITTED**

- 6.1** Data in accordance with UBC Standard 26-3.
- 6.2** Results of water permeability tests conducted in accordance with ASTM E 96.
- 6.3** Data in accordance with the ICC-ES Acceptance Criteria for Concrete and Concrete Masonry Wall Systems (AC15), dated February 2010, including beam pocket tests.
- 6.4** Report of fire-resistive tests conducted in accordance with ASTM E 119.
- 6.5** Manufacturer’s published installation instructions (*Builder Guideline Booklet*), dated January 2006.
- 6.6** A quality control manual.

**7.0 IDENTIFICATION**

Each Superior Walls R-5 precast panel must bear a label with the name of the inspection agency (PFS Corporation) and the evaluation report number (ESR-1553). The label must be attached at mid-height, near the center of each wall panel. Additionally, each project must have at least one label on the foam insulation of one panel noting the name of the manufacturer, the name of the installer, and the manufactured and installation dates.

**TABLE 1—MINIMUM DEPTH OF CRUSHED STONE FOOTING (inches)**

CONSTRUCTION TYPE (Assumed Wall Loading)		SOIL TYPE AND LOAD-BEARING CAPACITY (psf)			
		1,500	2,000	3,000	4,000
		MH, CH, CL, ML	SC, GC, SM, GM SP, SW	GP, SW	
<b>Conventional Light-frame Construction</b>					
1-story	(1,100 pounds per linear foot)	4"	4"	4"	4"
2-story	(1,800 pounds per linear foot)	4"	4"	4"	4"
3-story	(2,900 pounds per linear foot)	12" <sup>1</sup>	8"	4"	4"
<b>Masonry Veneer over Light-frame Construction</b>					
1-story	(1,500 pounds per linear foot)	4"	4"	4"	4"
2-story	(2,700 pounds per linear foot)	10" <sup>1</sup>	6"	4"	4"
3-story	(4,000 pounds per linear foot)	20" <sup>1</sup>	12" <sup>1</sup>	6"	4"

<sup>1</sup>Stone must be vibrated in a maximum 8-inch lifts.

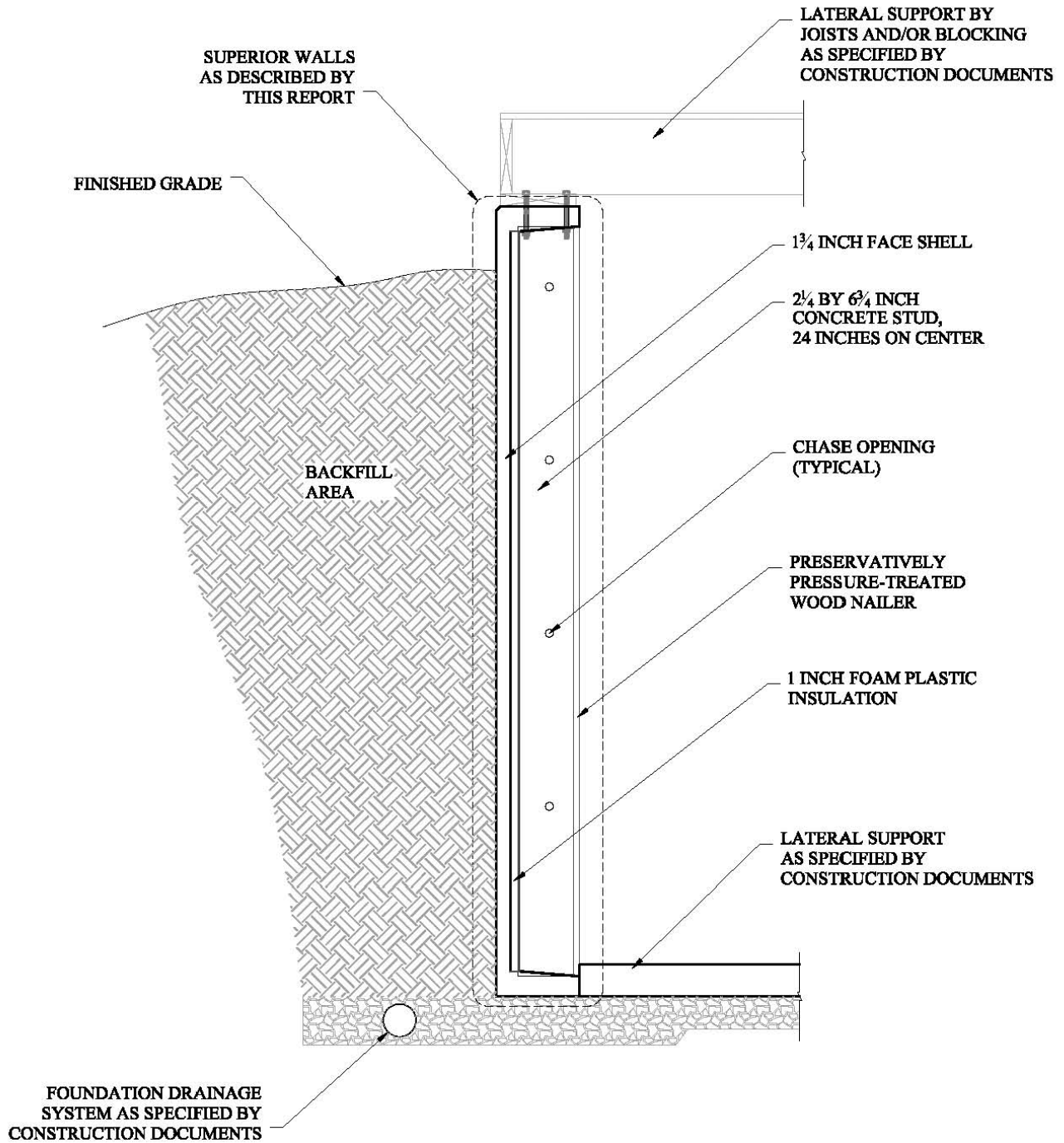


FIGURE 1—TYPICAL SUPERIOR WALL VERTICAL SECTION DETAIL

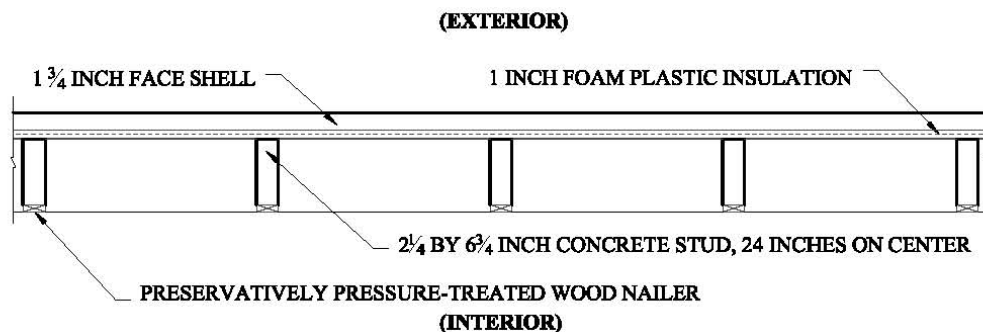


FIGURE 2—TYPICAL SUPERIOR WALL HORIZONTAL SECTION DETAIL

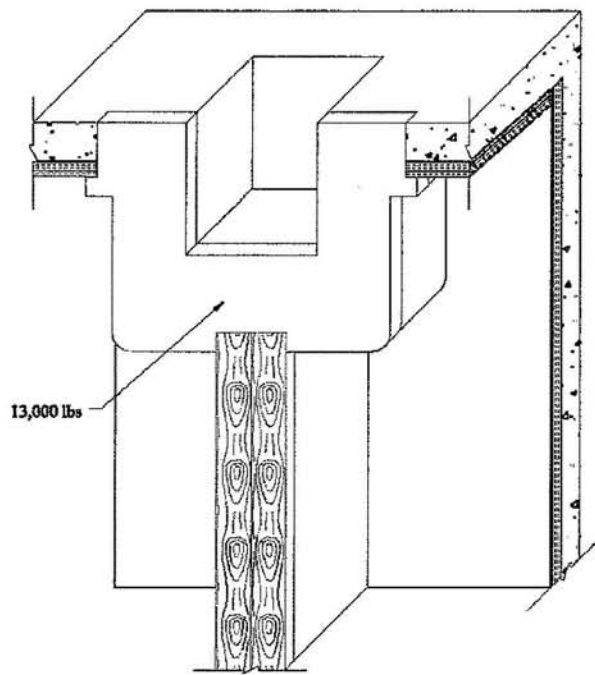
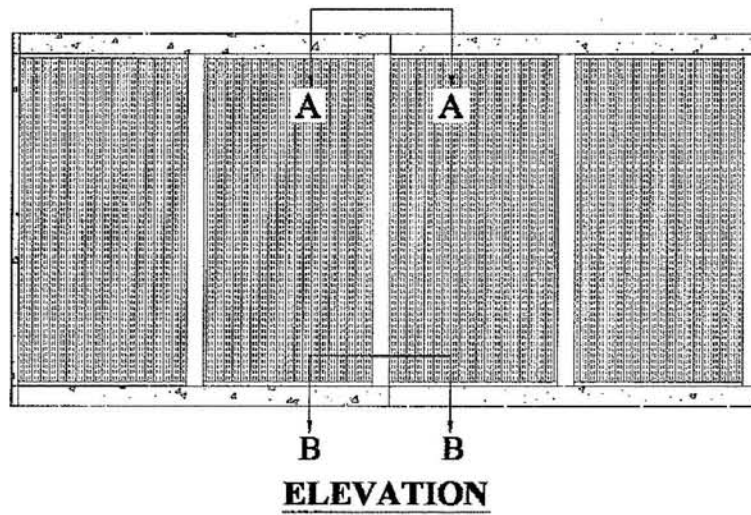
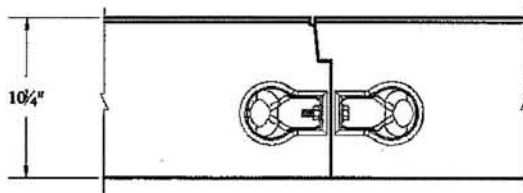


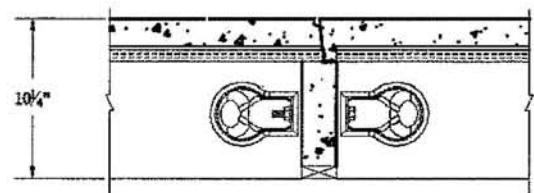
FIGURE 3—TYPICAL BEAM POCKET DETAIL



**ELEVATION**



**DETAIL A**



**DETAIL B**

FIGURE 4—TYPICAL WALL CONNECTION DETAIL