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PRODUCT: **HERCUWALL® SERIES 8 INSULATED CONCRETE PANEL SYSTEM, TYPE S, SW, I, IW and A PANELS**

REPORT HOLDER: HercuTech Inc.

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CSI DIVISION: Concrete

CSI SECTION: 03 11 19 - Insulating Concrete Forming

APPLICABLE CODES: 2018, 2015 International Building Code (IBC)
2018, 2015 International Residential Code (IRC)
2019 California Green Building Standards Code (CALGreen),
Title 24, Part 11
2015, 2012 ICC 700 *National Green Building Standard*™
(ICC 700)

EVALUATED: Foam Plastic, Surface Burning Characteristics
Thermal Insulation, Physical Performance
Structural Capacity
Combustible Components in Exterior Walls for Use in Types I-IV Construction
Fastener Capacity
Fire-Resistance Ratings



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1.0 APPROVED FOR FOLLOWING:

APPROVED TYPES OF CONSTRUCTION:	Type IB, Type IIAB, Type IIIAB, Type IV, Type VAB
APPROVED USE:	Stay-in-place Concrete Forms
APPROVED INSTALLATIONS:	<ul style="list-style-type: none"> • Bearing and non-load Bearing exterior and interior walls • Bearing and non-load bearing fire-resistance rated walls • Exterior and interior walls in non-combustible construction

2.0 DESCRIPTION:

2.1 General:

HercuWall® Series 8 Insulated Concrete Panel Systems are concrete formworks comprised of Type II expanded polystyrene (EPS) foam plastic thermal insulation panels with integrated vertical cavities for placement of concrete spaced at 12 inch (305 mm) or 8 inches (203 mm) on center spacing and horizontal cavities at the top of panel (bond beam) and bottom of panel (base beam). The HercuWall® system includes a factory installed ShearStrip® in each vertical cavity, with the ShearStrip® alternating in cavity orientation, that protrudes into the vertical cavity for final embedment into the concrete at time of concrete placement, bonding the concrete to the EPS form while providing steel reinforcement.

The ShearStrip® components include wide flanges to provide sheathing/cladding fastening locations on the interior and exterior HercuWall® panel faces. HercuWall® Series 8 panels are available in product models in sizes as outlined in Table 1 of this report. See Section 8.1.2 of this report and Figures 4 through 8 for additional product details.

HercuWall® Series 8 panels are manufactured with tongue and groove edges, allowing for interlocking during installation. The HercuWall® system is provided with top and bottom steel tracks for installation at the jobsite. HercuWall® Series 8 panels function as stay-in-place forms for concrete placement. HercuWall® requires additional components as prescribed in the 2018 / 2015 IBC or 2018 / 2015 IRC and as outlined in this report, to create the finished wall assembly. HercuWall® Series 8 panels are produced with rough openings for windows and doors. HercuWall® includes header, sill, jamb and casing components integrated into the HercuWall® system to create rough openings.

HercuWall® Series 8 panels require installation at the jobsite with the minimum concrete specified in Section 2.2.10 of this report.

HercuWall® Series 8 panels comply for use in Types I-V construction, including use in fire-resistance rating applications. See sections 4.4 and 8.2 and sections 4.5 and 8.3 of this report respectively, for details.

HercuWall® Series 8 panel's bond beam, at the top of the wall with steel reinforcing bars as described in Section 2.2.9 of this report act as lintels (Table 7) to carry uniform gravity loads over openings. Lintels are available in dimensions as noted in Table 7. The bond beam is continuous around the exterior wall perimeter complete with rebar per site specifications, which tie the HercuWall® panels together to create the final structure.



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HercuWall® Series 8 panels are available with single post, and double post options, which are utilized where increased loads are anticipated due to point loads. Vertical posts are also used as jamb posts for panel openings. Figure 11C 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 11A and 11B illustrate typical header and sill configurations, respectively. HercuWall® single and double post options have two times the ShearStrip® components compared to standard vertical cavities (2 ShearStrip® in single post, 4 ShearStrip® in double post) to provide increased steel reinforcement at post locations. See Section 8.1.2 of this report Figures 9, 10 and 20 for details.

HercuWall® Series 8 panels are available in a Solid Shear option comprised of Type IX EPS foam plastic thermal insulation panels providing a solid concrete core and horizontal cavities at the top of panel (bond beam) and bottom of panel (base beam) where additional in-plane shear resistance is required. See Section 8.1.2 of this report Figures 18 and 19 for details.

HercuWall® Series 8 CFC (Cold-Formed Steel/Concrete) Box Beams are utilized as girts in unbraced stacked panel, load-bearing and non-load-bearing exterior, and interior demising walls to construct multi-story assemblies. CFC Box Beams provide increased truss bearing surface area when utilized in braced conditions. CFC box beam configurations can be used in unbraced or braced applications. CFC Box Beams are job site applied. See Section 8.1.2 of this report and Figures 20 through 21, Figures 27 through 30, and Figures 32 through 34 that illustrate typical CFC Box Beam configurations.

HercuWall® Series 8 panels are available in the following products and sizes:

Table 1. HercuWall® Series 8 Products and Accessories¹

HercuWall® Series 8 Panels						Panel Type
Thickness		Maximum Width		Maximum Height		
inches	mm	inches	mm	inches	mm	
8 inches	203 mm	48	1219	144	3658	Type S
8 inches	203 mm	48	1219	144	3658	Type SW ²
8.5 inches	216 mm	48	1219	144	3658	Type I
8.5 inches	216 mm	48	1219	144	3658	Type IW ²
8 inches	203 mm	48	1219	144	3658	Type A

1. Sizes of HercuWall® Series 8 panels outside of Table 1 are available upon request and are outside the scope of this report.
2. SW and IW products include a factory applied water-resistive barrier on the exterior surface of the HercuWall® panel.

2018 / 2015 IBC and 2018 / 2015 IRC construction require Engineering Design, considering applicable site load requirements, connection details and calculations including site specific requirements for approval by the authority having jurisdiction.

HercuWall® Series 8 panels comply with Section A4.404.3.3 of the 2019 CALGreen. HercuWall® Type SW and Type IW panels comply for use with CALGreen section 5.407.1 as water-resistive barriers.



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2.2 PRODUCT COMPONENTS

2.2.1 EPS Foam Plastic Panels:

HercuWall® Series 8 panels include expanded polystyrene (EPS) *foam plastic* thermal insulation up to 8.5 inches (216 mm) thickness. The EPS *foam plastic* component has a flame spread index of 25 or less, and smoke developed index of 450 or less evaluated following UL 723 and complies with 2018 / 2015 IBC Section 2603.3 and 2018 / 2015 IRC Section 316.3 for thicknesses noted when protected with a code prescribed thermal barrier as outlined in Section 4.2.2 of this report.

The EPS foam in HercuWall® Series 8 panels is listed by an *approved agency* and complies with Type II specifications per ASTM C578 for use as thermal insulation. The EPS foam in HercuWall® Series 8 Solid Shear panels is listed by an *approved agency* and complies with Type IX specifications per ASTM C578 for use as thermal insulation.

2.2.2 ShearStrip®:

HercuWall® Shearstrip® components are factory located in the HercuWall® concrete cavities, alternating between cavity faces. The installation includes protrusion for the ShearStrip® into the concrete during placement, providing reinforcing to the concrete structure.

HercuWall® ShearStrip® steel is minimum 24-gauge (0.022 inches) (0.56 mm) thickness with 2 inch (51 mm) flanges and conforms to ASTM A653/A653M SS Grade 40 with G90 galvanized coating. See Section 8.1.2 Figure 12 for details.

2.2.3 Top and Bottom Tracks:

HercuWall® top and bottom track components are supplied to the jobsite with HercuWall® Series 8 panels. Bottom tracks are used at the base for locating the bottom of HercuWall® panels prior to placement of concrete. Top tracks are installed on the top of each HercuWall® panel (1 track on exterior side, 1 track on interior side). Top and bottom tracks are non-structural components and may be cut on the jobsite as required for panel installation and to allow passage of mechanical, electrical and plumbing (MEP) elements.

HercuWall® top and bottom track steel is minimum 24-gauge (0.022 inches) (0.56 mm) thickness and conforms to ASTM A653/A653M SS Grade 33 with G90 galvanized coating.

2.2.4 Window and Door Casings:

HercuWall® window and door casing components are factory applied to HercuWall® Series 8 panels, for creating openings for field installation of doors and windows.

HercuWall® window and door casing steel is minimum 20-gauge (0.033 inches) (0.84 mm) thickness and conforms to ASTM A653/A653M SS Grade 33 with G60 galvanized coating.



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2.2.5 CFC Box Beam:

HercuWall® CFC (cold form steel/concrete) Box Beam components are supplied to the jobsite with HercuWall® Series 8 panels. The CFC Box Beam form is installed to the HercuWall® Top Tracks with self-tapping screws to hold the CFC Box Beam form in position during concrete placement. Prefabricated #4 rebar cages are installed into the CFC Box Beam form for concrete reinforcement. ½ inch (13 mm) diameter J-bolts or #4 rebar dowels are embedded into the CFC Box Beam concrete and protrude into the Base Beam of the above HercuWall® panel for unbraced stacked panel applications. For braced stacked panel applications, embedded J-bolts are utilized to attach a top plate to the CFC Box Beam. Rebar cage details, J-bolts spacing, embedment and locations details can be found in Figures 21 through 22, Figures 28 through 31 and Figures 33 through 35.

HercuWall® CFC Box Beams are cold formed steel of nominal 16-gauge (0.06 inches) (1.6 mm) thickness and conforms to ASTM A653/A653M SS Grade 33 with G60 galvanized coating.

2.2.6 Truss Saddle Bracket:

HercuWall® truss saddle brackets are supplied to the jobsite with HercuWall® Series 8 panels, for attachment of trusses to the top of HercuWall® Series 8 panels. HercuWall® Truss Saddle Brackets are cold formed steel of nominal 20-gauge (0.035 inches) (0.89 mm) thickness and conforms to ASTM A653/A653M SS Grade 33 with G90 galvanized coating. See Section 8.1.2 Figure 14 for details.

2.2.7 Embed:

HercuWall® Embeds are supplied to the jobsite with HercuWall® Series 8 panels, for bottom of wall connections in platform framing to create multi-story construction. HercuWall® Embeds are cold formed steel of nominal 20-gauge (0.035 inches) (0.89 mm) thickness and conforms to ASTM A653/A653M SS Grade 33 with G90 galvanized coating. See Section 8.1.2 Figure 13 for details.

2.2.8 Rebar Clips:

HercuWall® Rebar Clips are factory applied to ShearStrip® components. The Rebar Clips are connected by an integral snap-on feature, that allows positioning for placement of rebar before concrete placement.

2.2.9 Rebar (reinforcement):

Rebar is used in the factory and jobsite installations of HercuWall® Series 8 panels 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), #4 rebar. A continuous #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 15. All rebar lap splices are to be a minimum of 48 bar diameter. The bond beam above openings must be designed as a lintel in accordance with Section 8.1.2 and Table 7 of this report.

2.2.10 Concrete:

Concrete materials and proportioning for use with HercuWall® Series 8 panels shall conform to ACI 318 and be composed of the following components: 3/8 inch (9.5 mm) maximum size aggregate, with coarse aggregate not to exceed 45%, with a slump flow test spread of 22 inches ± 2 inches (559 mm ± 51 mm). Concrete used shall have a minimum compressive strength of 4,000 psi (27.6 MPa) at 28 days.



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2.2.11 Water-Resistive Barrier:

HercuWall® Series 8 SW and IW panel types incorporate a polyester film laminated over the exterior EPS surface to create a water-resistive barrier complying with Section 1404.2 of the 2018 / 2015 IBC and Section R703.2 of the 2018 / 2015 IRC. The polyester film is applied at a nominal thickness of 3 mils (0.003 inches) (0.076 mm).

2.2.12 HercuWall® Seaming Tape:

HercuWall® Series 8 SW and IW panels require installation of HercuWall® Seaming Tape to ensure continuity of the water-resistive barrier at exterior panel joints to prevent water ingress. HercuWall® Seaming Tape is UV stabilized for durability and weathering resistance after installation.

HercuWall® Seaming Tape is of 3 mils (0.003 inches) (0.076 mm) nominal thickness, and of 3.78-inch (96 mm) width for factory application, and 1.89-inch (48 mm) width for field applications.

3.0 DESIGN:

Design loads to be resisted by HercuWall® Series 8 panels shall be determined in accordance with the applicable building codes.

Loads to be resisted by HercuWall® Series 8 panels shall not exceed the allowable loads outlined in Section 8.1.1 Tables 2 through 14 of this report.

Loads to be resisted by HercuWall® single and double post assemblies shall not exceed the allowable loads outlined in Section 8.1.1 Tables 4, 5 and 10 of this report.

Loads to be resisted by HercuWall® headers and sills shall not exceed the allowable loads outlined in Section 8.1.1 Table 6 of this report. Consideration for transverse loading over the width of the header and sill length is required in the Engineering Design.

Loads to be resisted by HercuWall® bond beams acting as lintels shall not exceed the allowable loads outlined in Table 7 of this report. Engineering Design is to consider the tributary load over openings transferred through the lintel beam to HercuWall® posts, and transverse loading over the width of the bond beam / lintels.

CFC Box Beam capacities are to be designed in accordance with 2018 / 2015 IBC Section 19 and ACI 318. Combined axial and transverse loads on wall assemblies which include CFC Box Beam are to be within allowable loading outlined in Tables 2 through 5 of this report.

End of wall conditions where intersecting wall angles are greater than 135 degrees, but less than 180 degrees require a post element at both sides of the intersection.

Window and door openings require a jamb post element adjacent to both vertical sides of the opening.

Allowable connections to HercuWall® panels are outlined in Tables 12 and 13 for perpendicular and parallel members. Connections outside of this report are to be designed by a Registered Design Professional and comply with the Engineering Design.

Allowable connection capacities at the bottom of the HercuWall® panels to the foundation with three different connection methods are noted in Table 11. Connections outside of this report are to be designed by a Registered Design Professional and comply with the Engineering Design.

Where used in fire-resistance rated construction, HercuWall® Series 8 panels are approved for use to 100% allowable load capacities outlined in Section 8.2 of this report.



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Loads in the tables may be applied to shorter panel spans or lengths/heights where supported by Engineering Design. Engineering Design is to consider load paths and anchorage of the HercuWall® Series 8 panel assembly, which are outside the scope of this report.

Extrapolation of allowable loads is outside the scope of this report.

4.0 INSTALLATIONS:

4.1 General:

Installation of HercuWall® Series 8 panels must comply with the manufacturer's published installation instructions, this report, and the applicable code(s). Where conflicts exist, this report and the applicable building code govern. Connections not identified in this report including connection of building elements to the HercuWall® Series 8 panel system, and connection of the HercuWall® Series 8 panels to the underlying structure is outside the scope of this report and shall be designed by a registered design professional. Inspection of concrete anchors is to be part of the Special Inspection as outlined in Section 4.1.1 of this report. Installations evaluated for load carrying capacity are outlined in Section 8.1.2. of this report, see Figures 4 through 26.

4.1.1 Special Inspection:

IBC: HercuWall® Series 8 panel construction requires special inspections as defined by Section 1705 for concrete construction Section 1705.3 of the 2018 / 2015 IBC. Special inspections are to include activities as outlined in 2018 / 2015 IBC Table 1705.3 including Type Items 1., 3., 4., 5., 6., 7., 8., 11., and 12., including concrete cylinder testing. Where exterior cladding is exterior insulation and finish systems (EIFS), special inspection in accordance with 2018 / 2015 IBC Section 1705.16 is required. Where a water-resistive barrier coating complying with ASTM E2570 is applied over HercuWal® Type S, I, and A panels, special inspection is required per the 2018 / 2015 IBC Section 1705.16.1.

IRC: Where used as walls under the IRC, Special Inspection is to be conducted following requirements of the IBC as noted above.

4.2 Interior:

4.2.1 General:

HercuWall® Series 8 panels are to be separated from the interior space in accordance with Section 4.2.2 and 4.2.3 of this report, as appropriate. Connection of interior decorum, furniture and cabinetry are approved when installed in accordance with the manufacturer's installation instructions.

4.2.2 Occupied Space:

4.2.2.1 Use with a Code Prescribed Thermal Barrier.

2018 / 2015 IBC: Except as provided in Sections 2603.4.1 and 2603.9 of the 2018 / 2015 IBC, HercuWall® Series 8 panels exposed to occupancies of the building interior shall be covered by a thermal barrier of minimum ½ inch thick gypsum board complying with ASTM C1396, or by a material complying with NFPA 275 compatible for use with the Type II EPS insulation at thicknesses of 8 inches (203 mm) or greater. Gypsum shall be mechanically connected to the HercuWall® ShearStrip® steel elements in accordance with the applicable code. Taping and mudding of fastener heads and joints are optional where gypsum is used, except where HercuWall® Series 8 panels are used in Types I-IV and fire-resistance rated applications, where installation shall conform to Sections 4.4 and 8.2 of this report.

2018 / 2015 IRC: Unless allowed under Section R316.5 of the 2018 / 2015 IRC, HercuWall® Series 8 panels exposed to occupancies of the building shall be protected by a thermal barrier of minimum



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1/2 inch gypsum wall board complying with ASTM C1396, 23/32 inch thick structural wood panel, or a material complying with NFPA 275 compatible for use with the Type II EPS insulation at thicknesses of 8 inches (203 mm) or greater. Where gypsum or structural wood panels are used, the thermal barrier shall be mechanically connected to the HercuWall® ShearStrip® steel elements in accordance with the applicable code. Taping and mudding of fastener heads and joints are optional where gypsum is used, except where HercuWall® Series 8 panels are used in Types VA fire-resistance rated applications, where installation shall conform to Sections 4.4 and 8.2 of this report.

4.2.2.2 Use Without a Code Prescribed Thermal Barrier.

No alternative thermal barriers are approved under this current report for use with HercuWall® Series 8 panels.

4.2.3 Attic and Crawlspace:

4.2.3.1 Use with a Code Prescribed Ignition Barrier:

HercuWall® Series 8 panels exposed in attics and crawlspaces shall be protected with a code prescribed ignition barrier as defined in the Section 2603.4.1.6 of the 2018 / 2015 IBC and Sections R316.5.3 and R316.5.4 of the 2018 / 2015 IRC. The ignition barrier is to cover all exposed foam.

4.2.3.2 Use Without a Code Prescribed Ignition Barrier:

No alternative ignition barriers are approved under this current report for use over HercuWall® Series 8 panels

4.3 Exterior Walls:

4.3.1. Above Grade:

4.3.1.1 Sheathing:

Exterior walls requiring sheathing as a structural element in the Engineering Design, shall have sheathing type and installation done in accordance with the applicable code. Where used in Types I-IV and fire-resistance rated construction, sheathing shall comply with Section 4.4 and 8.2 or Section 4.5 and 8.3 of this report as appropriate.

4.3.1.2 Weather Protection:

HercuWall® Series 8 S, I and A panels used as exterior walls require installation with a code prescribed water-resistive barrier, exterior cladding and flashings for providing weather protection in accordance with Section 1403.2 of the 2018 / 2015 IBC and Section R703.1.1 of the 2018 / 2015 IRC. Water-resistive barriers and exterior cladding materials shall comply with Section 1404 of the 2018 / 2015 IBC and R703 of the 2018 / 2015 IRC. Water resistive barriers and cladding components shall be installed in accordance with the applicable code and the manufacturer's installation instructions.

HercuWall® Series 8 SW and IW panels include a laminated water-resistive barrier, and require HercuWall® Seam Tape at joints, exterior cladding and flashings for providing weather protection in accordance with Section 1403.2 of the 2018 / 2015 IBC and Section R703.1.1 of the 2018 / 2015 IRC. Exterior cladding materials shall comply with Section 1404 of the 2018 / 2015 IBC and R703 of the 2018 / 2015 IRC. Water resistive barriers and cladding components shall be installed in accordance with the applicable code and the manufacturer's installation instructions.

Where used in Types I-IV construction, HercuWall® Series 8 panels weather protection elements shall comply with Section 4.5 and 8.3 of this report.



4.3.1.3 Vapor Retarders:

HercuWall® Series 8 panels EPS component is a Type II vapor retarder at thicknesses 8 inches (203 mm) or greater, so where a Class II vapor retarder is required, this can be omitted.

4.3.1.4 Termite Protection:

Where HercuWall® Series 8 panels are installed in areas defined as “very heavy” as indicated in Figure 2603.8 of the 2018 / 2015 IBC and Figure R301.2(6) of the 2018 / 2015 IRC, and where the EPS foam component is located within 6 in. (152 mm) above grade from exposed earth, construction is to follow Section 2603.8 of the 2018 / 2015 IBC and R318.4 of the 2018 / 2015 IRC. This construction requires all structural elements of walls, floors, ceilings and roofs to be of noncombustible materials or preservative-treated wood, unless an approved method of protecting the foam plastic from subterranean termite damage is provided to the authority having jurisdiction.

4.3.2. Below Grade:

The use of HercuWall® Series 8 panels for below grade has not been evaluated and is outside the scope of this report.

4.4. Fire-Resistance-Rated Construction:

4.4.1 1-Hour Load-Bearing Assemblies:

HercuWall® Series 8 including solid shear wall panels are approved for use in 1 hour load-bearing fire-resistance rated applications, where construction of the wall assembly includes 1 layer of minimum 5/8 inch (16 mm) Type X gypsum wall board complying with ASTM C1396 on each panel face. The addition of cladding and a water-resistive barrier is not considered to reduce the 1-hour fire-resistance rating, where connection of the water resistive barrier and cladding penetrates the ShearStrip® components, and no load is exerted on the exterior gypsum sheathing element.

See Section 8.2.1 of this report for details of installation for use in 1-hour load bearing fire-resistance-rated applications.

4.4.2 2-Hour Load-Bearing Assemblies:

HercuWall® Series 8 including solid shear wall panels are approved for use in 2-hour load-bearing fire-resistance rated applications where construction of the wall assembly includes 2 layers of minimum 5/8 inch (16 mm) Type X gypsum wall board complying with ASTM C1396 on each panel face. Gypsum board joints are required offset a minimum of 24 inches (610 mm) between gypsum layers. The addition of cladding and a water-resistive barrier is not considered to reduce the 2-hour fire-resistance rating, where connection of the water resistive barrier and cladding penetrates the ShearStrip® components, and no load is exerted on the exterior gypsum sheathing element.

See Section 8.2.2 of this report for details of installation for use in 2-hour fire-resistance-rated applications.

4.5 Type I-IV (Non-combustible) Construction:

HercuWall® Series 8 including solid shear wall panels are approved for use in exterior walls of Types I-IV (non-combustible) construction through evaluation to NFPA 285 for buildings greater than 40 ft (12 m) height, with EPS foam component having potential heat of 2,250 BTU/ft² (25.5 MJ/m²) per 1-inch (25 mm) thickness of insulation evaluated following NFPA 259.

See Section 8.3 of this report for details of installation for use in Types I-IV construction applications.



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5.0 LIMITATIONS

- Projects using HercuWall® Series 8 panel systems require Engineering Design submitted to the authority having jurisdiction, considering anticipated loading, the complete load path from the roof to the foundation, connection details and calculations in accordance with the applicable building code. When used in stacked panel applications, the load paths for the CFC Box Beam are to be considered.
- Installation of the HercuWall® Series 8 panel system is to match this report, the Engineering Design and site specifications.
- HercuWall® Series 8 panels are required to be separated from interior space by an approved thermal barrier when installed in accordance with Section 4.2.2 of this report and the applicable code. Where used in fire-resistant rated construction or Types I-IV construction as exterior walls, the thermal barrier is to comply with Sections 4.4 and 8.2 or 4.5 and 8.3 respectively.
- HercuWall® Series 8 panels used in Attic and Crawlspace applications require installation of an ignition barrier in accordance with Section 4.2.3.1 of this report.
- HercuWall® Series 8 S and I panels are required to be protected by a code-compliant water-resistive barrier prior to cladding application when installed on the exterior of the building above grade. HercuWall® Series 8 SW and IW panels require application of HercuWall® Seam Tape at panel joints and panel to track locations to seal the building envelope from water ingress, prior to installation of exterior claddings in accordance with Section 4.3.1 of this report.
- HercuWall® Series 8 when used in fire-resistance-rated construction are to be installed in accordance with Section 4.4 and Section 8.2 of this report.
- HercuWall® Series 8 panels used in Types I-IV Construction are to be installed in accordance with Section 4.5 and Section 8.3 of this report.
- HercuWall® Series 8 panels installed in termite activity areas defined as “very heavy” require protection in accordance with Section 2603.8 of IBC or Section R318.4 of IRC as applicable, as outlined in Section 4.3.1.4 of this report.
- Special inspections are required as per Section 1705 of the 2018 / 2015 IBC in accordance with Section 4.1.1 of this report.
- HercuWall® Series 8 panels and accessories are manufactured in Tempe, AZ with inspections by QAI Laboratories.

6.0 SUPPORTING INFORMATION:

The following data has been evaluated for HercuWall® Series 8 panels:

- Data outlining compliance for surface burning characteristics evaluated to UL 723.
- Data outlining compliance of Type II EPS foam for use as thermal insulation per ASTM C578.
- Data outlining strength testing conducted following method ASTM E72.
- Data outlining use as a water-resistive barrier.
- Data outlining details for use in load-bearing fire-resistance rated construction per ASTM E119.
- Data outlining compliance with NFPA 285 for use of combustible materials in exterior walls in non-combustible construction.



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7.0 MARKING:



Figure 1. Example of HercuWall® Series 8 Panels Finished Panel and Seam Tape Labels



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8.0 RESULTS / RATINGS AND DETAILS:

8.1 HercuWall® Series 8 Panels Allowable Load Information:

8.1.1 HercuWall® Series 8 Panels Allowable Load Capacities:

Table 2. HercuWall® Series 8 Panels Allowable Axial and Transverse Combined Loads 12 inch (305 mm) Stud Spacing

Panel Types S, SW, I, IW and A – Stud Spacing 12” (305 mm) ^{1,2,3,4,5}												
TRANSVERSE LOAD (psf)	0	5	10	15	20	25	28	30	35	40	45	48
PANEL HEIGHT (inches)	AXIAL CAPACITY (lbs/ft)											
Up to 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					
Maximum 144	4530	4358	4176	3993	3806	3624						

1. Transverse and axial combined load capacity is determined with bond and base beam supports. Design of connection details for anchorage of panel to substrate is outside the scope of this report and is to follow the Engineering Design.
2. Transverse and axial combined load capacity are determined for panels only and do not consider the contribution from sheathing materials.
3. Connection details including the connection of wall panels to the underlying structure is outside the scope of this report except where noted in Tables 9, 10 and 11, and are to be in accordance with the Engineering Design and project specifications.
4. Allowable loads are based off maximum panel capacity for loading conditions shown, with a factor of safety of 3 applied.
5. Axial loads were determined with an eccentricity of t/6 (0.92 inches) from center of panel.



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PANEL SYSTEM, TYPE S, SW, I, IW and A PANELS

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Table 3. HercuWall® Series 8 Panels Allowable Axial and Transverse Combined Loads, 8 inch (203 mm) Stud Spacing

Panel Types S, SW, I, IW and A – Stud Spacing 8” (203 mm) ^{1,2,3,4,5}												
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 (lbs/ft)											
Up to 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					
Maximum 144	6811	6537	6259	5985	5712	5434						

1. Transverse and axial combined load capacity is determined with bond and base beam supports. Design of connection details for anchorage of panel to substrate is outside the scope of this report and is to follow the Engineering Design.
2. Transverse and axial combined load capacity are determined for panels only and do not consider the contribution from sheathing materials.
3. Connection details including the connection of wall panels to the underlying structure is outside the scope of this report except where noted in Tables 9, 10 and 11, and are to be in accordance with the Engineering Design and project specifications.
4. Allowable loads are based off maximum panel capacity for loading conditions shown, with a factor of safety of 3 applied.
5. Axial loads were determined with an eccentricity of t/6 (0.92 inches) from center of panel.

Table 4. HercuWall® Series 8 Single Post Allowable Axial and Transverse Combined Loads

Single Post Type S, SW, I and IW – Post Interconnected with Double ShearStrip® (1 ShearStrip® Each Cavity Face) ^{1,2,3,4,5}											
TRANSVERSE LOAD (plf)	0	10	15	20	30	40	50	56.8	70	80	90.7
POST HEIGHT (inches)	AXIAL CAPACITY (lbs)										
Up to 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			
Maximum 144	5673	5524	5376	5222	5073	4924					

1. Transverse and axial combined load capacity is determined with bond and base beam supports. Design of connection details for anchorage of panel to substrate is outside the scope of this report and is to follow the Engineering Design.
2. Transverse and axial combined load capacity are determined for post only and do not consider the contribution from sheathing materials.
3. Connection details including the connection of wall panels to the underlying structure is outside the scope of this report except where noted in Tables 9, 10 and 11, and are to be in accordance with the Engineering Design and project specifications.
4. Allowable loads are based off maximum panel capacity for loading conditions shown, with a factor of safety of 3 applied.
5. Axial loads were determined with an eccentricity of t/6 (0.92 inches) from center of panel.



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Table 5. HercuWall® Series 8 Double Post Allowable Axial and Transverse Combined Loads

Double Post Type S, SW, I and IW – Post Interconnected with Double ShearStrip® (2 ShearStrip® Each Cavity Face) ^{1,2,3,4,5}												
TRANSVERSE LOAD (plf)	0	15	30	45	60	75	90	105	107	135	150	165
POST HEIGHT (inches)	AXIAL CAPACITY (lbs)											
Up to 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			
Maximum 144	10972	10401	9830	9259	8688	8121	7550	6979 ⁶				

1. Transverse and axial combined load capacity is determined with bond and base beam supports. Design of connection details for anchorage of panel to substrate is outside the scope of this report and is to follow the Engineering Design.
2. Transverse and axial combined load capacity are determined for post only and do not consider the contribution from sheathing materials.
3. Connection details including the connection of wall panels to the underlying structure is outside the scope of this report except where noted in Tables 9, 10 and 11, and are to be in accordance with the Engineering Design and project specifications.
4. Allowable loads are based off maximum panel capacity for loading conditions shown, with a factor of safety of 3 applied.
5. Axial loads were determined with an eccentricity of 1/6 (0.92 inches) from center of panel.
6. Maximum allowable transverse load is 97 plf.

Table 6. HercuWall® Series 8 Header and Sill Allowable Transverse Loads

HercuWall® Series 8 Header and Sill Allowable Transverse Loads ^{1,2,3} Panel Types S, SW, I, IW and A	
LENGTH (inches)	ALLOWABLE TRANSVERSE LOAD (plf)
Up to 102	90
108	65
114	59
120	57
126	57
132	57
138	57
Maximum 144	50

1. Allowable loads are based off maximum header and sill capacity for loading conditions shown, with a factor of safety of 3 applied.
2. Engineering Design is to consider tributary width of the header and sill for determination of transverse load.
3. Header and sill are required reinforced with interior and exterior oriented ShearStrip® steel elements.

Table 7. HercuWall® Series 8 Bond Beam Acting as Lintels Allowable Uniform Gravity Loads

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

7-A

7-B

7-C

SPAN (S)

DEPTH (D)

$L = (S + 1)$ #4 REBAR

1. Allowable loads are based off maximum capacity for loading conditions shown, with a factor of safety of 3 applied.
2. Jamb post is required to be reinforced with 1 pair of ShearStrip® oriented from interior to exterior.
3. Spans not outlined in Table 7 can be specified in Engineering Design when following ACI 318.



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Table 8. HercuWall® Series 8 Panels Allowable In-Plane Racking Shear Loading

HercuWall® Series 8 In-plane Racking Shear Resistance (Seismic Categories A and B Only)						
Panel Types S, SW, I, IW and A – Stud Spacing 12” (305 mm)^{1,2,3,4}						
Panel Height (inches)	Concrete Length (inches)			Concrete Length (inches)		Overturning Anchorage
	63	75	63	75		
	Allowable In-Plane Shear Capacity (plf)			Allowable Overturning Net Tension (lbs)		
96 or less	301	390	2408	3120	#4 rebar dowels protruding from the foundation and embedded 24 inches into wall panel at the center of the vertical stud at panel ends. See Figure 16 for details of installation.	
108	271	351	2439	3159		
114	258	334	2451	3173		
120	247	318	2470	3180		
126	238	304	2499	3192		
132	226	291	2486	3201		
138	219	279	2519	3209		
144	209	268	2508	3216		

HercuWall® Series 8 Reinforced In-plane Racking Shear Resistance (Seismic Categories A and B Only)							
Panel Types S, SW, I, IW and A – Stud Spacing 12” (305 mm)^{1,2,3,4}							
Panel Height (inches)	Concrete Length (inches)			Concrete Length (inches)			Overturning Anchorage
	27	39	63	27	39	63	
	Allowable In-Plane Shear Capacity (plf)			Allowable Overturning Net Tension (lbs)			
96 or less	508	646	337	4064	5168	2696	#4 rebar dowels protruding from the foundation and embedded 24 inches into wall panel at the center of the vertical stud at panel ends. See Figure 17 for details of installation.
108	446	585	304	4014	5265	2736	
114	423	545	288	4019	5178	2736	
120	399	529	276	3990	5290	2760	
126	380	499	263	3990	5240	2762	
132	348	486	253	3828	5346	2783	
138	327	466	242	3761	5359	2783	
144	312	448	233	3744	5376	2796	

1. Panel width is dimensions from outside post to outside post (ie minus the EPS) for the purpose of calculating shear capacities.
2. Allowable loads are based off maximum HercuWall® capacity for loading conditions shown, with a factor of safety of 3 applied.
3. ShearStrip® standard installation of alternating between vertical studs was used in determination of the above values. Additional ShearStrip® reinforcing can be included in the assembly, without detracting from the above allowable racking shear values.
4. Connection details for anchoring of dowels and bolts into underlying structure to resist loads transferred by HercuWall® panels is outside the scope of this report and is to follow ACI 318 and the Engineering Design.



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Table 9. HercuWall® Series 8 Solid Shear Panels Allowable In-Plane Racking Shear Loading

HercuWall® Series 8 Solid Shear Wall In-Plane Racking Shear Resistance (Seismic Categories A and B Only) Panel Types S, SW, I and IW^{1,2,3,4}			
Panel Height (inches)	Concrete Length (inches)		Overturning Anchorage
	20	20	
	Allowable In-Plate Shear Capacity (plf)	Allowable Overturning Net Tension (lbs)	
96 or less	609	4872	#4 rebar dowels protruding from the foundation and embedded 24 inches into wall panel at each end of the solid concrete section. See Figure 18 for details of installation.
108	551	4959	
114	522	4959	
120	494	4940	

HercuWall® Series 8 Reinforced Solid Shear Wall In-Plane Racking Shear Resistance (Seismic Categories A and B Only) Panel Types S, SW, I and IW^{1,2,3,4}									
Panel Height (inches)	Concrete Length (inches)				Concrete Length (inches)				Overturning Anchorage
	18	24	27	36	18	24	27	36	
	Allowable In-Plate Shear Capacity (plf)				Allowable Overturning Net Tension (lbs)				
96 or less	629	705	684	795	5032	5640	5472	6360	#4 rebar dowels protruding from the foundation and embedded 24 inches into the wall panel at each end of the solid concrete section, with additional reinforcement from base of wall to the bond beam. See Figure 19 for details of installation.
108	580	629	612	711	5220	5661	5508	6399	
114	549	596	580	669	5216	5662	5510	6356	
120	523	569	555	637	5230	5690	5550	6370	
126	498	526	527	612	5229	5523	5534	6426	
132	476	518	504	589	5236	5698	5544	6479	
138	456	495	483	564	5244	5693	5555	6486	
144	443	463	464	536	5316	5556	5568	6432	

1. Panel width is the length of solid concrete core section (ie minus the EPS) for the purpose of calculating shear capacities.
2. Allowable loads are based off maximum HercuWall® capacity for loading conditions shown, with a factor of safety of 3 applied.
3. ShearStrip® standard installation of alternating between vertical studs was used in determination of the above values. Additional ShearStrip® reinforcing can be included in the assembly, without detracting from the above allowable racking shear values.
4. Connection details for anchoring of dowels and bolts into underlying structure to resist loads transferred by HercuWall® panels is outside the scope of this report and is to follow ACI 318 and the Engineering Design.

Table 10. HercuWall® Series 8 Between Door / Window Between Panel Allowable In-Plane Racking Shear Loading

HercuWall® Series 8 Reinforced Between Window Twin Post In-Plane Racking Shear Resistance (Seismic Categories A and B Only) Panel Types S, SW, I and IW^{1,2,3,4}			
Panel Height (inches)	Concrete Length (inches)		Overturning Anchorage
	12	12	
	Allowable In-Plate Shear Capacity (plf)	Allowable Overturning Net Tension (lbs)	
96 or less	283	2264	#4 rebar dowels protruding from the foundation and embedded 24 inches into wall panel at each end of the solid concrete section. See Figure 19 for details of installation.
108	233	2097	

1. Panel width is the length of solid concrete core section (ie minus the EPS) for the purpose of calculating shear capacities.
2. Allowable loads are based off maximum HercuWall® capacity for loading conditions shown, with a factor of safety of 3 applied.
3. ShearStrip® standard installation of alternating between vertical studs was used in determination of the above values. Additional ShearStrip® reinforcing can be included in the assembly, without detracting from the above allowable racking shear values.
4. Connection details for anchoring of dowels and bolts into underlying structure to resist loads transferred by HercuWall® panels is outside the scope of this report and is to follow ACI 318 and the Engineering Design.

Table 11. HercuWall® Series 8 Allowable Connection Capacities at Bottom of Wall

HercuWall® Bottom of Wall Allowable Connection Loads (lbs.)^{1,2,4}				
Connection Methods and Hardware	Load Directions ^{3,7}			Reference Figure No.
	Uplift	F1	F2	
½" (#4) Rebar Dowel @ Min 3" Embed	453	1127	323	2A
½" Ø ATR w/Nuts and Washer @ Min 3" Embed	751	1214	290	2B
½" Ø J-Bolt w/Nut @ Min 3" Embed ⁶	751	1150 (540) ⁵	290	2C

1. Allowable loads are based on a safety factor of 3.0 applied to the ultimate load determined from testing.
2. Loads shown are governed by concrete failure, unless noted otherwise.
3. For combined loading, the connector must satisfy the unity equation: Demand/Capacity Ratio (one direction) + Demand/Capacity Ratio (other direction) ≤ 1.0
4. Connection to other materials (wood, steel, etc.) shall be evaluated separately.
5. Value for end of beam condition (minimum 6 inches)
6. Load values for J-Bolt are calculated per IBC, Chapter 19 which refers to ACI 318-19
7. See Figure 2D for direction of application of load.

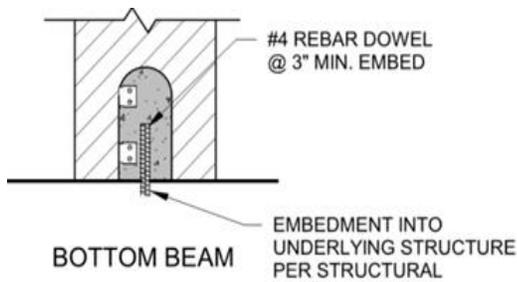


Figure 2A – Rebar Dowel

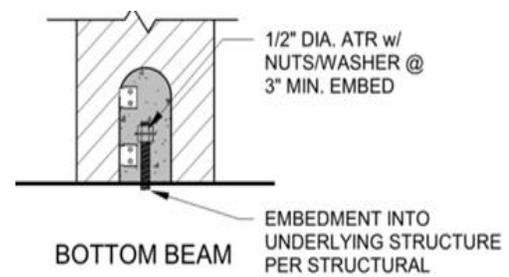


Figure 2B – All Thread Rod

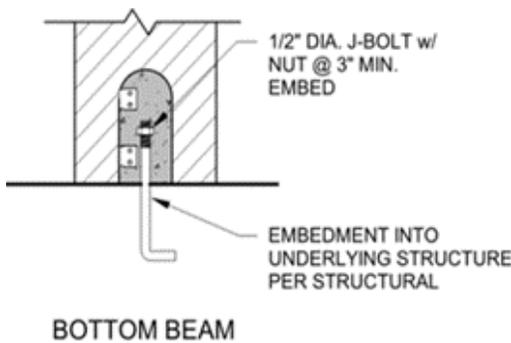


Figure 2C – J-Bolt

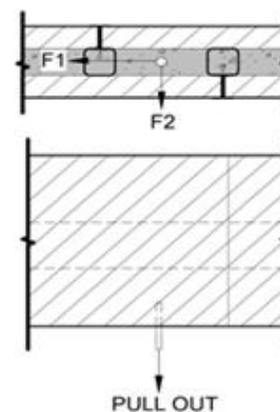


Figure 2D – Load Diagram

Table 12. HercuWall® Series 8 Allowable Connection Capacities at Member Perpendicular to Wall

Truss to HercuWall® Connection Shear Capacity - Members Perpendicular to Wall^{1,2}				
CONNECTION	ALLOWABLE CONNECTION CAPACITIES (lbs)			
	F1	F2(+)	F2(-)	UPLIFT
HercuWall® Saddle Bracket with (8)10D X 1-1/2" (38 mm) nails at Bottom Chord	230	278	429	442
HercuWall® Embed with (4) #9 X 2-1/2" (64 mm) Wood Screws at Top Chord	599	503	562	423

1. Allowable loads are based on maximum tested HercuWall® Connection capacity for loading conditions shown with a factor of safety of 3 applied.
2. See Figure 3 for Connection Loading Diagram.

Table 13. HercuWall® Series 8 Top of Wall Connection Capacities at Member Parallel to Wall

HercuWall® Top of Wall Connections – Members Parallel to the Wall^{5,6}				
CONNECTION		ALLOWABLE CONNECTION CAPACITIES (lbs)		
		F1	F2	UPLIFT
1/2" (13 mm) Dia. X 6" (152 mm) ATR with Nuts and Washers at 3" (75 mm) Min. Embed	Bottom Chord Connection	1214	289	751
1/2" (13 mm) Dia. X 7" (178 mm) ATR with Epoxy at 4" (102 mm) Min. Embed ^{1,4}		1288	394	799
5/8" (16 mm) Dia. X 9" (229 mm) ATR with PL3/16 x 2 x 2 at 6.5" (165 mm) Min. Embed ²		2144	320	1453
1/2" (13 mm) Dia. X 5" (127 mm) Concrete Bolt With 3-1/2" (89 mm) Min. Embed ^{3,4}		1522	375	565
HercuWall® Embed with (4) #9 X 2-1/2" (64 mm) Wood Screws	Top Chord Connection	548	532	423

1. Epoxy must be slow cure and code listed as an alternative to cast-in-place reinforcing bars governed by ACI 318 and IBC Chapter 19
2. 3/16" (4.8 mm) x 2" (51 mm) x 2" (51 mm) bearing plate minimum steel specification, ASTM A36; ASTM A-1011 Grade 33
3. Screw anchor manufactured from heat-treated steel complying with SAE J403 Grade 10B21
4. 1/2" (13 mm) Ø x 7" (178 mm) J-Bolt at 4" (102 mm) min. embedment allowed as alternate anchor.
5. Allowable loads are based on maximum tested HercuWall® connection capacity for loading conditions shown with a factor of safety of 3 applied.
6. See Figure 3 for Load Diagram for HercuWall Embed connection.

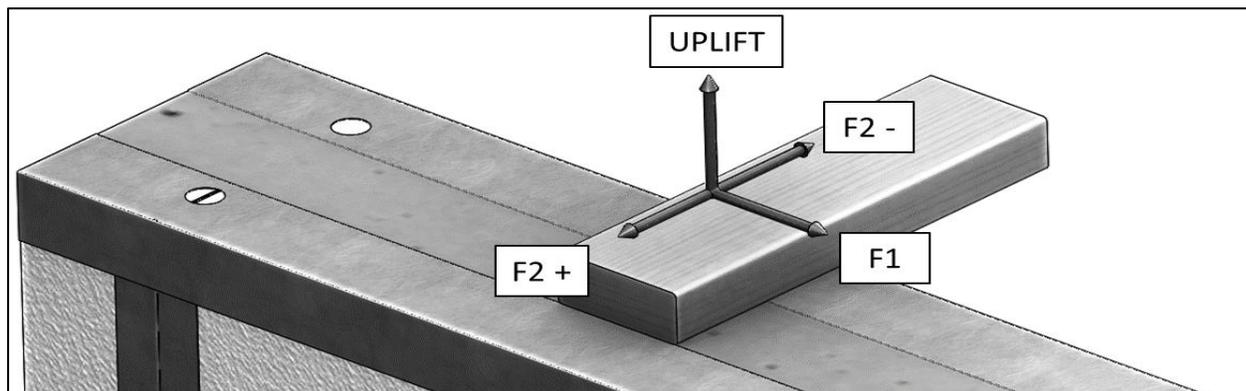


Figure 3. Load Diagram for Truss Saddle Bracket and Embed Connection

8.1.2 HercuWall® Series 8 Panel Installation Details:

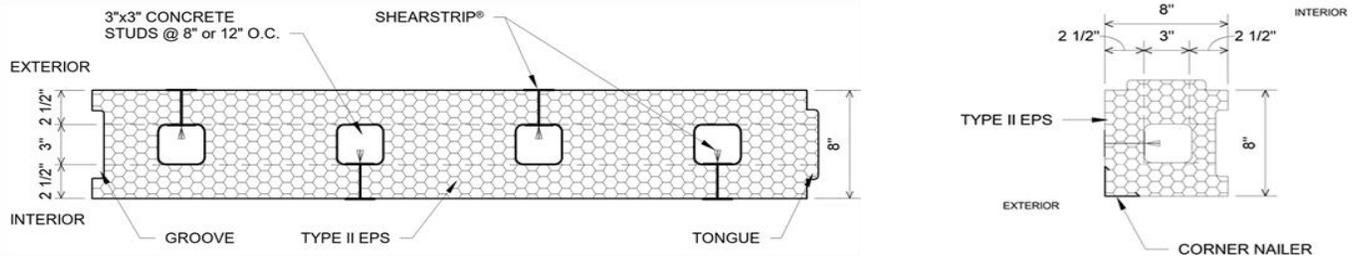


Figure 4. HercuWall® Series 8 Type S Panel and Corner Details

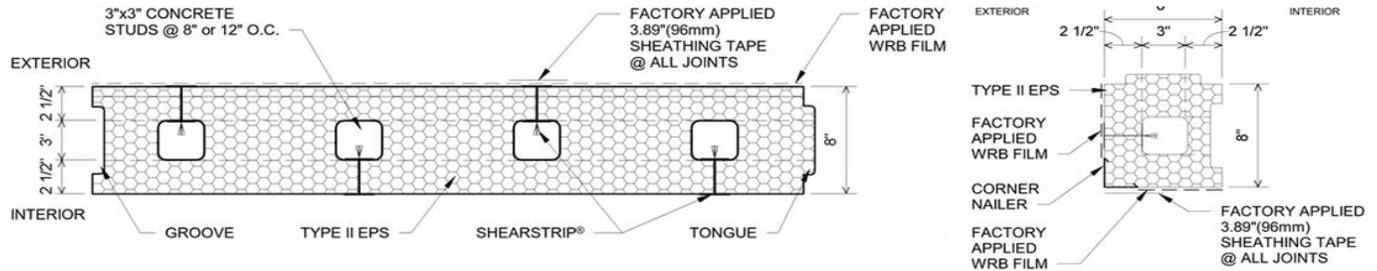


Figure 5. HercuWall® Series 8 Type SW Panel and Corner Details

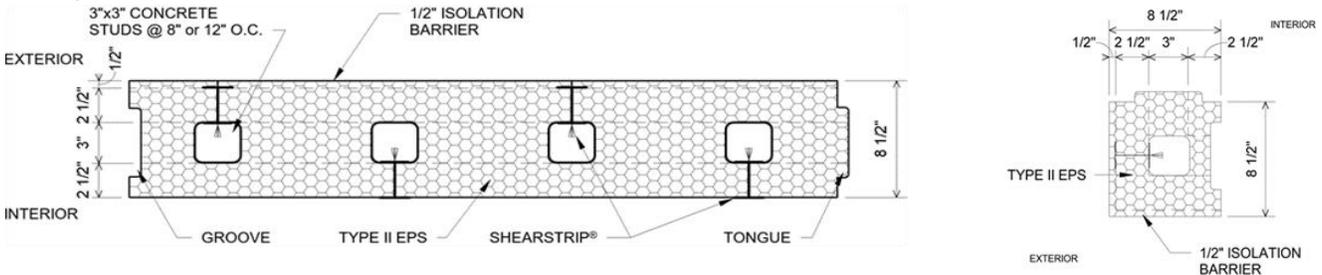


Figure 6. HercuWall® Series 8 Type I Panel and Corner Details

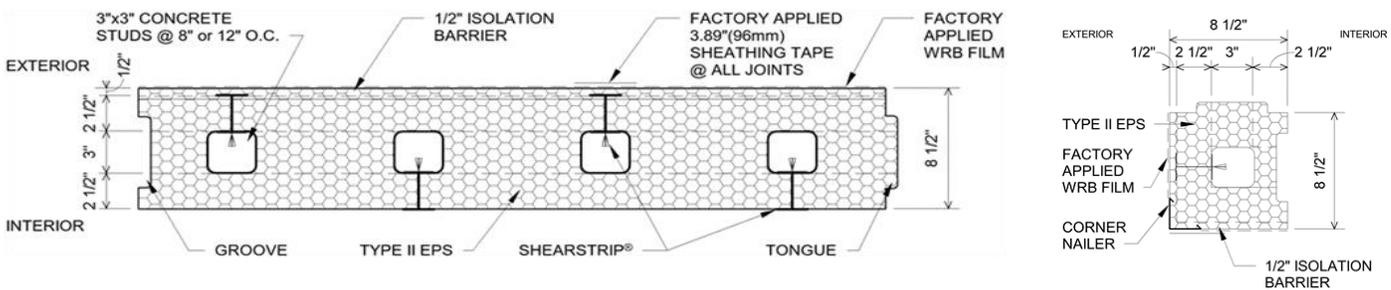


Figure 7. HercuWall® Series 8 Type IW Panel and Corner Details

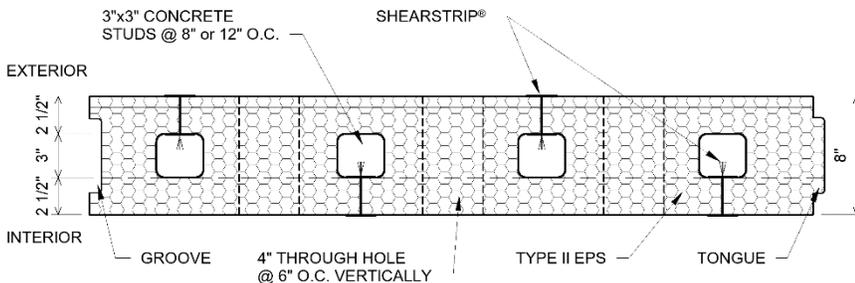


Figure 8. HercuWall® Series 8 Type A Panel Details

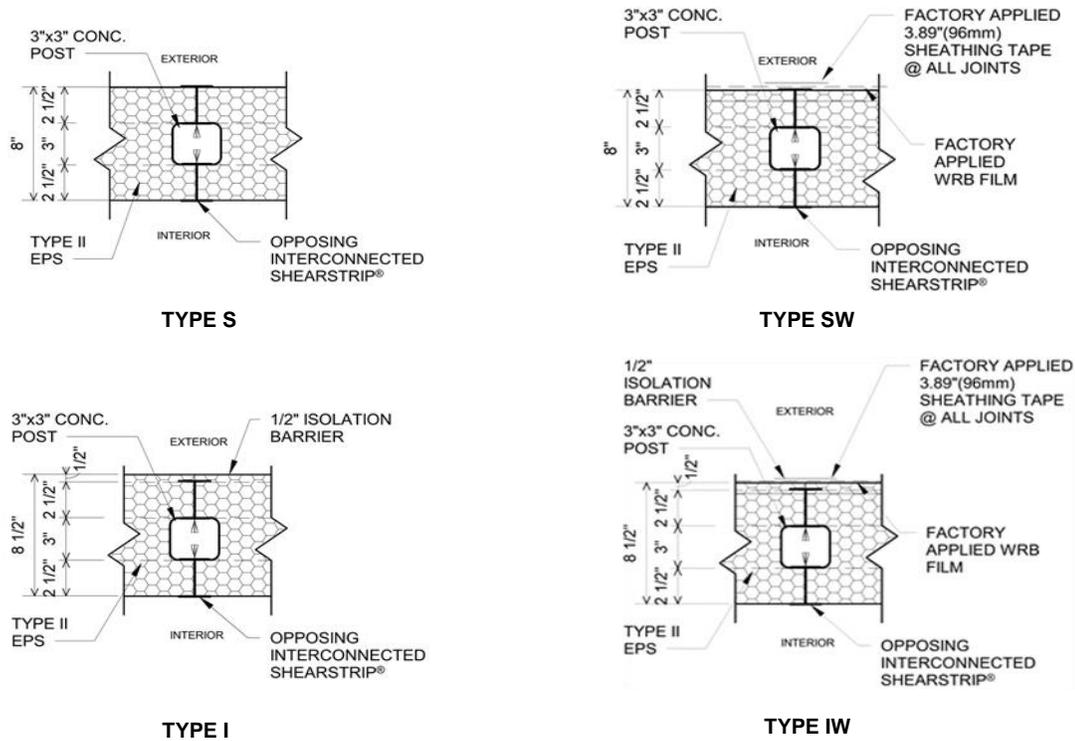


Figure 9 – HercuWall® Single Post Details

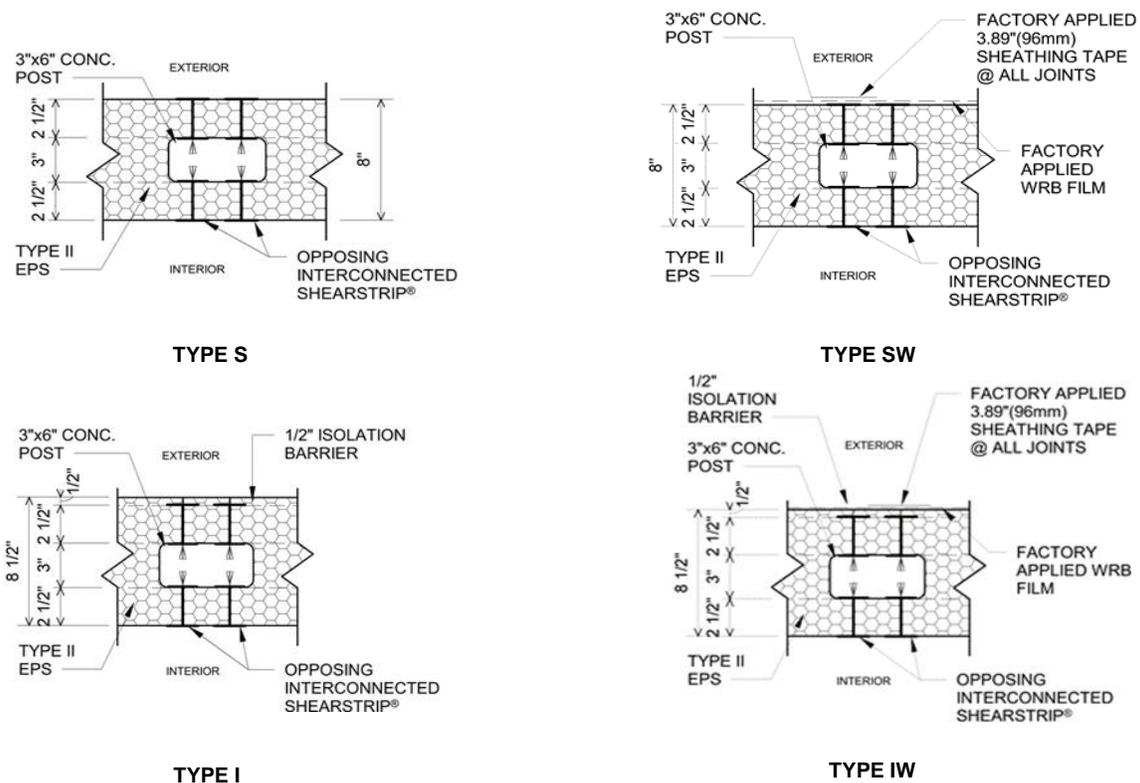


Figure 10 – HercuWall® Double Post Details

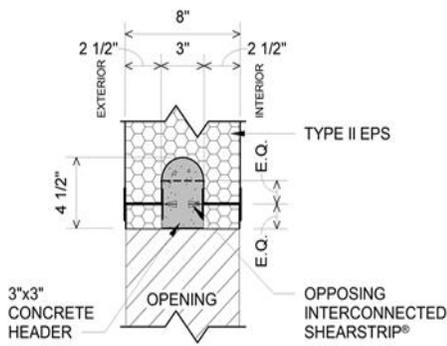


Figure 11A—Header

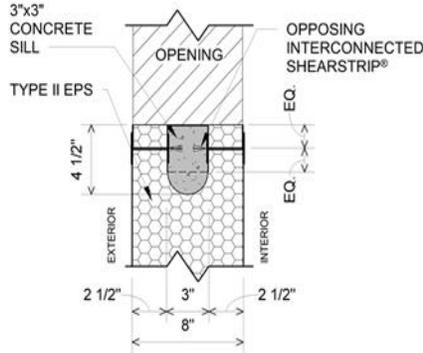


Figure 11B - Sill

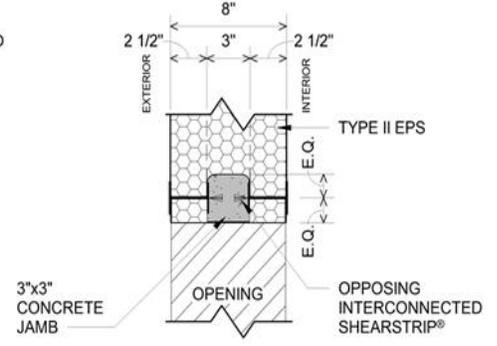


Figure 11C - Jamb

Figure 11 – HercuWall® Series 8 Header, Sill and Jamb Sections

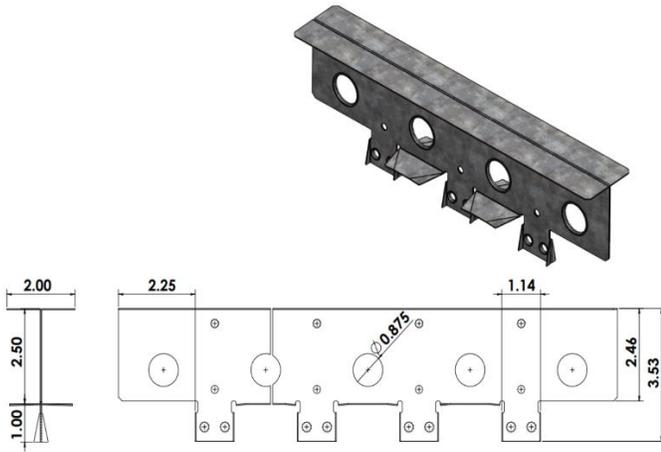


Figure 12 - HercuWall® ShearStrip

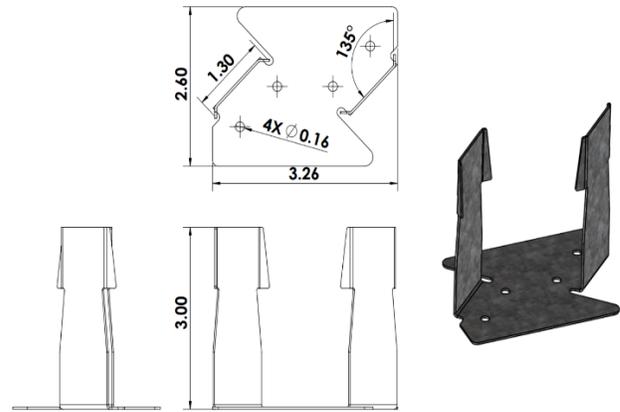


Figure 13 - HercuWall® Embed

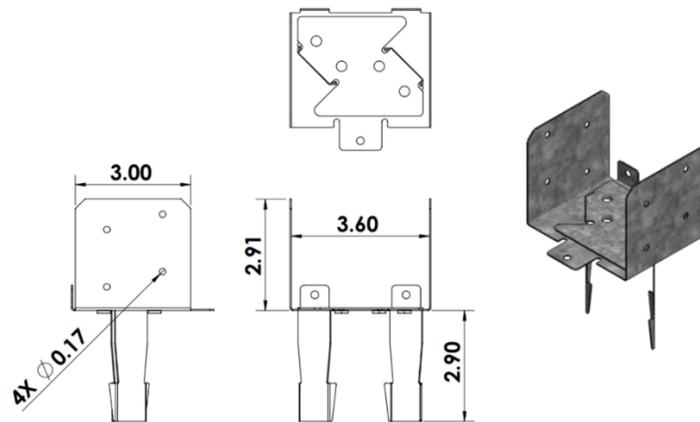


Figure 14 - HercuWall® Truss Saddle Bracket

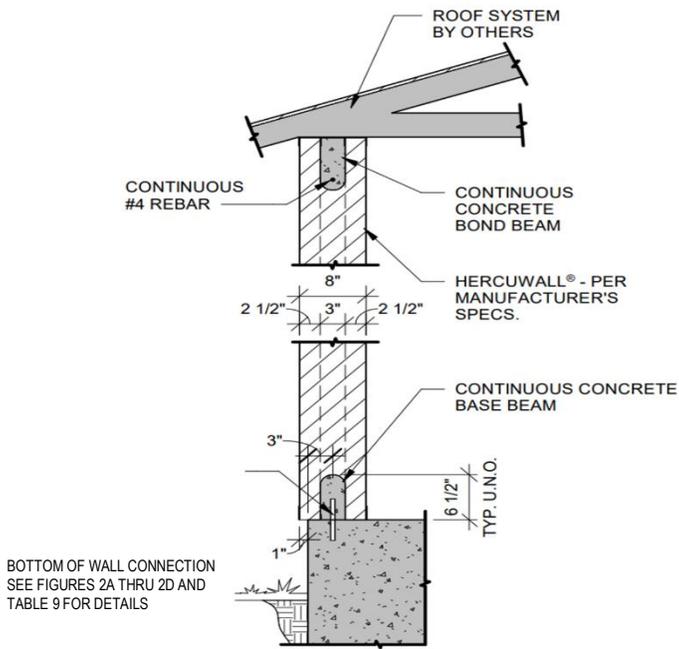


Figure 15– Typical Wall Section

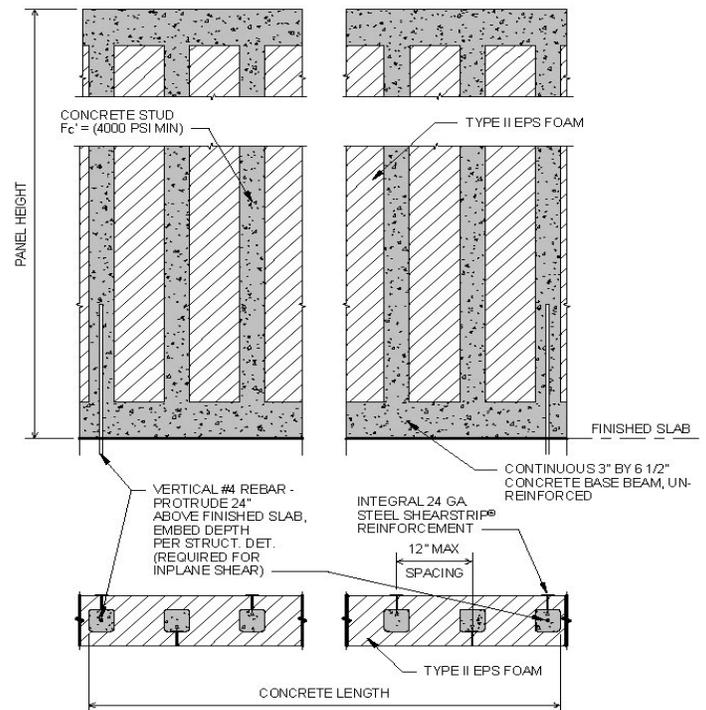


Figure 16– Typical Unreinforced Wall Section and Elevation

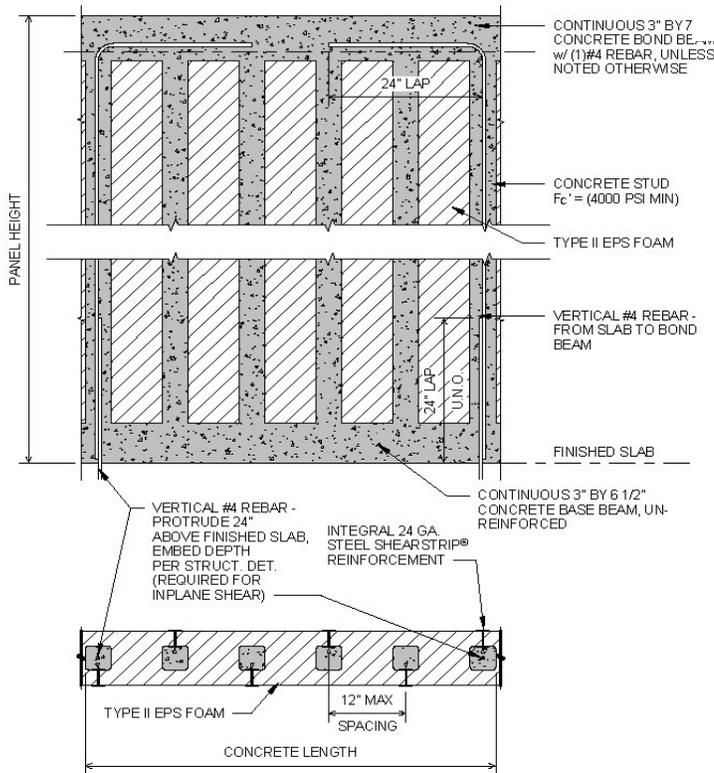


Figure 17– Typical Reinforced Wall Section and Elevation

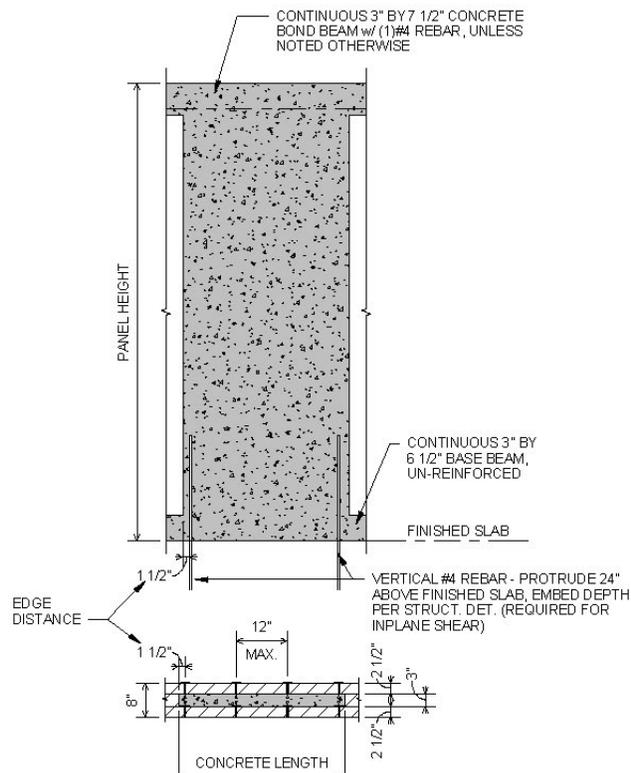


Figure 18– Typical Unreinforced Solid Shear Wall Section and Elevation

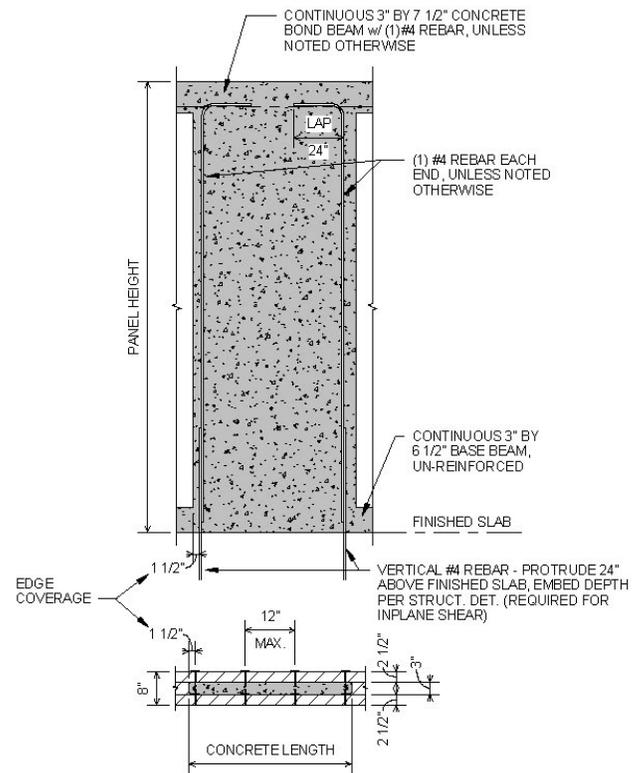


Figure 19– Typical Reinforced Solid Shear Wall Section and Elevation

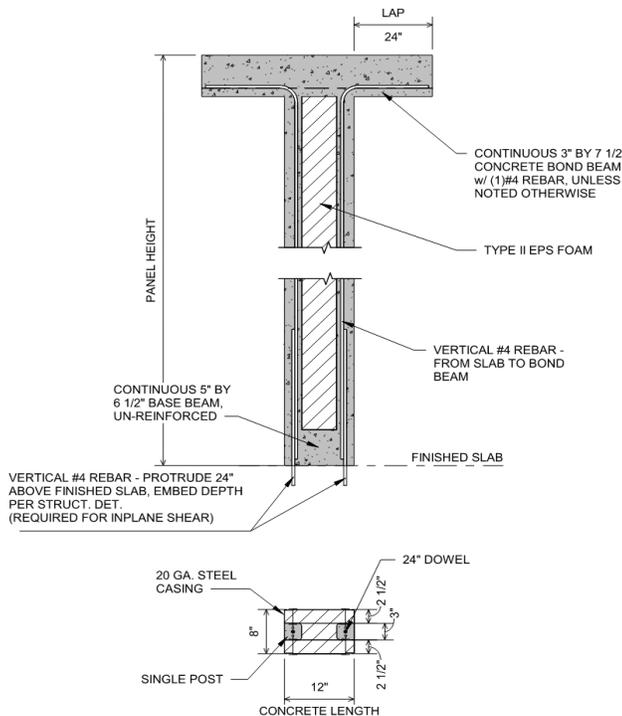


Figure 20– Typical Door / Window Between Panel Section and Elevation

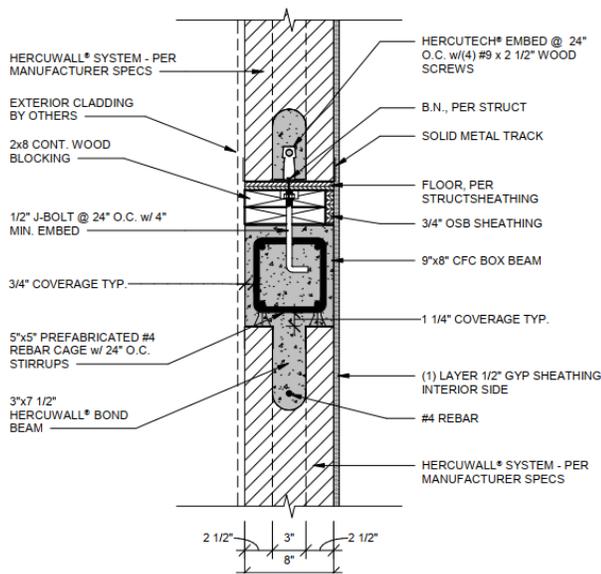


Figure 21 – Typical HercuWall® CFC Box Beam Wall Construction with Lumber Embed

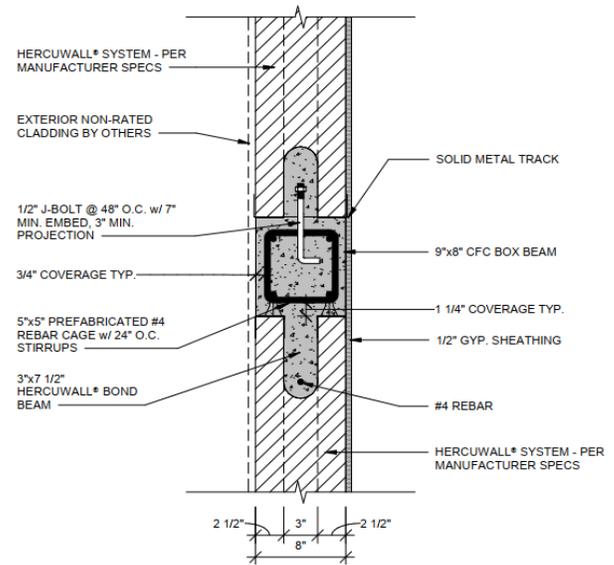


Figure 22– Typical HercuWall® CFC Box Beam Wall Construction Concrete Option

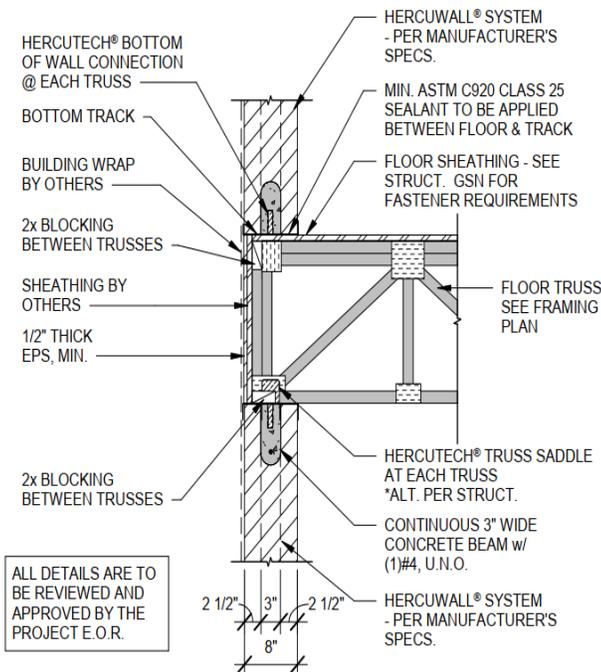


Figure 23 – HercuWall® Truss Perpendicular to Wall (Section)

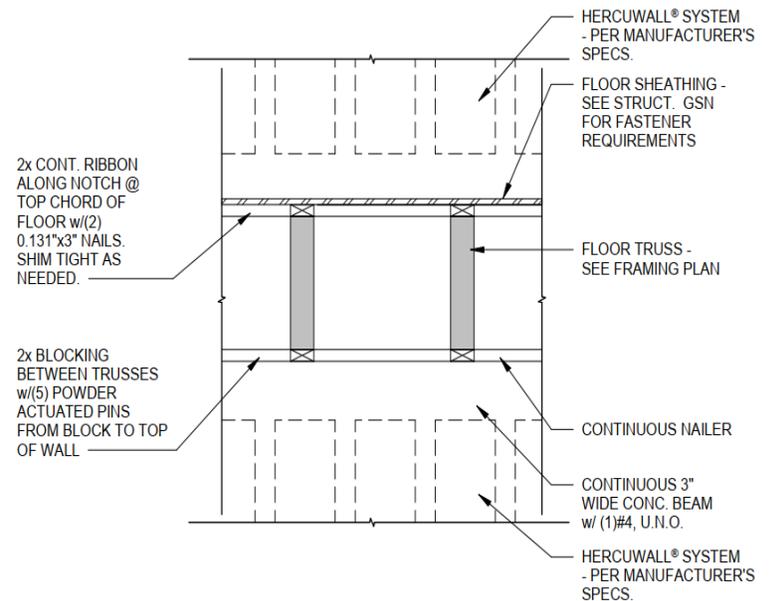


Figure 24 – HercuWall® Truss Perpendicular to Wall (Elevation)

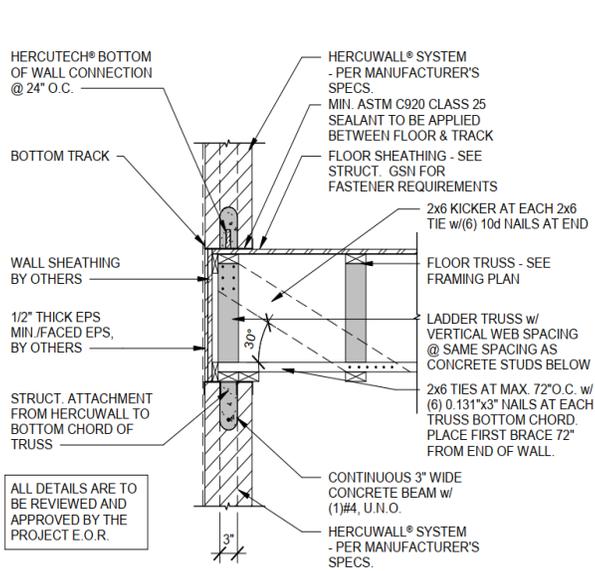


Figure 25 – HercuWall® Truss Parallel to Wall (Section)

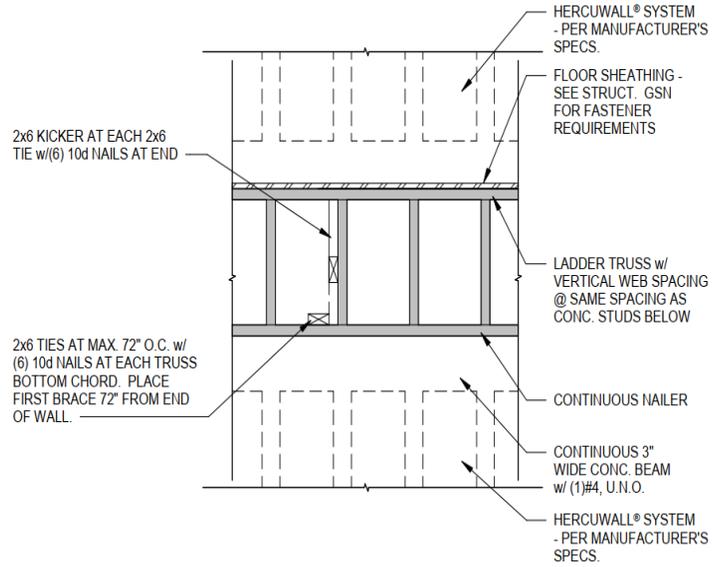


Figure 26 – HercuWall® Truss Parallel to Wall (Elevation)

8.2 Fire-Resistance-Rated Assembly Details:

8.2.1 HercuWall® Series 8 1-hour Load Bearing Fire-Resistance-Rated Assemblies.

8.2.1.1 HercuWall® Series 8 1-Hour Load-Bearing Wall Design¹

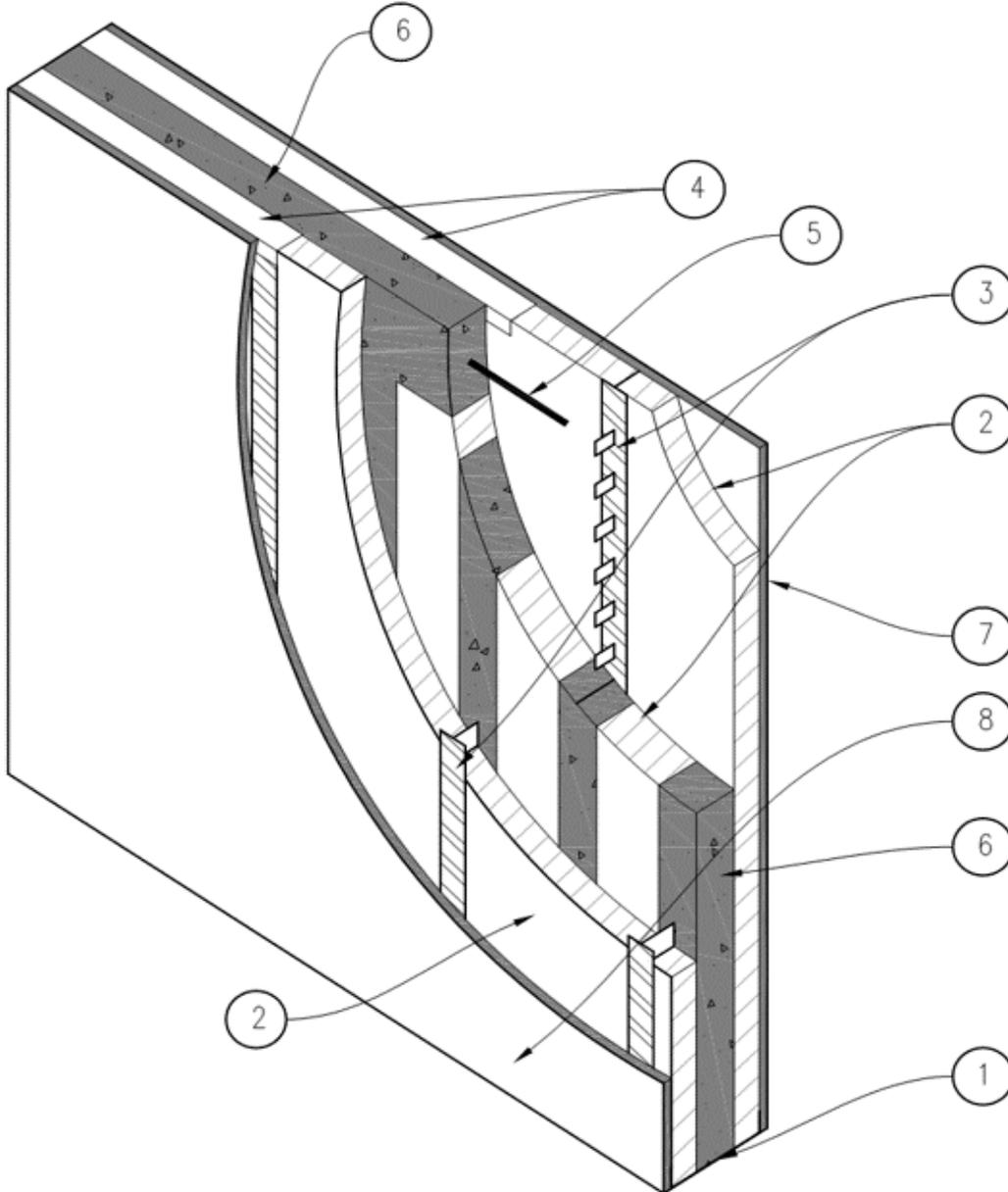


Figure 27. HercuWall® 1-Hour Load-Bearing Fire-Resistance Rated Wall Assemblies.



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Table 14. HercuWall® Series 8 1-hour Load Bearing Fire-Resistance-Rated Assemblies Description¹

Item	COMPONENT	DESCRIPTION	
1	Bottom Track	Manufacturer:	HercuTech Inc.
		Minimum Size:	24 gauge (0.022 inches) (0.55 mm) thickness. 8 inches (203 mm) depth.
		Installation:	Caulked and pinned to the foundation or underlying wall per manufacturers specifications.
2	HercuWall® Panel	Manufacturer:	HercuTech Inc.
		Approved Types:	Type S, Type SW, Type A products, Type II (1.5 lbs/ft ³) nominal density. Solid Shear products, Type IX (2.0 lbs/ft ³) nominal density (not shown).
		Installation:	HercuWall® panels are insert into the bottom track and fastened through the bottom track into the ShearStrip® with one #8 x 3/4 inch (19 mm) screws into each ShearStrip® to locate the panels.
3	ShearStrip®	Manufacturer:	HercuTech Inc.
		Minimum Thickness:	24 gauge (0.022 inches) (0.55 mm) thickness, 2 inches (51 mm) width.
		Installation:	ShearStrip® are factory installed in HercuWall® panels.
4	Top Track	Manufacturer:	HercuTech Inc.
		Minimum Thickness:	24 gauge (0.022 inches) (0.55 mm) thickness. 2.5 inches (64 mm) depth.
		Installation:	1 Top Track is installed on interior face, 1 Top Track is installed on exterior face for 2 Top Tracks per panel. Top Tracks are attached with one #8 x 3/4 inch (19 mm) screws into each ShearStrip®.
5	Reinforcing	Type:	Steel
		Specifications:	Minimum Grade 60 per ASTM A615.
		Minimum Size:	#4
		Installation:	Place into the bond beam 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 to be in accordance with the Engineering Design for site.
6	Concrete	Type:	3/8 inch (9.5 mm) aggregate, not to exceed 45%.
		Specifications:	Minimum 4,000 psi (27.6 MPa) compressive strength @ 28 days cure per Section 2.2.10 of this report.
		Installation:	Special Inspection and cylinder testing is required.
7	Interior Finish	Type:	Single layer Type X gypsum wall board complying with ASTM C1396
		Thickness:	Minimum 5/8 inches (16 mm).
		Installation:	Single layer on each face. The gypsum is to be anchored into the underlying ShearStrip® at 8 inches (203 mm) on center around the gypsum perimeter and 12 inches (305 mm) on center spacing in the field, with #6 1.25 inch (32 mm) length Type S drywall screws. Joints and screw heads are to be taped and mudded per industry standard.
8	Exterior Sheathing	Type:	Single layer Type X gypsum wall board complying with ASTM C1396 or ASTM C1177.
		Thickness:	Minimum 5/8 inches (16 mm).
		Installation:	Single layer on each face. The gypsum is to be anchored into the underlying ShearStrip® at 8 inches (203 mm) on center around the gypsum perimeter and 12 inches (305 mm) on center spacing in the field, with #6 1.25 inch (32 mm) length Type S drywall screws. Joints and screw heads are to be taped and mudded per industry standard.

Note 1: HercuWall® Series 8 panel assemblies described above, have been evaluated for load-carrying capacity at 100% allowable loading as outlined in Tables 2-5 of this report.

8.2.1.2 HercuWall® Series 8 CFC Box Beam 1-Hour Load-Bearing Wall Design¹

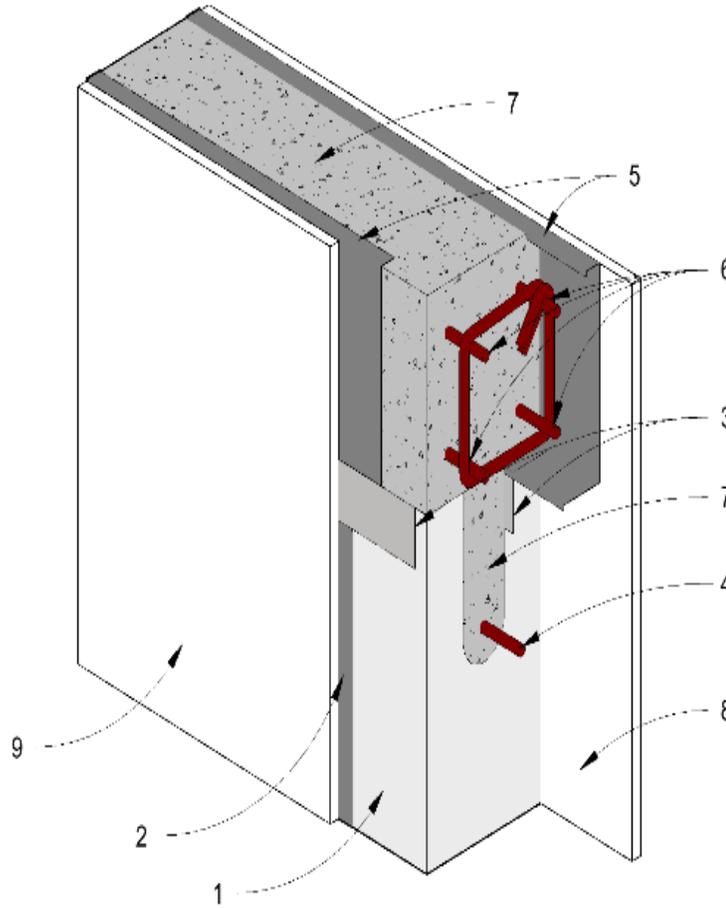


Figure 28. HercuWall® 1-Hour Load-Bearing Fire-Resistance Rated CFC Box Beam Wall Assembly Design.



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Table 15. HercuWall® Series 8 1-hour Load Bearing Fire-Resistance-Rated CFC Box Beam Wall Assembly¹

Item	COMPONENT	DESCRIPTION	
1	HercuWall® Panel	Manufacturer:	HercuTech Inc.
		Approved Types:	Type S, Type SW, Type A products, Type II (1.5 lbs/ft ³) nominal density. Solid Shear products, Type IX (2.0 lbs/ft ³) nominal density (not shown).
		Installation:	HercuWall® panels are insert into the bottom track and fastened through the bottom track with one #8 x 3/4 inch (19 mm) screw into each ShearStrip® to locate the panels.
2	ShearStrip®	Manufacturer:	HercuTech Inc.
		Minimum Thickness:	24 gauge (0.022 inches) (0.55 mm) thickness, 2 inches (51 mm) width.
		Installation:	ShearStrip® are factory installed in HercuWall® panels.
3	Top Track	Manufacturer:	HercuTech Inc.
		Minimum Thickness:	24 gauge (0.022 inches) (0.55 mm) thickness. 2.5 inches (64 mm) depth.
		Installation:	1 Top Track is installed on interior face, 1 Top Track is installed on exterior face for 2 Top Tracks per panel. Top Tracks are attached with one #8 x 3/4 inch (19 mm) screws into each ShearStrip®.
4	Reinforcing	Type:	Steel
		Specifications:	Minimum Grade 60 per ASTM A615.
		Minimum Size:	#4
		Installation:	Place into the bond beam 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 to be in accordance with the Engineering Design for site.
5	CFC Box Beam	Manufacturer:	HercuTech Inc.
		Minimum Thickness:	16 gauge (0.060 inches) (1.6 mm)
		Installation:	Attach the CFC Box Beam to the HercuWall® Top Track using #8 x 3/4 inch (19 mm) self-tapping screws prior to concrete pour. ½ inch (13 mm) diameter J-bolts or #4 rebar dowels are embedded into the CFC Box Beam concrete and protrude into the Base Beam of the above HercuWall® panel for unbraced stacked panel applications. For braced stacked panel applications, embedded J-bolts are utilized to attach a top plate to the CFC Box Beam. J-bolts spacing, embedment and locations details can be found in Figures 25-27.
6	Rebar Cage with Stirrups	Manufacturer:	HercuTech
		Size:	Pre-Engineered in size per site specifications.
		Specifications:	Location, size and installation into rebar chairs are to follow Engineering Design.
7	Concrete	Type:	3/8 inch (9.5 mm) aggregate, not to exceed 45%.
		Specifications:	Minimum 4,000 psi (27.6 MPa) compressive strength @ 28 days cure per Section 2.2.10 of this report.
		Installation:	Special Inspection and cylinder testing is required.
8	Interior Finish	Type:	Single layer Type X gypsum wall board complying with ASTM C1396
		Thickness:	Minimum 5/8 inches (16 mm).
		Installation:	Single layer on each face. The gypsum is to be anchored into the underlying ShearStrip® at 8 inches (203 mm) on center around the gypsum perimeter and 12 inches (305 mm) on center spacing in the field, with #6 1.25 inch (32 mm) length Type S drywall screws. Joints and screw heads are to be taped and mudded per industry standard.
9	Exterior Sheathing	Type:	Single layer Type X gypsum wall board complying with ASTM C1396 or ASTM C1177.
		Thickness:	Minimum 5/8 inches (16 mm).
		Installation:	Single layer on each face. The gypsum is to be anchored into the underlying ShearStrip® at 8 inches (203 mm) on center around the gypsum perimeter and 12 inches (305 mm) on center spacing in the field, with #6 1.25 inch (32 mm) length Type S drywall screws. Joints and screw heads are to be taped and mudded per industry standard.

Note 1: HercuWall® Series 8 panel assemblies described above, have been evaluated for load-carrying capacity at 100% allowable loading as outlined in Tables 2-5 of this report.

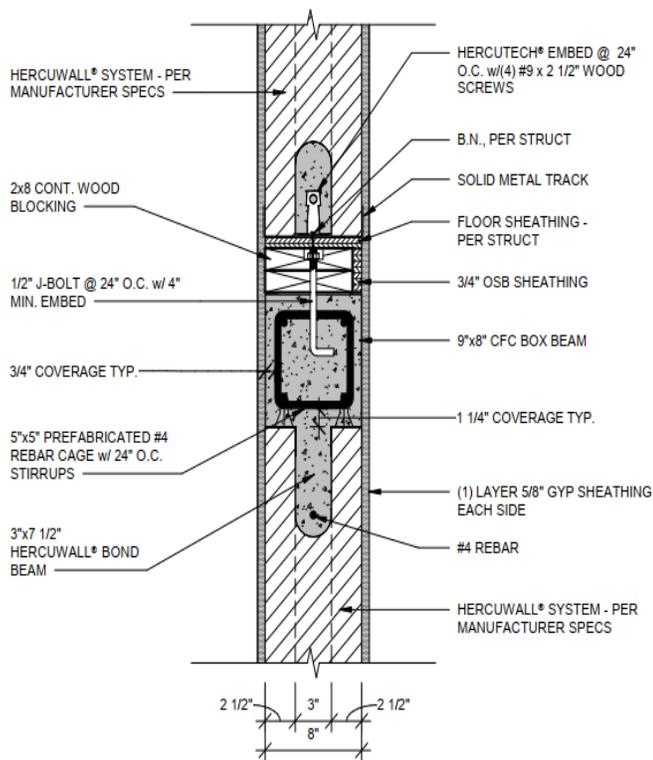


Figure 29 – 1-hr Load-Bearing Unbraced CFC Box Beam Wall

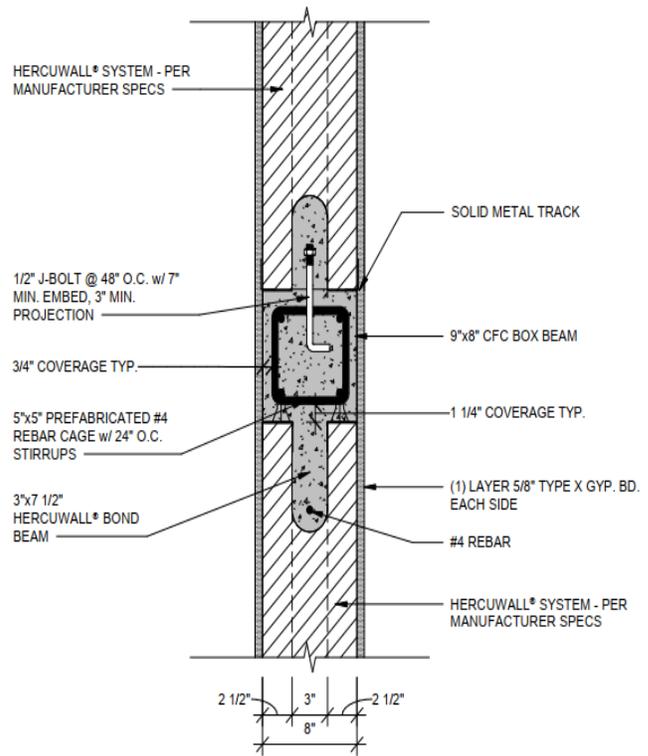


Figure 30– 1-hr Load-Bearing Unbraced CFC Box Beam Wall

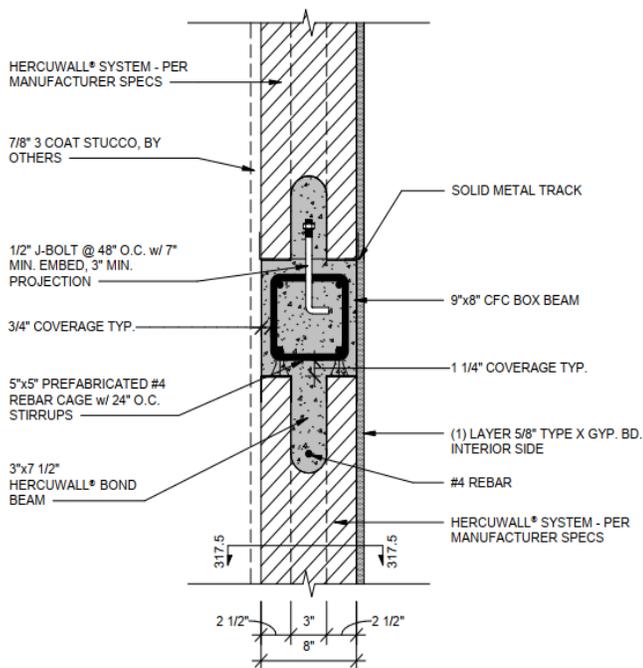


Figure 31 – 1-hr Load-Bearing Unbraced CFC Box Beam Wall

8.2.1 HercuWall® Series 8 2-hour Load Bearing Fire-Resistance-Rated Assemblies.

8.2.1.1 HercuWall® Series 8 2-Hour Load-Bearing Wall Design¹

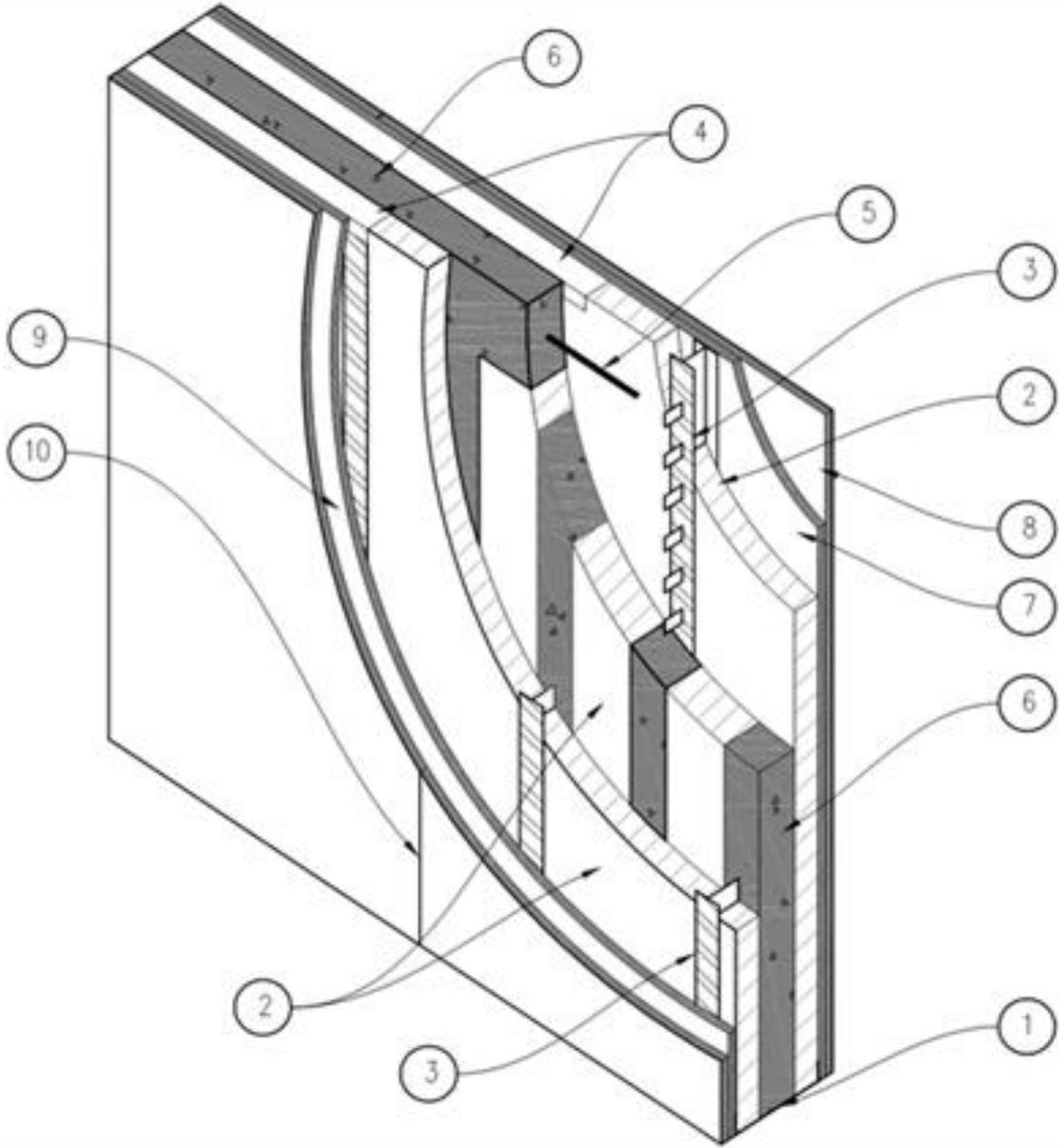


Figure 32. HercuWall® 2-Hour Load-Bearing Fire-Resistance Rated Wall Assemblies



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Table 16. HercuWall® Series 8 2-hour Load Bearing Fire-Resistance-Rated Assemblies Description¹

Item	COMPONENT	DESCRIPTION	
1	Bottom Track	Manufacturer:	HercuTech Inc.
		Minimum Size:	24 gauge (0.022 inches) (0.55 mm) thickness. 8 inches (203 mm) depth.
		Installation:	Caulked and pinned to the foundation or underlying wall per manufacturers specifications.
2	HercuWall® Panel	Manufacturer:	HercuTech Inc.
		Approved Types:	Type S, Type SW, Type A products, Type II (1.5 lbs/ft ³) nominal density. Solid Shear products, Type IX (2.0 lbs/ft ³) nominal density (not shown).
		Installation:	HercuWall® panels are insert into the bottom track and fastened through the bottom track with one #8 x 3/4 inch (19 mm) screw into each ShearStrip® to locate the panels.
3	ShearStrip®	Manufacturer:	HercuTech Inc.
		Minimum Thickness:	24 gauge (0.022 inches) (0.55 mm) thickness, 2 inches (51 mm) width.
		Installation:	ShearStrip® are factory installed in HercuWall® panels.
4	Top Track	Manufacturer:	HercuTech Inc.
		Minimum Thickness:	24 gauge (0.022 inches) (0.55 mm) thickness. 2.5 inches (64 mm) depth.
		Installation:	1 Top Track is installed on interior face, 1 Top Track is installed on exterior face for 2 Top Tracks per panel. Top Tracks are attached with one #8 x 3/4 inch (19 mm) screws into each ShearStrip®.
5	Reinforcing	Type:	Steel
		Specifications:	Minimum Grade 60 per ASTM A615.
		Minimum Size:	#4
		Installation:	Place into the bond beam 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 to be in accordance with the Engineering Design for site.
6	Concrete	Type:	3/8 inch (9.5 mm) aggregate, not to exceed 45%.
		Specifications:	Minimum 4,000 psi (27.6 MPa) compressive strength @ 28 days cure per Section 2.2.10 of this report.
		Installation:	Special Inspection and cylinder testing is required.
7-8	Interior Finish	Type:	Double layer Type X gypsum wall board complying with ASTM C1396.
		Thickness:	Minimum 5/8 inches (16 mm).
		Installation:	Double layer on each face. The first gypsum layer is to be anchored into the underlying ShearStrip® at 8 inches (203 mm) on center around the gypsum perimeter and 24 inches (610 mm) on center spacing in the field, with #6 1.25 inch (32 mm) length Type S drywall screws. The second gypsum layer is to be anchored into the underlying ShearStrip® at 8 inches (203 mm) on center around the gypsum perimeter and 12 inches (305 mm) on center spacing in the field, with #6 2 inch (51 mm) length Type S drywall screws. Joints between gypsum layers are required to have a minimum offset of 24 inches (610 mm). Joints and screw heads are to be taped and mudded per industry standard on the 2 nd drywall layer only.
9-10	Exterior Sheathing	Type:	Double layer Type X gypsum wall board complying with ASTM C1396 or ASTM C1177.
		Thickness:	Minimum 5/8 inches (16 mm).
		Installation:	Double layer on each face. The first gypsum layer is to be anchored into the underlying ShearStrip® at 8 inches (203 mm) on center around the gypsum perimeter and 24 inches (610 mm) on center spacing in the field, with #6 1.25 inch (32 mm) length Type S drywall screws. The second gypsum layer is to be anchored into the underlying ShearStrip® at 8 inches (203 mm) on center around the gypsum perimeter and 12 inches (305 mm) on center spacing in the field, with #6 2 inch (51 mm) length Type S drywall screws. Joints between gypsum layers are required to have a minimum offset of 24 inches (610 mm). Joints and screw heads are to be taped and mudded per industry standard on the 2 nd drywall layer only.

Note 1: HercuWall® Series 8 panel assemblies described above, have been evaluated for load-carrying capacity at 100% allowable loading as outlined in Tables 2- 5 of this report.

8.2.1.2 HercuWall® Series 8 CFC Box Beam 2-Hour Load-Bearing Wall Design¹

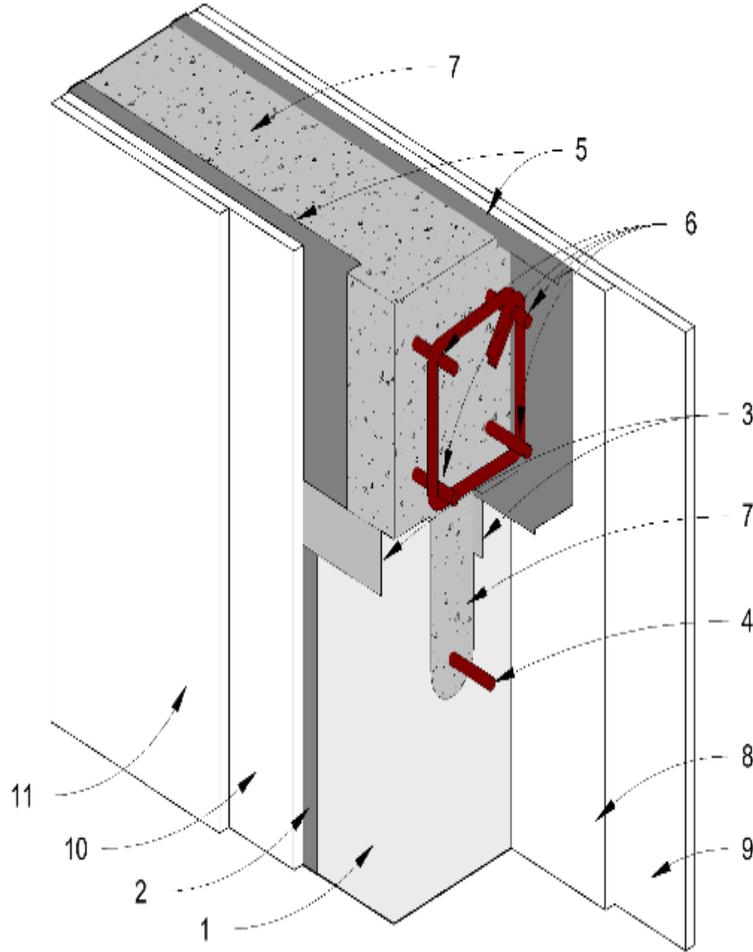


Figure 33. HercuWall® 2-Hour Load-Bearing Fire-Resistance Rated CFC Box Beam Wall Assembly Design.



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Table 17. HercuWall® Series 8 2-hour Load Bearing Fire-Resistance-Rated CFC Box Beam Wall Assembly¹

Item	COMPONENT	DESCRIPTION	
1	HercuWall® Panel	Manufacturer:	HercuTech Inc.
		Approved Types:	Type S, Type SW, Type A products, Type II (1.5 lbs/ft ³) nominal density. Solid Shear products, Type IX (2.0 lbs/ft ³) nominal density (not shown).
		Installation:	HercuWall® panels are insert into the bottom track and fastened through the bottom track with one #8 x 3/4 inch (19 mm) screw into each ShearStrip® to locate the panels.
2	ShearStrip®	Manufacturer:	HercuTech Inc.
		Minimum Thickness:	24 gauge (0.022 inches) (0.55 mm) thickness, 2 inches (51 mm) width.
		Installation:	ShearStrip® are factory installed in HercuWall® panels.
3	Top Track	Manufacturer:	HercuTech Inc.
		Minimum Thickness:	24 gauge (0.022 inches) (0.55 mm) thickness. 2.5 inches (64 mm) depth.
		Installation:	1 Top Track is installed on interior face, 1 Top Track is installed on exterior face for 2 Top Tracks per panel. Top Tracks are attached with one #8 x 3/4 inch (19 mm) screws into each ShearStrip®.
4	Reinforcing	Type:	Steel
		Specifications:	Minimum Grade 60 per ASTM A615.
		Minimum Size:	#4
		Installation:	Place into the bond beam 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 to be in accordance with the Engineering Design for site.
5	CFC Box Beam	Manufacturer:	HercuTech Inc.
		Minimum Thickness:	16 gauge (0.060 inches) (1.6 mm)
		Installation:	Attach the CFC Box Beam to the HercuWall® Top Track using #8 x 3/4 inch (19 mm) self-tapping screws prior to concrete pour. ½ inch (13 mm) diameter J-bolts or #4 rebar dowels are embedded into the CFC Box Beam concrete and protrude into the Base Beam of the above HercuWall® panel for unbraced stacked panel applications. For braced stacked panel applications, embedded J-bolts are utilized to attach a top plate to the CFC Box Beam. J-bolts spacing, embedment and locations details can be found in Figures 30-31.
6	Rebar Cage with Stirrups	Manufacturer:	HercuTech
		Size:	Pre-Engineered in size per site specifications.
		Specifications:	Location, size and installation into rebar chairs are to follow Engineering Design.
7	Concrete	Type:	3/8 inch (9.5 mm) aggregate, not to exceed 45%.
		Specifications:	Minimum 4,000 psi (27.6 MPa) compressive strength @ 28 days cure per Section 2.2.10 of this report.
		Installation:	Special Inspection and cylinder testing is required.
8-9	Interior Finish	Type:	Double layer Type X gypsum wall board complying with ASTM C1396.
		Thickness:	Minimum 5/8 inches (16 mm).
		Installation:	Double layer on each face. The first gypsum layer is to be anchored into the underlying ShearStrip® at 8 inches (203 mm) on center around the gypsum perimeter and 24 inches (610 mm) on center spacing in the field, with #6 1.25 inch (32 mm) length Type S drywall screws. The second gypsum layer is to be anchored into the underlying ShearStrip® at 8 inches (203 mm) on center around the gypsum perimeter and 12 inches (305 mm) on center spacing in the field, with #6 2 inch (51 mm) length Type S drywall screws. Joints between gypsum layers are required to have a minimum offset of 24 inches (610 mm). Joints and screw heads are to be taped and mudded per industry standard on the 2 nd drywall layer only.
10-11	Exterior Sheathing	Type:	Double layer Type X gypsum wall board complying with ASTM C1396 or ASTM C1177.
		Thickness:	Minimum 5/8 inches (16 mm).
		Installation:	Double layer on each face. The first gypsum layer is to be anchored into the underlying ShearStrip® at 8 inches (203 mm) on center around the gypsum perimeter and 24 inches (610 mm) on center spacing in the field, with #6 1.25 inch (32 mm) length Type S drywall screws. The second gypsum layer is to be anchored into the underlying ShearStrip® at 8 inches (203 mm) on center around the gypsum perimeter and 12 inches (305 mm) on center spacing in the field, with #6 2 inch (51 mm) length Type S drywall screws. Joints between gypsum layers are required to have a minimum offset of 24 inches (610 mm). Joints and screw heads are to be taped and mudded per industry standard on the 2 nd drywall layer only.

Note 1: HercuWall® Series 8 panel assemblies described above, have been evaluated for load-carrying capacity at 100% allowable loading as outlined in Tables 2-5 of this report.

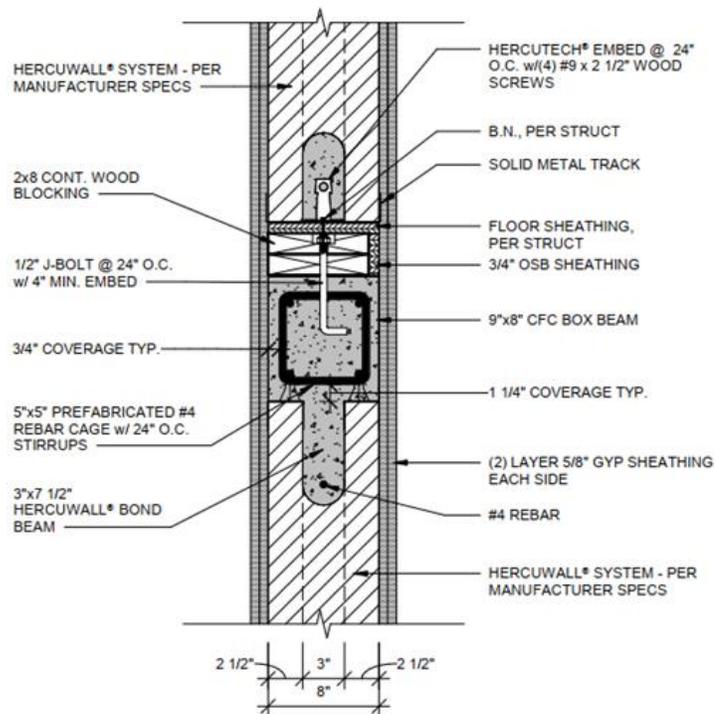


Figure 34 – 2-hr Load-Bearing Unbraced CFC Box Beam Wall

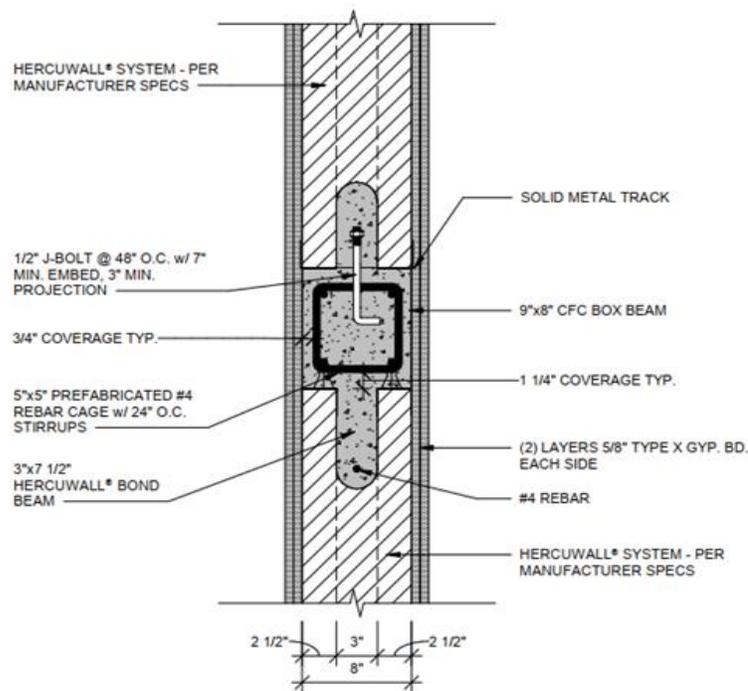


Figure 35 – 2-hr Load-Bearing Unbraced CFC Box Beam Wall

8.3 Types I-IV Construction Assembly Details:

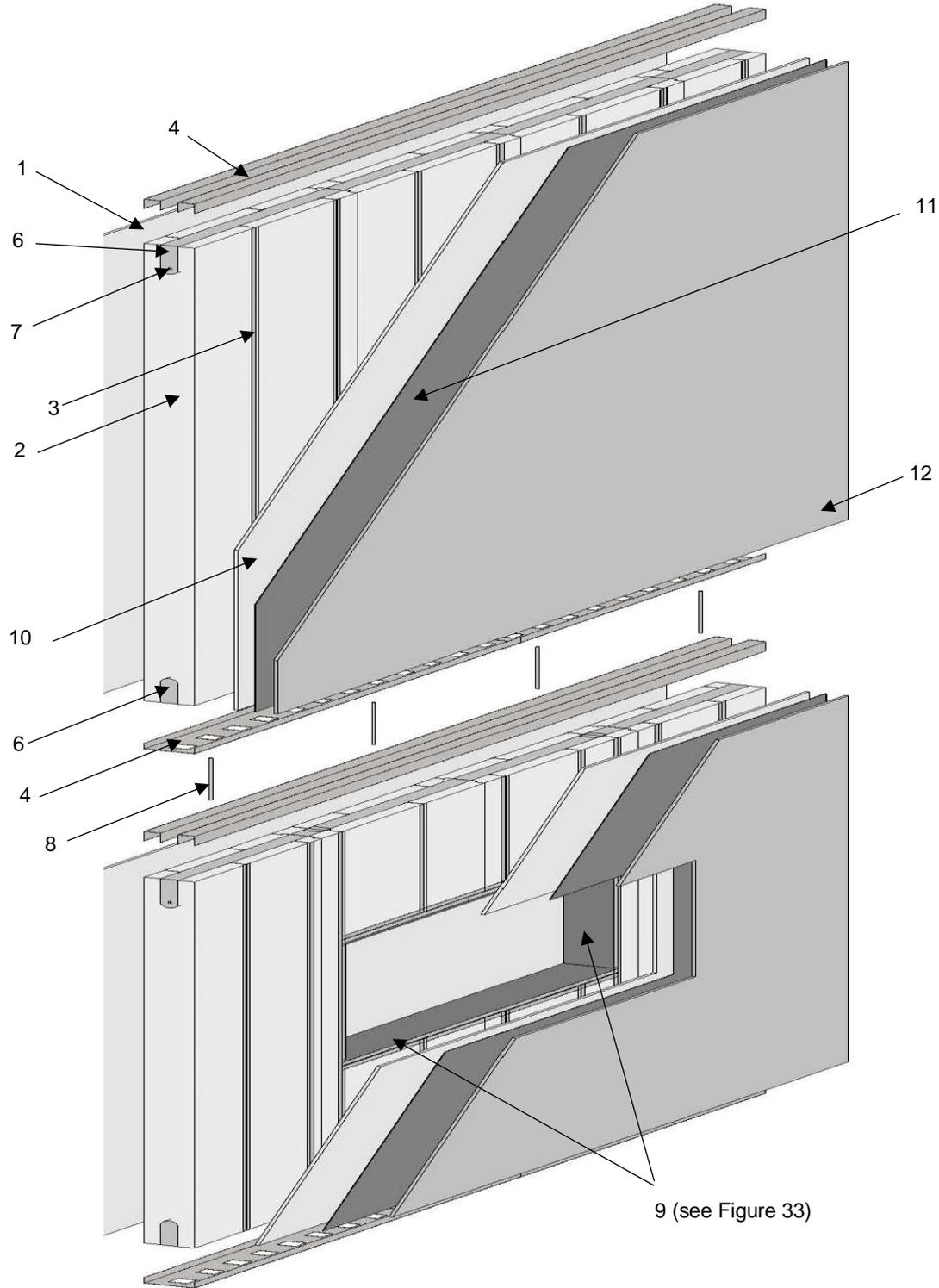


Figure 36. HercuWall® Types I-V Construction Design

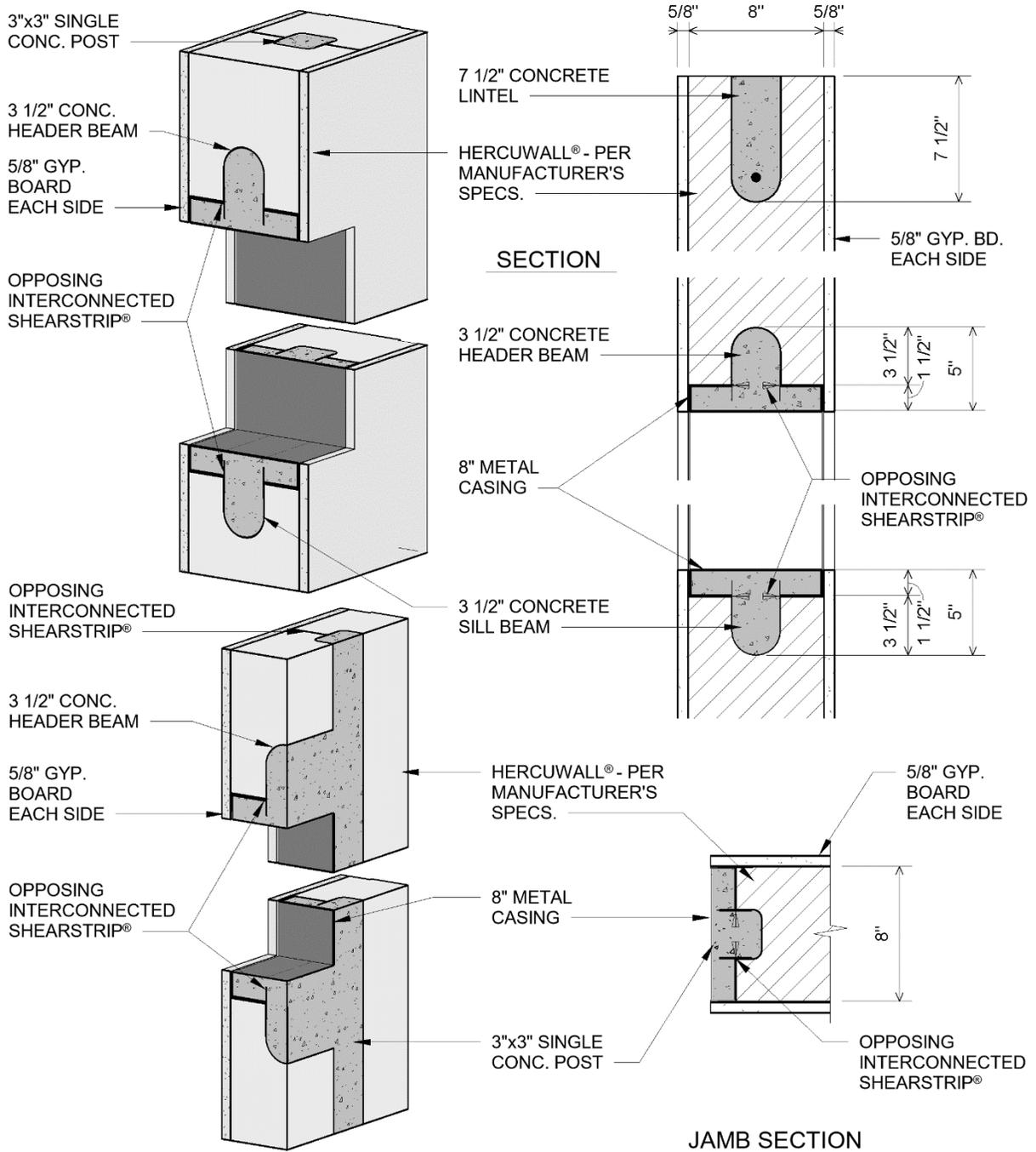


Figure 37. HercuWall® Openings (Window and Door) Opening Design for Types I-V Construction



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Table 18. HercuWall® Series 8 Type I-IV Construction Wall Assembly¹

ITEM	WALL COMPONENT	APPROVED MATERIALS
1	Interior Finish	Minimum 5/8 inch (16 mm) thickness, Type X gypsum wall board complying with ASTM C1396. Gypsum to be anchored into ShearStrip® flanges with #6 1.25 inch length Type S drywall screws at 8" (203 mm) on center around perimeter, and 12" (305 mm) in field. Joints to be taped and mudded.
2	HercuWall® Panel	Type S, Type SW, Type A products of 8 inch (203 mm) thickness, composed of Type II (1.5 lbs/ft ³) nominal density or Solid Shear (not shown) panels of Type IX (2.0 lbs/ft ³ EPS thermal insulation potential heat of 2,250 BTU/ft ² (25.5 MJ/m ²) per 1 inch (25 mm) thickness. Concrete stud spacing of 12" (305 mm), 8 inch (305 mm) or Solid Shear core options. See Section 2.2 of this report.
3	HercuWall® ShearStrip®	HercuWall® ShearStrip® component, alternating in orientation between vertical concrete cavities. See Section 2.2 of this report.
4	HercuWall® Top and Bottom Track	HercuWall® Top and Bottom track component. See Section 2.2 of this report.
5 (not shown)	Concrete Posts	Normal weight 4,000 psi (27.6 MPa) compressive strength at 28 days, See Section 2.2 of this report.
6	HercuWall® Bond Beam and Base Beam	Concrete bond beam and base beam, per Figure 32 of this report.
7	Steel Reinforcing	Minimum #4 Grade 60, located in the Bond Beams. Additional steel reinforcing to be applied in accordance with the Engineering Design. Addition of rebar inclusion does not reduce or detract from the Type I-IV compliance of the HercuWall® Series 8 assembly. See Figure 15 for details.
8	Rebar Dowels	Rebar dowels, of minimum 12 inches (304 mm) length, embedded into top and bottom HercuWall® Series 8 panels to create connections at panel junctions. Spacing of rebar dowels is per Engineering Design for site.
9	HercuWall® Window and Door Casing	HercuWall® door and window casing components. Preparation for ensuring 1-1/2" (38 mm) concrete coverage around openings before application of casings is required. See Figure 33. For information on window and door casing, see Section 2.2 of this report.
10	Exterior Sheathing	Minimum 5/8 inch (16 mm) thickness, Type X exterior gypsum board sheathing complying with ASTM C1177 or ASTM C1396. Sheathing to be anchored into ShearStrip® flanges with #6 1.25 inch length Type S drywall screws at 8" (203 mm) on center around perimeter, and 12" (305 mm) in field. Joints to be taped and mudded.
11	Water-Resistive Barrier	An approved water-resistive barrier, complying to 4.3.1.2 of this report.
12	Approved Exterior Claddings ²	<ul style="list-style-type: none"> • Brick Veneer shall be installed with minimum 1 inch (25 mm) (recommended 2 inch (51 mm)) air space. Brick veneer is to be a minimum of 2.625 inches (67 mm) thickness. • Fiber cement lap siding, minimum 0.25 inch (6 mm) thickness complying with ASTM C1186 Type A Grade II labeled by an approved agency classified as non-combustible. • Fiber cement panel siding, minimum 0.25 inch (6 mm) thickness complying with ASTM C1186 Type A Grade II labeled by an approved agency classified as non-combustible. • Glass-fiber reinforced concrete panels, minimum 0.375 inch (9.5 mm) thickness. • Marble slab of minimum 1 inch (25 mm) thickness. • Steel (approved corrosion resistant) of minimum 0.0149 inches (0.38 mm) thickness. • Stone (artificial) of minimum 1.5 inches (38 mm) thickness. • Stone (natural) of minimum 2 inches (51 mm) thickness. • Stucco or Exterior Cement Plaster (see required thickness per substrate type below): <ul style="list-style-type: none"> Three-Coat Work Over: <ul style="list-style-type: none"> ○ Metal Plaster Base – Minimum 0.875 inches (22 mm). ○ Unit Masonry – Minimum 0.625 inches (16 mm). ○ Cast in Place or Precast Concrete – Minimum 0.625 inches (16 mm). Two-Coat Work Over: <ul style="list-style-type: none"> ○ Unit Masonry – Minimum 0.5 inches (13 mm). ○ Cast in Place or Precast Concrete – Minimum 0.375 inches (9.5 mm). • Terra Cotta of minimum 1 inch (25 mm) thickness.

Note 1: HercuWall® Series 8 panel assemblies described above, have been evaluated for load-carrying capacity at 100% allowable loading as outlined in Tables 2- 5 of this report.

Note 2: Connection of the exterior cladding is to penetrate the ShearStrip® flange and not rely on anchorage into the exterior sheathing. Spacing and fastener type are to match the Engineering Design for resisting intended service loads. Design and connection of exterior cladding is outside the scope of this report.

9.0 ELIGIBILITY OF REPORT

The attached report has been reviewed by a QAI Registered Professional Engineer approved by the specific state Board of Professional Engineers noted on the specific P.E. seal(s).

Per section 1703 of the IBC, QAI is an independent third-party testing, inspection and certification agency accredited by the International Accreditation Service, Inc. (IAS) for this specific scope (see IAS PCA-118, PCA-119). QAI can confirm that based on its IAS accreditation it meets IBC Section 1703.1 on Independence, Section 1703.1.2 on Equipment and Section 1703.1 on Personnel.

This Evaluation report has been designed to meet the performance requirements of IBC Section 1703.4 and contains the required information to show the product, material or assembly meets the applicable code requirements.

The product is labeled per section IBC 1703 and subject to follow-up inspection per IBC 1703.6 using QAI IAS accredited ISO 17020 inspection program (see IAS AA-635, AA-723).

For more information regarding QAI Laboratories, please visit www.qai.org.



The above is an example of the QAI registered Listing mark. The Listing mark may only be used by the Report Holder per the QAI service agreement on products defined in this report. The 'us' indicator in the 8 o'clock position indicates the product complies with the properties evaluated with limitations outlined in this report for use in the US market. A 'c' indicator in the 4 o'clock position indicates the product has been evaluated for use in the Canadian market.

10.0 REFERENCED STANDARDS

UL 723 *Test for Surface Burning Characteristics of Building Materials.*

ASTM C578 *Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.*

ASTM C1396/C1396M *Specification for Gypsum Board.*

ASTM E119 *Standard Test Methods for Fire Tests of Building Construction and Materials.*

NFPA 285 *Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Compartments.*

ASTM E72 *Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.*