ELEMENT INSULATED CONCRETE FORMS MATERIAL PROPERTY DATA SHEET

This document is intended for general information purposes only regarding specifications for Element Insulated Concrete Forms (herein referred to as Element ICF). Technical specification sheet, as per Construction Specifications institute (CSI) formatting, can be downloaded at www.elementicf.com.

1 PRODUCT DESCRIPTION

- Element ICF consists of form units made with two flame-resistant EPS foam panels[1] separated by polypropylene webs. Element ICF are reversible ICF blocks available as preformed or site-assembled.
- The EPS foam panels are a minimum 2.75 inch (70 mm) thick.
- Web ties separate the EPS panels to form 4 (102), 6 (152), 8 (203), 10 (254) and 12 inch (152 mm), which create the concrete wall thicknesses. Site-assembled Element ICF are assembled with webs referred to as Flexties™.
- The webs are spaced every 8 inch (203 mm) on centre horizontally and 16 inch (406 mm) on centre vertically, and contain a 1.5 inch (38 mm) wide furring strip.
- The webs are designed with a locking mechanism to prevent forms from separating between courses. The furring strip extends 14.95 inches (380 mm) in height allowing space between courses to create chases for wiring. The furring strips shall facilitate fasteners for attachment of both exterior and interior finishes.
- The webs facilitate rebar placement in accordance with CAN/CSA A23.1, and ACI 318

1. Element ICF products may be regionally available with graphite polystyrene (GPS) insulation which offers higher thermal resistance. Contact your local Element ICF representative for more information and availability.

2 CODE/CERTIFICATION APPROVALS

The Element ICF form panels have been tested to the following standards:

- ASTM C578, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
- CAN/ULC S701, Standard for Thermal Insulation, Polystyrene Boards
- ASTM E2634, Standard Specification for Flat Wall Insulating Concrete Form (ICF) Systems
- CAN/ULC S717, Standard for Flat Wall Insulating Concrete Form (ICF) Units
- QAI CERus-1005

Pending evaluations:

- Miami-Dade County Approval
- State of Florida Certification of Approval
- Wisconsin Building Products Evaluation
- City of New York Materials and Equipment Acceptance

3 DESIGN/PERFORMANCE OF ELEMENT ICF

A brief description of the required EPS material properties are outlined in Table 1. In addition, further tests of the web ties and as an ICF system are shown in Table 2. Test reports are available upon request.

Table 1: Standard Minimum Required Properties of the EPS

DESCRIPTION	ASTM C578 (TYPE II EPS)	CAN/ULC S701 (TYPE 2 EPS)	REFERENCED STANDARD TEST METHOD
R-Value (Thermal Resistance) per inch (per 25.4mm)	Min. R 4.00 (RSI 0.70)		ASTM C518
Water Absorption	Max. 3.0%		ASTM D2842
Water Vapor Presence	3.5 perm-In (Max. 200 ng/Pa-s-m^2)		ASTM E96
Compressive Strength	Min. 15 psi	Min. 16 psi (110 kPa)	ASTM D1621 & ASTM C165
Flexural Strength	Min. 35 psi (240 kPa)		ASTM C203
Dimensional Stability – Thermal & Humid Aging	2.0%	Max. 1.5%	ASTM D2126
Density	Min. 1.35 pcf (22 kg/m^3)		ASTM C1622 & ASTM C303
Limiting Oxygen Index	Min. 24.0%		ASTM D2863
Flame Spread Index (max thickness)	≤ 25 (4 in)	≤ 250 (100 mm)	ASTM E84/CAN ULC S102.2
Smoke Developed Index (max thickness)	≤ 450 (4 in)	≥ 500 (100 mm)	ASTM E84/CAN ULC S102

Table 2: System and Web Tie Test Results

Physical

Test Description	Result	Pass/Fail Criteria	Referenced Standard Test Method
Dimensions	Min. length variation = 0.0% Max. length variation = 0.4% Min. width variation = 0.1% Max. width variation = 0.4% Min. thickness variation = -0.3mm Max. thickness variation = 0.9mm Max. squareness = 3mm	Min. -0.2% Max. 0.4% Min. -0.2% Max. 0.4% Max. -2mm Max. 4mm Max. 3mm	ASTM C303
Concrete Pour-in-place	Observations of deflection recorded.	N/A*	CCMC Masterformat 03131
Shear Strength of Polypropylene Web	18 MPa (2610 psi)	N/A*	ASTM E2634, Figure 2
Average Tensile Strength of Polypropylene Webs	3.11kN (700lbs)	N/A*	ASTM D638

Toxicity

Test Description	Result	Pass/Fail Criteria	Referenced Standard Test Method
Formaldehyde Emission	No formaldehyde detected	N/A*	AATTC-112
Fungi Resistance	No fungal growth detected	N/A*	ASTM G21
UPITT Toxicity	Pass	LC50 < 19.7g	University of Pittsburgh Toxicity Test

Fire

Test Description	Result	Pass/Fail Criteria	Referenced Standard Test Method
Fire Endurance Test	See Fire Resistance Rating table	N/A*	ASTM E119/CAN ULC S101/ANSI UL 263
Standard Room Fire Test	w/in acceptable limits	Met conditions required for exposure to fire for 15 minutes.	UBC 26-3/CAN ULC 1715
Flammability of Polypropylene Webs	CC1 Classification	N/A*	ASTM D635
Smoke Density Rating of Polypropylene Webs	19.1%	Max. 75%	ASTM D2843
Self Ignition Temperature of Polypropylene Webs	680°F	> 650°F	ASTM D1929

Table 2 Cont'd
Fasteners

Test Description	Result	Pass/Fail Criteria	Referenced Standard Test Method
#6 Fine Thread Drywall Screw - Average Ultimate Lateral Load	347 N (78 lbs)	N/A*	ASTM D1761
#6 Coarse Thread Drywall Screw - Average Ultimate Lateral Load	595 N (134 lbs)	N/A*	ASTM D1761
#8x2"Wood Screw - Average Ultimate Lateral Load	748 N (168 lbs)	N/A*	ASTM D1761
#10x2"Wood Screw - Average Ultimate Lateral Load	960 N (213 lbs)	N/A*	ASTM D1761
#8x2"Deck Screw - Average Ultimate Lateral Load	914 N (205 lbs)	N/A*	ASTM D1761
Average Withdrawal Resistance of Staples 1.59mm 16ga.	105N (24 lbs)	N/A*	ASTM D1761 (under cyclic temperatures)
Average Withdrawal Resistance of Plane Shank 1.5" long, 3/8" head	155N (35 lbs)	N/A*	ASTM D1761 (under cyclic temperatures)
Average Withdrawal Resistance of Ring Shank 1.5" long, 3/8" head	431N (97 lbs)	N/A*	ASTM D1761 (under cyclic temperatures)
Average Withdrawal Resistance of Spiral Shank 1.5" long, 3/8" head	135N (30 lbs)	N/A*	ASTM D1761 (under cyclic temperatures)
Average Lateral Resistance of Staples 1.59mm 16ga.	169N (38 lbs)	N/A*	ASTM D1761 (under cyclic temperatures)
Average Lateral Resistance of Plane Shank 1.5" long, 3/8" head	520N (117 lbs)	N/A*	ASTM D1761 (under cyclic temperatures)
Average Lateral Resistance of Ring Shank 1.5" long, 3/8" head	378N (85 lbs)	N/A*	ASTM D1761 (under cyclic temperatures)
Average Lateral Resistance of Spiral Shank 1.5" long, 3/8" head	200N (45 lbs)	N/A*	ASTM D1761 (under cyclic temperatures)
Average Withdrawal Resistance of Corrosion Resistance No.8-18 x 0.323 HD x 1.5/8"	567N (127 lbs)	N/A*	ASTM D1761
Average Withdrawal Resistance of Corrosion Resistance 6d (0.113" shank x 0.267 HD x 2" long)	93N (21 lbs)	N/A*	ASTM D1761

*Code body or referenced test standard required reporting test results only - no Pass/Fail criteria specified.

FIRE RESISTANCE RATING (ASTM E119 / ANSI UL 263)

Form Size (Concrete Wall Thickness)	Rating with ½" drywall
100mm (4")	2hrs
152mm (6")	3hrs (4hrs if 5/8" drywall used)
203mm (8") and above	4hrs

*Bearing load applied to wall = 360,000lbs (360kips)