ICC EVALUATION SERVICE®

ICC-ES Evaluation Report

ESR-3527

Reissued April 2023

This report is subject to renewal April 2024.

www.icc-es.org | (800) 423-6587 | (562) 699-0543 *A Subsidiary of the International Code Council®*

DIVISION: 03 00 00—CONCRETE
Section: 03 11 19—Insulating Concrete Forming

REPORT HOLDER:

HERCUTECH INC.

EVALUATION SUBJECT:

HERCUWALL® SERIES 8 INSULATED CONCRETE PANEL SYSTEM

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2018, 2015, 2012, 2009 and 2006 *International Building Code®* (IBC)
- 2018, 2015, 2012, 2009 and 2006 *International Residential Code®* (IRC)

Property evaluated:

- Structural
- Fire resistance
- Weather protections
- Types I through IV construction

1.2 Evaluation to the following green code(s) and/or standards:

- 2022 and 2019 California Green Building Standards Code (CALGreen), Title 24, Part 11
- 2020, 2015, 2012 and 2008 ICC 700 *National Green Building Standard™* (ICC 700-2020, ICC 700-2015, ICC 700-2012 and ICC 700-2008)

Attributes verified:

See Section 2.0

2.0 USES

HercuWall® Series 8 Insulated Concrete Panel System (HercuWall® Series 8 Panels) are used as stay-in-place forms for structural concrete, load-bearing and non-load bearing exterior and interior walls. The forms remain in place after placement and curing of concrete and must be covered with approved weather protection materials as described in Section 3.3.7; and interior and exterior finish materials as described in Sections 4.2.2 and 4.2.3 of this report, respectively. HercuWall® Series 8 Panels are available in Type S, Type SW, Type I, Type IW panels, HercuWall® Series 8 Posts, HercuWall® Series 8 Headers and Sills, HercuWall® Series 8 Lintels.

HercuWall® Series 8 Panels are limited to use in Type V-B construction under the IBC and in construction permitted under the IRC unless constructed in accordance with Sections 4.3 or 4.6 of this report. HercuWall® Series 8 Panels are for use in fire-resistance-rated construction when constructed in accordance with Section 4.3 of this report. HercuWall® Series 8 Type S or Type SW Panels are for use in exterior walls in buildings of Types I, II, III and IV construction when constructed in accordance with Section 4.6 of this report. Type IW and Type SW panels consist of a weather resistive barrier film and are allowed to be used as alternatives to the water-resistive barrier materials as specified in IBC Section 1404.2 and IRC Section R703.2 when installed in accordance with Section 4.2.3 of this evaluation report.

The attributes of the panels have been verified as conforming to the provisions of (i) 2022 and 2019 CALGreen Section A4.404.3.3 and (ii) ICC 700-2020, ICC 700-2015 and ICC 700-2012 Sections 601.5 and 11.601.5; and (iii) and ICC 700-2008 Section 601.5 for prefabricated structural components, and to the provisions of (i) CALGreen Section 5.407.1; (ii) ICC 700-2020 Sections 602.1.8, 11.602.1.8, 1202.6 and 13.104.1.4; (iii) ICC 700-2015 Sections 602.1.8,11.602.1.8 and 12.6.602.1.8; (iv) ICC 700-2012 Sections 602.1.8, 11.602.1.8 and 12.5.602.1.8; and (v) ICC 700-2008 Section 602.9 for water-resistive barriers. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

3.0 DESCRIPTION

3.1 General:

HercuWall® Series 8 Panels are factory-manufactured structural wall panels. The HercuWall® Series 8 Panel assemblies consist of expanded polystyrene (EPS) foam plastic shaped with vertical tongue and groove edges for interlocking, light gauge steel top and bottom tracks, and ShearStrip®, that serves as reinforcing.

The HercuWall® Series 8 Panels have vertical cavities with a minimum cross section of 9 in^2 (58 cm^2) and a standard spacing of 8 inches (205 mm) or 12 inches (305 mm) on center, across the width of the panel. The horizontal base and bond beam cavities are 3 inches (7.6 cm) wide with a cross section of 18 in^2 (116 cm^2) and span the width of the panel. The vertical and horizontal cavities intersect to form a stud, base beam and bond beam configuration. Each vertical stud receives a single ShearStrip® as concrete

reinforcement which extends into the base and bond beams. The ShearStrip® are placed adjacent to the stud alternating between each face of the panel. Parts of the ShearStrip® protrude into the vertical cavities and form a connection with concrete when the cavities are filled. Flanges on the ShearStrip® provide attachment points for interior sheathing and exterior cladding as described in Sections 4.2.2 and 4.2.3 of this report.

HercuWall® Series 8 Posts are location-specific elements integrated into HercuWall® Series 8 panels which locally increase the allowable capacity of the Series 8 Panels in areas of concentrated load. The posts are available in single and double posts (widths). Single posts have a 9 in^2 (58 cm^2) square inch cross section and a pair of opposing interconnected ShearStrip®. Double posts have an 18 in^2 (116 cm^2) cross section and two pairs of opposing interconnected ShearStrip®. Figures 2A and 2B illustrate a typical Series 8, single post and double post configuration, respectively. Vertical posts are also used as jamb posts for panel openings. Figure 3C illustrates a typical jamb post configuration.

HercuWall® Series 8 Headers and Sills utilize a horizontally oriented single post profile integrated into the HercuWall® Series 8 Panel openings. Figures 3A and 3B illustrate typical header and sill configurations respectively.

HercuWall® Series 8 bond beam at the top of the HercuWall® Series 8 wall panels with steel reinforcing bars as described in Section 3.3.4 of this report acts as a lintel (Diagram B) to carry uniform gravity loads over openings. Lintels are available in dimensions as noted in Table 7.

3.2 HercuWall Series 8 Panel Types: HercuWall® Series 8 Panels are manufactured in Type S, Type SW, Type I and Type IW configurations. All HercuWall Series 8 panels are produced in heights up to 138 inches (351 cm) maximum.

3.2.1 Series 8 Type S: HercuWall® Series 8 Type S panels have a nominal thickness of 8 inches (205 mm). Figure 1A illustrates a typical Series 8, Type S wall panel and corner panel.

3.2.2 Series 8 Type SW: HercuWall® Series 8 Type SW panel is manufactured from HercuWall® Series 8 Type S panel with a weather resistive barrier film (Section 3.3.7.1) hot-roll laminated onto the exterior face. Figure 1B illustrates a typical HercuWall® Series 8, Type SW wall panel and corner panel.

3.2.3 Series 8 Type I: HercuWall® Series 8 Type I panels have a nominal thickness of $8^1/_2$ inches (216 mm). Type I panels are manufactured with an additional $^1/_2$-inch-thick (13 mm) of expanded polystyrene (EPS) used as an additional thermal isolation barrier on the exterior face of the Type S panels. Figure 1B illustrates a typical Series 8, Type I wall panel and corner panel.

3.2.4 Series 8 Type IW: HercuWall® Series 8 Type IW panel is manufactured from HercuWall® Series 8 Type I panel with a weather resistant barrier film (Section 3.3.7.1) hot-roll laminated onto the exterior face. Figure 1D illustrates a typical HercuWall® Series 8, Type IW wall panel and corner panel.

3.3 Materials:

3.3.1 Foam Plastic: Panels are manufactured from expanded polystyrene (EPS) foam plastic blocks to a nominal thickness of 8 inches (205 mm) for Type S and Type SW, and $8^1/_2$ inches (216 mm) for Type I and Type IW. The EPS foam plastic complies with ASTM C578, Type II expanded polystyrene with a nominal density of 1.50 pcf (24 kg/m^3) . The EPS foam plastic has a flame spread index of 25 or less and a smoke developed index of 450 or less when tested in accordance with ASTM E84 or UL 723. The potential heat of the ASTM C578, Type II expanded polystyrene (EPS) foam plastic is 2250 BTU/ft^2 (25.5 MJ/m^2) per inch of thickness when tested in accordance with NFPA 259.

3.3.2 ShearStrip®: The ShearStrip® components are formed and stamped using cold rolled steel with a nominal thickness of 0.022 inches (0.56 mm) and minimum yield strength of 45 ksi (310 MPa). The steel is hot-dipped galvanized with a coating designation of G90 per ASTM A653. These components are factory positioned adjacent to the vertical cavities, with some a portion protruding into the void. Upon the cavities receiving concrete the ShearStrip® function as reinforcement.

3.3.3 Top and Bottom Tracks: Top and bottom tracks are furnished with HercuWall® Series 8 panels and are job site applied. Tracks are formed using cold rolled steel with a nominal thickness 0.022 inches (0.56 mm) and a minimum yield strength of 33 ksi (228 MPa). The steel is hot-dipped galvanized with a minimum coating designation of G90 per ASTM A653 standard or as specified.

3.3.4 Steel Reinforcing Bars: Steel reinforcing bars are deformed reinforcing bars (rebar) used in the factory and jobsite installations of HercuWall® Series 8 and must comply with ASTM A615-15a Grade 60, with a minimum yield strength of 60 ksi (414 MPa) and a nominal bar diameter of ½ inch (13 mm), No.4 rebar. A continuous No. 4 rebar must be job site applied in the bond beam around the entire perimeter of the HercuWall® Series 8 structure as illustrated in Figure 4 with a minimum of 48 bar diameter lap splices. The bond beam above openings must be designed as a lintel in accordance with Section 4.1.4 of this report.

3.3.5 Rebar Clips: Rebar positioning clips are factory applied. The clips are connected to ShearStrip® by means of an integral snap-on feature.

3.3.6 Concrete: Normal-weight concrete must conform to Section 1903 and 1905 of the IBC, as applicable, having a maximum $^3/_8$-inch (9.5 mm) aggregate with coarse aggregate not to exceed 45% and a slump flow test spread of 22 inches ± 2 inches (559 mm ±51 mm). The concrete must have a minimum specified compressive strength of 4,000 psi (27.6 MPa) at 28 days.

3.3.7 Weather Protection Materials:

3.3.7.1 Water-Resistive Barrier Film: Weather resistive barrier film is a polyester thin film used as a weather resistant barrier with attaching adhesive integrated on the film. The thin film has a nominal thickness of 3 mils [0.003 inch (0.076 mm)].

3.3.7.2 HercuWall® Seaming Tape: HercuWall® Seaming Tape is a UV stabilized, polypropylene water resistant sheathing tape for use at HercuWall Series 8, Type SW and Type IW exterior panel joints. The tape has a nominal thickness of 3 mils [0.003 inch (0.076 mm)] and is produced in nominal widths of 3.78 inches (96 mm) for factory installed applications and 1.89 inches (48 mm) for job site applications.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 Panel Allowable Loads: HercuWall® Series 8 Panels are limited to the allowable combined uniform axial and transverse loading conditions in Tables 1 and 2 of this report. The tabulated allowable loads are applicable to installations not exceeding the dimensions noted in the tables.

4.1.2 Post (Jamb) Allowable Loads: HercuWall® Series 8 posts are limited to the allowable combined concentrated axial and transverse loading conditions in Tables 3 and 4 of this report. When designing an opening jamb with HercuWall® Series 8 panels, the tributary width of the jamb section must be considered for axial and transverse loadings as illustrated in Diagram A.

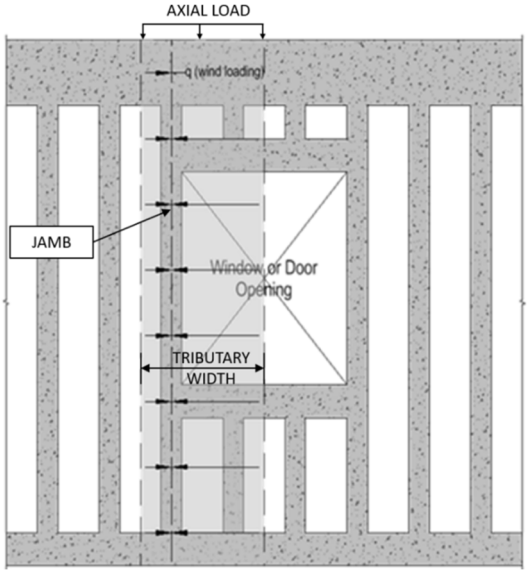


DIAGRAM A—POST (JAMB) TRIBUTARY WIDTH

4.1.3 Header/Sill Allowable Loads: HercuWall® Series 8 headers and sills are limited to the allowable transverse loads in Table 5 of this report. Headers and sills do not carry gravity loads. When designing an opening header or sill with HercuWall® Series 8 panels, the tributary width of the header or sill must be considered for transverse loading as illustrated in Diagram B.

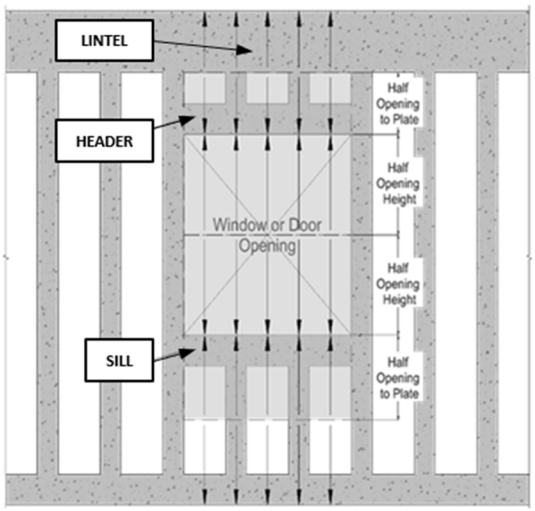


DIAGRAM B—LINTEL, HEADER OR SILL TRIBUTARY HEIGHT

4.1.4 Lintel Allowable Loads: HercuWall® Series 8 Lintels allowable uniform loads are specified in Table 7 of this evaluation report. The lintel may be designed in accordance with ACI 318 for spans not specfieid in Table 7.

4.1.5 In-Plane Shear: HercuWall® Series 8 panels are limited to the allowable in-plane shear loads with the dimensions and specified anchorage in Table 6 of this report for use in Seismic Design Categories A and B only.

4.1.6 Foundation: HercuWall® Series 8 panels must be supported on a foundation with reinforcing dowels or anchor bolts embedded into the foundation and extend into the base beam. The foundation, reinforcing dowels and anchor bolts are beyond the scope of this report and must be designed by the design professional in accordance with the IBC, IRC and ACI 318, as applicable.

4.2 Installation:

4.2.1 General: HercuWall® Series 8 panels must be installed in accordance with the manufacturer's installation instructions, the approved drawings and installation steps 1 through 6 as outlined in Figure 6 of this report.

A copy of the installation instructions and the approved drawings must be available at all times on the jobsite during installation.

4.2.2 Interior Finish:

The installation details in this section address compliance with the thermal barrier requirements of the codes. HercuWall® Series 8 panels exposed to the interior of the building must be finished with an approved 15-minute thermal barrier, such as minimum ½-inch-thick (1.3 cm) gypsum board as required by IBC Section 2603.4 and IRC Section R316.4, as applicable. The gypsum board must be using No. 6 x 1¼-inch-long self-drilling drywall screws spaced at 8-inches (205 mm) on center around board perimeter and 12-inches (305 mm) on center in the board field. Gypsum wallboard joints and screw heads must be taped and finished with joint compound in accordance with ASTM C840 or GA 216.

4.2.3 Exterior Wall Covering:

When used as an exterior wall panels, the exterior face of the HercuWall® Series 8 panels must be provided with weather protection and covered with an approved exterior wall covering in accordance with the applicable code or as evaluated in a current ICC-ES evaluation report. A water-resistive barrier must be installed over the panels in accordance with IBC Section 1404.2 or IRC Section R703.2, as applicable. Under the IRC, the walls must be flashed in accordance with 2018 and 2015 IRC Section R703.4 or 2012, 2009 and 2006 IRC Section R703.8, as applicable. The approved exterior wall covering must be attached to the metal ShearStrip® using corrosion-resistant No. 6 self-drilling screws and have sufficient length to penetrate through the metal ShearStrip®. The fastener type and spacing must be designed to support the gravity loads of the wall covering and resist negative wind pressures. The negative wind pressure capacity of the exterior wall covering must be the same as that recognized in the applicable code for generic materials, or that recognized in a current evaluation report for proprietary materials.

When used as exterior wall panels, HercuWall® Series 8 Type SW or Type IW panels consist a water-resistive barrier, complying with IBC Section 1404.2 or IRC Section R703.2, as applicable. Joints between HercuWall® Series 8, Type SW panels, Type IW panels, and panels and installation tracks must be taped in accordance with the manufacturer's installation instructions with HercuWall® 1.89 inch-wide (48 mm) joint tape, as described in Section 3.3.7.2 of the report, and centered over joints.

4.3 Fire-resistance-rated Construction:

General: The following assemblies have been evaluated for use in one and two hour fire-resistance-rated, load-bearing walls. When used as fire-resistance rated wall assemblies, the axial load shall be limited to the allowable uniform axial load specified in Table 1 or Table 2, as applicable. The tabulated allowable combined loads are applicable to installations not exceeding the dimensions noted in the tables.

4.3.1 One-hour Fire-resistance-rated Assemblies: The **HercuWall®** Series 8 must be HercuWall® Series 8 Type S or Type SW Panels covered with one layer of $^5/_8$-inch-thick (15.9 mm) Type X gypsum boards installed on both sides as illustrated in Figure 6. The assembly must comply with installation steps 1 through 8 outlined in Figure 6.

4.3.2 Two-hour Fire-resistance-rated Assemblies: The HercuWall® Series 8 must be HercuWall® Series 8 Type S or Type SW Panels covered with two layers of $^5/_8$-inch-thick (15.9 mm) Type X gypsum boards installed on both sides as illustrated in Figure 7. The assembly must comply with installation steps 1 through 10 outlined in Figure 7.

4.4 Special Inspections:

4.4.1 IBC: Special inspection is required in accordance with 2018, 2015 and 2012 IBC Section 1705 (2009 and 2006 IBC Section 1704, as applicable) for concrete construction, including placement of reinforcing steel and concrete, and for concrete cylinder testing. Special inspection in accordance with 2018 and 2015 IBC Section 1704.2 and 1705.16, 2012 IBC Sections 1704.2 and 1705.15, 2009 IBC Sections 1704.1 and 1704.14, or 2009 IBC Sections 1704.1 and 1704.12, as applicable, is required when an EIFS wall covering is applied. Duties of the special inspector include verifying field preparation in materials, expiration dates, installation of components, curing of components, and installations of joints and sealants.

4.4.2 IRC: For walls designed in accordance with the IBC for use under the IRC, special inspection in accordance with Section 4.4.1 is required.

4.5 Protection against termites:

4.5.1 Where the probability of termite infestation is defined as “very heavy” by the code official, the foam plastic must be installed in accordance with 2018, 2015, 2009 and 2006 IBC Section 2603.8, 2012 IBC Section 2603.9, 2018, 2015, 2012 and 2009 IRC Section R318.4 or 2006 IRC Section R320.5, as applicable. Areas of very heavy termite infestation must be determined in accordance with 2018, 2015, 2009 and 2006 IBC Figure 2603.8 or 2012 IBC Figure 2603.9 or IRC Figure R301.2(7), as applicable.

4.6 Installation as Exterior Wall Assemblies in Buildings of Types I, II, III or IV Construction (IBC):

4.6.1 General: Exterior walls constructed of HercuWall® Series 8 Type S or Type SW Panels, with $^5/_8$-inch-thick (15.9 mm) Type X ASTM C1396 complying gypsum wallboard sheathing on the interior side and $^5/_8$-inch-thick (15.9 mm) Type X ASTM C1177 complying exterior gypsum sheathing on the exterior side, up to 40 feet (12,192 mm) in height above grade plane and required to be Types I, II, III or IV construction (IBC), must comply with the applicable conditions cited below in Sections 4.6.2 through 4.6.12:

4.6.2 Interior Finish: The panels must be separated from the building interior with an approved 15-minute thermal barrier, such as minimum $^5/_8$-inch-thick (15.9 mm) Type X gypsum wallboard, installed as specified in Section 4.2.2.

4.6.3 Water-resistive barrier: An approved water-resistive barrier, complying with IBC Sections 1402.5 and 1403.2, must be installed over the exterior gypsum sheathing.

4.6.4 Exterior Finish – Brick Veneer: Anchored nominal 4-inch-thick (102 mm) clay brick veneer with a minimum 2 inch (51 mm) air gap must be mechanically fastened, through the $^5/_8$-inch-thick (15.9 mm) Type X gypsum wallboard sheathing, to the metal ShearStrip® as specified in Section 4.2.3.

4.6.5 Exterior Finish – Exterior Plaster (Stucco): Portland cement minimum ¾-inch-thick (19 mm) with self-furring metal lath installed in accordance with the IBC must be mechanically fastened, through the $^5/_8$-inch-thick (15.9 mm) Type X gypsum wallboard sheathing, to the metal ShearStrip® as specified in Section 4.2.3.

4.6.6 Exterior Finish – Natural Stone Veneer: Minimum 2-inch-thick (51 mm) natural stone (granite, limestone, marble, sandstone) using any standard non-open joint installation technique such as shiplap must be mechanically fastened, through the $^5/_8$-inch-thick (15.9 mm) Type X gypsum wallboard sheathing, to the metal ShearStrip® as specified in Section 4.2.3.

4.6.7 Exterior Finish – Cement Masonry Unit (CMU) or Precast Concrete Veneer: Minimum 1½-inch-thick (38 mm) concrete masonry unit (CMU) or precast concrete using any standard non-open joint installation technique such as shiplap must be mechanically fastened, through the $^5/_8$-inch-thick (15.9 mm) Type X gypsum wallboard sheathing, to the metal ShearStrip® as specified in Section 4.2.3.

4.6.8 Exterior Finish – Cast Artificial Stone Veneer: Minimum 2-inch-thick (51 mm) complying with ICC-ES AC51 using any standard non-open joint installation technique such as shiplap must be mechanically fastened, through the $^5/_8$-inch-thick (15.9 mm) Type X gypsum wallboard sheathing, to the metal ShearStrip® as specified in Section 4.2.3.

4.6.9 Exterior Finish – Terra Cotta Veneer: Minimum 1½-inch-thick (38 mm) using any standard non-open joint installation technique such as shiplap must be mechanically fastened, through the $^5/_8$-inch-thick (15.9 mm) Type X gypsum wallboard sheathing, to the metal ShearStrip® as specified in Section 4.2.3.

4.6.10 Exterior Finish – Fiber Cement Siding Veneer: Noncombustible fiber cement siding complying with IBC Section 1403.10 must be mechanically fastened, through the $^5/_8$-inch-thick (15.9 mm) Type X gypsum wallboard sheathing, to the metal ShearStrip® as specified in Section 4.2.3.

4.6.11 Exterior Finish – steel cladding: Corrosion-resistant steel having a minimum base-metal thickness of 0.016 inch (0.41 mm) must be mechanically fastened, through the $^5/_8$-inch-thick (15.9 mm) Type X gypsum wallboard sheathing, to the metal ShearStrip® as specified in Section 4.2.3.

4.6.12 Window and Door Openings: Perimeter design of window and door openings must be as specified in Figure 8 where the head, jamb and sill are encased with an 8-inch-wide (203 mm), nominal 0.033-inch-thick (0.84 mm), corrosion-resistant steel C-channel with 1½ inch (38 mm) legs. The HercuWall® Series 8 Panels adjoining the opening are designed to allow for a nominal 1½ inch-thick (38 mm) layer of concrete to form between the steel C-channel and the EPS core at the perimeter of the opening.

5.0 CONDITIONS OF USE

The HercuWall® Series 8 Panels 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 HercuWall® Series 8 Panels must be manufactured, identified and installed in accordance with this report and the manufacturer’s installation instructions. A copy of which must be available at the jobsite. In the event

of a conflict between this report and the manufacturer's installation instructions, this report governs.

5.2 Concrete quality, mixing and placement must comply with IBC Chapter 19, 2018, 2015 and 2012 IRC Section R608.5 or 2009 and 2006 IRC Section R611.5.1, as applicable.

5.3 Interior and exterior finishes must not be applied until after the concrete in the core of the panels has cured a minimum of 72 hours.

5.4 HercuWall® Series 8 Panels must be separated from the building interior as described in Section 4.2.2 with an approved 15-minute thermal barrier.

5.5 Construction documents including specifications, engineering plans and calculations specifying the HercuWall® Series 8 Panels must be submitted to the code official for approval. The construction documents must be prepared, signed and sealed by a registered design professional when required by the statutes of the jurisdiction where the project is to be constructed.

5.6 Engineering plans and calculations, submitted to the code official, must provide complete load path(s) for loading acting on the walls must be consistent with this report. The connections at the top and bottom of the HercuWall® Series 8 are beyond the scope of this report and must be designed and detailed by the design professional.

5.7 Special inspection must be provided as described in Section 4.4.

5.8 Use of the HercuWall® Series 8 are limited for use in Type V-B construction under the IBC and in construction permitted under the IRC unless constructed in accordance with Section 4.3 or Section 4.6 of this report. HercuWall® Series 8 Panels are for use in fire-resistance-rated construction when constructed in accordance with Section 4.3 of this report. HercuWall® Series 8 Type S Panels are for use in exterior wall assemblies in buildings of Types I, II, III or IV construction when constructed in accordance with Section 4.6 of this report.

5.9 HercuWall® Series 8 Panels are manufactured by HercuTech Inc. in Tempe, Arizona under an approved quality control program with inspections conducted by ICC-ES.

5.10 HercuWall® Seaming Tape is remanufactured and labeled for HercuWall® Series 8 panels by HercuTech, Inc. in Tempe, Arizona under an approved quality control program with inspections conducted by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels Used as Weather-resistive Barriers (AC71), dated February 2003 (editorially revised January 2018)

6.2 Reports of axial, transverse and combined axial and transverse load tests of wall panels in accordancewith the general guidelines of ASTM E72-10, Standard Methods of Conducting Strength Tests of Panels for Building Construction, ASTM International.

6.3 Report of fire resistance testing in accordance with ASTM E119-14, Standard Test Methods for Fire Tests of Building Construction and Materials.

6.4 Report of testing in accordance with NFPA 285 and fire analysis.

6.5 Report of testing in accordance with NFPA 259 of the expanded polystyrene (EPS) foam plastic.

7.0 IDENTIFICATION

7.1 HercuWall® Series 8 Panels are identified on each panel by a numbering indicating the installation location per the construction documents and a label that includes the company name and address of HercuTech Inc., the product name (HercuWall Series 8) and Type S, Type SW, Type I or Type IW, and the evaluation report number (ESR-3527).

7.2 Rolls of HercuWall® Seaming Tape are indentified with the product name (Seaming Tape 48 mm) and the ICC-ES evaluation report number (ESR-3257).

7.3 The report holder's contact information is the following:

HERCUTECH INC.
8980 SOUTH MCKEMY STREET, SUITE 101
TEMPE, ARIZONA 85284
(480) 284-4535
www.hercutech.com
randy.hartwick@hercutech.com

TABLE 1—ALLOWABLE COMBINED LOADS - HERCUWALL® SERIES 8 PANELS, 12" O.C STUD SPACING[1,2,3,4,5,6]

PANEL, TYPE S, SW, I AND IW												
TRANSVERSE LOAD (psf)	0	5	10	15	20	25	28	30	35	40	45	48
PANEL HEIGHT (inches)	**AXIAL CAPACITY (plf)**											
102	5890	5880	5870	5860	5850	5845	5840	5835	5825	5815	5805	5800
108	4980	4830	4680	4530	4375	4225	4135					
114	4930	4770	4615	4455	4295	4135	4040					
120	4880	4715	4550	4380	4210	4045	3945					
126	4830	4655	4480	4305	4130	3955	3850					
132	4780	4600	4415	4230	4050	3865	3755					
138	4730	4540	4350	4160	3965	3775	3660					

For SI: 1 Inch = 25.4 mm, 1 psf = 47.9 Pa, 1 plf = 14.6 N/m, 1 pound = 0.454 Kg, 1 foot = 304.8 mm.

[1]Allowable loads have been calculated using a safety factor of 3.0
[2]Posts are reinforced with alternating, interior and exterior, integral ShearStrip® reinforcement.
[3]The tabulated values are uniform axial loads applied with a maximum eccentricity of 0.92 inches measured from the centerline of the studs at specified transverse loading conditions.
[4]Concrete compressive strength must be a minimum of 4,000 psi (27,000 kPa) at 28 days.
[5]When used as recognized components of one-hour or two-hour fire-resistance rated assemblies, see Section 4.3 of this report.
[6]For panel heights below 102 inches, allowable loads are limited to the tabulated values listed for 102 inch panels.

TABLE 2—ALLOWABLE COMBINED LOADS - HERCUWALL® SERIES 8 PANELS, 8" O.C STUD SPACING[1,2,3,4,5,6]

PANEL, TYPE S, SW, I AND IW												
TRANSVERSE LOAD (psf)	0	7.5	15	22.5	30	37.5	42	45	52.5	60	67.5	72
PANEL HEIGHT (inches)	**AXIAL CAPACITY (plf)**											
102	8835	8820	8810	8795	8780	8765	8755	8750	8735	8725	8710	8700
108	7475	7245	7020	6790	6565	6335	6200					
114	7400	7160	6920	6680	6440	6200	6060					
120	7320	7070	6820	6570	6320	6070	5915					
126	7245	6985	6720	6460	6195	5930	5775					
132	7170	6895	6620	6345	6070	5800	5630					
138	7095	6810	6520	6235	5950	5660	5490					

For SI: 1 Inch = 25.4 mm, 1 psf = 47.9 Pa, 1 plf = 14.6 N/m, 1 pound = 0.454 Kg, 1 foot = 304.8 mm.

[1]Allowable loads have been calculated using a safety factor of 3.0
[2]Studs are reinforced with alternating, interior and exterior, integral ShearStrip® reinforcement.
[3]The tabulated values are uniform axial loads applied with a maximum eccentricity of 0.92 inches measured from the centerline of the studs at specified transverse loading conditions.
[4]Concrete compressive strength must be a minimum of 4,000 psi (27,000 kPa) at 28 days.
[5]When used as recognized components of one-hour or two-hour fire-resistance rated assemblies, see Section 4.3 of this report.
[6]For panel heights below 102 inches, allowable loads are limited to the tabulated values listed for 102 inch panels.

TABLE 3—ALLOWABLE CONCENTRATED COMBINED LOADS - HERCUWALL® SERIES 8 SINGLE POST, [1,2,3,4,5]

SINGLE POST, TYPE S, SW, I AND IW											
TRANSVERSE LOAD (plf)	0	10	15	20	30	40	50	56.8	70	80	90.7
POST HEIGHT (inches)	**AXIAL CAPACITY (lbs)**										
102	7060	7057	7055	7055	7050	7050	7045	7040	7040	7035	7030
108	6160	6040	5975	5915	5790	5670	5545	5460			
114	6110	5980	5915	5850	5720	5590	5460	5370			
120	6060	5925	5855	5790	5650	5515	5380	5285			
126	6010	5870	5795	5725	5580	5440	5295	5195			
132	5960	5810	5735	5660	5510	5360	5211	5110			
138	5910	5755	5675	5600	5440	5285	5130	5020			

For SI: 1 Inch = 25.4 mm, 1 psf = 47.9 Pa, 1 plf = 14.6 N/m, 1 pound = 0.454 Kg, 1 foot = 304.8 mm.

[1]Allowable loads have been calculated using a safety factor of 3.0
[2]Post is reinforced with one pair of interconnected, opposing interior and exterior, integral ShearStrip® reinforcement.
[3]The tabulated values are concentrated axial loads applied with a maximum eccentricity of 0.92 inches measured from the centerline of the post at specified transverse loading conditions.
[4]Concrete compressive strength must be a minimum of 4,000 psi (27,000 kPa) at 28 days.
[5]For post heights below 102 inches, allowable loads are limited to the tabulated values listed for 102 inch posts.

TABLE 4—ALLOWABLE CONCENTRATED COMBINED LOADS - HERCUWALL® SERIES 8 DOUBLE POST, [1,2,3,4,5]

DOUBLE POST, TYPE S, SW, I AND IW												
TRANSVERSE LOAD (plf)	0	15	30	45	60	75	90	105	107	135	150	165
POST HEIGHT (inches)	**AXIAL CAPACITY (lbs)**											
102	11260	11260	11260	11260	11260	11260	11260	11260	11260	11260	11260	11260
108	11260	11260	11260	11260	11260	11260	11260	11260	11260			
114	11260	11260	11260	11260	11260	11260	11260	10652	10535			
120	11260	11260	11260	11260	11260	11185	10400	9615	9510			
126	11260	11260	11260	11260	10860	10145	9435	8720	8625			
132	11260	11260	11195	10545	9895	9245	8595	7945	7860			
138	11430	10835	10240	9645	9050	8460	7865	7270	7190			

For SI: 1 Inch = 25.4 mm, 1 psf = 47.9 Pa, 1 plf = 14.6 N/m, 1 pound = 0.454 Kg, 1 foot = 304.8 mm.

[1]Allowable loads have been calculated using a safety factor of 3.0
[2]Double post is reinforced with two pairs of interconnected, opposing interior and exterior, integral ShearStrip® reinforcement.
[3]The tabulated values are concentrated axial loads applied with a maximum eccentricity of 0.92 inches measured from the centerline of the double post at specified transverse loading conditions.
[4]Concrete compressive strength must be a minimum of 4,000 (27,000 kPa) psi at 28 days
[5]For post heights below 102 inches, allowable loads are limited to the tabulated values listed for 102 inch posts.

TABLE 5—ALLOWABLE TRANSVERSE LOAD - HERCUWALL® SERIES 8, HEADER AND SILL[1,2,3]

HEADER AND SILL, TYPE S, SW, I AND IW	
LENGTH (inches)	**ALLOWABLE TRANSVERSE LOAD (plf)**
102	90
108	65
114	59
120	57
126	57
132	57
138	57

For SI: 1 Inch = 25.4 mm, 1 psf = 47.9 Pa, 1 plf = 14.6 N/m, 1 pound = 0.454 Kg, 1 foot = 304.8 mm.

[1]Allowable loads have been calculated using a safety factor of 3.0
[2]Header and sill are reinforced with opposing, interior and exterior, integral ShearStrip® reinforcement.
[3]Concrete compressive strength must be a minimum of 4,000 psi (27,000 kPa) at 28 days.

TABLE 6—ALLOWABLE IN-PLANE SHEAR LOAD - HERCUWALL® SERIES 8 PANELS, 8" or 12" O.C STUD SPACING[1,2,3,4,5]

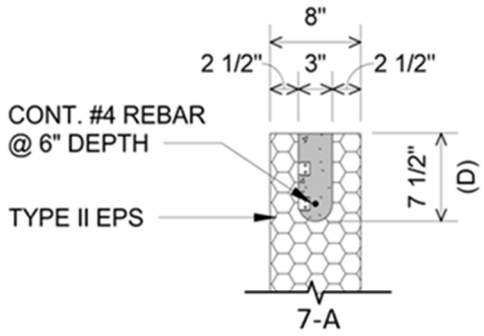
SEISMIC DESIGN CATEGORIES A AND B ONLY			
PANEL HEIGHT (inches)	**PANEL WIDTH (inches)**	**OVERTURNING ANCHORAGE**	**ALLOWABLE IN-PLANE SHEAR CAPACITY (plf)**
138 or less	Panel Height/2 (maximum)	#4 rebar dowels protruding from the foundation and embedded 24 inches into wall panel located at the center of the vertical stud at each end of the panel with an allowable overturning net tension of 2,070 lbs. (See Figure 5)	180

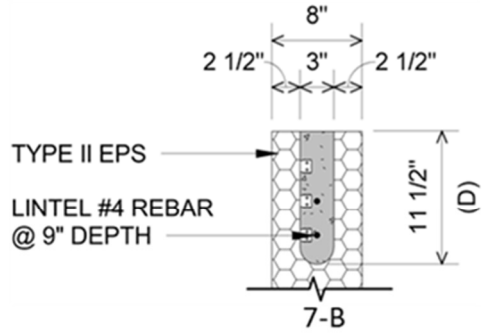
For SI: 1 Inch = 25.4 mm, 1 psf = 47.9 Pa, 1 plf = 14.6 N/m, 1 pound = 0.454 Kg, 1 foot = 304.8 mm.

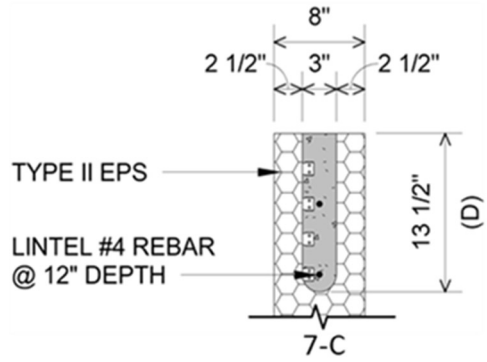
[1]Allowable loads have been calculated using a safety factor of 3.0
[2]Studs reinforced with alternating, interior and exterior, integral ShearStrip® reinforcement.
[3]The maximum shear wall height to width aspect ratio is 2:1
[4]Concrete compressive strength must be a minimum of 4,000 psi at 28 days.
[5]Reinforcing dowels and anchor bolts for shear transfer are beyond the scope of this report and must be designed by the design professional in accordance with ACI 318.

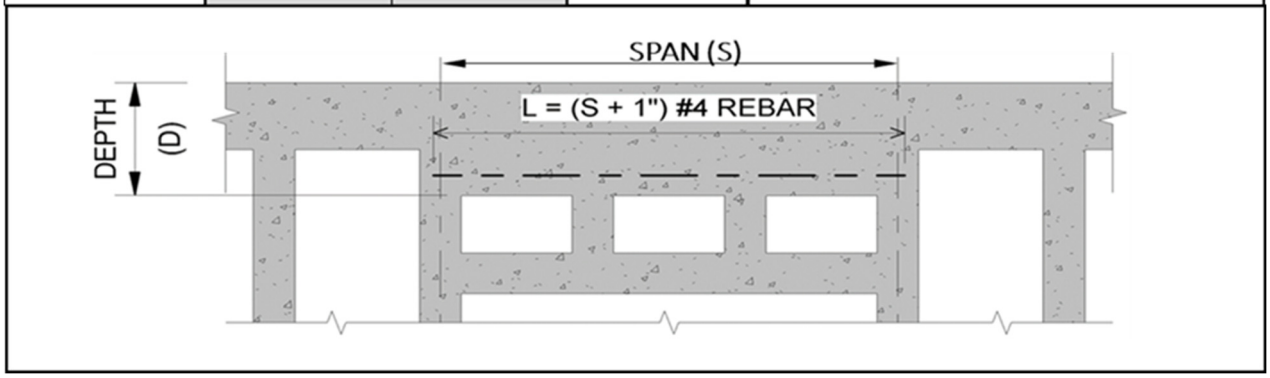
TABLE 7—ALLOWABLE UNIFORM LOAD - HERCUWALL® SERIES 8 LINTELS[1,2,3,4]

LINTEL, TYPE S, SW, I AND IW			
LINTEL PROFILE	3" x 7.5" (7-A)	3" x 11.5" (7-B)	3" x 13.5" (7-C)
SPAN (feet)	**ALLOWABLE SERVICE LOAD - ASD (plf)**		
3	1347	2807	3103
3.5	1068	2231	2473
4	859	1798	2001
4.5	696	1462	1634
5	566	1193	1340
5.5	459	973	1100
6	371	790	900
6.5	329	705	811
7	293	631	735
7.5	262	568	669
8	234	513	611
8.5	210	464	560
9	189	420	515
9.5	170	381	475
10	153	346	438
10.5	139	317	403
11	127	291	371
11.5	116	267	342
12	105	245	316
12.5	-	225	291
13	-	206	269
13.5	-	189	248
14	-	173	228
14.5	-	-	210
15	-	-	193
15.5	-	-	178
16	-	-	163









For SI: 1 Inch = 25.4 mm, 1 psf = 47.9 Pa, 1 plf = 14.6 N/m, 1 pound = 0.454 Kg, 1 foot = 304.8 mm.

[1]Allowable loads have been calculated using a safety factor of 3.0.
[2]Jamb Post is reinforced with one pair of interconnected, opposing interior and exterior, integral ShearStrip® reinforcement.
[3]Concrete compressive strength must be a minimum of 4,000 psi at 28 days.
[4]The lintel may be designed in accordance with ACI 318 for spans not specified in the table.

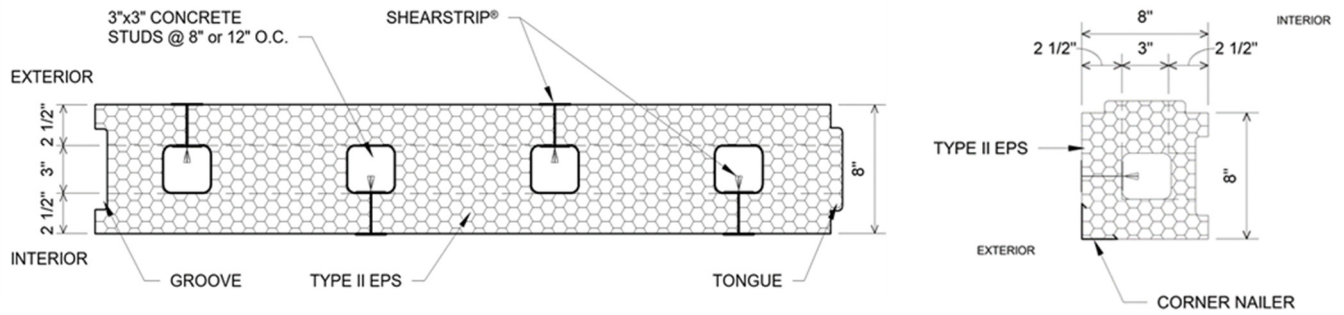


FIGURE 1A—TYPE S PANEL AND CORNER

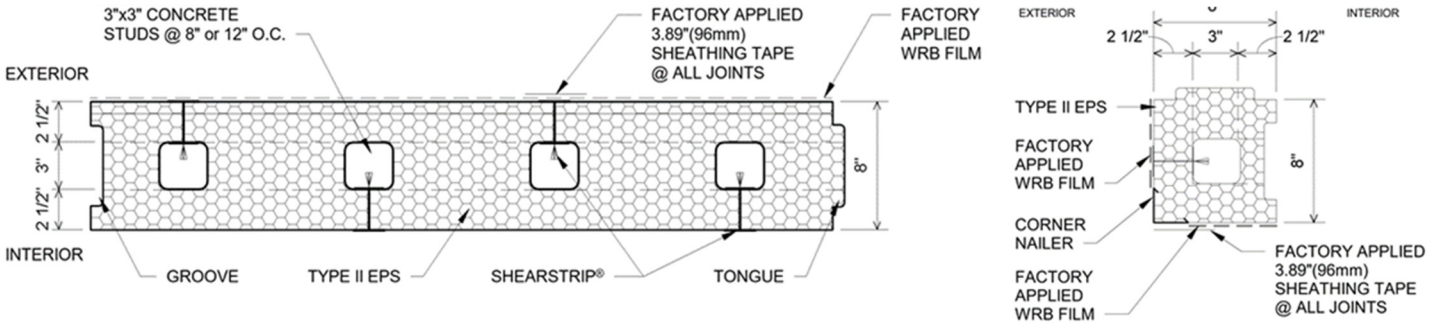


FIGURE 1B—TYPE SW PANEL AND CORNER

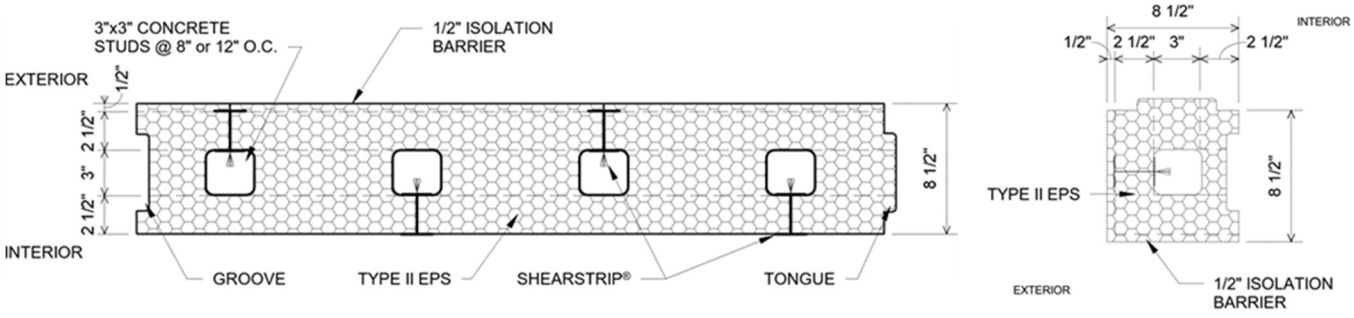


FIGURE 1C—TYPE I PANEL AND CORNER

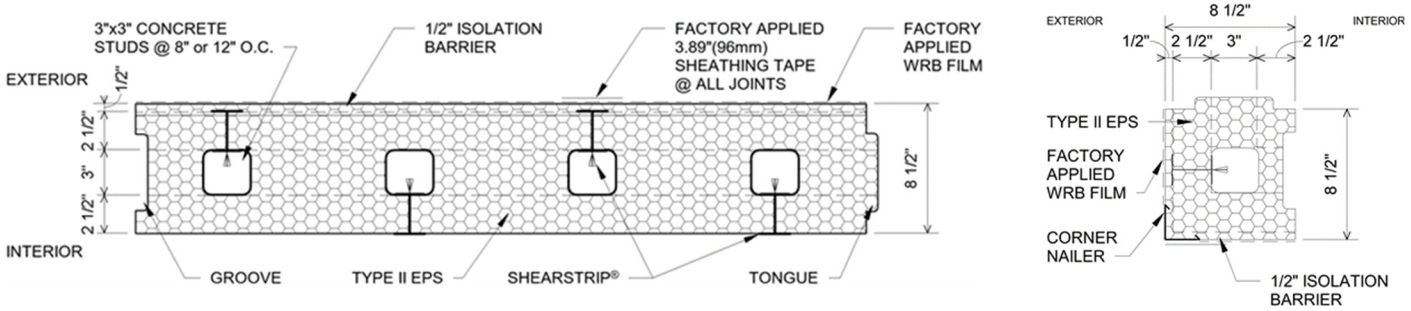
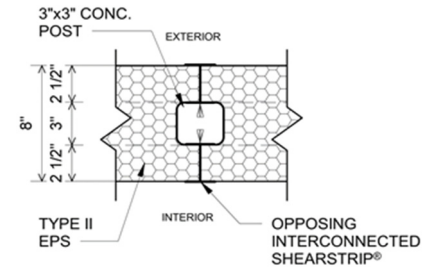
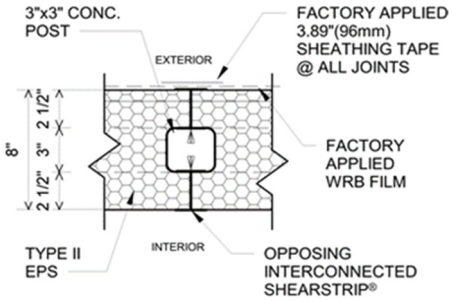


FIGURE 1D—TYPE IW PANEL AND CORNER

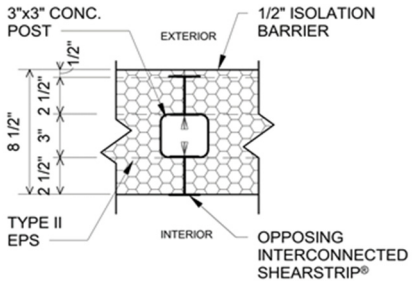
FIGURE 1—HERCUWALL®, SERIES 8, PANEL AND CORNER PLAN VIEW SECTIONS



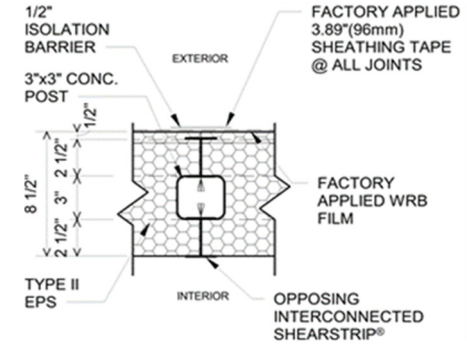
TYPE S



TYPE SW

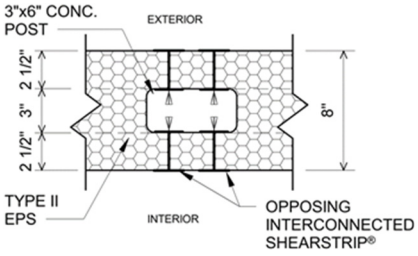


TYPE I

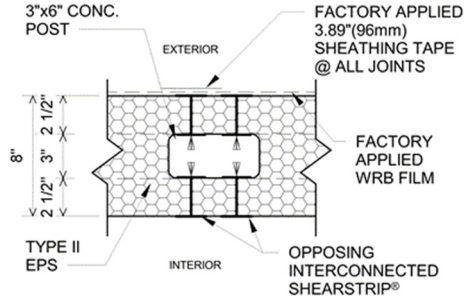


TYPE IW

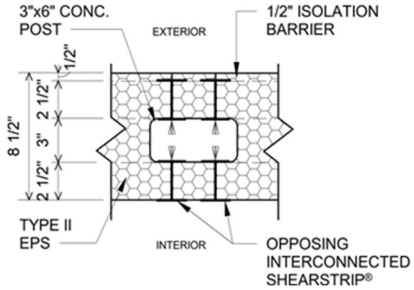
FIGURE 2A—SINGLE POST



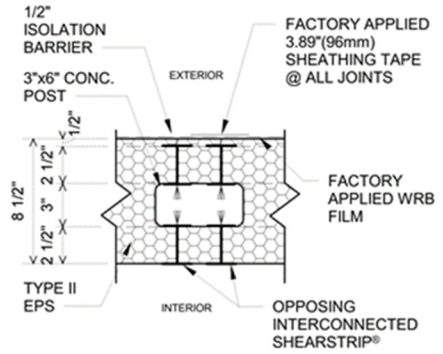
TYPE S



TYPE SW



TYPE I



TYPE IW

FIGURE 2B—DOUBLE POSTS

FIGURE 2—HERCUWALL®, SERIES 8, POST PLAN VIEW SECTIONS

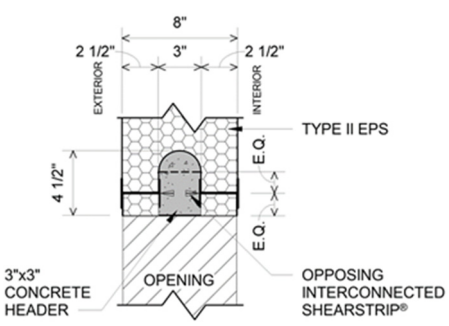


Figure 3A—HEADER

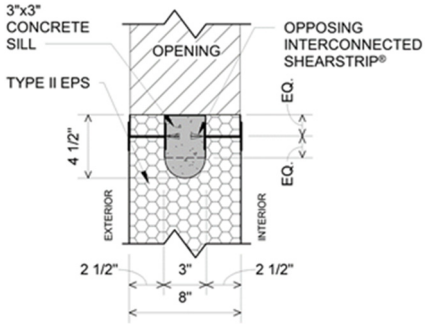


Figure 3B—SILL

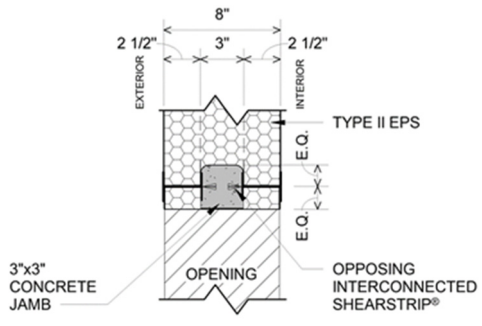


Figure 3C—JAMB

FIGURE 3—HERCUWALL®, SERIES 8, HEADER AND SILL SECTIONS

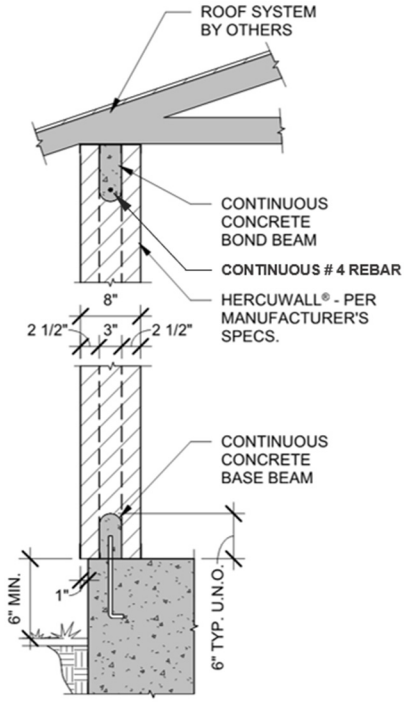


FIGURE 4—TYP. WALL SECTION

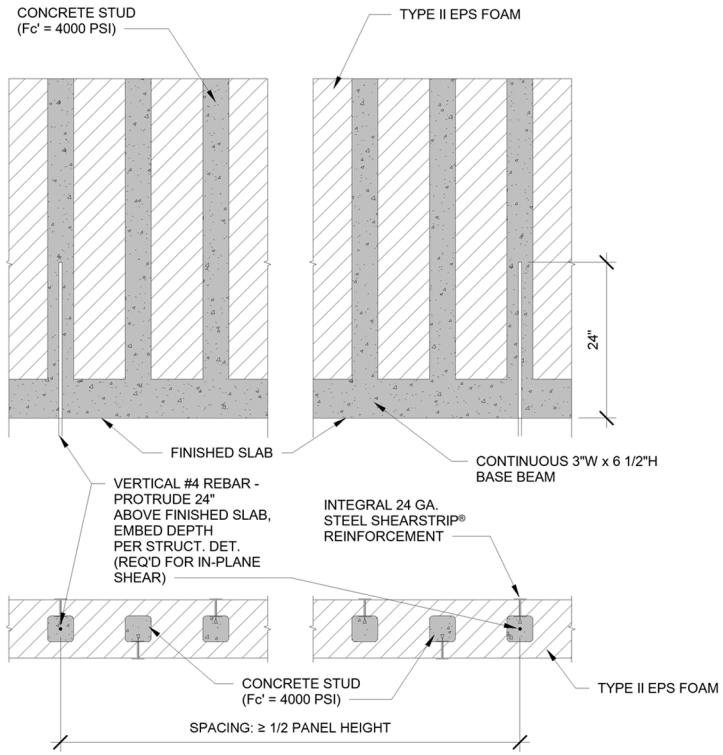
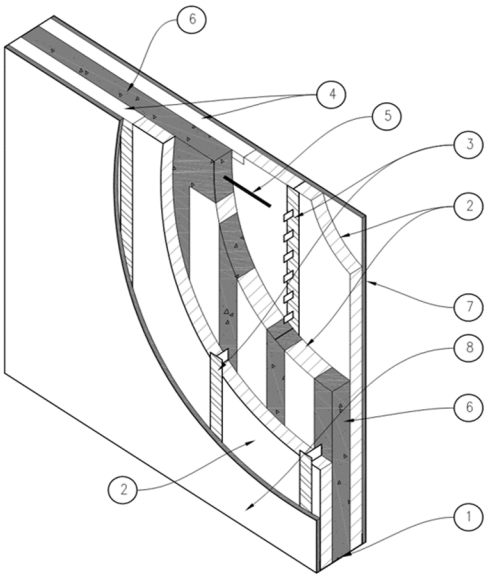


FIGURE 5—TYP. WALL SECTION AND EVATION



HercuWall® Series 8
One-Hour Fire-Resistance Rated Assembly Components

Item Number	Description
1	Bottom Track
2	HercuWall® Series 8 Panel
3	Metal ShearStrip®
4	Top Track
5	Reinforcing bar
6	Concrete studs or posts
7	Interior 5/8" Type X Gyp Board
8	Exterior 5/8" Type X Gyp Board

Installation Steps:

1) PERIMETER CAULKING (Not Shown)**:** Apply a min. 1/4 in. thick bead of caulk 1 inch in from the interior edge of the HercuWall bottom track as positioned around the perimeter of the building foundation.

2) BOTTOM TRACK: Install nominal 8 inch wide bottom track (Item 1) to the caulked foundation, pinning the track at a minimum of two locations (not shown) along the length of the track section and sealing the track to the foundation. Track corners are mitered so that there is no overlapping metal.

3) HERCUWALL PANEL: Place the first HercuWall Panel (Item 2) into the bottom track and fasten through the bottom track into the ShearStrip (Item 3) using a min. of two No. 8 x 3/4 inch long HD corrosion resistant screws (not shown) on the interior and exterior of each panel. Install adjacent panels in a similar manner, leveling and bracing the wall panels as construction continues.

4) TOP TRACKS: Place the top tracks (Item 4) on the exterior and interior sides of the wall (staggered from each other a minimum 24 inches) and fastened through the top tracks into the shear strips (Item 3) using a min. of two No. 8 x 3/4 inch long HD corrosion resistant screws (not shown).

5) REBAR: Place #4 rebar (Item 5) on the exterior side of the wall and into the prepared rebar hooks (not shown) located in the upper most position of the shear strip. Rebar size and spacing may vary depending upon the structural design requirements of the wall. Check plan specifications for rebar size and exact placement.

6) CONCRETE: Place Normal-weight concrete (Item 6) as specified in Section 3.2.6 of this report, in the HercuWall Panel forms to fill columns and beams.

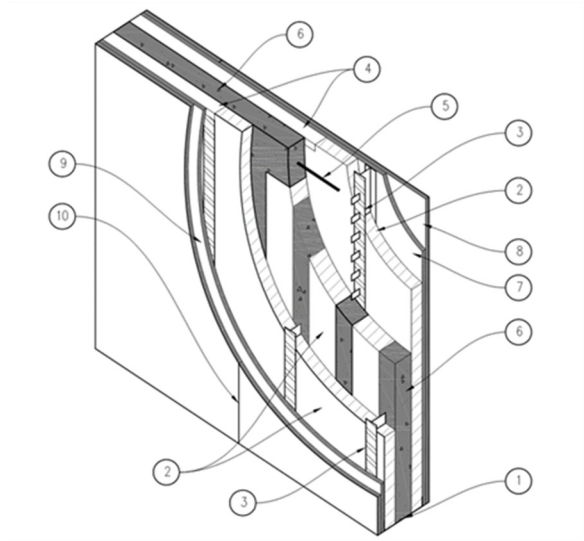
7) INTERIOR CLADDING: Install nominal 5/8 in. thick Type X gypsum board/panel (complying with ASTM C1178 or C1278 or C1396 or C1658) (Item 7) with long dimension parallel to metal ShearStrip (Item 3). Attach to metal ShearStrip (Item 3) using No. 6 x 1-1/4 inch long self-drilling drywall screws spaced 8 inch o.c. around board perimeter and 12 inch o.c. in the board field.

A. JOINT TAPE AND COMPOUND – (not shown) Vinyl or casein, dry or premixed joint compound applied to the face of gypsum board (Item 7) in two coats to all exposed fastener heads and board joints. A min. 2 inch wide paper, plastic, or fiberglass tape is embedded in first layer of compound over joints in gypsum board (not shown).

8) EXTERIOR CLADDING: Install nominal 5/8 in. thick Type X gypsum sheathing/board/panel (complying with ASTM C1177 or C1278 or C1396) (Item 8) with long dimension parallel to metal ShearStrip (Item 3). Attach to metal ShearStrip (Item 3) using No. 6 x 1-1/4 in. long self-drilling drywall screws spaced 8 inch o.c. around board perimeter and 12 inch o.c. in the board field.

A. JOINT TAPE AND COMPOUND – (not shown) Vinyl or casein, dry or premixed joint compound applied to face of the gypsum board (Item 8) in two coats to all exposed fastener heads and board joints. A min. 2 inch wide paper, plastic, or fiberglass tape is embedded in first layer of compound over joints in gypsum board (not shown).

FIGURE 6—HERCUWALL®, SERIES 8, TYPE S AND TYPE SW – ONE-HOUR FIRE-RESISTANCE-RATED ASSEMBLIES



HercuWall® Series 8
Two-Hour Fire-Resistance Rated Assembly Components

Item Number	Description
1	Bottom Track
2	HercuWall® Series 8 Panel
3	Metal ShearStrip®
4	Top Track
5	Reinforcing bar
6	Concrete studs or posts
7	Interior 5/8" Type X Gyp Board (Base Layer)
8	Interior 5/8" Type X Gyp Board (Face Layer)
9	Exterior 5/8" Type X Gyp Board (Base Layer)
10	Exterior 5/8" Type X Gyp Board (Face Layer)

Installation Steps:

1) PERIMETER CAULKING (Not Shown)**:** Apply a min. 1/4 in. thick bead of caulk 1 inch in from the interior edge of the HercuWall bottom track as positioned around the perimeter of the building foundation.

2) BOTTOM TRACK: Install nominal 8 inch wide bottom track (Item 1) to the caulked foundation, pinning the track at a minimum of two locations (not shown) along the length of the track section and sealing the track to the foundation. Track corners are mitered so that there is no overlapping metal.

3) HERCUWALL PANEL: Place the first HercuWall Panel (Item 2) into the bottom track and fasten through the bottom track into the ShearStrip (Item 3) using a min. of two No. 8 x 3/4 inch long HD corrosion resistant screws (not shown) on the interior and exterior of each panel. Install adjacent panels in a similar manner, leveling and bracing the wall panels as construction continues.

4) TOP TRACKS: Place the top tracks (Item 4) on the exterior and interior sides of the wall (staggered from each other a minimum 24 inches) and fastened through the top tracks into the shear strips (Item 3) using a min. of two No. 8 x 3/4 inch long HD corrosion resistant screws (not shown).

5) REBAR: Place #4 rebar (Item 5) on the exterior side of the wall and into the prepared rebar hooks (not shown) located in the upper most position of the shear strip. Rebar size and spacing may vary depending upon the structural design requirements of the wall. Check plan specifications for rebar size and exact placement.

6) CONCRETE: Place Normal-weight concrete (Item 6) as specified in Section 3.2.6 of this report, in the HercuWall Panel forms to fill columns and beams.

7) INTERIOR CLADDING (Base Layer): Install nominal 5/8 in. thick Type X gypsum board/panel (complying with ASTM C1178 or C1278 or C1396 or C1658) (Item 7) with long dimension parallel to metal ShearStrip (Item 3). Attach to metal ShearStrip (Item 3) using No. 6 x 1-1/4 inch long self-drilling drywall screws spaced 8 inch o.c. around board perimeter and 24 inch o.c. in the board field.

8) INTERIOR CLADDING (Face Layer): Install nominal 5/8 in. thick Type X gypsum board/panel (complying with ASTM C1178 or C1278 or C1396 or C1658) (Item 8) with long dimension parallel to metal shear strips (Item 3) with vertical board joint staggered 24 in. from the INTERIOR CLADDING (Base Layer). Attach to metal shear strips (Item 3) using No. 6 x 1-7/8 in. long self-drilling drywall screws spaced 8 inch o.c. around board perimeter and 12 inch o.c. in the board field. Joints and fastener heads receive an ASTM C840, Level 2 finish.

A. JOINT TAPE AND COMPOUND – (not shown) Vinyl or casein, dry or premixed joint compound applied to INTERIOR CLADDING (Face Layer) of gypsum board (Item 8) in two coats to all exposed fastener heads and board joints. A min. 2 inch wide paper, plastic, or fiberglass tape is embedded in first layer of compound over joints in gypsum board (not shown).

9) EXTERIOR CLADDING (Base Layer): Install nominal 5/8 in. thick Type X gypsum sheathing/board/panel (complying with ASTM C1177 or C1278 or C1396) (Item 9) with long dimension parallel to metal ShearStrip (Item 3) with vertical joint staggered 24 in. from the INTERIOR CLADDING (Base Layer). Attach to metal ShearStrip (Item 3) using No. 6 x 1-1/4 in. long self-drilling drywall screws spaced 8 inch o.c. around board perimeter and 24 inch o.c. in the board field.

10) EXTERIOR CLADDING (Face Layer): Install nominal 5/8 in. thick Type X gypsum sheathing/board/panel (complying with ASTM C1177 or C1278 or C1396) (Item 10) with long dimension parallel to metal shear strips (Item 3) with vertical board joint staggered 24 in. from the EXTERIOR CLADDING (BaseLayer). Attach to metal ShearStrip (Item 3) using No. 6 x 1-7/8 in. long self-drilling drywall screws spaced 8 inch o.c. around board perimeter and 12 inch o.c. in the board field. Joints and fastener heads receive an ASTM C840, Level 2 finish.

A. JOINT TAPE AND COMPOUND – (not shown) Vinyl or casein, dry or premixed joint compound applied to face of the EXTERIOR CLADDING (Face layer) of gypsum board (Item 10) in two coats to all exposed fastener heads and board joints. A min. 2 inch wide paper, plastic, or fiberglass tape is embedded in first layer of compound over joints in gypsum board (not shown).

FIGURE 7—HERCUWALL®, SERIES 8, TYPE S AND TYPE SW – TWO-HOUR FIRE-RESISTANCE-RATED ASSEMBLIES

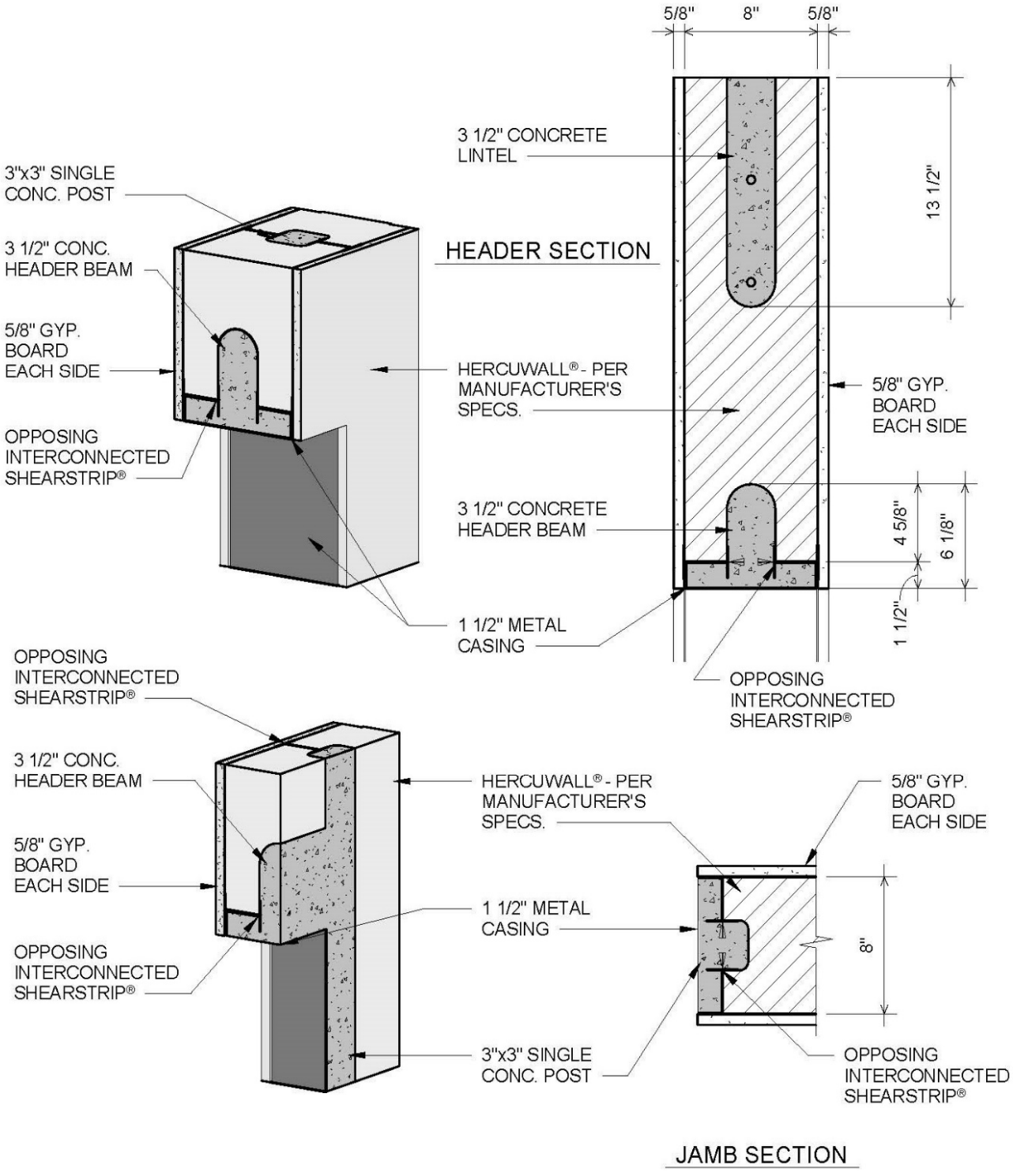


FIGURE 8—HERCUWALL® SERIES 8 TYPE S AND TYPE SW – PERIMETER DESIGN OF DOOR AND WINDOW OPENINGS WHEN USED IN BUILDINGS OF TYPES I, II, III OR IV CONSTRUCTION