LEGACY REPORT

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Legacy report on the 2000 *International Building Code*®, BOCA® *National Building Code*/1999, the 1999 *Standard Building Code*©, the 1999 *Uniform Building Code*™, and the 2000 *International Residential Code*®

DIVISION 07—THERMAL AND MOISTURE PROTECTION
Section 07410—Metal Roof and Wall Panels

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1.0 SUBJECT

PanelCraft Building Panels: Honeycomb and Polystyrene Sandwich Panels

2.0 PROPERTY FOR WHICH EVALUATION IS SOUGHT

2.1 Structural
2.2 Fire performance

3.0 DESCRIPTION

3.1 General

PanelCraft Building Panels are shop fabricated roof and wall sandwich panels for use in one-story buildings of combustible, unprotected construction. The panels are formed by gluing embossed 0.024 inch (0.610 mm) thick, 3105 H18, 3004 H32 or 3004 H36 grade aluminum facings to a core material of honeycomb or polystyrene. The honeycomb core material has a 3/4 inch (19.050 mm) hexagonal cell pattern and is made of 99# Kraft paper having an 11% or 18% resin content. The polystyrene core material is Type II expanded polystyrene (EPS) having a nominal density of 1.5 pcf (24.028 kg/m^3). The adhesive is a moisture-curing, one-part, 100% solid, non-volatile, Type II urethane adhesive. The typical aluminum panel edges are rolled to provide an internal lip along each long edge of each face, over which aluminum (6063 T6 or 6005 T5) H-channel extrusions are installed to seal and maintain the panels in alignment. For the honeycomb core panels, an extruded vinyl drive cleat is permitted in lieu of the aluminum H-channel unless improved structural performance provided by the aluminum H-channels is required by the load tables in this report.

The panels are 3 feet (914.4 mm) in width with lengths varying from 8 to 20 feet (2.44 to 6.1 m). Panels are available in thicknesses of 3, 4-1/2, and 6 inches (76.2, 114.3, and 152.4 mm).

When tested in accordance with ASTM E 84, the EPS foam cores used in the construction of the panels demonstrated a flamespread index of under 75 and a smoke developed index of under 450.

When tested in accordance with ASTM E 84, 3 inch (76.2 mm) and 6 inch (152.4 mm) thick honeycomb core panels demonstrated a flamespread index of under 75 and a smoke developed index of under 450 when tested with the panels joined with either vinyl cleats or aluminum H-channels. Therefore, the panels are assigned a Class B or Class II Interior Finish Classification.

When tested in accordance with ASTM E 84, 3 inch (76.2 mm) and 6 inch (152 mm) thick EPS core panels demonstrated a flamespread index of under 75 and a smoke developed index of under 450 when tested with the panels joined with aluminum H-channels. Therefore, panels joined with aluminum H-channels are assigned a Class B or Class II Interior Finish Classification.

When tested per UL Subject 1715, the EPS core panels joined by aluminum H-channels at the longitudinal joints between the panels (no horizontal joints between the ends of the panels) installed exposed as a roof over the test room demonstrated acceptable fire performance without the use of a thermal barrier.

When tested in accordance with ASTM E 108, with vinyl cleats at the longitudinal joints between the panels (no horizontal joints between the ends of the panels), the honeycomb core panels demonstrated a Class C roof covering classification. The Class C roof covering classification is also extended to the honeycomb core panels with aluminum "H" channels at the longitudinal joints between the panels (no horizontal joints between the ends of the panels).

When tested in accordance with ASTM E 108, with aluminum "H" channels at the longitudinal joints between the panels (no horizontal joints between the ends of the panels), the EPS foam core panels demonstrated a Class C roof covering classification.

Based on transverse load testing performed in accordance with ASTM E 72, the honeycomb and EPS core roof panels were determined to have allowable live load capacities as noted in Tables 1 and 2, at the end of this report, respectively. The honeycomb and EPS core wall panels are assigned a transverse wind load capacity equal to the live load capacity noted in Tables 1 and 2 respectively.

Based on axial load testing performed in accordance with ASTM E 72, the honeycomb and EPS core panels were determined to have allowable axial load capacities as noted in Table 3 at the end of this report. Unbraced panel heights for axially loaded wall panels shall not exceed 8 ft (2.44 m). Panels subjected to combined transverse and axial loading shall be designed to account for the interaction effects of the combined loading condition.

Based on racking load testing performed in accordance with ASTM E 72, the honeycomb and EPS core panel systems were determined to have allowable racking load capacities as noted in Table 4 at the end of this report.

4.0 INSTALLATION

Each structure built of PanelCraft Building Panels shall be designed in accordance with good engineering practice. Design loads shall be determined in accordance with Chapter 16 of the applicable building code. Panels loads shall not exceed those allowed by this report. Drawings shall contain specific instructions with regard to connections, erection, and installation of the panels and shall be available at all times on the jobsite during installation. The structure shall be constructed by a dealer authorized by Craft-Bilt Manufacturing Company.

5.0 IDENTIFICATION

Field identification as to this Evaluation Report shall be by a certificate bearing the manufacturer's name and address, the number of this report, and the name of the independent QA Agency (Applied Geosciences, Inc., NER-QA600). In addition, numbers stamped on the side of the panel cores provide direct traceability to manufacturing production records.

6.0 EVIDENCE SUBMITTED

6.1 Manufacturer's Quality Control Manual.

6.2 Letter prepared by Ambric Engineering, Inc. concerning testing and evaluation criteria, dated May 22, 1995, signed by D. D. Meisel, P.E.

6.3 Reports of fire testing conducted at Southwest Research Institute:

- Testing per UL Subject 1715, SwRI Project No. 01-6740-202, dated February, 1995, signed by Anthony L. Sauceda.
- Testing per ASTM E 84, SwRI Project Nos. 01-6739-073a and 01-6739-073b, dated November 21, 1994, signed by Howard W. Stacey and Alex B. Wenzel.

6.4 Reports of fire testing conducted in accordance with ASTM E 84 at Commercial Testing Company, Report Nos. 104960, 104961, and 104963, dated November 16, 1995, signed by Jonathan Jackson.

6.5 Reports of fire testing conducted in accordance with ASTM E 108, prepared by Western Fire Center, Inc., WFC Report Nos. 97008 and 97009, signed by Noel Putaansuu and Tom Woodford.

6.6 Report of transverse and racking load testing conducted in accordance with ASTM E 72, prepared by Ambric Engineering, Inc., Report No. 95-05-01-S1, dated May 1, 1995, signed by Donald D. Meisel, P.E.

6.7 Structural Testing Manual, prepared by Applied Geosciences, Inc., dated March, 2001.

6.8 Report of transverse and axial load testing conducted in accordance with ASTM E 72, prepared by Ambric Engineering, Inc., Report No. 96-01-24-S1 (revised), dated November 22, 1996, signed by Donald D. Meisel, P.E.

6.9 UL Classification Certificates and inspection reports on expanded polystyrene insulation material.

6.10 Report of fire testing conducted in accordance with ASTM E 84, prepared by Underwriters Laboratories, File R7503, Project 86RT3011, dated April 20, 1987, signed by Daniel P. Ryan and M. T. Cunningham.

6.11 Reports of fire testing conducted in accordance with ASTM E 84, prepared by Omega Point Laboratories, Report Nos. 15623-100725, 15623-100726, 15623-100727, and 15623-100728, dated November 12, 1996, signed by Conrad G. Hernandez and William E. Fitch, P.E.

6.12 Reports of room fire testing conducted in accordance with UL 1715, prepared by Western Fire Center, Inc., WFC Report No. 97006, signed by Noel Putaansuu and Tom Woodford.

6.13 Report of transverse load testing conducted in accordance with ASTM E 72, prepared by Ambric Technology Corporation, dated February 16, 2001, signed by Donald D. Meisel, P.E.

7.0 CONDITIONS OF USE

The National Evaluation Service Committee finds that Craft-Bilt's PanelCraft Building Panels, as described in this report conform with or are suitable alternates to that specified in the 2000 *International Building Code*®, BOCA® *National Building Code*/1999, the 1999 *Standard Building Code*©, the 1999 *Uniform Building Code*™, and the 2000 *International Residential Code*®, subject to the following conditions:

7.1 Design calculations and details for specific applications shall be furnished to the code official verifying compliance with this report and the applicable code. The individual preparing such documents shall possess the necessary credentials regarding competency and qualifications as required by the applicable code and the professional registration laws of the state where the construction is undertaken. Panels shall be loaded only in a similar manner to that in which they have been tested and design loads on panels shall not exceed the allowable loads noted in Table 1, 2, 3, or 4, as applicable.

7.2 The structural evaluation of this report includes an evaluation of the transverse, axial, and racking load capacities of the panels only. Items not covered by this report such as supporting framing, connections, window details, door details, foundations, plumbing, mechanical systems, etc. shall be submitted to the local authority having jurisdiction for approval when applying for a permit.

7.3 Panels shall be limited to roof and wall construction of one story buildings of the following types of construction:

- Type VB, construction in jurisdictions using the International Building Code or the BOCA National Building Code.
- Type VI, unprotected construction in jurisdictions using the Standard Building Code.
- Type VN, construction in jurisdictions using the Uniform Building Code.

7.4 For detached one- and two- family dwellings and multiple single-family dwellings (townhouses) where the *International Residential Code* (IRC) is the adopted code, design shall conform to the adopted model building code *(International Building Code*, *BOCA National Building Code*, *Standard Building Code,* or the *Uniform Building Code*) instead of the *International Residential Code*.

7.5 Longitudinal joints between EPS core panels shall be joined with aluminum “H” channels (vinyl cleats are permitted only on honeycomb core panels when structural design does not require the use of aluminum “H” channels). Each side of the “H” channel shall be joined to the adjacent EPS panels using Tek screws at a maximum spacing of 12 inches (305 mm) on center.

7.6 Horizontal joints between the ends of the panels are not permitted.

7.7 Panels having the expanded polystyrene cores shall be fully protected from the interior of the building by an approved 15 minute thermal barrier.

EXCEPTION: Roof panels applications where a Class B or Class II interior finish is permitted by the code.

7.8 Structures utilizing PanelCraft Building Panels shall be constructed by a dealer approved by Craft-Bilt Manufacturing Company.

7.9 This report is subject to re-examination on a periodic basis. For information on the current status of this report, contact the ICC-ES.

TABLE 1: LOAD/SPAN TABLE FOR HONEYCOMB CORE PANELS

PANEL SPAN (ft)	PANEL CONFIG.	ALLOWABLE LIVE ROOF LOADS FOR HONEYCOMB (H/C) PANELS								
		20 psf	25 psf	30 psf	35 psf	40 psf	45 psf	50 psf	55 psf	60 psf
8	3" HC	•	•	•	•	•	•	•	•	•
8	3" HC + H	•	•	•	•	•	•	•	•	•
8	4.5" HC	•	•	•	•	•	•	•	•	•
8	4.5" HC + H	•	•	•	•	•	•	•	•	•
8	6" HC	•	•	•	•	•	•	•	•	•
8	6" HC + H	•	•	•	•	•	•	•	•	•
9	3" HC	•	•	•	•	•	•	•	•	
9	3" HC + H	•	•	•	•	•	•	•	•	•
9	4.5" HC	•	•	•	•	•	•	•	•	•
9	4.5" HC + H	•	•	•	•	•	•	•	•	•
9	6" HC	•	•	•	•	•	•	•	•	•
9	6" HC + H	•	•	•	•	•	•	•	•	•
10	3" HC	•	•	•	•	•	•	•		
10	3" HC + H + SKY	•	•	•	•					
10	3" HC + H	•	•	•	•	•	•	•	•	•
10	4.5" HC	•	•	•	•	•	•	•	•	•
10	4.5" HC + H	•	•	•	•	•	•	•	•	•
10	6" HC	•	•	•	•	•	•	•	•	•
10	6" HC + H	•	•	•	•	•	•	•	•	•
11	3" HC	•	•	•	•	•	•			
11	3" HC + H + SKY	•	•	•						
11	3" HC + H	•	•	•	•	•	•	•	•	
11	4.5" HC	•	•	•	•	•	•	•	•	
11	4.5" HC + H	•	•	•	•	•	•	•	•	•
11	6" HC	•	•	•	•	•	•	•	•	•
11	6" HC + H	•	•	•	•	•	•	•	•	•
12	3" HC	•	•	•	•	•				
12	3" HC + H + SKY	•	•							
12	3" HC + H	•	•	•	•	•	•	•		
12	4.5" HC	•	•	•	•	•	•	•		
12	4.5" HC + H + SKY	•	•	•	•	•				
12	4.5" HC + H	•	•	•	•	•	•	•	•	•
12	6" HC	•	•	•	•	•	•	•	•	•
12	6" HC + H	•	•	•	•	•	•	•	•	•
13	3" HC	•	•	•						
13	3" HC + H + SKY	•								
13	3" HC + H	•	•	•	•	•				
13	4.5" HC	•	•	•	•	•	•			
13	4.5" HC + H + SKY	•	•	•	•					
13	4.5" HC + H	•	•	•	•	•	•	•	•	•
13	6" HC	•	•	•	•	•	•	•	•	•
13	6" HC + H	•	•	•	•	•	•	•	•	•

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TABLE 1 (cont)

PANEL SPAN (ft)	PANEL CONFIG.	ALLOWABLE LIVE ROOF LOADS FOR HONEYCOMB (H/C) PANELS								
		20 psf	25 psf	30 psf	35 psf	40 psf	45 psf	50 psf	55 psf	60 psf
14	3" HC	•	•							
14	3" HC + H	•	•	•	•					
14	4.5" HC	•	•	•	•	•				
14	4.5" HC + H + SKY	•	•	•						
14	4.5" HC + H	•	•	•	•	•	•	•	•	•
14	6" HC	•	•	•	•	•	•	•	•	
14	6" HC + H + SKY	•	•	•	•	•				
14	6" HC + H	•	•	•	•	•	•	•	•	•
15	3" HC									
15	3" HC + H									
15	4.5" HC	•	•	•	•	•				
15	4.5" HC + H + SKY	•	•							
15	4.5" HC + H	•	•	•	•	•	•	•	•	
15	6" HC	•	•	•	•	•	•			
15	6" HC + H + SKY	•	•	•	•					
15	6" HC + H	•	•	•	•	•	•	•	•	•
16	3" HC									
16	3" HC + H									
16	4.5" HC	•	•	•	•					
16	4.5" HC + H + SKY	•	•							
16	4.5" HC + H	•	•	•	•	•				
16	6" HC	•	•	•	•	•				
16	6" HC + H + SKY	•	•	•						
16	6" HC + H	•	•	•	•	•	•	•	•	
17	3" HC									
17	3" HC + H									
17	4.5" HC	•								
17	4.5" HC + H	•	•	•	•					
17	6" HC	•	•	•	•					
17	6" HC + H + SKY	•	•							
17	6" HC + H	•	•	•	•	•	•	•		
18	3" HC									
18	3" HC + H									
18	4.5" HC									
18	4.5" HC + H	•	•	•						
18	6" HC	•	•	•	•					
18	6" HC + H + SKY	•								
18	6" HC + H	•	•	•	•	•	•			
19	3" HC									
19	3" HC + H									
19	4.5" HC									
19	4.5" HC + H									
19	6" HC	•	•	•						
19	6" HC + H + SKY	•								
19	6" HC + H	•	•	•	•	•				

Notes:
1. Tables are applicable to simple span conditions only.
2. If application requires panel to support dead loads in addition to their own weight, the allowable live loads noted in the table shall be reduced accordingly.
3. Tabulated values limit deflection to span/90 and are valid for roofs which do not support ceilings.
4. Bearing lengths shall be a minimum of 1.5 inches (38.1 mm).
5. Linear interpolation permitted.
6. 3" HC = 3-inch thick honeycomb core panel.
7. H = Aluminum H-Channel joining panel edges.
8. SKY = Fixed ($38^{1}/_{2}$" L x $22^{1}/_{2}$" W x $2^{1}/_{2}$" D) OR Vented ($39^{3}/_{8}$" L x $23^{3}/_{8}$" W x 5" D) Skylite.
9. Roofs not having sufficient slope to insure adequate drainage shall be investigated for ponding.

TABLE 2: LOAD/SPAN TABLE FOR EXPANDED POLYSTYRENE CORE PANELS

PANEL SPAN (ft)	PANEL CONFIG.	ALLOWABLE LIVE ROOF LOADS FOR EXPANDED POLYSTYRTENE (EPS) PANELS								
		20 psf	25 psf	30 psf	35 psf	40 psf	45 psf	50 psf	55 psf	60 psf
8	3" EPS	•	•	•	•	•	•	•	•	•
8	3" EPS + H	•	•	•	•	•	•	•	•	•
8	4.5" EPS	•	•	•	•	•	•	•	•	•
8	4.5" EPS + H	•	•	•	•	•	•	•	•	•
8	6" EPS	•	•	•	•	•	•	•	•	•
8	6" EPS + H	•	•	•	•	•	•	•	•	•
9	3" EPS	•	•	•	•	•	•	•	•	
9	3" EPS + H	•	•	•	•	•	•	•	•	•
9	4.5" EPS	•	•	•	•	•	•	•	•	•
9	4.5" EPS + H	•	•	•	•	•	•	•	•	•
9	6" EPS	•	•	•	•	•	•	•	•	•
9	6" EPS + H	•	•	•	•	•	•	•	•	•
10	3" EPS	•	•	•	•	•	•	•		
10	3" EPS + H + SKY	•	•	•	•					
10	3" EPS + H	•	•	•	•	•	•	•		
10	4.5" EPS	•	•	•	•	•	•	•	•	
10	4.5" EPS + H	•	•	•	•	•	•	•	•	•
10	6" EPS	•	•	•	•	•	•	•	•	•
10	6" EPS + H	•	•	•	•	•	•	•	•	•
11	3" EPS	•	•	•						
11	3" EPS + H + SKY	•	•	•						
11	3" EPS + H	•	•	•	•	•	•			
11	4.5" EPS	•	•	•	•	•	•			
11	4.5" EPS + H	•	•	•	•	•	•	•	•	•
11	6" EPS	•	•	•	•	•	•	•	•	
11	6" EPS + H	•	•	•	•	•	•	•	•	•
12	3" EPS	•	•	•						
12	3" EPS + H + SKY	•	•							
12	3" EPS + H	•	•	•	•					
12	4.5" EPS	•	•	•	•					
12	4.5" EPS + H + SKY	•	•	•						
12	4.5" EPS + H	•	•	•	•	•	•	•	•	
12	6" EPS	•	•	•	•	•	•	•		
12	6" EPS + H	•	•	•	•	•	•	•	•	•
13	3" EPS	•	•							
13	3" EPS + H	•	•	•						
13	4.5" EPS	•	•	•	•					
13	4.5" EPS + H + SKY	•	•	•						
13	4.5" EPS + H	•	•	•	•	•	•	•		
13	6" EPS	•	•	•	•	•	•			
13	6" EPS + H + SKY	•	•	•	•	•				
13	6" EPS + H	•	•	•	•	•	•	•	•	•

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TABLE 2 (cont)

PANEL SPAN (ft)	PANEL CONFIG.	ALLOWABLE LIVE ROOF LOADS FOR EXPANDED POLYSTYRTENE (EPS) PANELS								
		20 psf	25 psf	30 psf	35 psf	40 psf	45 psf	50 psf	55 psf	60 psf
14	3" EPS	•	•							
14	3" EPS + H	•	•	•						
14	4.5" EPS	•	•	•						
14	4.5" EPS + H + SKY	•	•							
14	4.5" EPS + H	•	•	•	•					
14	6" EPS	•	•	•	•	•				
14	6" EPS + H + SKY	•	•	•	•					
14	6" EPS + H	•	•	•	•	•	•	•	•	•
15	3" EPS									
15	3" EPS + H									
15	4.5" EPS	•	•							
15	4.5" EPS + H + SKY	•								
15	4.5" EPS + H	•	•	•	•					
15	6" EPS	•	•	•	•					
15	6" EPS + H + SKY	•	•	•						
15	6" EPS + H	•	•	•	•	•	•	•	•	•
16	3" EPS									
16	3" EPS + H									
16	4.5" EPS	•								
16	4.5" EPS + H + SKY	•								
16	4.5" EPS + H	•	•	•						
16	6" EPS	•	•	•	•					
16	6" EPS + H + SKY	•	•	•						
16	6" EPS + H	•	•	•	•	•	•	•	•	
17	3" EPS									
17	3" EPS + H									
17	4.5" EPS									
17	4.5" EPS + H	•								
17	6" EPS	•	•	•						
17	6" EPS + H + SKY	•	•							
17	6" EPS + H	•	•	•	•	•	•			
18	3" EPS									
18	3" EPS + H									
18	4.5" EPS									
18	4.5" EPS + H									
18	6" EPS	•	•							
18	6" EPS + H + SKY	•								
18	6" EPS + H	•	•	•	•					
19	3" EPS									
19	3" EPS + H									
19	4.5" EPS									
19	4.5" EPS + H									
19	6" EPS									
19	6" EPS + H + SKY	•								
19	6" EPS + H	•	•	•						

Notes:
1. Tables are applicable to simple span conditions only.
2. Spans shown for EPS Panels without H-stiffeners are shown for informational purposes only (See Section 7.5).
3. If application requires panel to support dead loads in addition to their own weight, the allowable live loads noted in the table shall be reduced accordingly.
4. Tabulated values limit deflection to span/90 and are valid for roofs which do not support ceilings.
5. Bearing lengths shall be a minimum of 1.5 inches (38.1 mm).
6. Linear interpolation permitted.
7. 3" EPS = 3-inch thick expanded polystyrene core panel.
8. H = Aluminum H-Channel joining panel edges.
9. SKY = Fixed ($38^1/_2$" L x $22^1/_2$" W x $2^1/_2$" D) or Vented ($39^3/_8$" L x $23^3/_8$" W x 5" D) Skylite.
10. Roofs not having sufficient slope to insure adequate drainage shall be investigated for ponding.

TABLE 3: ALLOWABLE AXIL COMPRESSION LOADS FOR HC & EPS CORE PANELS

MAX. UNBRACED HEIGHT (feet)	THICKNESS (inches)	CORE	H-STIFFENER	PANEL-CANNEL CONNECTORS	ALLOWABLE LOAD (lb/ft)
8'	3"	HC	0	#8 x 1/4" Tek Screws @ 8" oc	1324
8'	3"	EPS	0	#8 x 1/4" Tek Screws @ 8" oc	1324

Notes: 1. HC = 3-inch thick honeycomb core panel.
2. EPS = 3-inch thick expanded polystyrene core panel.
3. Panels subjected to combined transverse and axial loading shall be designed to account for the interaction effects of the combined loading conditions.

TABLE 4: RACKING LOAD STRENGTHS FOR HC & EPS CORE PANELS

HEIGHT (feet)	THICKNESS (inches)	CORE	PANEL-PANEL CONNECTORS	ALLOWABLE LOAD (pounds/feet)	DEFORMATION AT ALLOW LOAD (inches)
8'	3"	HC	Vinyl Cleat	123	0.40
8'	3"	EPS	H-Stiffener with Caulking	173	0.40

Notes: 1. HC = 3-inch thick (or greater) honeycomb core panel.
2. EPS = 3-inch thick (or greater) expanded polystyrene core panel.
3. Allowable loads were determined by testing 3 ft wide by 8 ft long panels installed vertically and fastened to perimeter elements consisting of Craft-Bilt aluminum extrusions using #8 x ½ inch Tek screws at a maximum spacing of 8 inches o.c. along each perimeter edge of the assembly. Vertical joints between panels consisted of vinyl cleats for honeycomb core panels and aluminum H-channels for EPS core panels. H-channels are caulked to the panels and fastened to the panels with 4 - #8 x 1/4 inch Tek screws per face per stiffener end.