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ESR-4168

Issued 05/2019
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This report is subject to renewal 05/2020.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
SECTION: 07 42 43—COMPOSITE WALL PANELS

REPORT HOLDER:

WALPANEL INC.

EVALUATION SUBJECT:

WALLSHELL® THERMAL PANOPLY™ PANEL SYSTEM

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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2018 2015, 2012 and 2009 *International Residential Code*® (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Properties evaluated:

- Structural
- Durability
- Surface burning characteristics
- Non-Combustibility
- Types I, II, III, and IV (noncombustible) construction

2.0 USES

The Walpanel Wallshell® Thermal Panoply™ panel system is used as an exterior non-load bearing building cladding system in any type of construction.

3.0 DESCRIPTION

3.1 General:

The Wallshell® Thermal Panoply™ panel system consists of Wallshell® Thermal Panoply™ panels and Wallshell® LT anchoring systems. The Wallshell® Thermal Panoply™ panels are factory-assembled, laminated sandwich panels. The panels consist of fiber-cement carrier boards (front facers), including fiber cement carrier board slot strips; rock wool insulation cores; glass-fiber reinforced cement membranes (backer board). The carrier boards are bonded to rock wool insulation cores and to fiber cement carrier board slot strips by using a polymer-based adhesive. The Wallshell® Thermal Panoply™ panels are available in nominally 24-inch-wide-by-48-inch-long (610 mm by 1210 mm) and $2^1/_2$ to $4^1/_4$ inches (actually 58 mm to 109 mm) in thickness, and are manufactured in accordance with the panel specifications in the approved manufacturing quality documentation of the Wallshell® Thermal Panoply™ panels.

3.2 Components:

3.2.1 Fiber-cement Carrier Boards: The fiber-cement carrier boards are nominally $^1/_4$ inch to $^5/_{16}$ inch (actually 6 mm to 8 mm) in thickness, and comply with the material specifications of the fiber cement boards recognized in ESR-4333. The carrier boards are available in various surface textures and colors. The carrier boards have a flame spread index less than 25 and a smoke developed index less than 450, when tested in accordance with ASTM E84. The fiber-cement carrier boards are classified as non-combustible when tested in accordance with ASTM E136.

3.2.2 Rock Wool Insulation Cores: The rock wool insulation cores are nominally 2 to 4 inches (actually 50 mm to 101 mm) in thickness and meet the physical property requirements for Type IVA when tested in accordance with ASTM C612, and have a flame spread index less than 25 and a smoke developed index less than 450, when tested in accordance with ASTM E84. The rock wool insulation boards are classified as non-combustible material when tested in accordance with ASTM E136.

3.2.3 Glass-fiber Reinforced Cement Backer Boards: The backer boards are made in sheet form and nominally $^5/_{64}$ inch to $^1/_4$ inch (actually 2 mm to 6 mm) in thickness. The backer boards are laminated to rock wool insulation cores using cementitious bonding materials. The backer boards have a flame spread index less than 25 and a smoke developed index less than 450, when tested in accordance with ASTM E84; and are classified as non-combustible material when tested in accordance with ASTM E136.

3.2.4 Polymer-based Adhesive: Polymer-based adhesive shall comply with the specifications in the approved manufacturing quality documentation of the Wallshell® Thermal Panoply™ panels.

3.2.5 LT Anchoring Systems: Wallshell® LT anchoring system consists of L-profile clips, T-profile clips, L-profile brackets for concrete wall substrate or L-profile rails for steel framed wall substrate, and adjustment screws. The clips and brackets are made from galvanized steel or AISI Type 304 or Type 316 stainless steel. The thickness of the L-profile clips is $^1/_{16}$ inch (1.5 mm). The short leg of the L-shaped brackets is 1 inches (25 mm)

and the long leg ranges from $1^1/_2$ inches (42 mm) to 4 inches (102 mm). The T-shaped brackets are formed by pairing two L-shaped clips that are made from $^1/_{16}$ inch (1.5 mm) thick steel with the short leg of 1 inches (25 mm) and long leg ranges from of $1^1/_2$ inches (42 mm). The width of L-shaped clips is $^{25}/_{32}$ inch (20 mm). The adjustment screws (adjusters) are M4 x 5. See Figure 1 for a typical LT anchoring system.

3.2.6 Sealants: The sealants used at the panel joints must be complying with ASTM C920. Type S or M, minimum Grade NS, minimum Class 25 and Use O.

4.0 DESIGN AND INSTALLATION

4.1 General:

The Walpanel Wallshell® Thermal Panoply™ panel system must be installed over exterior walls and wall framing that are capable of supporting the imposed loads including, but not limited to, transverse wind loads, gravity and in-plane shear loads. The panel system must be securely connected to the supporting wall assembly substrate with corrosion-resistant fasteners that are compatible with the wall assembly substrate.

Walpanel Wallshell® Thermal Panoply™ panel system must be attached to support framing members with the mechanical attachment systems described in Section 3.2.5 Connection of the fastening system to the wall assembly substrate must be designed in accordance with Section 4.2.

4.2 Design:

Wind load capacities, including nominal strengths, ASD strengths, and LRFD strengths, given in Table 1, are based on transverse load tests in accordance with ASTM E330 on Walpanel Wallshell® Thermal Panoply™ panel system installed in accordance with Section 4.3.2.

In-plane shear strengths and transverse load strengths, given in Table 2, are based on shear load and transverse load tests in accordance with ASTM C1354 on the individual concealed clips installed into the slots on the Walpanel Wallshell® Thermal Panoply™ panel edges.

For transverse load design of exterior wall assemblies constructed with the Walpanel Wallshell® Thermal Panoply™ panel system, the applied transverse loads, determined in accordance with IBC Chapter 16 or Section R301.2.1 of the IRC, as applicable, must be equal to or less than the corresponding capacity, which must be the lesser of ASD strengths or LRFD strengths noted in Tables 1 and 2.

The exterior wall, wall framing and the attachment of the panel system to the supporting exterior wall or wall framing to withstand gravity, in-plane shear, and transverse forces must be designed by a registered design professional in accordance with the IBC, and the details must be submitted to the code official for approval. The capacities of the exterior walls or wall framing and the connection between the panel system and its supporting exterior walls or wall framing must be equal to or greater than those noted in this section (Section 4.2) and in Tables 1 and 2, unless the capacities of the panel system described in this evaluation report are reduced accordingly.

4.3 Installation:

4.3.1 General: The Walpanel Wallshell® Thermal Panoply™ panel system must be installed in accordance with the manufacturer's published installation instructions and this evaluation report. The panel system may be installed vertically or horizontally, as shown in the approved plans. A copy of the manufacturer's published installation instructions must be available on the jobsite at all times during construction.

The panel system must be installed over wall assemblies complying with 2018 IBC Section 1402.3 or 2015, 2012 and 2009 IBC Section 1403.3. Exterior wall assemblies, on which the panel system are to be installed, must include flashing, a water-resistive barrier, a means of draining water, and protection against condensation in accordance with 2018 IBC Section 1402.2 or 2015, 2012 and 2009 IBC Section 1403.2. The panel system boundaries at the top, bottom, and around building openings must be finished in accordance with the manufacturer's published installation instructions to prevent entry of pests and vermin. A ventilation path must be maintained to allow air to flow into, out of, and within the cavity between the water-resistive barrier and the wall cladding systems.

Exterior wall assemblies, on which the panel system is to be installed, must include flashing in accordance with 2018 IBC Section 1404.17 or 2015, 2012 and 2009 IBC Section 1405.4.

4.3.2 Walpanel Wallshell® Thermal Panoply Panel system: The panel system must be attached to L-shaped metal framing members using the concealed clips described in Section 3.2.5 The maximum on-center spacing between the concealed clips along the length of the panels must be 12 inches (actually 305 mm) and the maximum on-center spacing between the concealed clips along the width of the panels must be 24 inches (actually 615 mm). The minimum number of concealed attachment systems must be 1 clip per square feet (0.093 m^2). The concealed clips must be installed into the slots on the edges of the panels. The LT anchoring systems clips are secured onto the L-shaped metal framing by using one galvanized or Type 304 stainless steel hexogen setting screws provided by with the LT anchoring systems. The minimum edge distances between the L-profile or T-profile clips to the short edge of the panel must be minimum 4 inches (actually 101 mm). The maximum spacing between panels at joints is $^3/_8$ inch (actually 9.5 mm). The framing members, spaced at maximum 16 inches (406 mm), supporting the panels must be designed by a registered design professional. Code-compliance mortars coupled with the mechanical connectors, are permitted to be used when installing the panel system. Figure 2 provides an illustration of a Walpanel Wallshell® Thermal Panoply™ panel system supported by the LT anchoring systems.

5.0 CONDITIONS OF USE

The Walpanel Wallshell® Thermal Panoply™ panel system described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Installation must comply with this evaluation report, the manufacturer's published installation instructions, and the applicable code. In the event of a conflict between the manufacturer's published installation instructions and this report, this report governs.

5.2 The Walpanel Wallshell® Thermal™ Panoply panel system must be installed, by qualified installers recognized by Walpanel Inc., in accordance with Section 4.2 and 4.3 of this evaluation report.

5.3 The Wallshell® Thermal™ Panoply panel system and the support of the panel system must be designed in accordance with the applicable code and Section 4.2 of this evaluation report.

5.4 Drawings, design details, and calculations verifying the adequacy of the fastening to connect the Walpanel Wallshell® Thermal Panoply™ panel system to the supporting wall substrates must be submitted to the building code official for approval. These must be prepared by a registered design professional when required by the statutes of the jurisdiction in which the system is to be installed.

5.5 Support of the Walpanel Wallshell® Thermal Panoply™ panel system, including the screw connections between the LT anchoring system and the L-shaped metal supporting framing members, and the supporting framing, is outside the scope of this evaluation report.

5.6 When installed on exterior walls, the Walpanel Wallshell® Thermal Panoply™ panel system must be installed only on exterior walls incorporating sheathing capable of resisting the design wind pressures, both positive and negative. The sheathing must be covered with a water-resistive barrier, as required by the applicable code, and a ventilation path must be maintained between the water-resistive barrier and the panels.

5.7 When the panel system is installed over exterior walls constructed using noncombustible materials on buildings of Types I, II III and IV construction, Walpanel Wallshell® Thermal Panoply™ panel system must be installed at a maximum building height of 40 feet in accordance with Section 1402.5 of the 2018 IBC or Section 1403.5 of the 2015 and 2012 IBC, Except as permitted by Exception 2 of 2018 IBC 1402.5 or 2015 IBC Section 1403.5.

5.8 The Walpanel Wallshell® Thermal Panoply™ panel system are manufactured in Sichuan province, China under an approved quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Sandwich Panels (AC04), dated February 2012 (editorially revised May 2018).

6.2 Reports of testing in accordance with ASTM C297.

6.3 Reports of testing in accordance with ASTM C612.

6.4 Reports of testing in accordance with ASTM C1354.

6.5 Reports of testing in accordance with ASTM E84.

6.6 Reports of testing in accordance with ASTM E136.

6.7 Reports of testing in accordance with ASTM E330.

6.8 Reports of testing in accordance with ASTM E2485,

7.0 IDENTIFICATION

7.1 Each Walpanel Wallshell® Thermal Panoply panel system is labeled with the name and address of the manufacturer (Walpanel, Inc.), product name, and the evaluation report number (ESR-4168).

7.2 The report holder's contact information is as follows:

WALPANEL INC.
16701 MEDFORD BOULEVARD, SUITE 400
BOWIE, MARYLAND 20715
(888) 998-4611
www.walpanel.com
sales@walpanel.com

TABLE 1—NOMINAL STRENGTH FOR TRANSVERSE WIND LOAD CAPACITIES FOR THE WALLSHELL PANOPLY PANEL SYSTEM CONSTRUCTED WITH CONCEALED ATTACHMENT SYSTEMS

PANEL NAME	FASTENING SYSTEM	PANEL NOMINAL THICKNESS (inches)	NOMINAL STRENGTH FOR TRANSVERSE WIND LOAD[1] (psf)	
			Positive	Negative
WallShell® Thermal Panoply™	WallShell® LT Anchoring System	2½ -4 1/4	145	145

For **SI:** 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

[1]The tabulated positive and negative nominal strengths for transverse wind loads are based on the average values of tested ultimate loads, which are limited by the testing machine loading limitation. Installation of panels must comply with Section 4.3.2 of this report.
[2]To calculate the allowable transverse wind loads; divide the tabulated values by the ASD safety factor of 3.0.
[3]To calculate the LRFD values; multiply the tabulated values by the LRFD strength reduction factor, Φ, of 0.50.

TABLE 2—NOMINAL STRENGTH FOR SINGLE ANCHOR-TO-PANEL CONNECTIONS

FASTENING SYSTEM	PANEL NOMINAL THICKNESS (inch)	NOMINAL STRENGTH[1,2] (lbf)		
		In-plane Shear		Transverse (Negative)
WallShell® LT Anchoring System	2 1/2	265[3]	90[4]	170

For **SI:** 1 inch = 25.4 mm and 1 lbf = 4.448 N.

[1]To calculate the allowable in-plane shear or transverse loads, divide the tabulated values by the ASD safety factor of 4.0.
[2]To calculate the LRFD values; multiply the tabulated values by the LRFD strength reduction factor, Φ, of 0.50.
[3]The tabulated load (gravity) is applied perpendicular to the long-dimension of the panels.
[4]The tabulated load (in-plane shear) is applied parallel to the long-dimension of the panels.

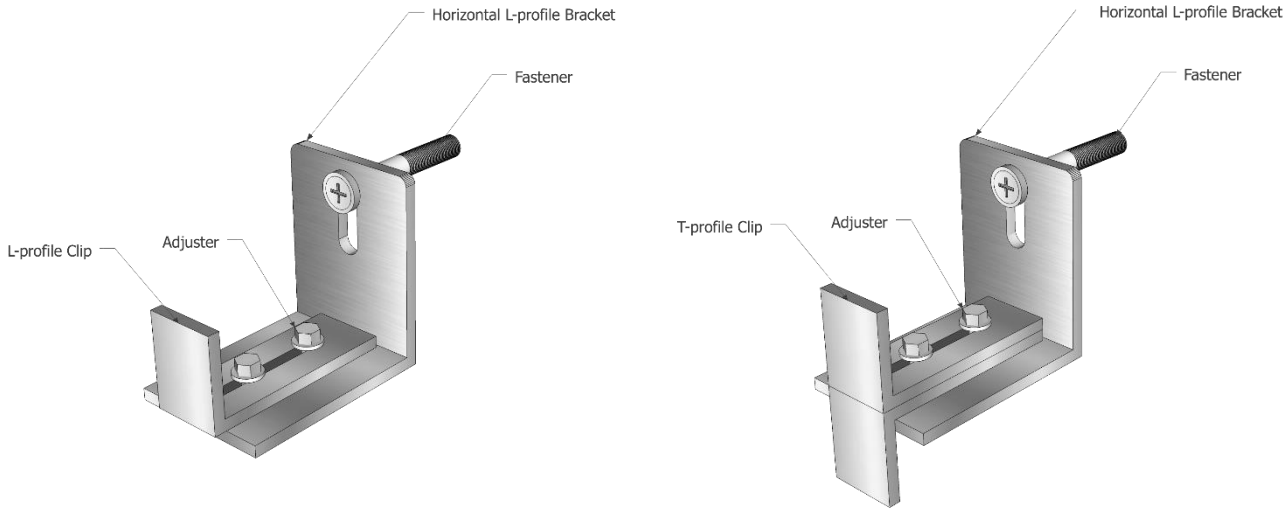
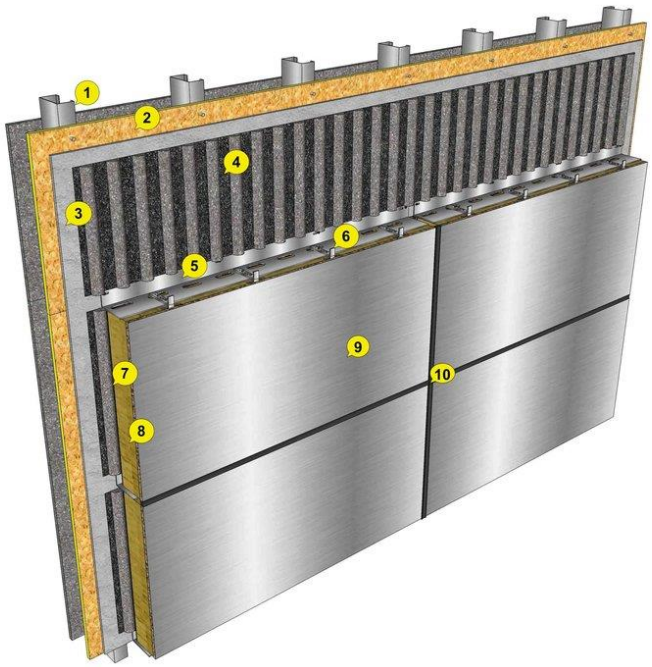


FIGURE 1—ILLUSTRATION OF A WALPANEL WALLSHELL® LT ANCHORING SYSTEM



1. Steel Studs (by design)
2. Sheathing (by design)
3. Vapor Barrier (by design)
4. Adhesive Drainage Plane
5. L-profile Supporting Rail
6. T-profile Panel Clips
7. Panel Backer Board
8. Panel Built-in Insulation
9. Finish Coat on Fiber Cement Panel
10. Panel Joint Sealant and weep tube

FIGURE 2—ILLUSTRATION OF A WALPANEL WALLSHELL® THERMAL PANOPLY PANEL SYSTEM SUPPORTED BY A LT ANCHORING SYSTEM