ICC-ES Evaluation Report

ESR-1146

Reissued January 2024

This report also contains:

- CBC Supplement

Subject to renewal January 2026

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION **Section: 07 42 13 – Metal Wall Panels**	**REPORT HOLDER: BARNMASTER SUPPLY, LLC**	**EVALUATION SUBJECT: MD/BARNMASTER STRUCTURAL WALL PANELS**	

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2021, 2018, 2015, 2012, 2009, and 2006 *International Building Code*® (IBC)
- 1997 *Uniform Building Code*™ (UBC)

Property evaluated:

- Structural

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

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

Attributes verified:

See Section 3.1

2.0 USES

The MD/BarnMaster Structural Wall panels are limited to use as exterior walls of stables or barns used for agricultural storage in Group U Occupancies under the IBC, and Group U, Division 1, Occupancies under the UBC.

3.0 DESCRIPTION

3.1 General:

The MD/BarnMaster Structural Wall panels are factory-assembled, nonbearing exterior wall panels. Each panel measures 12 feet (3658 mm) in length by 8 feet (2438 mm) in height, and is constructed from three 4-foot-long-by-8-foot-high (1219 mm by 2438 mm) plywood panels laminated on both sides with sheet metal. The plywood panels and facings are joined by steel splines and are encased in a steel C-channel perimeter frame to form the 12-by-8-foot (3658 by 2438 mm) panel. Drainage of moisture in contact with the laminated plywood is achieved by weep holes in the bottom channel of the perimeter frame.

The attributes of the panel system have been verified as conforming to the requirements of (i) CALGreen Section A4.404.3.3 and (ii) ICC 700-2015 and ICC 700-2012 Sections 601.5 and 11.601.5 and ICC 700-2008 Section 601.5. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the

verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

3.2 Materials:

3.2.1 Plywood Panels: Plywood panels are nominally 3/4-inch-thick (19.1 mm), five-layer, C-C Exterior Grade panels with a span rating of 48/24 and complying with DOC PS-1 as referenced in 2021, 2018, and 2015 IBC Section 2303.1.5 [2012 IBC section 2303.1.4]. or UBC Standard 23-2, as applicable.

3.2.2 Steel Frame and Splines: The steel frame and splines are galvanized C-channels manufactured fromNo. 14 gage [0.072 inch (1.83 mm) base-metal thickness] steel conforming to ASTM A653, SS Grade 50, Class 1 or better, having a G90 galvanized coating designation.The channels have the following dimensions: 1 3/4-inch-deep (44.5 mm) web, 2-inch-wide (51 mm) flanges, 1/2-inch (12.7 mm) first return lip and 3/8-inch (9.5 mm) second return lip. The splines that join the 4-by-8-foot (1219 by 2438 mm) panels together are spot-welded back-to-back at 8 inches (203 mm) on center.

3.2.3 Connector Column Assembly: The connector column assembly is used to connect 12-by-8-foot (3658 by 2438 mm) wall panels together and to transfer loads from the panels to the foundation. A connector column assembly primarily consists of the following components: a main C-channel (known as the connector column) having a minimum 2-inch-deep (51 mm) web and, 1 1/2-inch-wide (38 mm) flanges; and a closure-piece C-channel having the same dimensions as the main channel, except with minimum 1/2-inch (12.7 mm) flanges. The channels are manufactured from minimum No. 14 gage [0.072 inch(1.83 mm) base-metal thickness] steel conforming to ASTM A653, SS Grade 50, Class 1 or better, having a G90 galvanized coating designation. At the bottom of the main channel, a minimum No. 4 gage [0.2242 inch(5.7 mm)] base plate is shop-welded at the bottom of the channel to anchor the connector column assembly to the foundation. Vertical steel plates or C-shaped bend plates, having the same minimum thickness as the main channel, are shop-welded to interior flange walls of the main channel for closure-channel attachment. Welding must be in accordance with the approved quality control manual. Steel base plates are manufactured from ASTM A36 steel with a minimum yield strength of 36 ksi (250 MPa), or ASTM A569 steel, Grade 30, with a minimum yield strength of 30 ksi (208 MPa). See details C and D of Figure 1.

3.2.4 Sheet Metal: Sheet metal facings, used for weather protection, are galvanized No. 26 gage [0.0109 inch(0.28 mm) base-metal thickness] steel sheets conforming to ASTM A792, Grade 50, AZ50 or better. The sheet metal, sized to match the dimensions of each plywood panel, is bonded on both sides of the panel in accordance with the approved quality control manual.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The allowable load capacities in Table 1 of this report are for use in allowable stress design. Anchorage of the connector columns to the foundation must be designed to resist the applied loads. If the connector column–panel assemblies are required to be attached to other structural members, fasteners must be adequate to transfer or resist the required loading.

An analysis in accordance with IBC Section 1604.4 must be submitted to the code official for each project, showing that the panel system (including fasteners, anchor bolts and connector columns) provides a complete load path capable of transferring all loads and forces from the point of origin to load-resisting elements.

4.2 Installation:

Panels are field-installed with vertical connector columns. The panels are fastened, at the ends and along the height, to the connector columns with a minimum of three 1/2-inch-diameter (12.7 mm) galvanized steel bolts manufactured in accordance with ASTM A307; and a nut, to match the thread of the bolt, welded to the web (interior side) of the C-channel frame. The connector column must be anchored to the foundation with approved anchor bolts. The closure-piece channel is fastened to the connector column with 1/4-inch-diameter (6.4 mm), corrosion-resistant sheet metal screws. See Figure 1 for typical wall panel installation details for two different building configurations.

4.3 Special Inspection:

Based on Section 1705.2.1 of the 2021, 2018, 2015, and 2012 IBC, welding inspections for jobsite welding shall be in accordance with AISC 360. Based on Section 1704.3.1 of the 2009 and 2006 IBC, welding inspections for jobsite welding must be in compliance with AWS D1.1, and the basis for welding inspector qualification must be AWS D1.1. For use under the UBC, welding performed at the jobsite requires continuous special inspection in accordance with paragraph 5 of section 1701.5 of the UBC. Before proceeding, the welder

must demonstrate the ability to produce the prescribed weld to the special inspector's satisfaction. The inspector's other duties include verification of materials, weld preparation, welding procedures and welding processes.

5.0 CONDITIONS OF USE:

The MD/BarnMaster Structural Wall Panels system described in this report complies with those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Panel erection is in accordance with this report and the manufacturer's instructions, a copy of which shall be available on the jobsite during construction. Where a conflict exists between this report and the manufacturer's instructions, this report governs.

5.2 The design loads do not exceed those shown in Table 1 of this report.

5.3 The panels must be limited to exterior wall applications as described in Section 2.0 of this report.

5.4 When used as shearwalls, Exception 3 of IBC Section 1613.1 excludes agricultural storage structures from the seismic load resistance design provisions.

5.5 Structural calculations and plans, demonstrating compliance with this report, are submitted to the building official for each project.

5.6 The remaining portions of the structure are designed and constructed in accordance with the codes referenced in Section 1.0 of this report.

5.7 Special inspection is provided for job-site welding in accordance with Section 4.3 of this report.

5.8 The panels and connector columns are fabricated by Barnmaster Supply, LLC, at their facility located in Ontario, California, under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Wall Panels with a Welded Steel Perimeter Frame Used in Agricultural Storage Structures (AC390), dated May 2008 (editorially revised March 2021).

7.0 IDENTIFICATION

7.1 Each panel is stamped with the manufacturer's name(Barnmaster Supply, LLC) and the evaluation report number (ESR-1146). Connector columns are identified similarly to the panels.

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

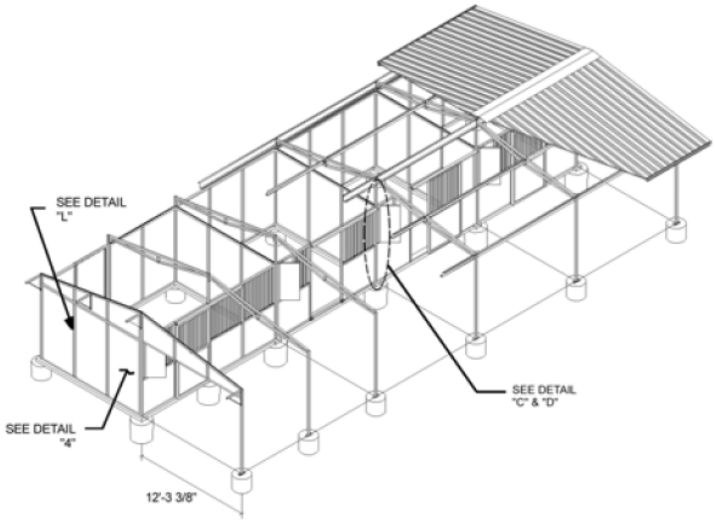
BARNMASTER SUPPLY, LLC
1720 EAST LOCUST STREET
ONTARIO, CALIFORNIA 91761
(909) 947-2276
www.mdbarnmaster.com

TABLE 1—ALLOWABLE PANEL CAPACITY

TYPE OF LOAD	ALLOWABLE LOAD[3]
Transverse uniform load[1]	13 psf
Racking shear[2]	4 kips

For **SI:** 1 psf = 47.8 Pa, 1 kip = 1000 lbf = 4.45 kN.

[1]Maximum wall panel size is 8 feet high by 12 feet long. The panel must be supported in accordance with this report.
[2]The shear walls are 8 feet high by 12 feet long. Value is based on the panel's capacity and connection of the panel to the connector columns at each end of the panel. Anchorage to foundation must be designed to resist or transfer the required loads. Shear wall must be continuously supported by a rigid foundation.
[3]No load increase is permitted for wind loading.



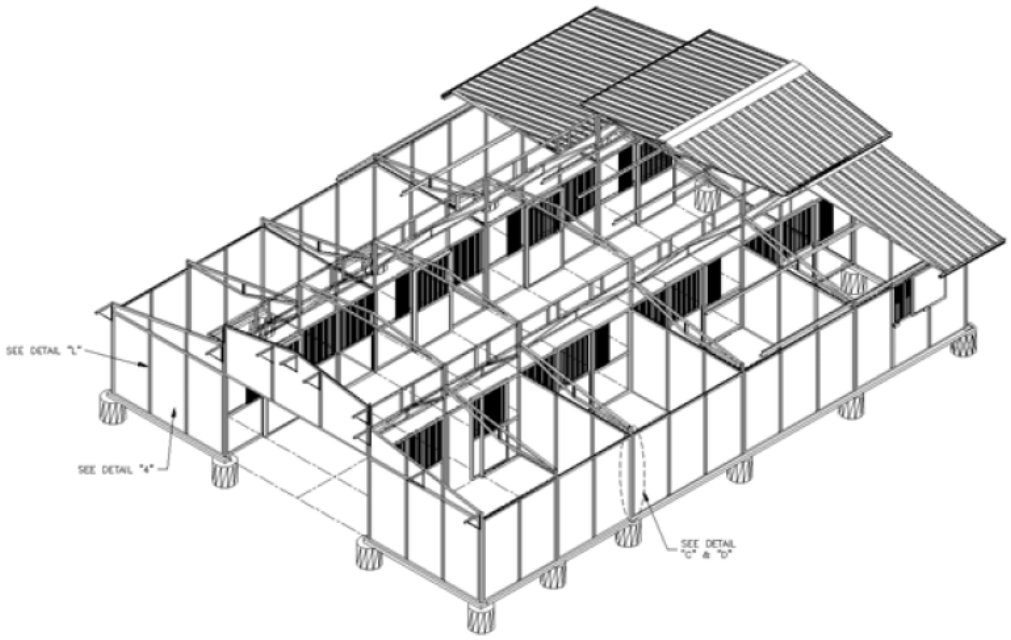
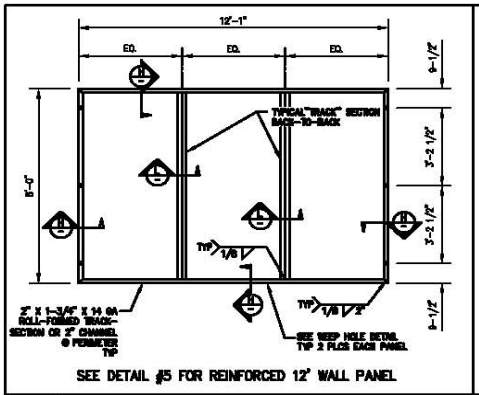
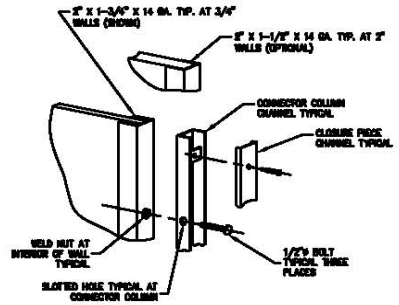


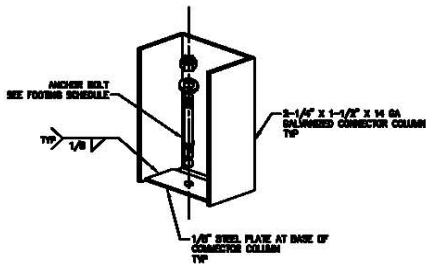
FIGURE 1—DETAILS



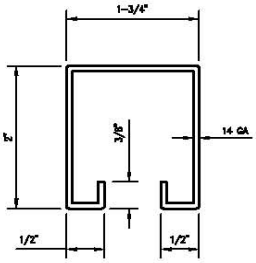
4 TYPICAL WALL PANEL



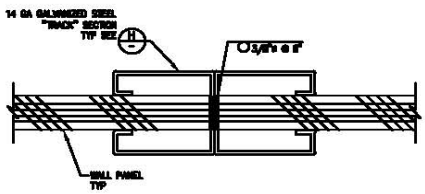
C



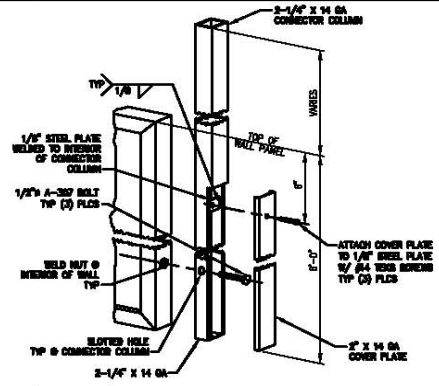
D CONNECTOR COLUMN BASE DETAIL



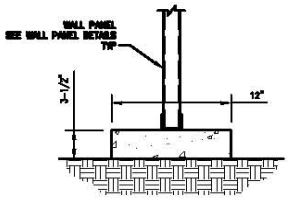
H ROLL-FORM DETAIL



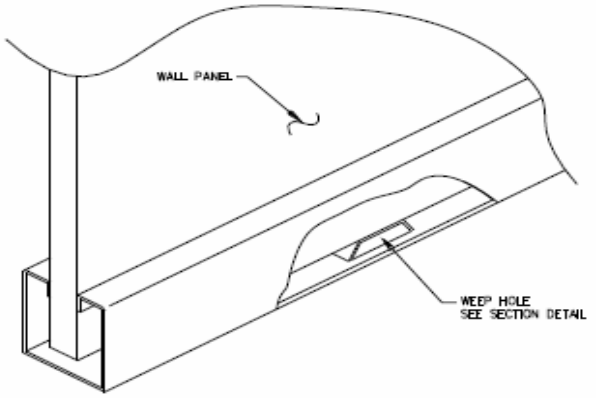
L 3/4" WALL SECTION



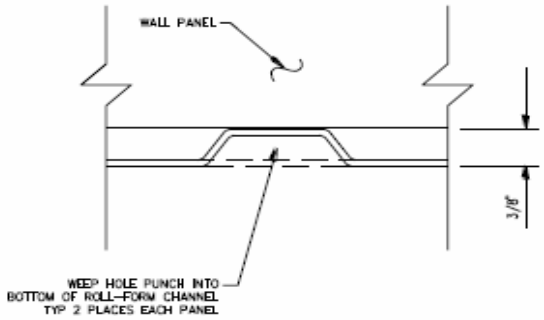
CONNECTOR COLUMN DETAIL



WALL PANEL W/ 3.5"X12" CURB DETAIL



WEEP HOLE ISO VIEW



WEEP HOLE SECTION DETAIL

FIGURE 1—DETAILS (Continued)

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 42 13—Metal Wall Panels

REPORT HOLDER:

BARNMASTER SUPPLY, LLC

EVALUATION SUBJECT:

MD/BARNMASTER STRUCTURAL WALL PANELS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that MD/BarnMaster Structural Wall panels, described in ICC-ES evaluation report ESR-1146, have also been evaluated for compliance with the code*(s)* noted below.

Applicable code edition*(s)*:

- 2019 *California Building Code* (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

2.0 CONCLUSIONS

2.1 CBC:

The MD/BarnMaster Structural Wall panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-1146, comply with CBC Chapter 22, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16, 17 and 22, as applicable.

2.1.1 OSHPD:

The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

2.1.2 DSA:

The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

This supplement expires concurrently with the evaluation report, reissued January 2024.