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RESEARCH REPORT: RR 24553
(CSI #13030)

Expires: February 1, 2017
Issued date: December 1, 2015
Code: 2014 LABC

GENERAL APPROVAL – Technical Modification – Hillphoenix ‘Walk-Ins’ – wood frame and high density foam frame wall, ceiling and floor panels for indoor and outdoor walk-in coolers and freezers

DETAILS

The panels consist of 3½" to 5" thick wood or high density urethane lumber frames with 26 gage stucco embossed galvanized steel or 20 gage smooth galvanized steel (36ksi minimum), complying with ASTM A653 CS Type A, and a core of urethane foam. The panels are held together by use of cam-locking devices along the edges of the panels. Access holes for these devices are covered with plugs. Top panels may be lag screwed to wall panels.

The wood frame panels are made of SPF, No. 2 or better, while the high density foam frame panels are made with molded urethane foam. The panels may be used as load bearing walls, roof panels, shear walls, and diaphragms. However, fasteners for shear wall uplift, anchorage loads perpendicular to the walls at the top and bottom, and other loads not specified shall be designed for each job. Surface burning characteristics of the finished building unit shall not exceed 75 for flame spread and 450 for smoke developed, respectively.

The panels are approved with following polyurethane foamed plastic cores as listed in UL File No. R14347.

- Dow Chemical Company Voracor polyurethane having a finished foam density of 2.30 pcf. The flame spread and smoke density ratings per ASTM E84 are 20 and 400 respectively, for the core material. The self-ignition and flash ignition temperatures for the foam, per ASTM D1929 are 824 °F and 824 °F, respectively.

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- Carpenter Company rigid urethane foam having a finished foam density of 2.27 pcf. The flame spread and smoke density ratings per ASTM E84 are 25 and 350 respectively, for the core material. The self-ignition and flash ignition temperatures for the foam, per ASTM D1929 are 1040 °F and 842 °F, respectively.
- BASF Corps Elastopor rigid urethane foam having a finished foam density of 2.30 pcf. The flame spread and smoke density ratings per ASTM E84 are 20 and 450 respectively, for the core material. The self-ignition and flash ignition temperatures for the foam, per ASTM D1929 are 861 °F and 752 °F, respectively.

Hill Phoenix Walk-Ins freestanding walk-in coolers and freezers constructed of panels described above are approved subject to the following conditions:

1. Use of the panels shall be limited to locations where combustible construction is permitted by the 2014 Los Angeles City Building Code.
2. The panels shall be fabricated in a shop of a licensed fabricator approved by the Los Angeles City Building Department. Fabrication in unlicensed shops will invalidate this approval.
3. A thermal barrier is required per Section 2603.4 of the 2014 Los Angeles City Building Code unless exempted per Section 2603.4.1.3 or Section 2603.4.1.2 when the building is protected with an automatic sprinkler system in accordance with Section 903.1.1.
4. Complete plans and calculations, signed and stamped by a civil or structural engineer or architect registered in the State of California, shall be submitted to the Structural Plan Check Division for their approval for each project.
5. An approved fire retardant roof covering (Class "A" or "B") shall be placed over the panels when used as exterior roof panels.
6. A separate approval from the Electrical Testing Laboratory shall be required for electrical installations within the panels.
7. Design of building utilizing the panels shall be in accordance with the requirements of the 2014 City of Los Angeles Building Code and the design data specified below:

A. Maximum Allowable Shear Load of Wood Framed Panels

Height to Width Ratio	Allowable Shear (lb/ft)
4 to 1	150
3 to 1	200
2 to 1	350
1 ½ to 1	400
1 to 1	600
½ to 1	750

B. Maximum Allowable Shear Load of High Density Foam Framed Panels

Height to Width Ratio	Allowable Shear (lb/ft)
4 to 1	40
3 to 1	60
2 to 1	80
1 ½ to 1	107
1 to 1	160
½ to 1	320

C. Maximum Allowable Vertical Loads of Wood Framed Panels

Panel Thickness (in)	Maximum Panel Height (ft)	Allowable Vertical Load (lb/ft)
3.5	23'-0"	1247
5	12'-0"	2138
5	17'-0"	2091
5	23'-0"	2036

D. Maximum Allowable Vertical Loads of High Density Foam Framed Panels

Panel Thickness (in)	Maximum Panel Height (ft)	Allowable Vertical Load (lb/ft)
3.5	23'-0"	500
5	23'-0"	500

Ceiling panel to wall panel connections are made with 3/8" dia. lag screws, 26 ga. galv. continuous cap angles with ¼" dia. x 1-½" long screws.

Panel to concrete slab connections are made with 1-½" x 1-½" x 20 ga. galv. Steel continuous angle with ¼" diameter x 1½" long screws to panel and ¼ dia. drive (screw) anchors to concrete.

Spacing of connections shall be calculated for each job but not less than two per width of panel. (Width of panel = 47").

Accurate alignment of adjacent panels is required for satisfactory workability.

Wall panel to floor panel connections can also be made with 1-½" x 1-½" x 20 ga. galvanized steel continuous angle with ¼" dia. x 1-½" long screws to wall panel. The connector is attached to a floor panel with ¾" dia. x 2" long lag screws and the floor panels are fastened to concrete with ¼" dia. drive (screw) anchors.

The allowable loads for these connections are:

	Wall/Floor Panel (lbs.)	Wall/Concrete (lbs.)
Tension	290	316
Shear	290	280

Maximum Allowable Loading for the Cam-Locking Devices:

	Wood Frame	High Density Foam Frame
Tension parallel to panel face	240 lbs	108 lbs
Shear along longitudinal edge of panel in direction parallel to panel edge	430 lbs	238 lbs

8. Locations of connectors must be detailed on approved plans.
9. Allowable loads for shear walls and diaphragms are not applicable to buildings incorporating structural steel framing.
10. No increase in allowable stresses is allowed for the values indicated above for short duration of loads due to wind or seismic forces.
11. All design values and methods not included in this report shall be in accordance with requirements of the 2014 Los Angeles City Building Code.
12. See attached panel structural data table for allowable panel spans based on transverse loading.

DISCUSSION

The technical modification is to update and revise panel span charts recognized as part of this general approval.

The report is in compliance with the 2014 City of Los Angeles Building Code.

The approval is based on tests on the foam per requirements of Section 2603 of the 2014 City of Los Angeles Building Code, tests conducted in accordance with ASTM E-84 on the finished panels, and load tests conducted in accordance with ASTM E-72.

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

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This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this Approval have been met in the project in which it is to be used.

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Attachment: Panel Structural Data Table (1 Page).